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Revision of EU Green Public Procurement (GPP) criteria for Imaging Equipment

TECHNICAL REPORT 2.0
Draft criteria

Kaps Renata, Vidal-Abarca-Garrido Candela, Gama-Caldas Miguel
(JRC Dir. B – Growth and Innovation)
Maya-Drysdale Larisa, Viegand Jan (Viegand Maagøe), Wood Jonathan (Tenvic)

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1 INTRODUCTION

This document is intended to provide the background information for the revision of the Green Public Procurement (GPP) criteria for Imaging Equipment[1]. The study has been carried out by the Joint Research Centre's Directorate B (JRC Dir. B – Growth and Innovation) with technical support from a consulting consortium. The work is being developed for the European Commission's Directorate General for the Environment.
EU GPP criteria aim at facilitating public authorities the purchase of products, services and works with reduced environmental impacts. The use of the criteria is voluntary. The criteria are formulated in such a way that they can be, if deemed appropriate by the individual authority, integrated into its tender documents.
There are four main types of GPP Criteria:

1. **Selection criteria (SC)** assess the suitability of an economic operator to carry out a contract and may relate to:
    - (a) suitability to pursue the professional activity;
    - (b) economic and financial standing;
    - (c) technical and professional ability.
2. **Technical specifications (TS)**, the required characteristics of a product or a service including requirements relevant to the product at any stage of the life cycle of the supply or service and conformity assessment procedures;
3. **Award criteria (AC)**, qualitative criteria with a weighted scoring which are chosen to determine the most economically advantageous tender. The criteria are linked to the subject-matter of the public contract in question and may comprise, for instance:
    - environmental performance characteristics, including technical merit, functional and other innovative characteristics;
    - organisation, qualification and experience of staff assigned to performing the contract, where the quality of the staff assigned can have a significant impact on the level of performance of the contract; or
    - after-sales service and technical assistance, delivery conditions such as delivery date, delivery process and delivery period or period of completion.

    Award criteria must be considered to be linked to the subject-matter of the public contract where they relate to the works, supplies or services to be provided under that contract in any respect and at any stage of their life cycle, including factors involved in:
    - (a) the specific process of production, provision or trading of those works, supplies or services; or
    - (b) a specific process for another stage of their life cycle,

    even where such factors do not form part of their material substance.
4. **Contract performance clauses (CPC)**, special conditions laid down that relate to the performance of a contract and how it must be carried out and monitored, provided that they are linked to the subject-matter of the contract.

For each set of criteria there is a choice between two ambition levels:

- **Core criteria** are designed to allow for easy application of GPP, focussing on the key area(s) of environmental performance of a product and aimed at keeping administrative costs for companies to a minimum.

[1] http://ec.europa.eu/environment/gpp/pdf/criteria/imaging/EN.pdf

- **Comprehensive criteria** take into account more aspects or higher levels of environmental performance, for use by authorities that want to go further in supporting environmental and innovation goals.

1.1 The criteria revision process and evidence base

The main purpose of this technical report is to evaluate the current criteria and discuss if they are still appropriate or should be revised, restructured or removed. It also identifies, based on the background technical analysis presented in the preliminary report[2], new criteria areas for consideration in order to better address key environmental impacts of the product group.
This document is complemented and supported by the abovementioned preliminary report addressing:

- Review of existing scope and product categorisation based on recent legislation, standards and voluntary agreements (Task 1)
- Review of technical state of play, procurement practices, market analysis and life cycle costs (Task 2),
- Review of key environmental aspects including identified life cycle hotspots, of Best Available Technologies (BAT) on the market and identification of improvement options to reduce life cycle environmental impacts (Task 3),

The conclusions of each of the tasks are presented in detail in the preliminary report[2]. In this introductory chapter, extraction of the main aspects and conclusions from these tasks is presented.

An initial survey was sent out to a wide range of stakeholders at the beginning of the revision process concerning scope, definitions and the currently valid criteria. The target groups were government, industry, NGOs, academy and public procurers. The input provided has been incorporated in the preliminary report, and together with the proposed criteria presented in this technical report, form the basis for consultation with the stakeholders. After the consultation process is finalised, this report will be revised and a final set of criteria will be established.

A first version of this technical report with the first criteria proposal was published in September 2018 and constituted the basis for the Ad-Hoc Working Group (AHWG) meeting, which took place in October 2018. This document has been reviewed based on the discussions carried out at the AHWG meeting and on stakeholders comments (see Annex 1 for detailed comments and answers) provided in written form after the meeting and a second proposal was formulated for a written consultation.

The main changes introduced in the second criteria proposal are briefly pointed out below:

- Definitions for consumables have been revised in order to reflect different types, i.e. new-builds, remanufactured or refilled cartridges and containers and complementary definitions have been modified accordingly. Minor changes have been introduced in other definitions referring to the scope.
- With regard to criteria
    - Several award requirements have been removed, mainly due to the difficulty in the verification ("extended page yield", "postconsumer recycled plastic minimum content" and “reduced number of materials”)
    - The rest of the requirements have been revised according to the comments received and further desk research.

For more detailed information on the changes introduced and rationale behind is included in the background to each specific criterion.

[2] Available at: http://susproc.jrc.ec.europa.eu/imaging-equipment/stakeholders.html

1.2 Structure of this technical report

Based on the findings from the preliminary report, this report is divided into following sections:

- Product group scope and definitions
- Public procurement roots
- Market volumes
- Life cycle costs
- The key environmental impacts and the identification of improvement potential which led to the focus areas and draft proposed criteria
- The criteria proposal

The focus is given to the areas where the procurers can apply the criteria and engage the tenderers to reduce their life cycle environmental impacts, concentrating in particular on those presenting mayor improvement opportunities and which can be verified by the procurers.
For each focus area, one or more criteria are proposed, supported by a background for the proposed criteria and its assessment and verification. The rationale covers to certain extent following aspects:

- Existing criteria and/or metrics
- Life cycle environmental hotspots and potential improvements
- Life cycle costs implications and trade-offs with potential environmental improvements
- Market implications and functionality
- Applicability to public procurement

1.3 Product group scope and definitions

For the assessment of the existing scope and definitions analysis of the product categorisation in statistical sources and well as in relevant legislation and standards was performed. In addition, a detailed study of the scope, product categorisations and definitions used in various environmental initiatives like the Energy Star[3], EU Voluntary Agreement[4], the EPEAT[5] scheme and national labels, i.e. Blue Angel[6], Nordic Swan[7] and Korea Ecolabel, was made.
Main background information which aids the revision of the current scope and definitions of the EU GPP for imaging equipment product group is presented in the previously-mentioned preliminary report[2]. In this section main findings which support the revised proposal are briefly explained along with the stakeholders' feedback.
This feedback has been gathered through a preliminary online survey and regarded mainly the practicability of the current product group definition and scope. Out of the 16 responses provided, half of the stakeholders consider that the scope of GPP should be changed, 4 of them think it should remain as it is and 4 have no opinion.
The most important findings are summarised below:

- Most stakeholders think the cartridges and consumables should be included within the scope of this product group, whilst others were of the opposite opinion (one thinks they should have their separate GPP criteria).
- Most respondents indicated that the speed restriction is unnecessary and a couple ask for alignment with other available environmental schemes.
- Several stakeholders consider that products designed for A2 media and larger as well as products marketed as plotters should be included.

Concerning the inclusion of cartridges and consumables, the stakeholders are mainly supporting their inclusion as these products are responsible for a large part of the product's environmental impacts and therefore giving to clients the opportunity to choose more environmentally friendly consumables is supported.

1.3.1 Revised proposal for scope and definitions for imaging equipment product group

The current EU GPP criteria focus on imaging equipment products. However, as the products become more efficient, the importance of consumables is more evident (responsible for 20-30% contribution to Global Warming Potential and Primary Energy Demand in the LCA studies reviewed[8)]. Furthermore, other widely used environmental schemes such as the Blue Angel[6], EPEAT[5] and the Nordic Swan[7] already consider consumables in their criteria concurring on their importance, which is also pointed out by the stakeholders answering the survey.

For the first proposal, it was therefore proposed to extend the scope of the EU GPP criteria to include consumables and harmonise with the above-mentioned schemes.
In addition, it was proposed to extend the scope to include also printing services, as the analysis of public tenders shown in the preliminary report suggests that a trend to increase the use of printing service agreements where the price is linked to the quantity of printed pages is

[3] Energy Star Version 3.0 can be downloaded from: https://www.energystar.gov/products/spec/imaging_equipment_specification_version_3_0_pd
4 For more information on EU Voluntary Agreement see: http://www.eurovaprint.eu/pages/voluntary-agreement/
[5] For more information on EPEAT scheme see: https://www.epa.gov/greenerproducts/electronic-product-environmental-assessment-tool-epeat
[6] Blue Angel has currently two sets of environmental criteria for imaging equipment: RAL-171 criteria can be downloaded from: https://www.ecomark.jp/pdf/171-1207-e.pdf and RAL-205 criteria can be downloaded from: https://produktinfo.blauer-engel.de/uploads/criteriafile/en/DE-UZ%20205-201701-en%20Criteria.pdf
7 Nordic Ecolabelling Version 6.5 can be downloaded from: http://www.svanen.se/en/Criteria/Nordic-Ecolabel-criteria/Criteria/?productGroupID=9
[8] For more details see Preliminary Report section 4.1, available at: http://susproc.jrc.ec.europa.eu/imaging-equipment/docs/PR_GPP_EUIE_1st_AHWG_September_2018.pdf

expected. These can include a leasing agreement for printing and scanning or selling the products including a service agreement covering maintenance and even optimised document output through a managed printing service (MPS). It is expected that these services develop further into established services offered to non-domestic users, and this needs to be taken into account in the revision of the current EU GPP criteria.

1.3.1.1 Imaging equipment products

For the purpose of the revised EU GPP criteria, in the first proposal, the definition of imaging equipment products was proposed to remain the same as in the existing criteria.
Also the scope of imaging equipment products remains almost the same as in the existing criteria in force, except that large format printing equipment is now included in scope as long as they fit the definitions in scope.
In the existing EU GPP, 'Large format printing equipment' is excluded from the scope. Being 'Large format printing equipment' defined as: large products which are not typically used in offices if they meet one of the following technical specifications:
- standard black and white format products with maximum speed over 66 A4 images per minute;
- standard colour format products with maximum speed over 51 A4 images per minute
- products designed for A2 media and larger; or
- products marketed as plotters.

In the revised scope these products are covered by the definition of 'Printer', in order to simplify the product categorisation and reflecting the categorisation of ENERGY STAR.
In addition, scanners were proposed to be in the scope for harmonizing with other important voluntary schemes (ENERGY STAR and Nordic Swan) and due to their market significance, which is at the same level as that of copiers.

During the Ad-hoc Working Group Meeting (AHWG) consultation, one stakeholder pointed out that large format printers should not be in scope as they are not designed for office. However, no evidence was provided that this is indeed the case. Moreover, the stakeholder mentioned that these products were mainly used for architectural, engineering and construction applications, which are also relevant for some public organisations. The study team thus believes this product group should remain in scope. Moreover, ENERGY STAR v3.0[9] includes them in scope and will therefore have to comply with energy efficiency requirements. In this regard a stakeholder asked about the basis to remove speed exemption. Since this exemption is only specified for the large format printers currently excluded, the argument for removing the speed exemption is the same as for including these products in scope.

Against this background, no relevant changes have been included after the AHWG meeting.
The exclusion of facsimiles machines, which was not mentioned in the first proposal by mistake, is now explicitly indicated in the text.

[9] https://www.energystar.gov/sites/default/files/FINAL%20Version%203.0%20ENERGY%20STAR%20Imaging%20Equipment%20Program%20Requirements.pdf

Imaging Equipment scope
Products that are marketed for office or domestic use, or both, and whose function is one or both of the following: a) to produce a printed image in the form of paper document or photo through a marking process either from a digital image, provided by a network/card interface or from a hardcopy through a scanning/copying process; b) to produce a digital image from a hard copy through a scanning/copying process. Excluded from the scope are: a) Digital Duplicators, b) Mailing machines, c) Facsimile (fax) machines.

Imaging equipment	Definition
Printer	A product whose primary function is to generate paper output from electronic input. A printer is capable of receiving information from single-user or networked computers, or other input devices (e.g., digital cameras). This definition is intended to cover products that are marketed as printers, and printers that can be field-upgraded to meet the definition of an MFD.
Copier	A product whose sole function is to produce paper duplicates from paper originals. This definition is intended to cover products that are marketed as copiers, and upgradeable digital copiers (UDCs).
Multifunctional device (MFD)	A product that performs two or more of the core functions of a Printer, Scanner, Copier, or Fax Machine. An MFD may have a physically integrated form factor, or it may consist of a combination of functionally integrated components. MFD copy functionality is considered to be distinct from single-sheet convenience copying functionality sometimes offered by fax machines. This definition includes products marketed as MFDs, and "multi-function products" (MFPs).
Scanner	A product whose primary function is to convert paper originals into electronic images that can be stored, edited, converted, or transmitted, primarily in a personal computing environment. This definition is intended to cover products that are marketed as scanners.
Professional Imaging Product	A printer or MFD marketed as intended for producing deliverables for sale, with the following features: a) Supports paper with basis weight greater than or equal to 141 g/m^2; b) A3-capable; c) If product is monochrome, monochrome product speed equal to or greater than 86 ipm; d) If product is colour, colour product speed equal to or greater than 50 ipm; e) Print resolution of 600 x 600 dots per inch or greater for each colour f) Weight of the base model greater than 180 kg; and Five of the following additional features for colour products or four for monochrome products, included standard with the Imaging Equipment product or as an accessory: g) Paper capacity equal to or greater than 8,000 sheets; h) Digital front-end (DFE); i) Hole punch; j) Perfect binding or ring binding (or similar, such as tape or wire binding, but not staple saddle stitching); k) Dynamic random access memory (DRAM) equal to or greater than 1,024 MB. l) Third-party color certification (e.g., IDEAlliance Digital Press Certification, FOGRA Validation Printing System Certification, or Japan Color Digital Printing Certification, if product is color capable); and m) Coated paper compatibility.

1.3.1.2 Imaging equipment consumable

For the first proposal, the scope and definitions for consumables were developed based on the analysis of the definitions found in other schemes like the EPEAT, Blue Angel, Nordic Ecolabelling, Eco Mark and the Korea eco-label (see preliminary report, chapter 2.3) with the aim or harmonisation with those schemes.

During the AHWG meeting, a stakeholder suggested to include paper and other components integrated in printing modules that aid on the printing by the cartridges. Regarding paper, this is already covered by another set of EU GPP criteria[10]. Regarding other components, these are already included in the definition of cartridges. A stakeholder also asked to include clones, i.e. new cartridges/containers manufactured by a third party (not Original Equipment Manufacturers (OEM)), but illegally branded under an OEM brand name, in the scope by a specific definition.

Against this background, the definition text has been revised. The most common types of cartridges and containers consumables have been included in the complementary definitions below.

Imaging Equipment consumables scope
A replaceable product that is essential to the functioning of the imaging equipment product. It can be replaced or replenished by either the end user or service provider during the normal usage and life span of the imaging equipment product. Imaging equipment consumables covered under the scope of this EU GPP include: a) Containers, b) Cartridges, c) Drum units, d) Fusers units, e) Transfer kits.

Imaging equipment consumable	**Definition**
Container	An end-user replaceable product that holds toner or ink and that fits onto or into or is emptied into an imaging equipment product. Containers do not contain integrated components or moving parts integral to the imaging product's function. Containers can be: • New built (Original Equipment Manufacturers (OEM) and non-OEM manufactured, including counterfeits) • Remanufactured (by OEM and non-OEM) • Refilled (by OEM and non-OEM) Containers may also be called bottles or tanks.
Cartridge (Ink/toner)	An end-user replaceable product, which fits into or onto an imaging equipment product, with printing-related functionality that includes integrated components or moving parts integral to the imaging equipment's function beyond holding the ink or toner material. Cartridges can be: • New built (OEM and non-OEM manufactured, including counterfeits) • Remanufactured (by OEM and non-OEM) • Refilled (by OEM and non-OEM) Cartridges may also be called modules.

[10] The EU GPP criteria for paper are available for download from: http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

Drum units	An end-user replaceable product, which fits into an imaging equipment product and which includes a photosensitive drum.
Fusers units	An end-user replaceable product, which fits into an imaging equipment product and which consists of a pair of heated rollers that fuse toner onto output media.
Transfer unit	An end-user replaceable product, which fits into an imaging equipment product, and which supports the transfer of toner onto output media ahead of a fusing process.
Complementary definitions	
New built	A new cartridge/container
Remanufactured	A cartridge/container that, after having been used at least once and collected at its end-of-life, is restored to its original as new condition and performance, or better, by for example replacing wear parts and filled in with new toner or ink (incl. solid ink). The resulted product is sold like-new with warranty to match.
Refilled	A cartridge/container that has been used and filled with new toner or ink (incl. solid ink)
Counterfeits	Counterfeits are new cartridges/containers manufactured by a third party (not an OEM), but illegally branded under an OEM brand name, these are also known as "clones". [11]

1.3.1.3 Print services

The proposed scope and definitions for print services is based on general practices. Many schemes and business models exist for the provision of these services (see chapter 1.4 for more details), so the proposed definition is generic in order to cover all these possibilities.

Print services
Service agreements where the price is linked to the quantity of printed pages. These agreements can include the supply of IE products and /or consumables, maintenance, end of life activities and optimisation of organisation's document output.

[11] According to IDC, these represented 1% of Western Europe's consumable shipments in 2016 Source: Revision of Voluntary Agreement on Imaging Equipment. Task 2 report. March 2019.

1.4 Public procurement routes

Directive 2014/24/EU[12] defines three kinds of contracts:

1) '**public supply contracts**' means public contracts having as their object the purchase, lease, rental or hire-purchase, with or without an option to buy, of products. A public supply contract may include, as an incidental matter, siting and installation operations;

2) '**public service contracts**' means public contracts having as their object the provision of services other than those referred to in point on '**public supply contracts**';

"3) '**public works contracts**' means public contracts having as their object one of the following:

(a) the execution, or both the design and execution, of works related to one of the activities within the meaning of Annex II;

(b) the execution, or both the design and execution, of a work;

(c) the realisation, by whatever means, of a work corresponding to the requirements specified by the contracting authority exercising a decisive influence on the type or design of the work;

In addition, contracts can also be classified according to its duration and form:

- one-off (e.g. buy one printer; provide a service to clean the windows for a specific date)
- long-term (e.g. supply of a certain number of cartridges every month for one year; offices cleaning service provision every day for one year)
- call-downs from framework contracts that specify the conditions of sale of something during a given time duration but not the amount (e.g. supply as many printers as requested by fix price and specific conditions during one year).

The large variance in imaging equipment products, consumables and services in the scope of this revision project means that procurement practices will also vary significantly.

Lack of data causes that it is not possible to indicate the exact purchasing patterns, which are used by businesses. Many large businesses, including large public organisations, may purchase imaging equipment products or printing services directly from imaging equipment manufacturers. There are also many imaging equipment resellers who are also focussed on the larger business market.

However, government purchasing patterns can be identified due to the requirement for public disclosure of information. The European Commission Tenders Electronic Daily (TED) website includes records of how government bodies throughout the EU purchase imaging equipment[13]. TED is the supplement to the Official Journal of the EU where all public procurement contracts over set financial thresholds for central government authorities and sub-central contracting authorities are mandatorily published. The thresholds differ according to the type of contracts but it should at least be of value above 135 000 EUR. It is important to note that government purchasing of imaging equipment under the set thresholds may not be recorded in the TED database as there is no requirement to publish the contract through TED. This means that contracts from smaller government bodies are more likely to be missed from this analysis.

Questioning the TED database shows that in 2016 public institutions in the EU published 384 contract award notices for **supply contracts**, **service contracts** and exceptional cases of **work**

[12] Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC.
[13] http://ted.europa.eu/TED/misc/aboutTed.do

contracts which included products meeting the CPV code 30232100 (Printers and plotters)[14] (see Table 1).

About 85% of the procurement of contracts of imaging equipment in the EU are supply contracts, indicating that most of the public institutions that procured imaging equipment in 2016 over a 135 000 EUR threshold purchased products. This highlights the importance of maintaining EU GPP criteria for imaging equipment products. Although it is predicted that more public institutions will purchase services in the future, this is in fact not yet known with accuracy and criteria for products are therefore needed.

Table 1 also shows that a significantly larger amount of these contracts are procured by diverse government depending organisations with specific purposes (i.e. bodies governed by public law), regional and local authorities and ministries and other national/federal authorities which are not agencies. These public institutions contract imaging equipment products in their large majority.

Table 1.: EU public institution supply, service and work contracts covering CPV 30232100 in 2016 by public institution type

Type	Supply contracts	Service contracts	Work contracts	Total by public institution type
Ministry or any other national or federal authority	79	9		**88**
National or federal Agency/ Office	7	2		**9**
Regional or local authority	92	19	2	**113**
Regional or local Agency/ Office	3	1		**4**
Utilities	16	5		**21**
Body governed by public law	129	20		**149**
Total by type of contract	**326**	**56**	**2**	**384**

Table 2 shows that most procurement contracts in the EU happened as open procedure[15] in 2016. This keeps a more fair competition and may reflect the wide availability of imaging equipment products, consumables and services providers in the EU.

[14] According to the Common Procurement Vocabulary (CPV). SIMAP (système d'information pour les marchés publics), Codes and nomenclatures – CPV, available from https://simap.ted.europa.eu/cpv

[15] In an open procedure any business may submit a tender. The minimum time limit for submission of tenders is 35 days from the publication date of the contract notice. If a prior information notice was published, this time limit can be reduced to 15 days.

Table 2.: EU public institution supply, service and work contracts covering CPV 30232100 in 2016 by procurement procedure

Type	Supply contracts	Service contracts	Work contracts	Total by procurement procedure
Contract award without prior publication	2			**2**
Competitive dialogue	1	1		**2**
Competitive procedure with negotiation		3		**3**
Negotiated procedure without a call for competition	3	5		**8**
Open procedure	303	45	2	**350**
Restricted procedure	3			**3**
Negotiated procedure	14	2		**16**
Total by type of contract	**326**	**56**	**2**	**384**

Many purchasing decisions concerning imaging equipment are made at departmental or individual, rather than at the organisational level. This can result in a surplus of imaging equipment products, especially lower specification desktop based devices (e.g. small inkjet printers, scanners and/or multifunctional devices), which also leaves larger centralised imaging equipment underutilised. This situation can result in increased costs for procuring authorities due to the need for increased support and inefficient use of resources. A lack of visibility and understanding over the Total Cost of Ownership (TCO) of printing drove the imaging equipment market to recognise the need for better management of imaging equipment and to provide imaging equipment management services.

1.5 Market volumes

1.5.1 Imaging equipment products

This section provides a brief summary of the market analysis included in the preliminary report (chapter 3)[2].

The imaging equipment market is characterised by a relatively small number of manufacturers. A total of 14 manufacturers account for over 95% of all imaging equipment sold in the European Union (EU).[16] These manufacturers are:

- Brother International Europe
- Canon
- Epson
- HP
- Konica Minolta Business Solutions Europe
- KYOCERA Document Solutions Europe B.V.
- Lexmark International
- OKI (UK) Ltd.
- Panasonic Europe Ltd.
- Ricoh Europe PLC
- Samsung Electronics Europe
- Sharp Electronics Europe Ltd (SEE)
- Toshiba TEC Germany Imaging Systems
- Xerox

Approximately 70% of the total annual EU sales are estimated to be non-domestic products, which covers both public procurement and private business to business purchases.
Because of the lack of procurement-specific data, the volumes and future trends are established based on assumptions made on the share of products sold for B2B purposes.
The annual sales for all imaging equipment products (i.e. B2B and B2C) have been estimated based on several data sources (see Table 3), which have been, in a great extent, reviewed and complemented after the AHWG meeting considering input from stakeholders (see detailed input in Annex 1). This review used also the latest input provided to the revision of the Voluntary Agreement for Imaging Equipment[17] on market trends, lifetime and sales. The following data sources have been used:

[16] For more information see: *http://www.eurovaprint.eu/pages/our-members/*
[17] Revision of Voluntary Agreement on Imaging Equipment. Task 2 report. March 2019. Available at: https://www.review-imagingequipment.eu/documents

Table 3.: Data sources for sales of products in scope

Product type	Product sub-type	Data sources	
		Historical sales	Current and future sales
Printers	Inkjet printers	Imaging equipment Impact assessment 2013[18] and Survey of the Market Penetration of energy Efficient Office Equipment under the EU ENERGY STAR Programme[20]	2016-2021: Revision of the Voluntary Agreement for Imaging Equipment, Task 2[17]; 2021-2040: Linear regression
	Laser printers		
Multifunctional devices (MFDs)	Inkjet MFDs	Imaging equipment Impact assessment 2013[18] and Survey of the Market Penetration of energy Efficient Office Equipment under the EU ENERGY STAR Programme[20]	
	Laser MFDs	Linear regression between 1995-2015, assuming zero sales in 1995[19] and Survey of the Market Penetration of energy Efficient Office Equipment under the EU ENERGY STAR Programme[20]	
Copiers		Impact assessment 2013[18] and Survey of the Market Penetration of energy Efficient Office Equipment under the EU ENERGY STAR Programme[20]	2016-2020: Linear regression until 2020, assuming zero sales in 2020
Scanners		Online research[21,22] and linear regression between 2009-2020	2016-2020: Linear regression; 2020-2040: Stable sales no growth

The estimated annual sales of imaging equipment in scope of the GPP are presented in Table 4. Only the period of 2015 to 2040 is shown as previous sales are not considered relevant. Historic sales have been estimated purely to compare trends and being able to apply linear regressions in the case of data gaps.

The assumed decrease in sales can be a consequence of the trend in businesses and offices aiming to become "paper free", where more work is handled digitally e.g. signing of contracts digitally and reports which are handed in online. This also impacted the domestic sector too, where the sales are also falling in the recent years. In many countries, the public sector and semi-public like the energy and water utilities are also going more digital e.g. by using secure e-mail etc. for sending letters and documents to citizens and organisations. However, many people still prefer to print their assignments and reports for different purposes, so a lot of printing is

[18] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex:52013SC0014
[19] Brother introduced the world's first multi-function machine - https://www.brother.co.uk/about-brother/history
[20] ENER/C3/2014-561 Support for Energy Star Impact Assessment and Market Penetration Survey. Interim Report 3: Q3-Q4 2015: Survey of the Market Penetration of Energy Efficient Office Equipment under the EU ENERGY STAR Programme (not publicly available).
[21] http://www.infotrends.com/public/Content/INFOSTATS/Articles/2007/07.31.2007.html
[22] http://newbusinesstechnology.co.uk/2011/05/document-scanner-market-analysis/

still occurring tough with declining tendency. It can be assumed that the sales of paper follow trend set by the sales of imaging equipment.

In general, accurate predictions and estimations of the future sales of products are difficult to make as many factors might have an impact. However, the sales are assumed to decrease for all types of imaging equipment with varying rates. The highest decrease is expected to be connected with single functionality copiers which are considered to almost disappear from the market in 2020. Scanners sales are expected to grow mainly due to increased demand in small and medium offices where public organisations prefer to buy scanners rather than big MFDs. This is estimated based on the analysis on the number of scanners and copiers in the EU ENERGY STAR database. Inkjet printers have had the largest decrease in sales since 2005. In general, the sales of printers have decreased more than the sales of MFDs, and today, based on sales data, MFDs are clearly the preferred type of imaging equipment. The total annual sales amount to ca. 24.8 million units back in 2015 and 23.5 million units in 2020.

Table 4: Estimated annual sales of imaging equipment in million units, including average annual growth rate

Product type	Product sub-type	2015	2020	2025	2030	2035	2040	2015-2040 average annual growth rate
Printers	Inkjet	0.96	0.91	0.86	0.82	0.78	0.74	-1.0%
	Laser	3.8	3.6	3.5	3.3	3.1	3.0	-1.0%
Multi-functional devices (MFDs)	Inkjet	14.8	14.1	13.4	12.8	12.1	11.5	-1.0%
	Laser	4.2	4.0	3.8	3.6	3.4	3.2	-1.0%
Copiers		0.57	0	0	0	0	0	0%
Scanners		0.46	0.88	0.88	0.88	0.88	0.88	2.63%[23]
TOTAL IN SCOPE		**24.8**	**23.5**	**22.4**	**21.3**	**20.3**	**19.4**	**-0.98%**

In order to establish the market volumes of imaging equipment products that are relevant to the GPP criteria, the share of annual sales for the non-domestic market was estimated. Sales of imaging equipment products in the UK show increased B2B share for printers, MFDs, scanners and copiers (data not publicly available). Assuming a similar trend in the rest of the EU, it is expected that there will be an overall increase in the proportion of sales to non-domestic users, as domestic consumer needs for imaging equipment reduces. Printing devices, apart from MFD laser, are estimated to have an increase in non-domestic sales. Shares of copiers and scanners B2B market share are expected to remain stable due to the ongoing and future need of this equipment to digitalize older documents. Furthermore, in many public institutions the need to document in hard copy is still a common practice.

The EU GPP background report of previous revision (2014)[24] gave the ratio of images produced at work and at home as approximately 20 to 3. This ratio is used as the basis for estimating the non-domestic (i.e. B2B) and domestic (i.e. B2C) market shares for scanners and copiers. The market shares of printers and MFDs are based on the partial sales data from one Member State combined with the total EU-28 market size, and refined based on expert assumptions projected up to 2030[25]. The established share of imaging equipment products sold to the non-domestic market is shown in Table 5.

[23] Although no growth from 2020 onwards, this is the estimated total growth averaged over the 25 year period
[24] Green Public Procurement for Imaging Equipment Technical Background Report, 2014
[25] Sales data were used to establish a market division between B2C and B2B. It was assumed the B2B will grow considerably for inkjet MFDs since the laser MFD market is already saturated.

Table 5: Estimated non-domestic B2B market share (as percentage of annual sales)

Product type	Product sub-type	2015	2020	2025	2030	2035	2040
Printers	Inkjet	38%	42%	46%	50%	54%	58%
	Laser	86%	87%	87%	88%	89%	89%
Multi-functional devices (MFDs)	Inkjet	53%	57%	61%	65%	69%	73%
	Laser	98%	98%	98%	98%	69%	73%
Copiers		97%	not relevant	not relevant	not relevant	not relevant	not relevant
Scanners		97%	87%	87%	87%	82%	79%

Based on these shares, the estimated annual sales for the non-domestic market, both historical and forecasted, are shown in Table 6.

Table 6: Estimated non-domestic B2B market annual sales (in million units)

Product type	Product sub-type	2015	2020	2025	2030	2035	2040
Printers	Inkjet	0.36	0.38	0.40	0.41	0.42	0.43
	Laser	3.3	3.2	3.0	2.9	2.8	2.7
Multi-functional devices (MFDs)	Inkjet	7.9	8.0	8.2	8.3	8.4	8.4
	Laser	2.2	2.3	2.3	2.3	2.4	2.4
Copiers		0.55	0.0	0.0	0.0	0.0	0.0
Scanners		0.45	0.77	0.77	0.77	0.72	0.70
TOTAL		**14.7**	**14.6**	**14.7**	**14.7**	**14.6**	**14.6**

The data show that, in the future, printers will be sold much less in B2B applications than multifunctional devices (MFDs), in particular inkjet printers. Annual sales data on inkjet printers will continue being modest while annual sales of inkjet MFDs are expected to grow in B2B applications and will remain having more than half of the B2B market in the EU. In 2015 inkjet printers had already been significantly reduced due to the rapid shift from inkjet printers to inkjet MFDs. The B2B market share of scanners will slightly decrease, mainly due to the overall low sales of these products combined with an increase of interest by B2C users. All in all, the MFDs will be dominant in the non-domestic market. Overall, it is expected that the non-domestic market for imaging equipment products will remain stable.

During the AHWG meeting, some stakeholders mentioned the sales predictions for imaging equipment were not realistic, where they showed market growth in the future. Both the imaging equipment and the consumables sales, from historic to present to future trends, have been revised and updated in above-presented tables based on different data sources. The revised sales show actually net sales reductions; although these are small as some product and consumable types will continue to grow.

1.5.2 Imaging equipment consumables

During the AHWG consultation, stakeholders expressed concerns on the lack of consumables market volumes, as these figures are important to understand the magnitude of the problem. After the meeting, this section has been revised. Data on consumable sales has been established for ink/toner consumables, which are expected to cover most of the printing consumables in the EU market. Sales estimations have been based on desktop research and a range of sources used during the revision of the Voluntary Agreement for Imaging Equipment[17]. The main data sources and assumptions are detailed below:

- The current annual sales of ink and toner consumables are 2008 – 2016 data for Western Europe from InfoTrends[26], which has been scaled up to the whole EU-28 via a factor derived from GDP.
- The historical data was linearly estimated based on the available data for 2008 – 2016.
- From 2017 onwards to 2021, based on International Data Corporation (IDC)'s info[27] .
- From 2021 onwards, no data is available, sales are assumed to have a steady 1% decrease.
- The data from InfoTrends only consider ink and toner consumables and does not further sub-divide into "cartridges" or "containers", the following assumptions are made:
    - For ink it is assumed that 20 % of the ink is sold as cartridges and the remaining 80 % are sold as containers, according to inputs from stakeholders[28].
    - For toner it is assumed that 80 % of the toner is sold as cartridges and the remaining 20 % are sold as containers, according to consultant's expert opinion.

Based on these data sources, estimations and assumptions, the sales of consumables are shown in Table 7 (only B2B sales). The market share for B2B consumables sales applied was the same used to estimate the B2B sales of imaging equipment (see Table 5). Both printers' and MFDs' B2B market shares were averaged for each printing technology type (i.e. average of ink printers and MFDs and average of laser printers and MFDs).

Table 7: Consumable non-domestic B2B sales (ink/toner cartridges and containers) (in million units), including average annual growth rate

Consumable type	2015	2020	2025	2030	2035	2040	2015-2040 average annual growth rate
Ink cartridges	37	35	35	35	36	36	-1.5%
Ink containers	147	138	139	142	144	146	
TOTAL INK CONSUMABLES	**184**	**173**	**173**	**177**	**180**	**182**	
Toner cartridges	82	73	70	69	67	66	
Toner containers	20	18	17	17	17	16	
TOTAL TONER CONSUMABLES	**102**	**92**	**87**	**86**	**84**	**82**	
TOTAL CONSUMABLES	**286**	**265**	**261**	**263**	**264**	**265**	

Table 7 shows that the majority (i.e. 80 %) of the inkjet consumables are containers, while the majority (i.e. i.e. 80%) of the laser consumables are cartridges. This shows that the containers market in the EU is much more mature for inkjet equipment than for laser equipment. This may be due to the higher complexity of laser consumables needed for laser equipment. This trend is expected to continue unless there are more incentives to manufacture simpler consumables for laser equipment. For inkjet, this is already achieved, although cartridges will continue to exist.

From 2017 onwards to 2021, toner and inkjet cartridges sales are falling by 2.7% - 4% annually, due to multipack and high yield inkjet cartridges, as well as high yield toner cartridges with the intention to reduce servicing costs in contracts. Overall, it is expected that the sales of ink and toner consumables will decrease at an average of 1.5% annually, due to decreasing stock levels of imaging equipment.

[26] U.S., Western European and World Wide Market and Trends for Laser and Inkjet Supplies, John Shane, sales data from 2008 - 2016

[27] IDC, EMEA Consumables Tracker, March 2017. Western Europe Consumables shipments, 2014-2021 by technology.

[28] EFIM (European Federation of ink and ink cartridges manufacturers) inputs, stakeholder consultation July- August 2018

1.5.3 Print services

Publicly available data on the amount of print services used in public procurement is not known. However, the analysis of public tenders done in the preliminary report suggests that most public contracts are for purchasing products and not for leasing and services. The overview of the procurement practices performed in the preliminary report, shows that mostly supply contracts (i.e. supply of imaging equipment products) are awarded by public authorities at EU level over a threshold of 135 000 EUR. This, however, does not tell whether the absolute number of imaging equipment products is higher for supply rather than service (i.e. printing services) contracts.

On the other hand, a trend is expected for an increased use of purchase service agreements where the price is linked to the quantity of printed pages. It is expected that these services develop further into established services offered to non-domestic users.

1.6 The life cycle costs of imaging equipment

The Life Cycle Costs (LCC) of imaging equipment products in the scope have been established in order to get an overview of the most important costs to consumers, which in this case are the public procurers. The LCCs are also used as the starting point to identify whether certain criteria would incur on significant costs to the procurers.

LCCs account for the products' total cost of ownership. The life cycle stages considered relevant during the development of the current GPP criteria for imaging equipment products are found applicable for the revision of the criteria. These are:

- Purchase cost
- Running costs for operation (i.e. costs for electricity, paper, and toner/ink cartridges)
- Running costs for repair and maintenance
- End of life costs

Installation costs are considered negligible.

Printers and MFDs come in different sizes with very different purchase and operating costs in the market. Three sizes based on printing speed were observed during the data collection, which can be seen in

Table 8. Furthermore, prices and costs also vary widely depending on whether the printing is colour or monochrome. Therefore, costs data is split throughout this chapter not only on size but on type of printing.

Scanners don't show these differences, and they are therefore grouped in one product category without further categorization.

All aspects of the LCC analysis except electricity consumption were established based on data collected from online retail prices, including costs of consumables, purchasing costs, and maintenance.

Table 8.: Printers and MFDs categories based on size (defined by printing speed)

Size	Printing speed (Pages per minute – ppm)
Small	1-20
Medium	21-40
Large	>40

The total Life Cycle Costs are shown in Figure 1 below, which considers all the information, assumptions and data presented in the Preliminary Report (see task 2, chapter 10). The error bars primarily originate from the large variation in the costs of paper.

Generally, the paper is the dominant cost for medium/large laser MFDs and printers, while for small laser MFDs and printers the toner is also significant. These total LCCs represent a wide variation of pages printed per lifetime based on the calculated average prints per month presented in section 10.2.2.1 of the Preliminary Report (i.e. 2500, 8000, and 25000 for small, medium and large products). This has a direct influence on the calculated total LCCs, as large products show higher paper costs.

Figure 1 can hence be used to estimate the total LCC for the products lifetime, but not used comparatively between devices if a set number of printed pages per month is assumed.

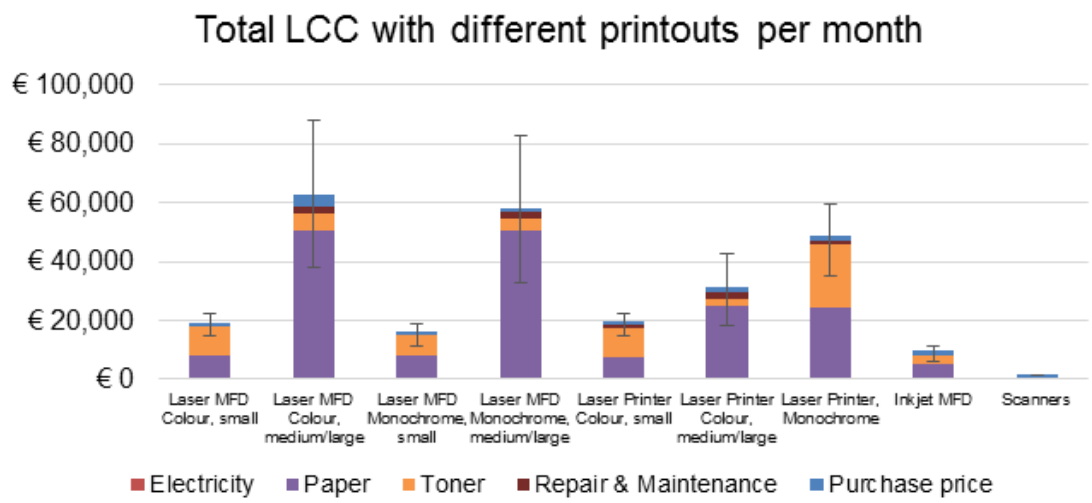

Figure 1: Total Life Cycle Costs for different printouts per month

Figure 2, Figure 3 and Figure 4 assume a fixed number of pages printed each month, and compare the total LCC of the different devices for their whole lifetime. This can hence be used to compare total LCC when buying new devices, if the required number of pages printed each month is known. Note that the Inkjet MFD devices have a lower number of total pages printed, due to its lifetime being smaller than the Laser printers.

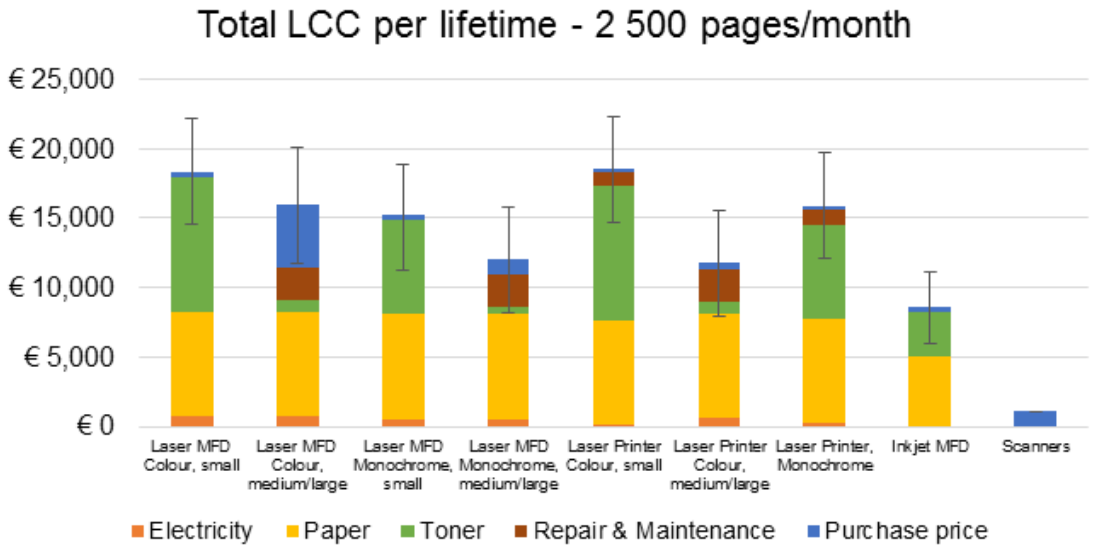

Figure 2.: Total Life Cycle Costs for product lifetime assuming 2500 printouts/month

The figures show that if the printing requirements of an office are at or close to 2500 pages per month, the type of MFD and printer chosen is not as important for the total LCC as it is for more printouts. When below 2500 pages, the smaller printers tend to be cheaper, as the dominant factor becomes the purchasing price, instead of consumables. Moreover, in these smaller printout ranges, other costs such as purchase price and repair/maintenance costs become important.

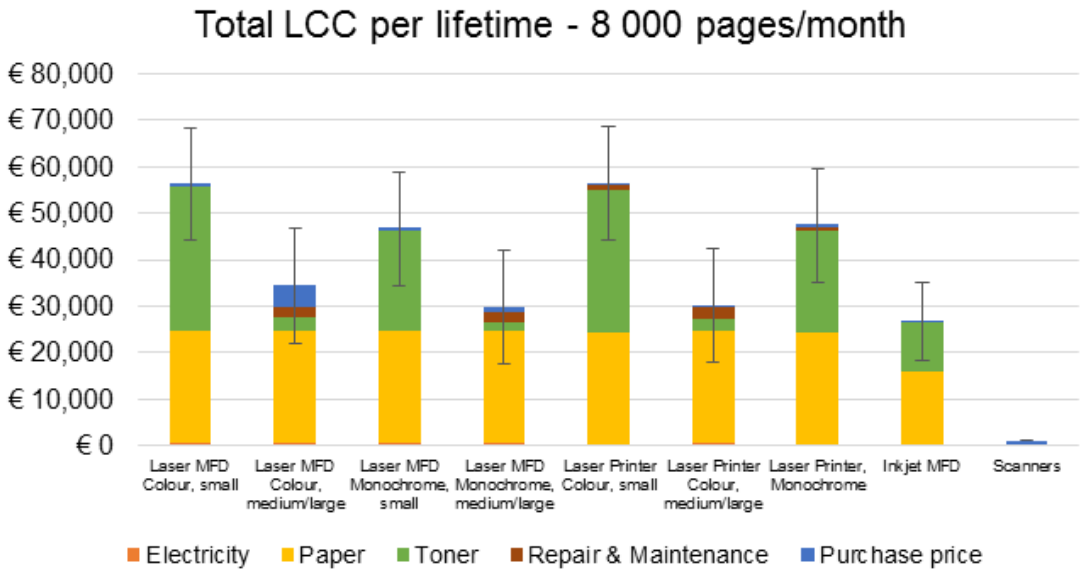

Figure 3.: Total Life Cycle Costs for product lifetime assuming 8000 printouts/month

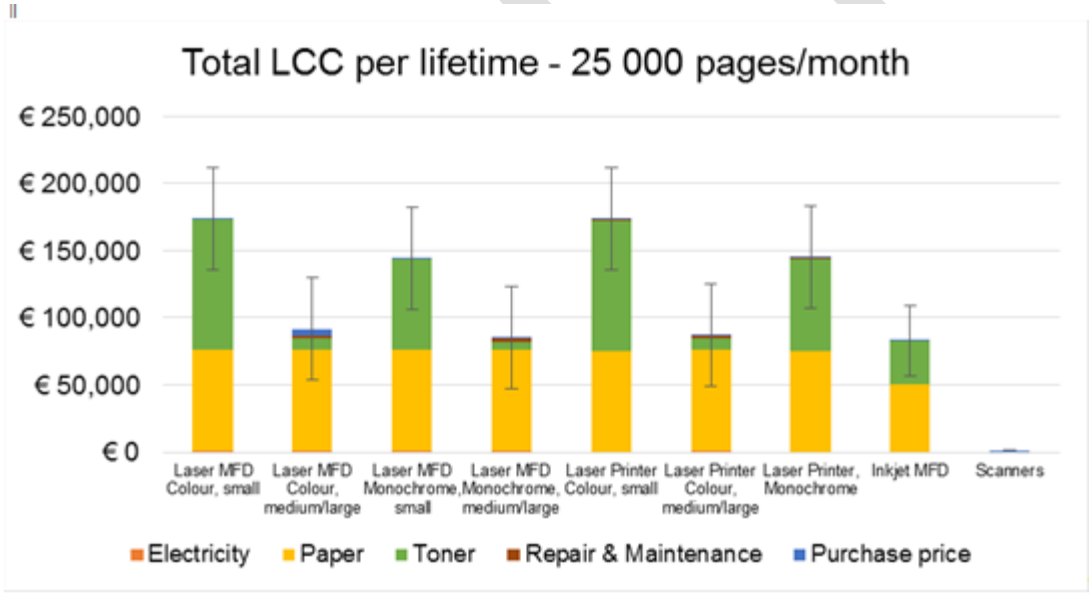

Figure 4.: Total Life Cycle Costs for product lifetime assuming 25000 printouts/month

When above 2500 pages, large devices tend to be dominantly cheaper. This is solely because of the differentiation between costs of toner/ink cartridges for small and for large devices.

1.7 The key environmental impacts and improvement potentials according to technical analysis

Review of key environmental aspects including identified life cycle hotspots, of Best Available Technologies (BAT) on the market and identification of improvement options to reduce life cycle environmental impacts. The conclusions are presented in detail in the preliminary report[2].

1.7.1 Imaging equipment products

The review of LCA studies has identified the following hotspots for imaging equipment products:

- Use of electricity for printers and MFDs, particularly for those with less efficient printing technologies.
- Use of electricity for scanners, which can be reduced if consumer utilises low power modes for longer periods.
- Use of consumables, particularly paper and cartridges (for printers and MFDs).
- Manufacturing of printers, MFDs and scanners, particularly for the more efficient printing technologies (i.e. laser technologies).

Key Performance Indicators (KPIs) used by other environmental schemes and initiatives are:

- Energy use
- Availability of low power modes and power management functions
- Use of cartridges
- Manufacturing impacts
- Recyclability
- Recycled content
- Product weight
- Product lifetime extension
- Content of hazardous substances

Furthermore, the BAT review indicates that the best products on the market concerning energy and material efficiency aspects are:

- Energy efficient both for active state and low power modes
- Designed for recycling
- Accepting of remanufactured cartridges
- Limiting the content of hazardous substances

1.7.2 Imaging equipment consumables

The review of LCA studies has identified the following hotspots for imaging equipment consumables:

- Manufacturing of cartridges, in particular of the housing and print head, which can be greatly reduced if cartridges can be refilled; the more refills the less contribution from manufacturing.
- The amount of paper the cartridge uses to deliver printouts with a desired quality; the higher the quality the more the reductions of environmental impacts by using less paper. However, this can be a subjective parameter to measure as different users can have different expectations of how their printouts should look like and the required quality will depend on the purpose of the printout (just a draft, final document etc.).

- The consumer transport for refilled cartridges; the more refills the higher the contribution of transport for the total environmental impacts. However, this is subject to great variability depending on the allocated fuel used per trip per refilling.

KPIs used by other environmental schemes and initiatives are:

- Paper use
- Manufacturing impacts
- Possibility to refill cartridges
- Indoor emissions

Furthermore, the BAT review indicates that the products on the market incentivizing the reduction of energy and materials for their consumables are:

- Promoting more common cartridges designs which promote the use of remanufactured cartridges
- Accepting refilled cartridges
- Reducing use of paper
- Limiting the indoor emissions from the use phase
- Limiting the content of hazardous substances

During and after the AHWG meeting, a couple of stakeholders pointed at the imbalance of the assessment concerning the reviewed LCAs. They questioned mainly the validity of reviewed LCAs where findings were different to LCA studies performed by one specific OEM, assessing specific imaging equipment models and consumables and showing use of OEM consumables was better. (See Annex 1 for detailed comments and answers (under "General" and "Supply of reused/remanufactured cartridges and containers" sections)).

A stakeholder said they do not agree on including 10 years' LCAs in the assessment. Another stakeholder said old LCAs shouldn't be discarded just because they are old, their comprehensiveness, data quality and independency is also important.

However, the study team emphasized during the meeting that the LCA review was done based on criteria presented in ISO 14040 series of standards on Life Cycle Assessment. 9 studies were assessed (5 of them were OEM). A scoring matrix was used to evaluate the completeness and relevance of the different studies.

According to this technical analysis included in the preliminary report, conclusions were drawn, indicating that, regardless whether the consumables are OEM or non-OEM, the use of remanufactured and refilled cartridges and/or containers reduces the life cycle environmental impacts of imaging equipment significantly and the use of single use consumables, in particular cartridges, is one of the main hotspots. Therefore, no changes were made to the main conclusions of this assessment.

1.7.3 Imaging equipment services (Print services)

At organization level, contracting of leasing agreements may promote use of products with higher durability, extend the real usage time and reduce the amount of waste by encouraging take-back systems and managed printing services. This is due to the fact that the imaging equipment fleet may be better managed when outsourced, in particular in large public institutions where time used on tracking product utilization and maintenance by internal staff may be more limited.

Take-back systems reduce the amount of waste and promote reuse and recycling of imaging equipment products and of cartridges. Managed printing services can encourage the use of remanufactured cartridges by encouraging manufacturers to offer brand agnostic services, can reduce the amount of paper used by optimizing document output, can integrate other office

service areas to optimize the use of energy and can improve employers education in terms of the products and consumables environmental impacts.

1.7.4 Identified improvement options

Considering information collected for imaging equipment, related services and its consumables identified improvement options (not placed in the order of importance) are shown in Table 9.

Table 9.: Identified improvement options based on environmental analysis

Imaging equipment category	Improvement options
Imaging equipment products	1. Limiting the use of energy, both in active state and in low power modes 2. Promote the use of recycled materials in imaging equipment products 3. Promote modular designs which facilitate repair and recycling 4. Restrict the indoor use emissions, in particular of hazardous substances such as VOCs 5. Ensure accepting of remanufactured cartridges 6. Limiting the content of hazardous substances 7. Measuring and reporting the impacts of manufacturing of imaging equipment products 8. Limiting the use of paper and promote the use of recycled paper and printing features in the printer such as automatic duplexing, N-up printing, certified use of recycled and low weighted paper, pull printing, and printing awareness tools 9. Encouraging the use of refilled cartridges, and of remanufactured cartridges rather than limiting to the use of OEM cartridges 10. Promoting more common cartridges designs which promote the use of remanufactured cartridges 11. Accepting refilled cartridges 12. Promote reusability and recyclability trough take back system 13. Provision of information for green performance
Imaging equipment consumables	1. Promote efficient consumables (materials and printing efficiency) 2. Limiting the indoor emissions from the use phase 3. Limiting the content of hazardous substances 4. Promote reusability and recyclability trough design and take back system 5. Provision of information for green performance
Imaging equipment services (Print services)	1. Promote imaging equipment fleet optimization 2. Promoting resource efficiency 3. Provision of information for green performance

2 DRAFT CRITERIA AREAS AND PROPOSALS

2.1 Criteria structure

This is a second proposal of the revised EU GPP criteria. The criteria have been divided into three main sections, depending on the subject matter, and one additional horizontal section which applies to all three criteria areas. Two levels of ambitions are proposed for the majority of criteria, first one more basic, so called "core level" and the second one, with higher environmental ambition level, called the "comprehensive level".

Table 10 presents the GPP criteria proposal ordered by the type of criteria, i.e. technical specifications, award criteria, contract performance clauses and selection criteria. Later in this document, the criteria are ordered by thematic areas.

Table 10: Overview of Green Public Procurement criteria

	No	Criterion	Core	Compre-hensive
CRITERIA AREA 1 – IMAGING EQUIPMENT PRODUCTS SUBJECT MATTER: PURCHASE, LEASING OF IE PRODUCTS				
CONTRACT PERFORMANCE CLAUSES	CPC1	Preliminary assessment of existing fleet and procurement needs	**X**	**X**
1. REQUIREMENTS ON THE PRODUCT				
SELECTION CRITERIA	SC1	Restricted substance control		**X**
TECHNICAL SPECIFICATIONS	TS1	Imaging equipment minimum energy efficiency	**X**	**X**
	TS2	Duplex imaging capability	**X**	**X**
	TS3	N-up printing	**X**	**X**
	TS4	Capability to use recycled paper	**X**	**X**
	TS5	Capability to use remanufactured cartridges	**X**	**X**
	TS6	Reduced number of materials		**X**
	TS7	Information on postconsumer recycled plastic used		**X**
	TS8(a)	Spare parts availability	**X**	**X**
	TS8(b)	Design for disassembly and repair	**X**	**X**
	TS8(c)	Design for recycling	**X**	**X**
	TS9	Substance emissions	**X**	**X**
	TS10	Noise emissions	**X**	**X**
	TS11	Substances of Very High Concern	**X**	**X**
	TS12	Hazardous substances content		**X**
	TS13	Firmware update control		**X**
AWARD CRITERIA	AC1	Improvement in the imaging equipment energy efficiency beyond TS1 (Imaging equipment minimum energy efficiency)	**X**	**X**
	AC2	Cost competitiveness of spare parts	**X**	**X**

2. AFTER-SUPPLY REQUIREMENTS				
TECHNICAL SPECIFICATIONS	TS14	Warranty and services agreements	**X**	**X**
	TS15(a)	Supply of copy and graphic paper meeting the EU GPP criteria	**X**	**X**
	TS15(b)	Supply of cartridges meeting the EU GPP criteria	**X**	**X**
AWARD CRITERIA	AC3(a)	Longer warranties	**X**	**X**
	AC3(b)	The longest warranty		
	AC4	Imaging equipment take-back system implementation	**X**	
		End-of-life management of imaging equipment		**X**
	AC5	Supply of reused/remanufactured ink and/or toner cartridges	**X**	**X**
CONTRACT PERFORMANCE CLAUSES	CPC2	Reporting on reuse/recycle activities of imaging equipment	**X**	**X**
	CPC3	Reporting on supplied consumables	**X**	**X**
CRITERIA AREA 2 – IMAGING EQUIPMENT CONSUMABLES SUBJECT MATTER: PURCHASE OF PRODUCT CONSUMABLES				
1. REQUIREMENTS ON THE CONSUMABLE				
TECHNICAL SPECIFICATIONS	TS16	Cartridges/containers page yield declaration	**X**	**X**
	TS17	Consumables resource efficiency		**X**
	TS18	Consumable hazardous substances		**X**
	TS19	Design for reusing/remanufacturing	**X**	**X**
	TS20	Consumable quality	**X**	**X**
AWARD CRITERIA	AC6	Electrophotographic consumables resource efficiency	**X**	**X**
	AC7	Advanced design for reusing/remanufacturing		**X**
	AC8	Facilitating reusability/remanufacturability		**X**
2. AFTER-SUPPLY REQUIREMENTS				
TECHNICAL SPECIFICATIONS	TS21	Take-back system for cartridges and containers and WEEE registration	**X**	**X**
AWARD CRITERIA	AC9	End-of-life management of cartridges		**X**
CONTRACT PERFORMANCE CLAUSES	CPC4	Reporting on reuse/recycle activities of consumables	**X**	**X**
CRITERIA AREA 3 – PRINT SERVICES SUBJECT MATTER: PURCHASE OF OUTPUT - NUMBER OF PRINTOUTS				
1. REQUIREMENTS ON THE SERVICE				
SELECTION CRITERIA				
TECHNICAL SPECIFICATIONS	TS22(a)	Commitment to reuse of imaging equipment	**X**	**X**
	TS22(b)	Commitment to repair of imaging equipment	**X**	**X**

	TS23	Supply of imaging equipment meeting the EU GPP criteria	**X**	**X**
	TS24(a)	Supply of paper meeting the EU GPP criteria	**X**	**X**
	TS24(b)	Supply of cartridges meeting the EU GPP criteria	**X**	**X**
AWARD CRITERIA	AC10	Supply of reused/remanufactured cartridges and containers	**X**	**X**
	AC11	Provision of managed print services		**X**
CONTRACT PERFORMANCE CLAUSES	CPC5	Reporting on supplied consumables	**X**	**X**
	CPC6	Provision of consumable use information		**X**
	CPC7	Provision of environmental information during service contract		**X**
HORIZONTAL CRITERIA (applicable to all criteria areas)				
SELECTION CRITERIA	SC2	Tender environmental management activities	**X**	**X**
TECHNICAL SPECIFICATIONS	TS25(a)	Guaranteed provision of consumables during contract	**X**	**X**
	TS25(b)	Guaranteed provision of spare parts during contract	**X**	**X**
	TS26	User instructions for green performance management	**X**	**X**

2.2 Criteria area 1 – Imaging equipment products

Criteria described in this section can be used when purchasing and/or leasing imaging equipment products that are within scope of the EU GPP. They could also be used for provision of these products under a print service contract (See section **Supply of imaging equipment** under print service criteria section).

2.2.1 Preliminary assessment of existing fleet and procurement needs

Existing EU GPP criteria in force does not include a criterion regarding assessment of existing fleet and procurement needs for imaging equipment.
The following criterion, presented already in the AHWG meeting, is proposed:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
CONTRACT PERFORMANCE CLAUSE	
CPC1 Preliminary assessment of existing fleet and procurement needs	
(This contract should be considered as a preliminary procedure, conducted by a different provider than the potential provider for procurement of imaging equipment. This preliminary assessment should apply only when the procuring authority identifies the need to optimise the use of existing fleet prior to procurement of new imaging equipment and when the procurer decides not to use in-house staff to carry out this assessment.) The service provider must conduct evaluation of any current fleet of imaging equipment that the procuring authority has on their site(s) and provide to the procuring authority the results of that evaluation. The evaluation must identify the following: • Number of imaging equipment models on each site • Name, model number and type of each imaging equipment model • Approximate age of each imaging equipment model Based on the main print needs communicated by the procurer (or assessed through the analysis of data registered by the existing machines) and the above evaluation results, the service provider must classify each imaging equipment model into distinct categories which identify their future status. Example categories include: o Retain: Product to be kept for continued use on procuring authority's estate o Return: Product to be returned to incumbent or past supplier (if applicable) o Reuse: Product to be sold for reuse outside of procuring authority's estate o Refurbish: Product to be treated to increase or restore its performance and/or functionality or to meet applicable technical standards or regulatory requirements, with the result of making a fully functional product to be used for a purpose that is at least the one that was originally intended. o Recycle: Product to be sent for end-of-life processing Based on above elements service provider must produce a short report advising the procurer on the number and characteristics of the additional new products to be procured.	

2.2.1.1 Background for the proposed criteria

The ability to better manage imaging equipment within a public body could encourage significant reductions in environmental impacts across many environmental hotspots. For example, a full assessment of an imaging equipment fleet could result in identification of areas where fewer products could be used.
There are no known criteria in any major environmental initiatives which cover assessments of products already included in an imaging equipment fleet. No standard metrics are required to assess compliance with this criterion. However, it is suggested that assessments of current fleets of imaging equipment would help procuring authorities to better manage imaging resources on their sites and if they plan to purchase additional equipment.
It is suggested that the assessment is conducted by a different provider to the one who will supply new equipment. It is recognised that procuring authorities would need to work with

potential suppliers to identify how products would be classified (i.e. into the Retain, Return, Reuse or Recycle categories).

2.2.1.2 Further background after AHWG meeting

Several stakeholder comments were submitted on this criterion.

One stakeholder stated that the procuring authority should preferably have an asset management system in place, the evaluation asked for usually has a cost if not part of an Managed Print Services offering. The study team noted that the criterion does not state that the assessment of the fleet needs to be free of charge and so no changes are made.

An additional stakeholder stated that the requirement should only be for large product fleets. The study team noted that the criterion is relevant for all type of purchases regardless of the size. An additional stakeholder comment noted that the term "Refurbishment" was not listed under the "Rs". The wording of material efficiency terminology was subsequently reviewed and a category of "refurbish" was added.

Another stakeholder comment claimed that there was a need to take account of use intensity as well as age; however as it is expected that an incoming service provider would not have normally access to historical usage statistics (unless provided by the customer), no change was made to the criterion.

2.2.2 Energy efficiency

Existing EU GPP criteria in force include an energy criterion consisting of requirements that products meet the Energy Star v.2.0 specification for imaging equipment.
For the AHWG meeting a first criteria proposal linked to ENERGY STAR was presented. The criteria have been revised as follows after the meeting:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
TS1 Imaging equipment minimum energy efficiency Imaging equipment must meet all energy efficiency and power management requirements laid down in the Appendix 1 of the Industry Voluntary Agreement for Imaging Equipment to improve environmental performance of imaging equipment placed on the European market Version xxx[29], later called Voluntary Agreement. *Note 1: Copiers and scanners are excluded from the scope of this criterion.* *Note 2: Tiers/target levels specified in point 4.1 of Voluntary Agreement[30] do not apply. Compliance is required for 100% of products to which this criterion is applicable.* **Verification:** *The tenderer must provide test reports carried out according to the test methods laid down in the Appendix 1 of the Voluntary Agreement. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*	
AWARD CRITERIA	
AC1 Improvement in the imaging equipment energy efficiency beyond TS1 Points will be awarded if imaging equipment is more energy efficient than the TEC_MAX value laid down in the Appendix 1 of the Voluntary Agreement or the TEC_{MZul}[31] value(s) laid down in the Blue Angel RAL-UZ 205 specification. Points must be calculated in comparison with the	

[29] To be inserted once the VA is published
[30] Voluntary agreement sets specific target levels of compliance for different tiers (i.e. for different periods within the validity of the Voluntary Agreement)
[31] Maximum Typical Energy Consumption value established in Blue Angel, DE-UZ205, Edition January 2017

maximum typical electricity consumption (TEC_MAX) allowed under the Appendix 1 of the Voluntary Agreement or maximum typical electricity consumption (TEC_{MZul}) allowed under the latest version of Blue Angel specification.
A maximum of x points [to be specified] may be awarded. Points must be awarded in proportion to the improvement in energy efficiency in comparison to the TEC_MAX or TEC_{MZul} value(s):
- over 80% lower: x points
- 60-79% lower: 0.8x points
- 40-59% lower: 0.6x points
- 20-39% lower: 0.4x points
- 10-19% lower: 0.2x points

Note 1: Copiers and scanner are excluded from the scope of this criterion.

Verification:
The tenderer must provide test reports carried out according to the test methods laid down in the in the Appendix 1 of the Voluntary Agreement or latest version of Blue Angel. The tenderer must detail the measured TEC value and the TEC_MAX value, or Blue Angel TEC_{MZul} value, *for each applicable product and a calculation of the improvement in energy efficiency. These must be provided upon award of the contract or prior to that upon request.*

2.2.2.1 Background for the proposed criteria

Energy consumption during the use phase for all imaging equipment products in scope is still one of the three major hotspots, as recognized during the development of the current criteria. This does not only apply to active state consumption but also consumption at other low power modes. In the case of scanners, consumption in low power modes is the main hotspot.
Concerning printers and MFDs, studies assessing differences between different technologies showed that energy consumption during use is more critical for solid ink devices than for laser devices increasing about 20-30% of the environmental impacts from the use phase. Therefore, it is important to retain energy efficiency as part of the criteria.

Energy efficiency is being a widely known indicator on the market which is easy to verify.
The ENERGY STAR specification for imaging equipment (v2.0) was implemented in the US and EU in 2014. The US EPA has finalized by end of 2018 the process of revising the ENERGY STAR specification for imaging equipment. The new version 3.0 will take effect on October 11, 2019.[32] The criteria for ENERGY STAR v3.0 can be found here.
Besides the ENERGY STAR, Blue Angel is among the voluntary schemes most widely known in public procurement in the EU, with over 1,400 models of imaging equipment across 17 manufacturers registered with the scheme[33]. The criteria for the Blue Angel (RAL-UZ 205) can be downloaded here.

Both criteria offer similar energy efficiency requirements, having energy use and power management as their main focus areas.
The current EU GPP criteria on imaging equipment include requirements based on the ENERGY STAR v2.0 specification and is therefore outdated. At the time ENERGY STAR specifications are developed they are designed to be met by only the top 25% most efficient products on the market.

[32] US EPA, 2017, *Imaging Equipment Specification Version 3.0*, available from https://www.energystar.gov/products/spec/imaging_equipment_specification_version_3_0_pd
[33] Blue Angel, Energy saving and Low-Pollutant Printers, Copiers and Multifunction Devices, available from https://www.blauer-engel.de/en/products/office/drucker-kopierer-und-multifunktionsgeraete-2012

The US EPA estimates that 100% of the MFD's and printers on the US market met the ENERGY STAR v2.0 specification by mid-2016[34]. Figure 4 and Figure 5 illustrate the improvement in energy efficiency of standard sized laser printers and laser MFDs found in the EU ENERGY STAR database during January 2014 and April 2018. The graphs show that products registered with the EU ENERGY STAR initiative in 2014 used considerably more energy than similar products registered in 2018.

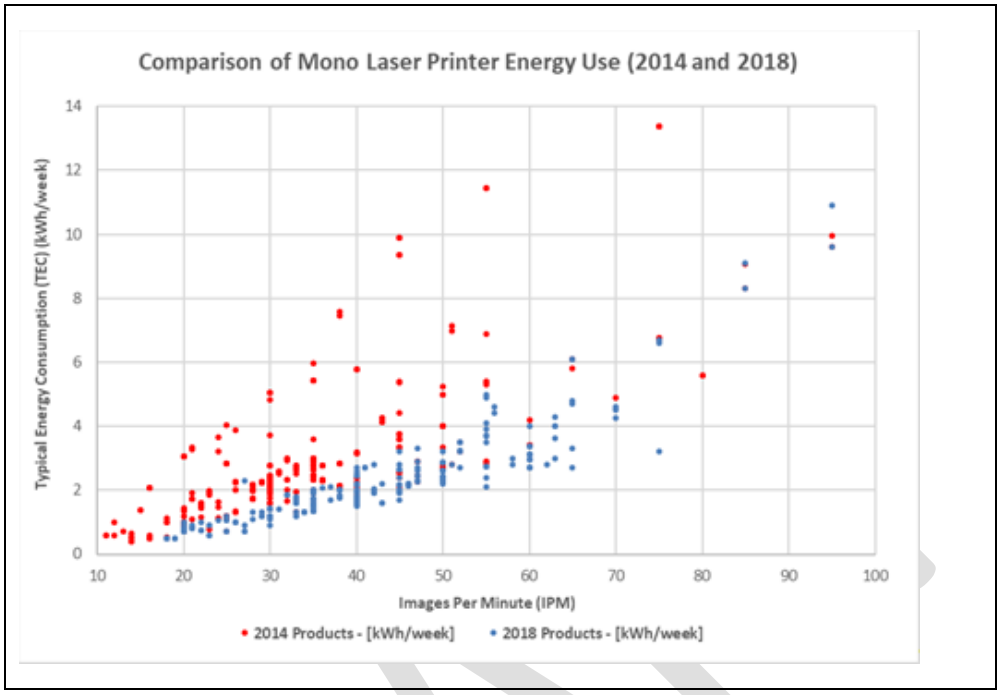

Figure 5.: Comparison of energy use between standard sized mono laser printers in the ENERGY STAR database during 2014 and 2018

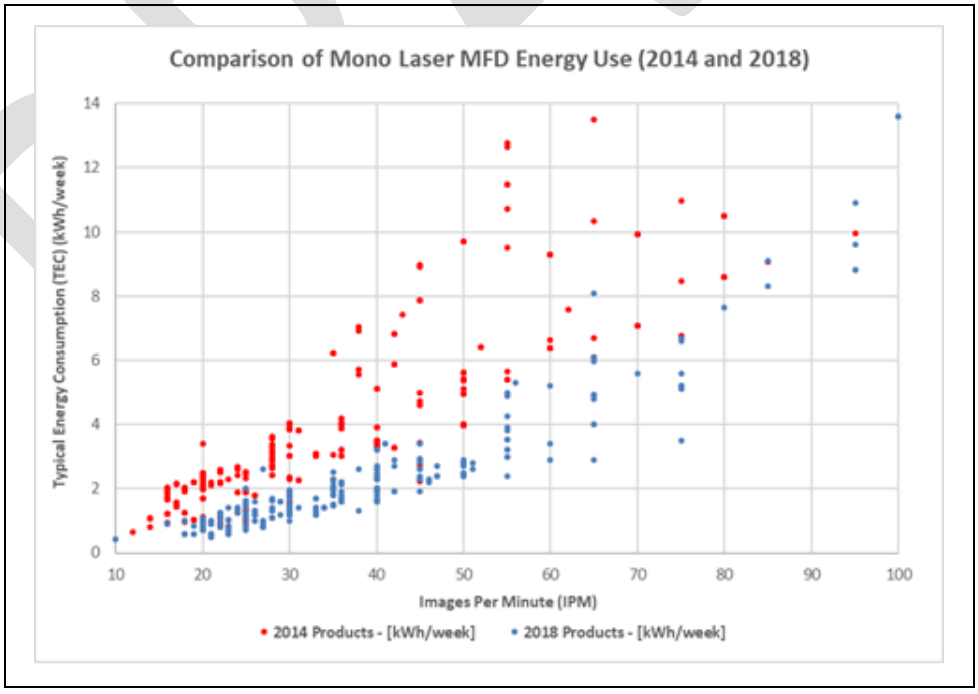

Figure 6.: Comparison of energy use between standard sized mono laser MFDs in the ENERGY STAR database during 2014 and 2018

[34] US EPA, Annual Shipment Data, ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2016 Summary, available from https://www.energystar.gov/ia/partners/downloads/unit_shipment_data/2016_USD_Summary_Report.pdf?bb80-83d4

Against this background, due to their wide use and knowing they are already applied in public procurement, it was decided for the first criteria proposal to establish a technical specification and an award criterion in the revised EU GPP criteria, including a dynamic link to the energy efficiency and power management requirements of these voluntary schemes (ENERGY STAR for the technical specification and both schemes in the award criterion), which can be tied to the most recent updates. By making the criteria linked to the latest version of ENERGY STAR, it would be assured that the energy consumption levels are kept updated in relation to technological development and securing the potential energy savings according to this development.

The proposed award criterion aimed to promote purchase of products which go beyond the ENERGY STAR and Blue Angel. Points would be calculated in comparison with the maximum typical energy consumption allowed in each scheme. As an alternative to awarding points for greater energy efficiency, procurers could opt for an LCC approach whereby more than just the purchase price is included in the costs when assessing the tenders. The rules for the use of LCC are set out in article 68 of Directive 2014/24/EU[35] on public procurement. Procurers have to indicate the data to be provided by the tenderers and the method which the contracting authority will use to determine the life-cycle costs on the basis of this data. It is necessary that the monetary value of the cost elements can be determined and verified.

With regard to the life cycle costs of the proposed criterion it is understood that given the large-scale uptake of ENERGY STAR there are unlikely to be any significant costs for either manufacturers or procuring authorities.

Procuring authorities are likely to save some costs through running more efficient imaging equipment. The running costs differences between products that meet ENERGY STAR requirements and those that do not are likely to be smaller than in the past. Reduced savings are expected as most imaging equipment models on the market already exhibit a good degree of energy efficiency (as witnessed by the high market coverage against the ENERGY STAR v2.0 specification).

2.2.2.2 Background for the proposed verification

The verification text specified that tenderer must provide the test reports carried out according to the test methods laid down in the latest version of the ENERGY STAR (and Blue Angel in award criterion). When new ENERGY STAR specifications are developed they reflect the performance of the top 25% most efficient products in the ENERGY STAR dataset (i.e. the database of products that is used to inform the ENERGY STAR specification development process). The delay (N.B. varies between 3 months and 18 months) between development of new ENERGY STAR specifications and their implementation provides manufacturers with the opportunity to ensure that new products will meet the new ENERGY STAR specifications. Manufacturers are often quick to ensure new products meet ENERGY STAR specifications as compliance to ENERGY STAR specifications are mandatory requirements in US and was supported in the EU central government public procurement contracts in the past.[36,37] The EU ENERGY STAR program followed an Agreement between the EU and the Government of the US to coordinate energy labelling of office equipment. It was managed by the European Commission and the Environmental Protection Agency (EPA). The EU-US agreement expired

[35] Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC

[36] US EPA, 2017, *What Energy Efficient Products Are Federal Agencies Required to Purchase?*, available from https://www.energystar.gov/index.cfm?c=fed_agencies.fed_ag_efficient

[37] European Commission, *EU ENERGY STAR: For public procurers*, available from https://www.eu-energystar.org/publicprocurement.htm

on 20 February 2018[38]. Still, ENERGY STAR is widely used by manufacturers. This widespread uptake ensures that there are sufficient products that meet new ENERGY STAR specifications available on the market.

Verifying whether products meet the energy efficiency and power management requirements of ENERGY STAR or Blue Angel is unlikely to cause complications due to extensive use of the ENERGY STAR test procedure by imaging equipment manufacturers. The test procedure used behind the ENERGY STAR specification 2.0 is used within the latest Blue Angel specification as well as referred to in the ECMA-370 declaration[39].

2.2.2.3 Further background after AHWG meeting

During the AHWG, there was wide agreement amongst stakeholders to use ENERGY STAR specifications as the basis of the GPP criteria.
In addition the **comments** pointed out that the award criterion should also allow business inkjet imaging equipment to receive award points. The stakeholders suggested that the Blue Angel TEC measurement methodology could be used to support assessment of business inkjet energy use within the award criterion. The study team agreed that this approach was feasible and that business inkjet imaging equipment should not be excluded from the award stage analysis.

For the **second criteria proposal** several changes have been included in the criteria text and verification section. In the requirements the link to the "latest version of ENERGY STAR" has been removed, as a consequence of the expiration of the agreement between the US and the EU and that the EU is not involved anymore in the development of Energy Star technical specifications.. Instead Appendix 1 of the Industry Voluntary Agreement for Imaging Equipment to improve environmental performance of imaging equipment placed on the European market Version xxx is referred. At present, the industry Voluntary Agreement uses the same requirements of the Energy Star 3.0 technical specifications. This appendix includes all energy efficiency and power management requirements covered in ENERGY STAR v3.0. With regard to the award criterion, modification in the text have been included in order to refer to test methods laid down in the Appendix 1 of the Voluntary Agreement and to latest version of Blue Angel. Furthermore, following the requests from the stakeholders the possibility to use LCC in this criterion has been removed, as the LCC indeed cover more aspects than the energy efficiency.

[38] See DG ENERGY website for more information: https://ec.europa.eu/energy/en/energy-star
[39] For details on ECMA-370 declaration see: https://www.ECMA-international.org/publications/standards/ECMA-370.htm.

2.2.3 Duplex imaging capability

For the second revision of this criterion the following is proposed:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
TS2 Duplex imaging capability Imaging equipment must meet automatic duplexing requirements laid down in the Appendix 1 of the Voluntary Agreement. . *Note 1: Copiers, scanners and professional imaging equipment products whose intended function is to print on special single-sided media for the purpose of single printing (e.g., release of coated paper for labels, direct thermal media, etc.,) are excluded from the scope of this criterion.* *Note 2: Tiers/target levels specified in point 4.1 of Voluntary Agreement[40] do not apply. Compliance is required for 100% of products to which this criterion is applicable.* **Verification:** *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply. A statement from the manufacturer demonstrating that these requirements have been met is also accepted.*	

2.2.3.1 Background for the proposed criteria

Use of paper is the most important hotspot throughout the life cycle of printers and MFDs. It has been since the development of the existing criteria, even after later developments with paper savings functionalities. Furthermore, this continues to be a hotspot considering printing on hard copy is not done up to the extent it was done 8-10 years ago when the background studies for the development of the existing criteria were done (see Preliminary Report, section 4.1).
The availability of duplex printing as an automatic function and as default setting in the software provided by the manufacturer has an impact on the user concerning use of paper as it directs them to use less. In reality this criterion would continue to secure the potential environmental savings already estimated for existing criteria and the evidence indicates this is still an important criterion which should not be removed.
Duplex functionality set as default is already part of the current EU GPP criteria. Duplex imaging capability is required though only for imaging equipment with monochrome printing/copying speeds which exceeded 25 images per minute (A4 size paper).
Majority of known environmental initiatives include requirements on duplex printing, as shown in following table.

[40] Voluntary agreement sets specific target levels of compliance for different tiers (i.e. for different periods within the validity of the Voluntary Agreement)

Table 11.: Environmental Initiative Inclusion of Duplex Imaging Criteria

Environmental Impact Areas		Initiative						
Impact Area	**Sub-Impact Area**	**ENERGY STAR v2.0**	**EU GPP Criteria**	**Ecodesign VA**	**Blue Angel [6]**	**Nordic Swan**	**EPEAT/IEEE 1680.1**	**Korea Ecolabel**
Paper Use	**Automatic duplex**	Yes	Yes	Yes	Yes	Yes	Yes	Yes

For the first criteria proposal it was suggested that the revised technical specification (core level) should reflect the duplex requirements found in ENERGY STAR.

The ENERGY STAR version 2.0 states that imaging speed must be the highest speed as claimed by the manufacturer, expressed in images per minute (ipm) and rounded to the nearest integer, as follows:

1) In general, for Standard-size products, a single A4 or 8.5" × 11" sheet printed/copied/scanned on one side in one minute is equal to 1 (ipm).

a) When operating in duplex mode a single A4 or 8.5" × 11" sheet printed/copied/scanned on both sides in one minute is equal to 2 (ipm).

2) For all products, the product speed must be based on:

a) The highest manufacturer-claimed monochrome print speed, unless the product cannot print, in which case,

b) The highest manufacturer-claimed monochrome copy speed, unless the product cannot print or copy, in which case,

c) The manufacturer-claimed scan speed.

d) When a manufacturer intends to qualify a product in a certain market by making use of test results that qualified the product in another market using other sizes of paper (e.g., A4 versus 8.5" × 11"), and if its maximum claimed speeds differ when producing images on different sizes of paper, the highest speed must be used.

The requirements in the ENERGY STAR v2.0 can be seen in following table.

Table 12.: ENERGY STAR v2.0 Duplexing requirements

Product type:	**Monochrome Product Speed (s) as Calculated in the Test Method (ipm)**	**Automatic Duplexing Requirement**	**Automatic Duplexing Optional Requirements**
Colour TEC Copiers, MFDs, and Printers	s ≤ 19	None	Additional software-supported option for duplex printing and copying.
	19 < s < 35	Integral to the base product or optional accessory	Duplex printing must be set as default
	s ≥ 35	Integral to the base product	
Monochrome TEC Copiers, MFDs, and Printers	s ≤ 24	None	
	24 < s < 37	Integral to the base product or optional accessory	
	s ≥ 37	Integral to the base product	

The Blue Angel requirement matches that in ENERGY STAR v2.0 but also includes requirements on duplex imaging needed to be set as a default option.

The first proposal for the revised core criterion was slightly more stringent than the existing EU GPP criterion for some products but more lenient for others. That is, the current EU GPP criterion requires that all products with an imaging speed of at least 25 ipm must have automatic duplexing functionality. The revised proposed criterion requires that products with imaging speeds between 19 and 24 must offer automatic duplexing as an optional accessory. The core criterion does not impose extra burden to manufacturers and would continue securing the environmental and costs savings already identified for the existing criteria.
The first proposal for comprehensive level included a more ambitious requirement that all imaging equipment which uses thermal marking technologies needs to provide automatic duplexing functionality.

Market availability of compliant products is high given the large number of products registered with the ENERGY STAR. Market availability of products which are compliant with the comprehensive criterion is also high given that it is similar as in the Blue Angel and there is a high number of products registered under this scheme. In addition, the Voluntary Agreement (VA)[4] on imaging equipment includes similar requirements on duplex imaging.
With this regard, life cycle costs implications addition of a duplexing unit will result in some extra product costs. These costs are likely to be offset by a reduction in paper usage, especially where installed in a high use imaging equipment model. The requirement for software supported duplex imaging is unlikely to add significant cost to either manufacturers or purchasing authorities.

The presence of duplex printing functionality in products will not result in any significant trade-offs with other impact areas. There is some potential for duplex printing to increase electricity consumption in products due to a more complicated paper path. Any extra electricity usage will be offset by the embodied energy savings resulting from reduced paper use.

2.2.3.2 Background for the proposed verification

Verification of whether a product supports duplexing functionality, and whether this functionality is set to default, can be achieved through reviewing suitable product technical documentation. Manufacturers include these declarations as part of their engagement with initiatives such as ENERGY STAR and via declarations such as the ECMA-370. For the first proposal, it was proposed to request documentation, registration to ENERGY STAR or a statement from the manufacturer demonstrating that these requirements have been met is also accepted.

2.2.3.3 Further background after AHWG meeting

At the end of November 2018 revised ENERGY STAR version 3.0 criteria were published. The new requirements can be found in following table.

Table 13.: ENERGY STAR v3.0 Duplexing requirements for all TEC MFD ands and printers

Product type:	Product speed (ipm)
Color	s > 19
Monochrome	s > 24

For the **second criteria proposal** minor wording changes have been introduced in line with criteria on energy efficiency. Instead of referencing the "latest version of ENERGY STAR", *Appendix 1 of the Voluntary Agreement* is referred. The Appendix 1 list the requirements included in ENERGY STAR v3.0. In addition, the original comprehensive criterion, that included reference to "thermal technologies" have been removed, as there were only minor

benefits as a result of the updated ENERGY STAR (v3.0) specification. For the second proposal, same level is proposed for core and comprehensive level.

2.2.4 N-up printing

For the second revision of this criterion the following is proposed:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
TS3 N-up printing Imaging equipment must offer as a standard feature the capability to print 2 or more pages of a document on one sheet of paper when the product is managed by original software provided by the manufacturer (printer driver). **Verification:** *The tenderer must provide documentation stating that the requirement is met. Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.*	

2.2.4.1 Background for the proposed criteria

N-up printing (i.e. the ability to print multiple pages on a single sheet of paper) is already part of the existing EU GPP as criterion titled 'Multiple images on single sheet of paper' that requires all imaging equipment to offer capability to print and/or copy 2 or more pages of a document on one sheet of paper as a standard feature and thereby reducing the paper usage.
This ability is related to the use of paper, which is the most important hotspot in the life cycle of printers. The availability of N-up printing as a standard feature can save considerable amounts of paper, although its use is generally reserved for draft copies of files or notes due to the reduction in size of each page on the sheet of paper and it does not have the same impact as the availability of duplex printing.
It is assumed that only a share of printouts would be for draft files or notes such as power point presentations, maps or internal notes, which would vary between one third and half of the printouts as a general assumption. Therefore, this criterion would continue to secure the potential environmental savings already estimated for existing criteria and it should not be removed.

Apart from the EU GPP criteria, this criterion is also found in the existing Voluntary Agreement of Imaging Equipment[41] and in the Blue Angel. The VA of imaging equipment includes a requirement that all products placed on the market after the 1st January 2012 should offer N-up functionality. This functionality is a widely applied metric in the EU not imposing extra burdens to the manufacturers. The respective requirements included in the EU Voluntary Agreement and in Blue Angel can be seen in Table 14 below.

Table 14.: N-Up Printing criteria in other initiatives

Environmental initiative	**Criterion Text**
EU Voluntary Agreement 2015	***5.1 Availability of N-up printing*** *All product models first placed on the EU market after 1 January 2012 must offer as a standard feature the capability to print several pages of a document on one sheet of paper, when the product is managed by original software provided by the manufacturer (printer driver). A*

[41] Industry voluntary agreement to improve the environmental performance of imaging equipment placed on European market, VA v.5.2, April 2015, https://ec.europa.eu/energy/sites/ener/files/documents/VA%20Imaging%20Self-Regulatory%20Initiative-V-4-0.pdf

	model is considered Part II qualified when it meets all the requirements as detailed in section 5.
Blue Angel[6]	***1.4.3 Availability of N-up printing*** *Devices must offer as a standard feature the capability to print several pages of a document on one sheet of paper. The required information on the availability of N-up printing and software settings must be contained in the information and data sheet.*

N-Up printing is a software-based application and so is supported in many common formats such as PDF.[42]

Against this background, it was proposed for the AHWG meeting to keep the existing EU GPP criterion 'Multiple images on single sheet of paper' renamed as "N-up printing". Even though it is understood that majority of products is already compliant, it was considered reasonable to keep this criterion just as a safety net, due to the fact that if a product does not have this functionality typically it cannot be retrofitted. It requires an update of the printer software to include this feature. An alternative option is to install an add-on 3rd party software, however, this option may add complexity for the users.

Given the wide scale use of N-Up printing it was not necessary to derive a separate more ambitious comprehensive criterion. No changes were suggested to be introduced in the criterion text and its verification.

2.2.4.2 Further background after AHWG meeting

One stakeholder commented that N-Up imaging was a standard feature and so the criterion should be deleted. It is recognized that whilst N-Up printing is a standard option on most imaging equipment, it is not clear whether all imaging equipment offered this functionality. As N-Up printing can provide paper savings it has been decided to retain the criterion to ensure availability of this functionality. No changes have been introduced in this criterion for the second proposal.

2.2.5 Capability to use recycled paper

Existing EU GPP criteria in force do not directly cover the capability to use recycled paper within imaging equipment.

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
TS4 Capability to use recycled paper Imaging equipment must be capable of processing recycled paper that meets the quality requirements of EN 12281[43]. **Verification:** *The tenderer must provide a declaration confirming or documentation proving that recycled paper meeting the requirements in EN 12281 can be used in the product. Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.*	

2.2.5.1 Background for the proposed criteria

Recycled paper can have substantially lower environmental impacts than virgin paper[44,45], so the confirmed ability of the equipment to use recycled paper can bring significant reduction of

[43] EN 12281:Printing and business paper for dry toner imaging processes

impacts (for instance energy consumption reduced by 27%; wastewater reduced by 33%, air particulate emission reduced by 28% and solid waste reduced by 54%)[46]. The availability of using recycled paper in imaging equipment products is found already in many devices on the market. Recycled paper, providing that it meets certain quality standards (e.g. in EN 12281), can deliver quality printouts. Capability to use recycled paper is a requirement already found in the Blue Angel, the EU Voluntary Agreement and EPEAT (See Table 15). It was thus suggested for the **first criteria proposal** to include a requirement on capability to use recycled paper.

Table 15.: Related criteria in other initiatives

Environmental initiative	Criterion Text
Voluntary agreement	***6.4 Information on Paper recyclability*** *For new product models first placed on the EU market after 1 April 2015 Signatories must make available and provide to users information regarding recycled paper via website or other means.* *Example statements are listed below:* *• Recycled paper promotes the circular economy with more recycling saving more natural resources.* *• The use of waste paper to produce recycled paper significantly reduces the amount of energy and water consumed compared to virgin fiber paper. In addition, the forest resources are conserved - an important contribution to biodiversity! Existing environmental savings can be enhanced in a simple and efficient manner.* *• Modern recycled paper meets the highest quality requirements for different printing processes - appropriate standards guarantee this. The imaging equipment supplied by the VA signatories is suitable for using with recycled paper meeting the EN 12281:2002 standard.* *• Regarding archiving - recycled paper meets all requirements for long-term storage.* *• The use of recycled paper is a visible and credible sign of ecological, resource efficient behavior.*
Blue Angel[6]	***3.1.4.1 Usability of recycled paper*** *The devices must be capable of using recycled paper made of 100% post-consumer recycled paper that meets the requirements of EN 12281. The distributor is free to recommend certain types of recycled paper.* *The information and data sheet must include the following note: "This equipment is suitable for using recycled paper". A reference to EN 12281 can be included.*
EPEAT	***4.9.1.1 Required—Allow use of general office paper with renewable content, recycled content, and that is chlorine free*** *Product criterion: The product allows the use of general office paper with renewable content, and paper with pre/postconsumer recycled content, and paper that is chlorine free. Documentation that the product allows the use of these types of paper is readily available or has been provided to the purchaser. For example, documentation types may include the following:* *a) An owner's manual, set-up instructions, label or other information provided with the product, or* *b) Warranty and/or service contract provided with the product, or* *c) Information on the manufacturer's Website, such as included in*

[44] https://www.nap.edu/read/5734/chapter/9#61
[45] http://www.planetexperts.com/recycled-beats-virgin-paper-environmental-impact-new-study-shows/
[46] Pratima Bajpai, 15 - Environmental Aspects of Recycling, in: Recycling and Deinking of Recovered Paper, 2014, Pages 271-282; available online at: https://www.sciencedirect.com/topics/earth-and-planetary-sciences/recycled-paper

	product specification or as a policy statement, etc. *The manufacturer may require that paper must meet standard paper quality requirements such as EN12281:2002.*

There are unlikely to be any life cycle costs implications because of products needing to accept good quality recycled paper. There may be some costs involved for manufacturers needing to test products to ensure that recycled paper can be used without impacting performance

With the aim of harmonization across different environmental schemes, it is recommended to add a new technical specification to the existing EU GPP criteria to secure more environmental savings. No differentiation between core and comprehensive criteria are suggested.

2.2.5.2 Background for the proposed verification

The VA on imaging equipment and the Blue Angel specification include specific requirements that recycled paper meeting the EN 12281 standard can be used in products. Given the extensive coverage of the VA across imaging equipment on the EU market, no issues with market availability are foreseen.

Verification against this criterion can take the form of a manufacturer's declaration or technical dossier from the manufacturer proving that that recycled paper conforming to the EN 12281 standard can be used in their product.

2.2.5.3 Further background after AHWG meeting

There were no comments to this specific criterion neither during the AHWG meeting nor during the written consultation. No changes have been made to this specific criterion.

2.2.6 Capability to use remanufactured cartridges

Existing EU GPP criteria in force includes a requirement regarding the capability to use remanufactured cartridges in imaging equipment. For the AHWG meeting discussions it was proposed to keep it in the revised criteria too. The criterion has been revised after the meeting as shown below:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
TS5 Capability to use remanufactured cartridges and containers The products must accept remanufactured toner and/or ink cartridges and containers. Constructive, software-based or other measures that prevent use of remanufactured cartridge and containers should not be present or applied. **Verification:** *The tenderer must provide a declaration confirming or documentation proving that remanufactured cartridges and containers can be used in the product. Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply.*	

2.2.6.1 Background for the proposed criteria

This criterion addresses the area linked to use of remanufactured cartridges/containers. Reuse of cartridges is resource efficient but can be also associated with economic benefits as the price of reused items is generally lower than the price of new ones. This can be of special importance as in the analysis of cost consideration for this product group the life cycle costs for the procurers are strongly influenced by the cost of inks/toners.

The main aim of this criterion is to promote reuse and recycling of consumables materials (thus reducing in this way the amount of new resources which have to be used if the waste materials are not recovered) and to give the incentive to manufacturers to design their products in the way that enables longer life of these consumables.

The reference point for this criterion is the existing requirement set in the EU GPP criteria for Imaging Equipment[47]. Main outcomes of the consultation with manufacturers and ink or toners remanufacturers (questionnaire feedback) in the previous revision, further input received during the AHWG meeting and more up-to-date sources of information from the ongoing revision of the Voluntary Agreement on Imaging Equipment indicate that:

- with regard to cartridge waste volumes and reuse rates of cartridges [48]:
  - approximately 404 million ink cartridges and containers and 148 million toner cartridges and containers were sold in 2016 in the EU-28;
  - there is a low collection rate amongst OEM in the EU under their material recycling programmes, which is about 10—15% approximately including primary sorting;
  - about 30%-50% of all printer cartridges are being recycled or reused in the UK, Germany, Austria and Switzerland (best practice) while less than 10% are recycled or reused in Eastern Europe;
  - a few OEM producers are involved in reused/remanufacturing activities where up to 3% of their cartridges in the EU are reused whereas 75% of their cartridges are recycled into new materials;
  - it is estimated that in total volume per year the 60 -70 % of the cartridges end up in landfills and/or incinerators after single use.
- with regard to the cartridge reuse circles stakeholders suggest that:
  - It is estimated that ink and toner cartridges can be reused at least once but on average 2-3 times, and printing quality remains sufficiently good at this level of reuse;
  - Toner cartridges can be remanufactured more easily than ink cartridges and there are examples of even up to 25 reuse cycles;
  - Some parts break down easier and have to be changed in the remanufacturing process;
  - The number of reuse circles depends on the model and the condition of the collection of the cartridge.
- with regard to parameters affecting the cartridge reuse cycles stakeholders suggest that:
  - This is a very complex area and there are several parameters affecting the reuse of the cartridge which vary based on the type and model of the cartridge. In cases of remanufacturing of OEM cartridges via cartridge return programs there are obviously no problems. However, for cartridge remanufacturing by third parties the identified technical parameters (which can limit/influence this process) are as follows:
    - presence of clever/killer/smart chips;
    - design features that hamper remanufacturing i.e. welding, glue, blind screws or conjoined parts to fit cartridge-parts together;
    - weaker print heads.

[47] Green Public Procurement for Imaging Equipment - Technical Background Report, JRC Scientific and Policy Reports, 2014, available online at: http://ftp.jrc.es/EURdoc/JRC88789.pdf, accessed August 2018.

[48] Source: Revision of Voluntary Agreement on Imaging Equipment. Draft version. Task 2 report. March 2019. Available at: https://www.review-imagingequipment.eu/documents

The potential for achieving environmental savings and resource conservation via reusing cartridges is high as the majority of them are disposed after the first use. Reuse has either better or equal environmental benefits as recycling, thus it shall be prioritised as an option. This is in line with the waste management hierarchy.

Technical analysis from the previous revision has been updated in the preliminary report and concluded that use of remanufactured cartridges should be promoted. Still it is important to mention that there are studies which provide evidence around the environmental benefits of using OEM vs remanufactured cartridges. The answer to which is the most environmentally preferable option is dependent on a set of variables such as:

- Final disposal route and end-of-life practices for cartridges/containers and their associated materials
- Reliability rates of the virgin and remanufactured cartridges
- The number of times a single cartridge/container can be remanufactured
- The number of cartridge/container parts that need to be changed during remanufacture
- The quality of cartridges and related printouts
- Other remanufacturing process impacts

What is clear from the studies is that cartridge/container remanufacturing can, under certain circumstances, result in lower overall environmental impacts.[49,50,51]
A Commission funded project into the consumable market has estimated that increasing consumable remanufacturing rates to 75% (from a current estimate of 25%) would result in an annual CO_2 impact reduction of around 4 kt per year in the EU.[52]

There are a significant number of market implications surrounding the remanufacturing of consumables. The previously-mentioned study investigated in detail the consumable reuse/remanufacturing market in Europe. Original Equipment Manufacturer (OEM) suppliers dominate the consumables market with an estimated 18% of inkjet and 25% of laser consumables being collected for remanufacturing. Most remanufacturing organisations are EU based SME's which typically sell remanufactured consumables for significantly less than the originals.

Against this background, the existing EU GPP requirement was proposed to be kept for the first criterion proposal before the AHWG meeting. Freedom given to the designer on how to achieve this goal is considered of importance as no eco-innovation shall be hampered.

2.2.6.2 Background for the proposed verification

Verification against this criterion can take the form of a manufacturer's declaration or technical dossier from the manufacturer proving that that remanufactured cartridges can be used in their product.

2.2.6.3 Further background after AHWG meeting

There were several stakeholder comments on "capability to use remanufactured cartridges and containers" criterion. One stakeholder commented that the criterion should limit the use of chips

[49] Four Elements Consulting, 2011, *Life Cycle Environmental Impact Study HP LaserJet Toner Cartridges vs. Remanufactured Cartridges in North America SUMMARY REPORT*, available from http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/LJ-LCA-NA.pdf

[50] First Environment, 2004, LaserJet Cartridge Environmental Comparison: A Life Cycle Study of the HP 96A Print Cartridge vs. its Remanufactured Counterpart in North America, available from http://www.etira.org/images/content/HPFirstEnvironmentreport%20Sept%202004.pdf

[51] Berglind et al, 2002, *Life Cycle Assessment of Toner Cartridge HP C4127X Environmental impact from a toner cartridge according to different recycling alternatives*, available from http://www.etira.org/wp-content/uploads/2013/07/LCA-Kalmar-Univ.pdf

[52] *European Commission, 2017, Study on the implementation of product design requirements set out in Article 4 of the WEEE Directive The case of re-usability of printer cartridges. Final report*

in consumables. The study team pointed out that cartridge chip issues are dealt with in award criterion "advanced design for reuse/remanufacturing", and to limit the use of chips would restrict supplies availability.

Other stakeholder commented that the text of the criterion should be harmonized with the text in BA RAL-UZ-205 3.1.1.3 table 3, no.4. This text asks: *"Is the use of refurbished toner modules and refurbished ink modules and containers according to DIN 33870-1 and 33870-2 not prevented by constructive, software-based or other measures?"*

In accordance with the suggestion, the wording of the criterion has been slightly modified with direct reference to exclusion of constructive, software-based or other measures.

2.2.7 Reduced number of materials

Existing EU GPP criteria in force do not address the number of materials used in imaging equipment. The following requirement is proposed for the revised criteria version:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
	TS6 Reduced number of materials The number of materials used for plastic components of similar function is limited to one material. Applies to: – Casing parts, chassis – Mechanical parts (≥ 25g) **Verification:** *The tenderer must provide a product schematic illustrating the applicable plastic parts and the type of polymer used.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*

2.2.7.1 Background for the proposed criteria

Plastic parts constitute an important share of the volume and weight of imaging equipment products. Increasing the share of these parts sent for recycling would bring environmental benefits, especially for devices with large plastic parts. When more polymer blends are used, it becomes more difficult to recycle them as the melting and granulation processes cannot deliver the purity that the pellet needs so it can be reused again for injection moulding and other types of plastic processing. Generally, the more 'pure' the plastics are, the easier is to recycle them (e.g. HDPE, PET, PC), excluding those with certain additives such as pro-oxidants and photo-oxidation catalysts and galvanizers which hinder the recycling process[53,54]. However, it is important to notice that the embodied environmental impacts of plastics are generally much lower (except for some high-end plastics) than those of metals, in particular aluminium, steel and copper. Though, the levels of recovery and recyclability of the latter are already very high.
Existing EU GPP criteria in force do not address the number of materials used in imaging equipment. However requirements on reduced number of materials are found in several schemes. The Blue Angel, under the section 3.1.1.2 Requirements concerning a material

[53] http://plasticsrecycling.org/images/pdf/design-guide/Full_APR_Design_Guide.pdf
[54] An overview of chemical additives present in plastics: Migration, release, fate and environmental impact during their use, disposal and recycling. Hahladakisa et al. (2018). Journal of Hazardous Materials. Available at: https://www.sciencedirect.com/science/article/pii/S030438941730763X

selection for recyclability, the requirement number 1 promotes products with limited number of materials used for plastic components for similar function. The EPEAT initiative includes a requirement on the use of single recyclable plastic type per plastic parts heavier than 100 g. The EU Voluntary Agreement includes criteria limiting the polymers used in plastic casing parts with a mass greater than 100 grams. Detailed formulation of the requirements can be found in Table 16.

Table 16.: Reduced numbers of materials criteria in other initiatives

Environmental initiative	Criterion Text
Blue Angel[6]	**3.1.1.2 Requirements concerning a material selection for recyclability*** **(1)** Is the variety of materials used for plastic components of similar function limited to one material? Applies to: Casing parts, chassis and mechanical parts (≥ 25g) The smaller the variety of materials, the more efficient the separation and recycling processes are. This requirement does not apply to parts that are demonstrably reused according to para. 3.1.1.4.
EPEAT	**4.3.2.1 Required—Use of single recyclable plastic type per plastic part** Each plastic part >100 g must consist of only one recyclable plastic type. Printed circuit boards, labels, cables, connectors, electronic components, optical components, ESD components, EMI components, and hoses/tubes for transporting fluid within the unit are excluded from this requirement.
EU Voluntary Agreement	**5.3 Polymer composition** *For all new TEC product models first placed on the EU market after 1 January 2015:* In order to limit the variety of materials used, plastic casing parts with a mass greater than 100 grams have to consist of one single polymer or a polymer blend. All plastic casing parts may only consist of up to four separable polymers or polymer blends. Large-sized casing parts must be designed in a way that the contained plastics can be used for the production of high-quality durable products by applying available recycling techniques. The use of coatings for special parts is to be reduced to a minimum, unless it can be demonstrated that it does not alter recyclability. Galvanic coatings on plastic parts are not permissible.
**Note*	*Other requirements under 3.1.1.2 Requirements concerning a material selection for recyclability are covered in other criteria sections (see complete Blue Angel Table 2 in section 2.2.9.1 (Table 21 in this report))*

There are two additional criteria within the same section of the VA. The first deals with the reuse of recovered plastics in the production of new products. This criterion was not adopted due to difficulties in verifying whether plastics have indeed been reused in alternative products.

The second one deals with reduction in coatings that impact recyclability. This requirement is dealt with in criterion 1.6 - Design for disassembly/recyclability. There are also a number of other requirements in the Blue Angel section 3.1.1.2 on material selection for recyclability. They are presented and referred to in the next chapters, namely 2.2.8 (requirement number 10) and 2.2.9 (requirements 2 to 8).

Against this background, it was initially proposed to include a comprehensive new technical specification in the revised EU GPP based on the VA.

2.2.7.2 Background for the proposed verification

Signatories to the VA account for 96% of all imaging equipment sold in the European Union, and over 90% of signatories' products are complaint with the VA requirements. As such, no market availability issues were expected as a result of using the proposed "reduced number of materials" criterion in public procurement contracts. Verification against this criterion was proposed to take the form of a product schematic illustrating the applicable plastic parts and the type of polymer used. Compliance with an environmental initiative which also covers the same reduced number of materials requirements.

2.2.7.3 Further background after AHWG meeting

Several stakeholders requested that the requirements and wording of the EU GPP mirrored those in the Blue Angel. After the discussions at the AHWG meeting it was decided to align the criterion with the Blue Angel UZ 205 section 3.1.1.2, table 2, requirement number 1. Alignment with Blue Angel will facilitate verification and will not reduce the level of ambition, while making the criterion more precise. Compliance is required for casing parts, chassis and for mechanical parts (≥ 25g). No changes have been introduced in the verification part.

2.2.8 Postconsumer recycled plastic

Existing EU GPP criteria in force do not include requirements on postconsumer recycled plastic content. For the AHWG meeting criteria on information on postconsumer recycled plastic used was proposed. These criteria have been further revised after the AHWG meeting:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
	TS7 Information on postconsumer recycled plastic used The percentage of postconsumer recycled plastic content, calculated as a percentage of total plastic (by weight) must be declared. The percentages must be provided in increments of x <1%, 1% ≤ x < 5%, 5% ≤ x < 10%, 10% ≤ x < 15%, 15% ≤ x < 20% and beyond (in 5% intervals). The following parts may be excluded from the calculation: printed circuit boards, cables, connectors, electronic components, optical components, electrostatic discharge (ESD) components, electromagnetic interference (EMI) components, and biobased plastic material. **Verification:** *The tenderer must provide documentation, which specifies the percentage of postconsumer plastic used within the imaging equipment model(s). Documentation may consist of a manufacturer declaration, proof of compliance to an appropriate environmental scheme which includes the same product design features or other alternative means of proof detailing postconsumer recycled plastic content Equipment holding a relevant Type I Eco-label*

	fulfilling the specified requirements will be deemed to comply.

2.2.8.1 Background for the proposed criteria

Manufacturing is the fourth most important environmental hotspot in the life cycle of imaging equipment products. For more energy efficient product where the energy consumption is no longer the most important hotspot, manufacturing has become even more important. This trend will continue in the future, as more devices become more efficient.

One of the sources of impacts is the materials used in imaging equipment products. Because of the complexity of designs, in particular of MFDs and in some printers, the number, type and quantity of materials contained in imaging equipment products vary considerably due to the broad scope of this product group. However, most material volume consists of common plastics (e.g. PS (HI-PS), ABS, PC) and metals (steel, copper, aluminium). In spite of their high embodied impact, steel and aluminium are nowadays highly recyclable[55,56] but plastics are not. Therefore, it was considered important to address this source of impacts by proposing a criterion to incentivize the use of recycled plastics.

The use of post-consumer recycled plastic in products can result in trade-offs with hazardous material content. This trade-off can occur where manufacturers face difficulties sourcing post-consumer plastics which do not meet hazardous material content requirements. The likelihood of this trade-off occurring reduces as the restrictions on hazardous material content increase in ambition and lifetime.

The declaration of recycled plastics content in imaging equipment products is a criterion/requirement found in Blue Angel, EPEAT, the EU Voluntary Agreement and the Nordic Swan. Due to the great market penetration of Blue Angel and EPEAT in public procurement, this metric is considered widely applied and possible to add to the existing EU GPP criteria. The relevant criteria are listed in the tables below.

Table 17.: Postconsumer recycled plastic criterion in other initiatives

Environmental initiantive	Criterion Text
Voluntary agreement	**5.5 Recycled plastic content** For all new product models first placed on the EU market after 1 January 2015 signatories must make information available to customers on the minimum percentage of postconsumer recycled plastic content*, calculated as a percentage of total plastic (by weight) in each product. * In increments of 0-5%, 5-10%, 10-15%, etc. The following may be excluded from the calculation of the percentage: printed circuit boards, labels, cables, connectors, electronic components, optical components, electrostatic discharge (ESD) components, electromagnetic interference (EMI) components, and biobased plastic material. Products that do not contain plastics can declare "Not applicable" for this criterion.
Blue Angel[6]	**3.1.1.2 Requirements concerning a material selection for recyclability** **(10)** Is the share of post-consumer recycled plastics stated in the information and data sheet, calculated as percentage of total plastic (by

[55] http://www.world-aluminium.org/media/filer_public/2013/01/15/fl0000181.pdf
[56] http://www.eurofer.org/Sustainable%20Steel/Steel%20Recycling.fhtml

Environmental initiantive	Criterion Text
	weight) and indicated in intervals of 0-1%, 1-5%, 5-10%, 10-15%, 15-20%, and so on (in 5% intervals)? Explanation: The following parts may be excluded from the calculation of the recyclate share: printed circuit boards, cables, connectors, electronic components, optical components, electrostatic discharge (ESD) components, electromagnetic interference (EMI) components, and biobased plastic material.
EPEAT	**4.2.1.1 Required—Declaration of postconsumer recycled plastic content** Product criterion: Manufacturer declares minimum percentage of postconsumer recycled plastic content, calculated as a percentage of total plastic (by weight) in each product. The following may be excluded from the calculation of percentage: printed circuit boards, labels, cables, connectors, electronic components, optical components, electrostatic discharge (ESD) components, electromagnetic interference (EMI) components, and bio based plastic material.

The percentage of post-consumer recycled plastic in products is declared under all above-mentioned initiatives. Whilst EPEAT requires that exact percentages of post-consumer recycled plastic are provided, the Blue Angel and VA initiatives require that declarations are provided in incremental values.

The results of questioning the EPEAT database around these criteria can be seen in Table 18.

Table 18.: Compliance rates to EPEAT postconsumer recycled plastic criteria

EPEAT Criterion	Products compliant (No.)	Products compliant (%)	Max Value	Min Value
4.2.1.1 - Declaration of postconsumer recycled plastic content	1832	100.0%	N/A	N/A
4.2.1.1 - Declaration of postconsumer recycled plastic content (%)	1832	100.0%	53.6%	0.0%
4.2.1.2 - Minimum content of postconsumer recycled plastic *	1798	98.1%	N/A	N/A
4.2.1.3 - Minimum 5% to 10% content of postconsumer recycled plastic	220	12.0%	N/A	N/A
4.2.1.4 - Minimum 25% content of postconsumer recycled plastic	26	1.4%	N/A	N/A
* Any product containing plastic parts whose combined weight exceeds 100 g must contain at least 5g of postconsumer recycled plastic.				

The results from the EPEAT database show that 98.1% of products registered with EPEAT contain at least 5% postconsumer plastic in parts over 100 g. Fewer products meet the EPEAT criterion 4.2.1.3 criterion which requires that products containing less than 5kg of plastic

contain, on average, a minimum of 10% postconsumer recycled plastic and products with more than 5 kg of plastic must contain a minimum of 5% postconsumer recycled plastic. The EPEAT results also show that manufacturers are readily communicating information about the postconsumer recycled content in imaging equipment. In addition, an assessment of the EPEAT database[57], suggests that less than 20% of products on the market contain more than 5% of postconsumer recycled plastic.

Whilst it is clear that manufacturers are able to source some postconsumer recycled plastic for use in imaging equipment it is unclear if this results in additional costs. However, given that 98.1% of imaging equipment models registered with the EPEAT scheme contain at least some postconsumer recycled plastic it is assumed that any increases in costs are not significant.

The VA on imaging equipment includes a criterion requiring manufacturers to report on the amount of postconsumer recycled plastic in new products. The inclusion of this requirement in the VA suggests that communication of postconsumer recycled plastic information in imaging equipment is commonplace within the EU market.

Against this background it was first proposed to include a new comprehensive technical specification criterion aligned to Blue Angel and a comprehensive award criterion for higher post-consumer recycled content in the revised EU GPP.

2.2.8.2 Background for the proposed verification

It was suggested that the verification against this criterion can take the form of a manufacturer declaration which specifies the percentage of postconsumer plastic used within the imaging equipment model(s). Blue Angel and EPEAT awards can be used to assist with verification.

2.2.8.3 Further background after AHWG meeting

Several stakeholders pointed out that both Blue Angel and EPEAT criteria include exemptions for some components when determining total postconsumer recycled plastic content. They asked to include such exemptions also in the EU GPP. The text has been amended to include the list of exempted components to ensure that the criterion was not excessively stringent. In addition, the intervals have been slightly modified to be completely harmonised with Blue Angel.

With regard to the initially proposed award criterion in the light of lack of credible verification scheme, it has been decided to remove this criterion from the revised proposal.

2.2.9 Reparability and recyclability

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
TS8 (a) Spare parts availability Spare parts listed below must be made available by manufacturers for at least 3 years after the equipment supply and the information about this availability of spare parts shall be available to the procurer. • Print heads (where not considered a consumable) • Laser unit (where not considered a	**TS8 (a) Spare parts availability** Spare parts listed below must be made available by manufacturers for at least 5 years after the equipment supply and the information about this availability of spare parts shall be available to the procurer. • Storage devices • Scanning units • Print heads (where not considered a consumable)

[57] EPEAT, Product Search, available from https://www.epeat.net/?category=imaging

consumable) • Fuser units (where not considered a consumable) • Drum units (where not considered a consumable **Verification:** *The tenderer must provide documentation, which clarifies that spare parts will be available for the durations listed in the criteria, including documentation of the parts which explains how they fit the definition of spare parts.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*	• Laser unit (where not considered a consumable) • Fuser units (where not considered a consumable) • Drum units (where not considered a consumable) • Transfer belts/kits (where not considered a consumable) • Maintenance kits (where not considered a consumable) • Paper feed components • Density sensors • Power and control circuit boards • Cartridge/container attachment components • External power supplies • Hinges **Verification:** *The tenderer must provide documentation, which clarifies that spare parts will be available for the durations listed in the criteria.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*
Note: Spare parts are all components or assemblies that can potentially fail and/or that are expected to need replacement within the service life of the product. Other parts which have a lifetime usually exceeding the typical life span of the product are not spare parts.	
TS8 (b) Design for disassembly and repair Imaging equipment shall be designed to facilitate disassembly and repair. The following requirements shall be met: • Casing parts, chassis, electric/electronic assemblies and cartridges/containers are separable or connected by separation aids[1] • Electric/electronic assemblies and components such as batteries and condensers which have a risk of containing constituents bearing hazardous substances, as well as fluorescent lamps containing mercury are easy to find and to remove • Disassembly of casing, chassis and electric/electronic assemblies can be undertaken with commercially available tools (i.e. all tools except of proprietary tools[2]) • Screw connections for fastening casing parts, chassis and electric/electronic assemblies can be tightened with no more than three tools • Disassembly of the entire unit can be performed by a single person (i.e. not more than one snap-on connection have to be loosened at the same time). • Casing parts are free of electronic assemblies • Manufacturer has carried out a trial disassembly, with reference to the above design features, and recorded it with focus on weak spots • Repair manual with enough information to support repair operations (e.g. illustrating the parts that can be accessed and replaced, the tools required and how the repair process should	

be conducted, etc.) must be available to the procuring authority and to repairers. **Verification:** *The tenderer must provide a declaration of compliance with above requirements together with the repair manual (physical document or a link where the document is available), which must include an exploded diagram of the product illustrating the parts that can be accessed and replaced, the tools required and how the repair process should be conducted..* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*	
Note [1]: The term "separation aids" refers to predetermined breaking points, for example. Note [2]: Proprietary tools are tools that are not available for purchase by the general public or for which any applicable patents are not available to license under fair, reasonable, and non-discriminatory terms.	
TS8 (c) Design for recycling Imaging equipment must be designed to facilitate recycling through the following design features: • Plastic components weighing more than 25 g with a flat surface of at least 200 mm^2 must be provided with a permanent marking of the material in accordance with ISO 11469 (considering ISO 1043) or equivalent standard, • Galvanic coatings on plastic parts are not used in casing parts and cartridges/containers. **Verification:** *The tenderer must provide documentation, which proves that each of the design for recycling requirements have been met. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*	**TS8 (c) Design for recycling** Imaging equipment must be designed to facilitate recycling through the following design features: • Plastic components weighing more than 25 g with a flat surface of at least 200 mm^2 must be provided with a permanent marking of the material in accordance with ISO 11469 (considering ISO 1043) or equivalent standard, • Galvanic coatings are not used in casing parts and cartridges/containers, • The presence of paints and coatings (other than galvanic) in casing parts must not significantly impact upon the resilience of plastic recyclate produced from these parts upon recycling and when tested according ISO 180[1] or equivalent. **Verification:** *The tenderer must provide documentation, which proves that each of the design for recycling requirements have been met.* *A valid mechanical/physical test reports carried out according to ISO 180 or equivalent should be provided for requirement regarding paints. Alternatively, third party test reports obtained from plastics recyclers, resin manufacturers or independent pilot tests shall be accepted.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.* *Note [1] For the purposes of this criterion a significant impact is defined as a >25% reduction in the notched izod impact of a recycled resin as measured using ISO 180.*
Core criteria	**Comprehensive criteria**
AWARD CRITERIA	
AC2 Cost competitiveness of spare parts Points will be awarded to the tenderer who provides the most cost-competitive offer for the spare parts declared in core criterion TS8	**AC2 Cost competitiveness of spare parts** Points will be awarded to the tenderer who provides the most cost-competitive offer for the spare parts declared in comprehensive

(a) Spare parts availability. The offer should include the price list of the referred spare parts and the length of time for which given prices are valid. **Verification:** *The tenderer must provide a price list for spare parts, as well as indications about how long prices will remain valid.*	criterion TS8 (a) Spare parts availability. The offer should include the price list of the referred spare parts and the length of time for which given prices are valid. **Verification:** *The tenderer must provide a price list for spare parts, as well as indications about how long prices will remain valid.*

2.2.9.1 Background for the proposed criteria

Spare parts are all components or assemblies that can potentially fail and/or that are expected to need replacement within the service life of the product. In addition, design to access to spare parts influences indirectly product durability as it incentivizes the repair rather than disposal. Short product lifetime does not seem to be recurrent in office imaging equipment product nowadays, where modular designs are available for many of the larger MFDs making repair more accessible. This is not the case for smaller devices, which are still in use by many small offices with small groups of staff.

In addition, design targeted at easy disassembly/dismantling is one of the crucial legislative features[58,59] for enhancing recycling of products at their end of life. However, materials must also be easily identified so that they can be sorted more easily according to the type to be recovered. If imaging equipment products are sorted out properly, more of their parts containing highly valued materials can be recovered and sent for recycling. This also avoids the mixing with other products and materials which hinders recycling.

Therefore spare parts availability, design for easy access (spare parts accessibility in the product) and design to facilitate recycling are critical aspects for maintaining the product lifetime and ensure recycling of products at their end of life.

Spare parts availability:

Even though the manufacturing of spare parts implies also environmental burdens from the use of new resources and manufacturing and transport processes, their provision will avoid a premature disposal of the products which will imply a whole new purchase, creating a much larger environmental impact. Generally, the provision of spare parts contributes to reducing the impacts from manufacturing of new products, which is one of the hotspots of imaging equipment products.

The availability of spare parts as a requirement/criterion is found in Blue Angel, EPEAT, the EU Voluntary Agreement and Nordic Swan. The main criteria used to inform the development of the EU GPP criterion can be seen in the tables below.

[58] http://www.europarl.europa.eu/legislative-train/theme-new-boost-for-jobs-growth-and-investment/file-ecodesign-for-circular-economy

[59] http://ec.europa.eu/environment/circular-economy/implementation_report.pdf

Table 19.: Spare parts criterion in other initiatives

Environmental initiative	Criterion Text
Blue Angel[6]	**3.1.5.3 Repair options** The distributor commits to ensure that the spare parts and exchange parts needed for repair of the devices and the according infrastructure are available for at least 5 years after ceasing production and that the user is informed about this availability of spare parts. Other parts the life span of which usually exceeds the typical life span of the product do not have to be held available as spare parts. The distributor commits to provide easily accessible repair options for the device to the users. Such repair options may consist in a delivery to the service centre of the manufacturer by means of licensed dealers or logistical solutions (package services) offered to the customer, or that dealers and repair centres independent from the manufacturer have access to spare parts and repair information. *Spare parts are components or assemblies that can potentially fail within the service life of the products. This includes e.g. hinges of casing parts, paper trays etc. as well as cable connections and electronic components which might be damaged by overheating*.
EPEAT	**4.4.3.1 Required—Spare parts** Manufacturer must declare if spare parts are available, and if available, the length of time that spare parts are available after the end of production. The following information must be provided to purchasers: a) If spare parts are available, and if available the length of time that they are planned to be available after the end of production. b) If spare parts are available, how to obtain spare parts (or, at the manufacturer's option, compatible spare parts from a different supplier). *Spare parts: A component of a product that is kept in reserve for possible use to replace a similar or identical component in the product.*
EU Voluntary Agreement	**6.2 Availability of spare parts** For new product models first placed on the EU market after 1 January 2015, Signatories must make available spare parts for the minimum time periods after the end of product manufacturing: • For Electrophotography, Solid Ink and High Performance Inkjet models - 5 years • For Inkjet models - 3 years Making spare parts available must only involve offering spare parts for sale through their usual spare part distribution channels and must not require Signatories to trade directly with Customers or users. In this section, *"spare parts" means those parts which it is reasonably anticipated by the manufacturer of a model as being likely to fail during the typical use of the product. In contrast, those parts whose life cycle usually exceeds the usual life of the product do not have to be made available as spare parts*.

EPEAT requires that manufacturers declare the length of time that spare parts are available after the end of production. While the Blue Angel initiative includes a requirement that spare parts should be available for at least 5 years after the end of production. Blue Angel and VA define spare parts as parts that typically have the potential to fail during the normal use of the product. Blue Angel also provides a small list of examples including hinges of casing parts, paper trays, cable connections and electronic components which might be damaged by over-heating.

Spare parts availability for a period of two years is covered by the EU legal warranty. A 2-year period is much shorter than the products estimated lifetime of 6 years for laser printers and MFDs and 4 years for inkjet printers and MFDs and scanners.
Spare parts availability is a common requirement in many of the established environmental initiatives dealing with imaging equipment and thus spare parts are likely to be widely available for these product types.
The current EU GPP criteria include a requirement that spare parts are available for all imaging equipment for a period of 5 years. For the first criterion proposal, it is suggested to keep this requirement. Given the relatively short average lifespan of inkjet products the 5-year period was deemed a little too restrictive for a core criterion, therefore 3 years was proposed instead (for inkjet models), in line with Voluntary Agreement. The comprehensive criterion maintained the 5-year spare parts availability period for all types of imaging equipment in scope of the EU GPP specification. A number of components that have been deemed as applicable spare parts were listed to add clarity. In addition, an award criterion was added to reward the supplier(s) which offer the most cost-competitive spare parts service
Despite the large compliance rates, stocking of spare parts does result in additional costs for manufacturers, especially in terms of storage. However, given the fact that the spare parts are already widely available it is not expected that the proposed EU GPP criteria would cause any additional life cycle cost implications.

Further background with regard to spare parts availability after AHWG meeting

During the AHWG meeting and consultation thereafter, stakeholders questioned the formulated list of spare parts that deem compliance with these criteria. This list is based on an analysis of what other schemes list as spare parts examples, and considers also those that typically have a shorter lifetime than the equipment's service life and that cause equipment's failure. However, defining a specific list of parts is considered necessary in order to ensure that the parts which are prone to failure are available. In the second revised criterion, it is proposed to reduce the list of spare parts for the core proposal. In addition the definition of spare part was included in line with the work of the JRC group developing the Repair Scoring System[60].

No changes have been included in the comprehensive proposal.

Questions to stakeholders
Do you agree with the spare parts list included in the core technical specification or do you consider it should be expanded to cover additional spare parts? In the latter case, please provide a proposal.

Design for disassembly and repair:

Access to spare parts is important as some of those tend to fail and need replacement to prevent disposal of the device because of failure. Spare parts that are important to replace are storage devices and storage units which cause product fail if not repaired.
The inclusion of design features to facilitate reparability could potentially have some impact on the durability of products. That is, if parts are easily replaced there may be less incentive on the manufacturers to ensure that parts are durable. The extent of this potential impact would be curtailed through longer warranty periods which place the financial burden for reparability on the manufacturer not the user. In addition, design targeted at easy disassembly/dismantling is crucial for enhancing reparability of products and recycling of materials from them at their end of life. By making the access of these parts available by using universally available tools, materials can be better recovered. Since the housing of imaging equipment products is typically

[60] JRC study about the analysis and development of a scoring system for repair and upgrade of products, available at https://ec.europa.eu/jrc/en/publication/analysis-and-development-scoring-system-repair-and-upgrade-products

made of plastics, it is important they are easily removed to recover important parts. Marking of plastic parts is also important to enhance the recycling of plastics so plastics are not mixed before treatment. Finally, availability of high quality repair manual is crucial for the support of successful repair operation.
Blue Angel, EPEAT, the EU Voluntary Agreement, Nordic Swan and the Korean Ecolabel include criteria on design for disassembly. However, only Blue Angel and EPEAT include extensive requirements in this area.
The Blue Angel specification includes a broad range of requirements in sections "3.1.1.1 Design for disassembly requirements".

Table 20.: Blue Angel requirements on 3.1.1.1 Design for disassembly requirements (Table 1 in BA) [6]

No.	Requirement	Applies to Assembly	Must/Should Requirement
1	Are assemblies made of mutually incompatible materials separable or connected by separation aids?	Casing parts, chassis, electric/electronic assemblies, modules for colourants	Must
2	Are electric/electronic assemblies easy to find and to remove?	Entire unit, including lamps	Must
3	Are detachable connections easy to find?	Casing parts, chassis, modules for colourants	Should
4	Can disassembly be done exclusively with general-purpose tools?	Casing, chassis, electric/electronic assemblies	Must
5	Have the points of application and the work space required for disassembly tools been considered?	Casing parts, chassis, electric/electronic assemblies	Must
6	Are all connecting elements that have to be dismantled for recycling axially accessible?	Casing parts, chassis, electric/electronic assemblies	Should
7	Can screw connections for fastening assemblies be tightened with no more than three tools?	Casing parts, chassis, electric/electronic assemblies	Must
8	Are detachable connections of plastic components at least half click/snap-on connections?	Casing parts	Should
9	Can the disassembly be performed by one person?	Entire unit	Must
10	Can the supporting surface be maintained during the entire disassembly process?	Unit to be handled	Should
11	Are casing parts free of electronic assemblies?	Casing parts	Must

No.	Requirement	Applies to Assembly	Must/Should Requirement
12	Has the manufacturer carried out a trial disassembly (e.g. in accordance with no.1-11) and recorded it with focus on weak spots?	Entire unit	Must

Most of the Blue Angel criteria in this area are marked as "must" criteria meaning that products have to comply with in order to be awarded the Blue Angel label
Against this background, for the first proposal, it was suggested to add a new technical specification on design for disassembly focused on accessibility and easy separation of spare parts/components in order to facilitate reparability and recyclability at the end of life. The criterion was inspired by the EU GPP for computers[61] and Blue Angel[6]/EPEAT[5] criteria. However, some of the Blue Angel "must" criteria were not reflected to allow the use of other initiatives.

Given that large numbers of products in the marketplace include design features which facilitate disassembly it is estimated that there would not be any additional costs associated with meeting the design for reparability criteria. That is, manufacturers have already taken steps to include reparability features into products and therefore already absorbed the costs for these changes to the product design. It is not expected that the design features would continue to add extra costs to the product as they only dictate fastening types. As such, the EU GPP criteria will have little, if any, impact on product price in respect of reparability design features.

Further background with design for disassembly and repair after AHWG meeting

During the AHWG meeting and following comments, a number of stakeholders recommended that criterion TS8(b) design for disassembly and repair should be harmonized with Blue Angel RAL-UZ205 3.1.1.1 table 1 No. 1,2,4,5,7,9,11 and 12. Stakeholders also requested that reference to an exploded diagram should be removed from the criterion.
For the second criteria proposal, it is proposed to amend the criterion in order to further harmonize with the suggested Blue Angel RAL-UZ205 design for disassembly and repair requirements, still keeping certain level of flexibility, as only "must" Blue Angel criteria have been included..

Design for recycling:

Materials must also be easily identified so that they can be sorted more easily according to the type to be recovered. If imaging equipment products are sorted out properly, more of their parts containing highly valued materials can be recovered and sent for recycling. This also avoids the mixing with other products and materials which hinders recycling.

The Blue Angel specification includes a broad range of requirements in section "3.1.1.2 Requirements concerning material selection for recyclability". For instance, requirement number 3 restricts the use of coating which are incompatible with recycling in addition to a ban on the use of galvanic coatings (see Table 21). Compliance with the Blue Angel specification would result in the proposed GPP criterion being met.

[61] EU GPP criteria for Computers and Monitors can be downloaded from: http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

EPEAT also includes a broad range of criteria in this area under the section "4.3 Design for end of life"[62]. EPEAT also includes restrictions on coatings that negatively impact recyclability of materials.

Table 21.: Blue Angel requirements on 3.1.1.2 Requirements concerning material selection for recyclability (Table 2 in Blue Angel)

No.	Requirement	Applies to Assembly	Must/Should Requirement
1	Is the variety of materials used for plastic components of similar function limited to one material?	Casing parts, chassis Mechanical parts (≥ 25g)	Must
2	Are components that are made of the same plastic dyed uniformly or compatibly?	Casing parts, modules for colourants	Should
3	Has the coating of plastic components been limited to a minimum? Have no galvanic coatings been used?	Casing parts, modules for colourants	Must
4	Are recyclable materials and material composites used?	Casing parts, chassis, modules for colourants	Must
5	Is the partial use of post-consumer recycled plastics permitted?	Casing parts, chassis, modules for colourants	Must
6	Does the share of post-consumer recycled plastics amount to at least 5% of the complete plastic material?	Casing parts, casings of modules for colourants	Should
7	Are assemblies and materials easy to dismantle according to Appendix 4 of the Electrical and Electronic Equipment Act (ElektroG)?	Entire unit	Must
8	Have materials been selected in accordance with no.1-5 and has this been documented in writing?	Casing parts, chassis, modules for colourants	Must
9	Are plastic parts >25 g with a flat surface of at least 200 mm2 marked in accordance with EN/ISO 11469 considering ISO 1043?	Entire unit (exempted are plastic parts contained in reused complex assemblies)	Must
10	Is the share of post-consumer recycled plastics stated in the information and data sheet, calculated as percentage of total plastic (by weight) and indicated in intervals of 0-1%, 1-5%, 5-10%, 10-15%, 15-20%, and so on (in 5% intervals)?	All assemblies	Must

[62] https://www.epeat.net/resources/criteria-2/#tabs-1=imagingequipment

No.	Requirement	Applies to Assembly	Must/Should Requirement
Note	Requirements number 1 and 10 ae covered under previous criteria sections		

For the first proposal, it was suggested to include a new technical specification in the revised EU GPP. These requirements were used as the main point of reference to develop the proposed GPP criteria. They were reformulated from questions to requirements, selecting only the most relevant requirements which are common across Blue Angel and EPEAT. Common criteria with a focus on limiting the presence of paints and coating were chosen to ensure that the EU GPP criteria could be more readily verified.

Due to high market penetration of these schemes in procurement, it was assumed this criterion will not create extra burdens on the market and would create harmonization amongst EU GPP and the rest of the schemes.. The proposed criterion was supposed to provide a valuable addition for increasing the recycling of imaging equipment products. A separate comprehensive criterion was not proposed due to uncertainties over market penetration levels against more ambitious requirements.

Further background with design for recycling after AHWG meeting

Several stakeholders also recommended that criterion TS8(c) Design for recycling should be harmonized with Blue Angel RAL UZ205 3.1.1.2 table 2 No.9 as the current EU GPP criterion wording included additional requirements beyond Blue Angel making verification more difficult. Several changes have been introduced in the second proposal:

- Requirement on marking has been fully aligned with Blue Angel,
- The scope has been specified for galvanic coatings in line with Blue Angel,
- Requirement on paints and coatings not impeding recycling has been added in the comprehensive technical specification.

2.2.9.2 Background for the proposed verification

For criterion 8(a) suppliers can prove compliance against this criterion through documentation which details spare part availability, and any associated conditions, for each model of imaging equipment included in a proposal. For the award criterion the manufacturer must provide a price list and indicative costs for labour replacement. After the consultation, for 8(a), the verification of the core criterion has been modified, so documentation on the relevance of the parts, to be classified as 'spare parts', is provided.

Verification against this criterion 8(b) and 8(c) can be conducted through the provision of documentation showing that products are compliant with an environmental initiative which covers the same design for disassembly/recycling attributes. For both 8(b) and 8(c) this would mean that proving compliance with Blue Angel RAL UZ205 would be a suitable means of verification. Manufacturers could also provide other third-party evidence showing that they meet the applicable requirements and applicable standards such as ISO 11469[63]. In addition, manufacturers can provide other appropriate means of proof such as a technical dossier or product schematic where no access to certificates or test reports is possible. Any such alternative means of verification must prove that the products meet the criterion.

[63] ISO 11469 Plastics – Generic identification and marking of plastics products

Given the large number of imaging equipment models that are registered with Blue Angel and EPEAT there are no market availability issues foreseen as a result of including reparability and recyclability criteria within the EU GPP specification.

2.2.10 Substance emissions

The existing EU GPP specification does not include any requirements on substance emissions from imaging equipment.
For the AHWG meeting, a criterion with this regard was proposed. The criterion has been revised after the meeting:

Second criteria proposal

Core criteria	**Comprehensive criteria**

TECHNICAL SPECIFICATIONS

TS9 Substance emissions

Imaging equipment must meet the following substance emission rate requirements when measured according to the test procedure detailed in Blue Angel specification RAL-UZ 205:

Permissible test values for emission rates as determined according to appendix S-M for electrophotographic devices**			
(All values in mg/h)		**Monochrome printing**	**Colour printing**
Pre-operating phase	TVOC*	1 (Desktop Devices) 2 (Floor-mounted De-vices, Device Volume > 250 l)	1 (Desktop Devices) 2 (Floor-mounted De-vices, Device Volume >250 l)
Print Phase (= Pre-operating + Print Phase)	TVOC*	10.0	18.0
	Benzene	< 0.05	< 0.05
	Styrene	1.0	1.8
	Ozone	1.5	3.0
	Dust	4.0	4.0

Verification:

The tenderer must provide test results indicating emission rates during print phase for each of the named substances along with the details concerning the test procedure used to measure the emission rates. Test reports for devices of identical construction are accepted. The definition of "identical construction" is the same as listed in Blue Angel RAL-UZ

TS9 Substance emissions

Imaging equipment must meet the following substance emission rate requirements when measured according to the test procedure detailed in the Blue Angel specification RAL-UZ 205:

Permissible test values for emission rates as determined according to appendix S-M for electrophotographic devices**			
(All values in mg/h, except for particle emissions)		**Monochrome printing**	**Colour printing**
Pre-operating Phase	TVOC*	1 (Desktop Devices) 2 (Floor-mounted De-vices, Device Volume > 250 l)	1 (Desktop Devices) 2 (Floor-mounted De-vices, Device Volume >250 l)
Print Phase (= Pre-operating + Print Phase)	TVOC*	10.0	18.0
	Benzene	< 0.05	< 0.05
	Styrene	1.0	1.8
	Unidentified Single Substances VOC	0.9	0.9
	Ozone	1.5	3.0
	Dust	4.0	4.0
Print Phase	PER10 PW [Particles/10 min]	3.5 * 1011	3.5 * 1011

205 Appendix B-M to the Basic Award Criteria.
Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.

Permissible test values for emission Rates determined according to appendix S-M for inkjet devices**

(All values in mg/h)		**Monochrome printing**	**Colour printing**
Pre-operating Phase	TVOC*	1 (Desktop Devices) 2 (Floor-mounted De-vices, Device Volume > 250 l)	1 (Desktop Devices) 2 (Floor-mounted De-vices, Device Volume >250 l)
Print Phase (= Pre-operating + Print Phase)	TVOC*	10	18
	Benzene	< 0.05	< 0.05
	Styrene	1	1.8
	Unidentified Single Substances VOC	0.9	0.9

Verification:
The tenderer must provide test results indicating emission rates during print phase for each of the named substances along with the details concerning the test procedure used to measure the emission rates. Test reports for products of identical construction are accepted. The definition of "Identical construction" is the same as listed in Blue Angel RAL-UZ 205 Appendix B-M to the Basic Award Criteria.
.Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply

****** Appendix S-M of the Blue Angel specification RAL-UZ 205 (Edition January 2017 (Printers and Multifunction Devices))
* The list of volatile organic compounds which must be considered when measuring emissions from imaging equipment with printing function must be determined as listed in the Blue Angel specification RAL-UZ 205 (edition January 2017) - (Appendix S-M - para. 4.5 VOCs).

2.2.10.1 Background for the proposed criteria

VOC, dust and other emissions from imaging equipment are hazardous to humans when emitted indoors over certain thresholds.

Some older studies in the early 2000[64,65,66] reported levels of VOCs indicating laser printers had higher emission levels than inkjet printers, specially operating units rather than idle units. Overall for all imaging equipment products, the emission rates from photocopiers were much higher than for printers and multi-functional devices. But one of the studies refers to other studies and their high variability, ranging over three orders of magnitude for some chemicals, e.g., toluene and styrene. Despite this, there are some consistencies between the studies that show that chamber concentrations of styrene, xylenes and ozone are increased in printing process of the laser printer, and pentanol is detected from the ink-jet printer. The emission rates of laser printers were the highest and found to be about 6 times that of ink-jet printers.

Chemical emissions, both as reporting and limits requirements are found in Blue Angel, EPEAT, Nordic Swan and the Korean Ecolabel. Blue Angel eco-labelled printers, copiers and MFDs all make particularly low contributions to indoor air pollution at the workplace or in private households. For better indoor quality, strict requirements on air emissions are set for low content of harmful substances. In addition, strict requirements are made for fine and ultrafine particle release during laser printer operation. Currently, 979 products are registered as complying with Blue Angel[6].

A standard already exists for measuring and reporting five chemical substances as emissions from the use of imaging equipment products, namely:

- Dust (particulate matter) (electrophotographic imaging equipment only),
- Styrene,
- Benzene,
- TVOC,
- Ozone (electrophotographic imaging equipment only).

Moreover, the Blue Angel specification includes a test procedure. Nevertheless, measuring these emissions is not a common practice. Although more than one thousand products are registered in Blue Angel, complying with certain limits may be a costly exercise for manufacturers. Reporting may also imply extra costs, however this may be already a common practice by manufacturers, but only covering OEM products (i.e. not non-OEM cartridges set-up in imaging equipment printers and MFDs).

The EPEAT levels are slightly less stringent than those found in the latest version of Blue Angel, whereas the Nordic Ecolabelling criteria refer to the Blue Angel specification (RAL UZ 205) for compliance. The same applies to the Korean Ecolabel, except that the emission requirements for VOCs are also applicable to standby mode.
Against this background, for the first revised GPP criteria version, it was proposed to include a technical specification aligned to Blue Angel. Blue Angel requirements are the most comprehensive and are used also in other schemes.

For core criterion it was asked to measure TVOC in pre-operating phase and the following emissions in the print phase:

[64] Destaillats, Hugo, Randy L Maddalena, Brett C Singer, Alfred T Hodgson, and Thomas E Mckone. 2008. "Indoor Pollutants Emitted by Office Equipment: A Review of Reported Data and Information Needs." Atmospheric Environment 42: 1371–88. doi:10.1016/j.atmosenv.2007.10.080.

[65] Naoki Kagia, Shuji Fujiib, Youhei Horibab, Norikazu Namikic, Yoshio Ohtanic, Hitoshi Emic, Hajime Tamurad, and Yong Shik Kime. 2007. "Indoor Air Quality for Chemical and Ultrafine Particle Contaminants from Printers." Building and Environment 42: 1949/1954.

[66] S.C. Lee, Sanches Lam ∗, Ho Kin Fai. 2001. "Characterization of VOCs, Ozone, and PM10 Emissions from Office Equipment in an Environmental Chamber." Department of Civil and Structural Engineering 36: 837/842.

- TVOC,
- Benzene,
- Styrene,
- Ozone,
- Dust

for electrographic products.

Requirements for inkjet based imaging equipment were not included in the core criterion due to the relatively low number of inkjet products certified to the Blue Angel label.
With regard to the GPP comprehensive criterion requirements are set for electrographic and inkjet devices. In the case of electrographic equipment, in the comprehensive criteria beside the same emissions restricted in the core criterion, also maximum allowed value for particles PER10 PW was established. In the case of inkjet devices the following emissions are restricted:

- TVOC,
- Benzene,
- Styrene,
- Unidentified Single Substances VOC.

The large number of products compliant to the Blue Angel specifications suggests that neither manufacturers nor procuring authorities would see additional costs associated with these criteria.

2.2.10.2 Background for the proposed verification

ECMA 370 declarations are widely used by the imaging equipment manufacturers in the EU as a means of providing information about the environmental performances of their products. With regard to Blue Angel, at the time of writing of the report, 979 products registered against the RAL-UZ-205 specification and 1379 products registered against the RAL-UZ-171 specification. Products meeting the RAL-UZ-171 specification would be able to comply with both the core and comprehensive criteria. As such, no market availability issues are foreseen.

Manufacturers will be able to verify compliance to the criteria through submission of documentation showing that products have been tested to the appropriate test procedures, or equivalent, and meet the substance emission requirements.

Products holding ISO type I schemes certification which addresses the relevant requirement would be deemed to comply.

2.2.10.3 Further background after AHWG meeting

During consultation stakeholders commented that Blue Angel allows for a single product to be tested and all identical products to use this single test for compliance purposes. The Blue Angel specification includes a detailed definition for “identical product”. This ensures that any product using the emission tests results of another product would itself be compliant if tested.

For the second criteria proposal, it was proposed allowing identical products to use test results from a single tested product in order to reduce costs without decreasing levels of ambition. A statement has been included in the criterion verification section allowing identical products to the tested product to meet the requirement. In addition it has also been included a reference to the Blue Angel ecolabel definition for “identical products”.

2.2.11 Noise Emissions

The existing EU GPP specification does not include any requirements on noise emissions from imaging equipment; however a proposal was made for the AHWG meeting and discussed with stakeholders. After these discussions the proposal was modified as follows:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	

TS10 Noise emissions

The A-weighted sound power level *LW*A must be determined according to ISO 7779. Devices capable of colour printing must be tested in both monochrome mode (*LW*A,M) and colour mode (*LW*A,F).

- Noise measurements must be conducted without optional peripheral devices.
- A4 size paper of grammage 60 g/m² to 80 g/m² must be used for test operations.
- The 4-page Adobe Reader file from the Office Test Suite according to B.1 of ISO/IEC 24734 must serve as test pattern.
- Only one-sided printing must be measured.
- The noise measurement must only be conducted during repetitive printing operation cycles. The measurement time interval must include at least three complete outputs of the 4-page test pattern (12 pages). The interval must begin after the printing preparation.

At least three devices of one model have to be tested. The declared A-weighted sound power level *LW*Ad must be determined following the procedures of ISO 9296:1988. It must be declared in decibels (dB) with one decimal place. If the noise emission measurement can be performed with one device only the following formula may be used as a substitute to determine the declared A-weighted sound power level *LW*Ad.

$L_{WAd} = L_{WA1} + 3{,}0$ dB

(*LW*A1 = A-weighted sound power level of a single device, in dB with one decimal place)

The declared A-weighted sound power level(s) of (both) monochrome mode *LW*Ad,mo (and full colour mode *LW*A,co, if applicable) must not exceed the limit. The limit *LW*A,lim must be determined depending on the page throughput of (both) mono-chrome mode sM and colour mode sF, if applicable, given to one decimal place and according to the following formula:

$L_{WA,lim} = 47 + 15 * \lg (S_{M/F} + 10)$ dB

The values of the declared A-weighted sound power level L_{WAd} in dB with one decimal place and page throughput $S_{M/F}$ in ipm must be indicated in the information and data sheet under "environment and health-related statements". For devices capable of colour printing the declared A-weighted sound power levels $L_{WAd,M}$ and $L_{WAd,F}$ and corresponding page throughput *S*M and *S*F, both of monochrome mode and col-our mode, must be indicated.

Verification:

The tenderer must provide documentation, such as a test report, which identifies noise emission rates during print phase when measured according to requirements in ECMA-109 (ISO 9296). The testing laboratory must be accredited ac-cording to both ISO/IEC 17025 and ISO 7779 for acoustical noise measurements or equivalent. The documentation should also identify if the A-weighted sound-power level in the criterion has been met.

Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.

2.2.11.1 Background for the proposed criteria

Noise pollution is not reflected in Life Cycle Assessments of imaging equipment products. However, it has an impact on end-user, in particular when confined to a closed area such as public offices.

Noise pollution, is considered relevant for this product group as larger products such as MFDs may create irritating noise to end-users while in operation. Some of the short and long term effects[67] that can be avoided are:

[67] Green Public Procurement for Imaging Equipment. Technical Background report. 2014.

- It creates annoyance to the receptors due to sound level fluctuations.
- Physiological features like breathing amplitude, blood pressure, heart-beat rate, pulse rate, blood cholesterol are affected.
- Noise has negative impacts on cognitive performance. For attention and memory, a 5 dB(A) reduction in average noise level results in approximately a 2-3 % improvement in performance.
- It causes pain, ringing in the ears, feeling of tiredness, thereby effecting the functioning of human system.
- It affects sleepiness by inducing people to become restless and lose concentration during their activities.

Some standards, such as the ECMA-370 (The Eco Declaration), support measurement of noise emission level. Nordic Ecolabel[7] and Blue Angel[6] require certified products to comply with certain limit values.

In order to keep protecting end-users from noise pollution, in the first proposal it was suggested to include criteria on noise emissions as part of the updated GPP criteria. The core criterion only required that noise emission rates meet the older Blue Angel (RAL-UZ-171[6]) limits. The comprehensive criterion was aligned with the new version of Blue Angel RAL-UZ-205 specification.

The large number of products compliant to the Blue Angel specifications (1379 for RAL-UZ-171 and 979 for RAL-UZ- 205) suggests that neither manufacturers nor procuring authorities are expected to face significant additional costs associated with these criteria.

2.2.11.2 Background for the proposed verification

Manufacturers will be able to verify compliance with the criteria through submission of documentation showing that products have been tested to the appropriate test procedures, or equivalent, and meet the allowed noise emission levels. This documentation could take the form of a manufacturer declaration or proven compliance to the ECMA-10968 (ISO 929669) specification.

2.2.11.3 Further background after AHWG meeting

During consultation several stakeholders commented that some requirements in the initially proposed core criterion were more stringent than those in the comprehensive criterion. The stakeholders also noted that this situation had occurred because some of the older Blue Angel requirements used in the core criterion were more stringent that newer Blue Angel criteria used in the comprehensive criterion. The stakeholders recommended harmonizing the EU GPP (core and comprehensive) criteria with the newest Blue Angel criterion.

It has been decided to accept the comments and for the second proposal the original core criterion based on the older Blue Angel specification has been removed.

[68] Standard ECMA-109 Declared Noise Emission Values of Information Technology and Telecommunications Equipment
[69] ISO 9296:2017 Acoustics - Declared noise emission values of information technology and telecommunications equipment

2.2.12 Hazardous substances requirements

The existing EU GPP specification does not include any requirements on hazardous material content.

For the AHWG meeting criteria on hazardous substances were proposed. In the proposal the core sub-criterion on Substances of Very High Concern has been revised after the meeting as follows:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
SELECTION CRITERIA	
	SC1 Restricted Substance Controls The tenderer must demonstrate implementation of a framework for the operation of Restricted Substance Controls (RSCs) along the supply chain for the products to be supplied. Product evaluations according to the RSCs should, as a minimum, cover the following areas: - Product planning/design; - Supplier conformity; - Analytical testing. The RSCs must apply, as a minimum, to REACH Candidate List substances and RoHS restricted substances. The IEC 62474 material declaration database* must be used as the basis for identifying tracking and declaring specific information about the composition of the products to be supplied. The RSCs must be used to ensure that the tenderer is aware of the presence or non-presence of substances that are listed in the IEC 62474 database. Supplier declarations of conformity with the RCSs must be collected and maintained up-to-date for relevant materials, parts and sub-assemblies of the products to be supplied. These may be supported, where appropriate, by supplier audits and analytical testing. The RSCs procedures must ensure that product and supplier compliance is re-evaluated when: - restricted substance requirements change; - supplied materials, parts and sub-assemblies change; - manufacturing and assembly operations change. Implementation of the RCSs must be with reference to the guidance in IEC 62476 or equivalent and the IEC 62474 material declaration database *****_International Electrotechnical Commission (IEC), IEC 62474: Material declarat_ion for products of and for the electrotechnical industry**,** http://std.iec.ch/iec62474 **Verification:** *The tenderer must provide documentation, which describes the system, its procedures and*

	proof of its implementation. *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
TS11 Substances of Very High Concern No REACH Candidate List substances are to be intentionally added as constituents to the plastics in casings and casing parts. The requirements also apply to recycled material. Compliance to be ensured for the latest version of the SVHC list available at the moment of tendering. **Verification:** *The tenderer must provide a declaration of compliance with the criterion.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*	**TS11 Substances of Very High Concern** No REACH Candidate List substances are to be intentionally added as constituents to the plastics in following parts: – Casing and casing parts – Circuit boards, – Display unit (including backlighting), – Scanning units (including backlighting), – External control panel, – External AC and DC power cords (including adapters and power packs). The requirements also apply to recycled material Compliance to be ensured for the latest version of the SVHC list available at the moment of tendering. **Verification:** *The tenderer must provide a declaration of compliance with the criterion.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*
	TS12 Hazardous substances content • Halogenated polymers and halogenated organic compounds for their use as flame retardants are not permitted. Exempted from this requirement are: ○ Fluorinated organic additives (as, for example, anti-dripping agents) used to improve the physical properties of plastics, provided that they do not exceed 0.5% w/w. ○ Fluorinated polymers as, for example, PTFE. ○ Plastic parts with a mass equal to or less than 25 grams. However, these must not contain PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenyl ethers) or chlorinated paraffins. (This exemption does not apply to control panel keys.) ○ Special plastic parts located close to heating and fuser elements. These parts must, however, not contain PBBs, PBDEs or chlorinated paraffins. • No substances are to be intentionally added as constituents to the plastics which meet at least one of the conditions set out in following table: **Conditions for the exclusion of substances from materials in casings and casing parts.**

Hazard class	Hazard category	CLP-regulation (EC) No. 1272/2008
Carcinogenicity	Carc. 1A, 1B	H350 May cause cancer
Carcinogenicity	Carc. 1A, 1B	H350i May cause cancer if inhaled
Germ cell mutagenicity	Muta. 1A, 1B	H340 May cause genetic damage
Reproductive toxicity	Repr. 1A, 1B	H360 May damage fertility or the unborn child

The requirements also apply to recycled material.

- The support material of printed circuit boards must not contain PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenyl ethers) or chlorinated paraffins.

Verification:
The tenderer must provide documentation, which proves that the requirement has been met. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.

2.2.12.1 Background for the proposed criteria

Most electronics products, including imaging equipment, contain at least some hazardous ingredients. Of particular concern are for instance heavy metals (e.g. mercury, cadmium, lead) and certain flame retardants in plastics. A number of other substances found on the Candidate List of Substances of Very High Concern (SVHC) and REACH Annex XIV (List of Substances Subject to Authorization) are also likely to be present in some imaging equipment products.
Hazardous material content data for imaging equipment is addressed in a number of environmental initiatives (Blue Angel, Nordic Swan, ECMA 370, EPEAT).

Most of these hazardous ingredients are unlikely to be emitted to the environment during a product's useful life as they are found in internal components. Nevertheless, in some cases hazardous substances may be emitted to the environment during end-of-life processing, depending on the amount and type of initial hazardous content and the specific end-of-life processing which takes place[70]. In order to minimize this risk is considered relevant to address

[70] The EU has taken a number of initiatives to address the hazardous waste issues. e.g. the RoHS Directive 2002/95/EC, the Stockholm convention, the Waste Shipment Regulation and the original and revised WEEE Directives

hazardous substances in the revised GPP criteria, especially for the procurers who would like to establish more ambitious requirements (i.e. through GPP comprehensive criteria).

The most important criteria from other initiatives used to inform the EU GPP criteria can be seen in the tables below.

Table 22.: EPEAT Hazardous material content criteria

Criterion Number and Title	Criterion Text
4.1.3.1 Required—Reporting on amount of mercury content in light sources	*Manufacturer must report the number of mercury containing light sources in the product and the mercury content per light source. Data may be reported in accordance with the ranges of the following list:* *− 0 mg (less than lower limit of detection)* *− > 0 mg to ≤ 5 mg* *− > 5 mg to ≤ 10 mg* *− > 10 mg to ≤ 50 mg* *− > 50 mg to ≤ 100 mg* *− > 100 mg to ≤ 1 g* *− Greater than 1 g* *For products that do not contain light sources, the manufacturer may declare "Not applicable" on the MSE Registry.*
4.1.3.2 Optional—Use of non-mercury containing light sources	*No intentionally added mercury in light sources. Light source employs a technology that is documented not to require the presence of mercury.*
4.1.4.1 Optional—Reduction of substances on the EU REACH Candidate List of SVHCs	*A product must not contain substances included in the Candidate List of Substances of Very High Concern (SVHC) and REACH Annex XIV (List of Substances Subject to Authorization) above the 0.1% weight by weight threshold as described by the current European Chemicals Agency "Guidance on Articles" document or the REACH regulation. The manufacturer must demonstrate absence (less than 0.1% weight by weight in the product) of substances on the Candidate List of SVHC that have a Date of Inclusion on the candidate list of one year or more prior to the date he product in question is first registered. External attachments and associated accessories that ship with the product being registered must also not contain SVHCs above 0.1% weight by weight of the individual attachment or accessory.*
4.1.6.1 Required—Reducing BFR/CFR/PVC content of external plastic casings	*External plastic casings greater than 25 g must contain no more than 0.1% weight (1000 ppm) bromine and 0.1% weight. (1000 ppm) chlorine attributable to brominated flame retardants (BFRs), chlorinated flame retardants (CFRs), and polyvinyl chloride (PVC) with the following exceptions:* *− Parts containing 25% or more postconsumer recycled content are permitted up to 0.3% weight (3000 ppm) bromine and 0.3% weight (3000 ppm) chlorine.* *− Uses of brominated or chlorinated substances that are not classified as BFRs, CFRs, or PVC are allowed, but their use must be documented if the bromine or chlorine content exceeds the applicable threshold.* *− External plastic casings for external power supplies.*
4.1.6.2 Optional—Eliminating or reducing BFR/CFR content of printed circuit board laminates	*All printed circuit board laminates included in the product excluding components soldered or affixed to the printed circuit board laminates must contain no more than 0.1% weight (1000 ppm) bromine and 0.1% weight (1000 ppm) chlorine attributable to BFRs and CFRs, with the following exception:* *− Uses of brominated or chlorinated substances that are not classified as BFRs or CFRs are allowed, but their use must be documented if the bromine or chlorine content exceeds the applicable threshold.*

4.1.6.3 Optional—Eliminating or reducing BFR/CFR/PVC content of product	*All plastic materials within the product must contain no more than 0.1% weight (1000 ppm) bromine and 0.1% weight (1000 ppm) chlorine attributable to BFRs, CFRs, and PVC with the following exceptions:* *− Parts containing 25% or more postconsumer recycled content are permitted up to 0.3% weight (3000 ppm) bromine and 0.3% weight (3000 ppm) chlorine.* *− Uses of brominated or chlorinated substances that are not classified as BFRs, CFRs, or PVC are allowed but their use must be documented if the bromine or chlorine content exceeds the applicable threshold.*

Table 23.: Blue Angel (RAL-UZ-205)[6] hazardous material content criteria

<table>
<tr><th>Criterion Number and Title</th><th>Criterion Text</th></tr>
<tr><td>3.2.1 Hazardous substances in casings and casing parts</td><td>
Halogenated polymers and halogenated organic compounds for their use as flame retardants are not permitted.
Exempted from this requirement are:

Fluorinated organic additives (as, for example, anti-dripping agents) used to im-prove the physical properties of plastics, provided that they do not exceed 0.5% w/w.
Fluorinated polymers as, for example, PTFE.
Plastic parts with a mass equal to or less than 25 grams. However, these must not contain PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenyl ethers) or chlorinated paraffins. (This exemption does not apply to control panel keys.)
Special plastic parts located close to heating and fuser elements. These parts must, however, not contain PBBs, PBDEs or chlorinated paraffins.
Large-sized plastic parts which are reused as can be proven and which are marked according to 3.1.1.2, Table 2, no. 9. They must not, however, contain PBBs, PBDEs or chlorinated paraffins.

Flame retardants used in plastic parts with a mass greater than 25 grams are to be confidentially reported to the RAL and identified by their CAS number.
In addition, no substances are to be intentionally added as constituents to the plastics which meet at least one of the conditions set out in Table 5:
Table 5: Conditions for the exclusion of substances from materials in casings and casing parts
<table>
<tr><th>Hazard class</th><th>Hazard category</th><th>CLP-regulation (EC) No. 1272/2008</th></tr>
<tr><td>Carcinogenicity</td><td>Carc. 1A, 1B</td><td>H350 May cause cancer</td></tr>
<tr><td>Carcinogenicity</td><td>Carc. 1A, 1B</td><td>H350i May cause cancer if inhaled</td></tr>
<tr><td>Germ cell mutagenicity</td><td>Muta. 1A, 1B</td><td>H340 May cause genetic damage</td></tr>
<tr><td>Reproductive toxicity</td><td>Repr. 1A, 1B</td><td>H360 May damage fertility or the unborn child</td></tr>
<tr><td colspan="3">Substances of the so-called candidate list according to REACH Article 59. The version of the candidate list at the point of application applies.</td></tr>
</table>
The requirements also apply to recycled material.
</td></tr>
<tr><td>3.2.2 Hazardous Substances in Printed Circuit Boards</td><td>The support material of printed circuit boards must not contain PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenyl ethers) or chlorinated paraffins.</td></tr>
</table>

EPEAT contains a criterion which requires that products contain less than 0.1% by weight of substances on the REACH Candidate List. As of May 2017, 49% of the 1832 imaging equipment models registered with EPEAT were shown to meet this requirement. The EPEAT scheme also includes a criterion on the identification of intentionally added chemicals residing in products. Under the EPEAT criterion manufacturers must declare if they have identified the presence, within their products, of the Joint Industry Guide 101 (JIG-101)[71] or IEC 62474[72] declarable substance lists in concentrations above the thresholds noted in the latest published revisions of those initiatives. It should be noted that the IEC 62474 list has formally replaced the JIG-101.The Blue Angel RAL-UZ-205 specification also includes criteria which address substances on the REACH candidate list but also includes additional hazardous substances limitations. Substances restricted within the Blue Angel label include:

- Halogenated polymers and halogenated organic compounds for their use as flame retardants are not permitted (exemptions apply).
- Substances of the so-called candidate list according to REACH Article 59. The version of the candidate list at the point of application applies.
- Support material of printed circuit boards must not contain PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenyl ethers) or chlorinated paraffins

Given the relevance of addressing hazardous substances in imaging equipment, and the fact that the issue is covered by other environmental initiatives, it was suggested **for the first proposal** to include in the revised GPP a hazardous substances content technical specification criteria to limit possible impacts from their release, particularly at the products' end-of-life. It is recognized that hazardous material criteria including "white lists" of acceptable substances would be preferable to criteria which restrict some substances. However, there is currently no widely acceptable list of substances that could be referenced in a "white list" approach. Future versions of the GPP criteria should investigate this approach further to understand if such lists of acceptable substances are widely available.

The current EU GPP criteria on computers and monitors include a selection criterion (SC1) which requires that suppliers have implemented a framework for the operation of Restricted Substance Controls (RSCs) along their supply chains. It was proposed that the revised EU GPP specification of imaging equipment also includes this as a selection criterion for comprehensive level at this first proposal. More information on how extended is the use of Restricted Substance Controls (RSCs) for IE industry would be needed in order to set a proposal at core level. Imaging equipment manufacturers are increasingly aware that they need to understand and control hazardous material content of products. This is witnessed by the registration of large numbers of products within schemes that include restrictions on hazardous material content. Manufacturers would need to develop a supply chain management system to effectively control hazardous material content of products. As such, it is assumed that most manufacturers that claim restrictions of hazardous materials in their products would be able to meet the proposed selection criterion.

In addition, it was suggested to include a technical specification (core and comprehensive) (TS11 "Substances of Very High Concern") which excluded substances of very high concern present at a concentration of greater than 0.1% (by weight) in the whole product and in a number of defined sub-assemblies. Furthermore, a second technical specification (only comprehensive) (TS12 "Hazardous substances content") reflected the more ambitious requirements laid out in the new Blue Angel (hazardous material content criteria).

There are unlikely to be any additional costs associated with compliance to the core criterion. Some additional costs may be associated with use of the comprehensive criterion given the potential lower number of complaint products on the market. Any additional costs associated

[71] http://www.ipc.org/4.0_Knowledge/4.1_Standards/Free/JIG-101-Ed-4.0.pdf
[72] IEC 62474 - Material Declaration for Products of and for the Electrotechnical Industry

with use of the comprehensive criterion will likely reduce over time as manufacturers ensure that their products are compliant with the new Blue Angel specification.

2.2.12.2 Background for the proposed verification

Manufacturers will be able to verify compliance with the criteria through submission of documentation showing that products have been tested to the appropriate test procedures, or equivalent, and meet the hazardous material content requirements (where relevant). This documentation could take the form of a manufacturer declaration or proven compliance to the Blue Angel RAL-UZ-205 specification (where relevant) or other type of ISO type I label fulfilling the respective requirements.

As of March 2018, 38% of the products registered in the EPEAT imaging equipment database met the EPEAT criterion on identification of hazardous substances within the IEC 62474 declarable substance list.

2.2.12.3 Further background after AHWG meeting

During consultation, several stakeholders commented on SC1 stating that the criterion was too ambitious, and should either be deleted or changed to an award criterion.
In addition, one stakeholder suggested referencing the ISO 1043 standards rather than IEC 62474.

However, no changes have been introduced in the SC1 as a result of the consultation. The SC1 is kept as comprehensive technical specification criterion, which is designed to highlight best practices. With regard to the standards, the study team reviewed the indicated documents and identified some benefits of the IEC approach over referencing the ISO standard. The IEC 62474 - Material Declaration for Products of and for the Electrotechnical Industry and the associated database are regularly updated. In addition, the IEC standard appears to cover a wider range of substances that the ISO standard. As such, it does not seem appropriate to change the reference to the ISO standard.

Stakeholders also provided comments on TS11 “Substances of Very High Concern”, which focussed on requests to harmonize with Blue Angel as the current core criterion was seen as too ambitious. Against this, it has been decided to move the first proposed criterion to comprehensive and develop a new core criterion aligned with Blue Angel restrictions on REACH candidate list which only applies to casing and casing parts. This alteration ensured that procurers could choose a more ambitious criterion if desired but also allowed more products to meet the core criterion. One stakeholder pointed out that the candidate list is updated every 6 months. Therefore the text has been clarified to reflect that compliance is requested at the moment of tendering. In addition, there is a dynamic link in the criteria to the SVHC candidate list, so there is no problem when the list is updated.

With regard to TS12 “Hazardous substances content”, two stakeholders provided stated that it was too ambitious. However, as the requirement is based on Blue Angel requirements, and there are large numbers of products registered with Blue Angel, potential impacts on product availability would likely be minimal. This criterion has been revised to reflect the listed requirements included in Blue Angel.

2.2.13 Firmware Update Control

The existing GPP specification on imaging equipment does not tackle control of firmware updates. For the AHWG meeting a comprehensive criterion was proposed. The requirement has been revised after the meeting as follows:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
	TS13 Firmware update control The imaging equipment must include functionality allowing firmware updates to be rolled back to previously installed versions. This functionality may be provided through a network connected computer or within the imaging equipment itself. Instructions detailing how firmware updates can be rolled back must be provided in the technical documentation. If the previous version of the firmware is made openly available on the internet, from the time it is first released, and users are provided clear instructions on where this can be located, then the objectives of the criterion are met. **Verification:** *The tenderer must provide documentation, which identifies that the requirement has been met. Documentation may consist of a manufacturer declaration or other alternative means of documentation that provide the necessary information.*

2.2.13.1 Background for the proposed criteria

The possibility to control firmware would give the end-users control over any updates that interfered with the operation of their imaging equipment. This is an important consideration given that some manufacturer firmware updates sent to imaging equipment in use have resulted in the ability to no longer use remanufactured consumables.[73] Therefore, for the first proposal, it was suggested to include a criterion on firmware control to ensure that public authorities can maintain the option to use remanufactured consumables. The criterion was listed as comprehensive due to uncertainties surrounding market availability of this option. None of the main schemes used as background for the EU GPP criteria includes this kind of criterion.

Any additional costs from facilitating user control of software updates would likely be minimal for manufacturers and have no negative costs implication for procuring authorities. Procuring authorities could see savings because of continued available use of remanufactured cartridges.
It is currently unclear how many imaging equipment manufacturers support the rolling back of firmware updates. At least one imaging equipment manufacturer has provided users with the ability to disable software updates that have limited the ability to use remanufactured cartridges.[74] Given that one manufacturer has afforded users the ability to remove software it suggests that other manufacturers could provide the same service.

[73] Bit-tech, 2017, *HP re-releases third-party ink cartridge lock-out firmware*, available from https://www.bit-tech.net/news/tech/peripherals/hp-re-releases-third-party-ink-cartridge-lock-out-firmware/1/

[74] HP, 2017, *HP Inkjet Printers - Dynamic Security Feature Affecting Cartridges Using Non-HP Security Chip*, available from https://support.hp.com/us-en/product/hp-officejet-pro-8610-e-all-in-one-printer-series/5367603/model/5367606/document/c05308850/

2.2.13.2 Background for the proposed verification

Tenderers must provide documentation (manufacturer declaration or other alternative means of documentation) which identifies that the users are afforded the ability to roll back firmware updates.

2.2.13.1 Further background after AHWG meeting

Stakeholders provided a range of comments with regard to this criterion. In particular, stakeholders expressed some concerns about security impacts and potential non-compliance with the General Data Protection Regulation (GDPR) ((EU) 2016/679). They asked for it to be deleted. .

However no relevant changes with this regard have been introduced in the criterion. The market availability of option on firmware control has not been well established and so it was included as a comprehensive rather than core criterion. The requirements of the General Data Protection Regulation ((EU) 2016/679); called later GDPR, became enforceable in May 2018. It is assumed that any software placed on imaging equipment is already compliant with the requirements of the mentioned regulation. The criterion does not require that users block firmware updates, but rather they have the ability to roll back firmware updates that may have caused for instance interoperability issues with remanufactured consumables. Manufacturers would retain the ability to notify product users of any potential conflicts with the GDPR Regulation arising as a result of downloading a previous version of firmware. That is, manufacturers will be able to ensure that their customers take on the responsibility for any GDPR Regulation compliance if they choose to revert to an older version of firmware. This would provide manufacturers with an exemption from any GDPR Regulation compliance issues.

Stakeholders also requested that if old versions of the firmware are available on the internet then this should be seen as a compliant action as not all imaging equipment has a rollback function. With this regard, additional text has been added. It was also clarified that the firmware needs to be made available from the time it is first released. This is to limit the chance that there is a delay in publishing the previous version of the firmware.

2.2.14 Warranty and service agreements

The existing EU GPP criteria include a product longevity and warranty criterion. This requests repair and replacement warranty for a period of five years including availability of spare parts.
For the first proposal criteria on warranty and service agreements were proposed. The criteria have been revised after the AHWG meeting as follows:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
[*This criterion is not relevant for contracts including maintenance****]*** **TS14 Warranty** The tenderer must also provide a minimum two-year warranty, free of additional costs, effective from delivery of the product. This warranty must cover repair or replacement. The warranty must ensure that the products are in conformity with the contract specifications at no additional cost. **Verification:** *A copy of the warranty and service agreement*	***[****This criterion is not relevant for contracts including maintenance****]*** **TS14 Warranty and service agreements** The tenderer must provide a minimum three-year warranty, free of additional costs, effective from delivery of the product. This warranty must cover repair or replacement and include a service agreement with options for pick-up and return or on-site repairs. The warranty must guarantee that the products are in conformity with the contract specifications at no additional cost. The warranty must not be invalidated as a result of non-OEM

must be provided by the tenderer. They must provide a declaration that they cover the conformity of the goods with the contract specifications.	cartridges or containers being used in imaging equipment unless it is proven that any malfunction or damage was directly caused by the use of a non-OEM cartridge or container. **Verification:** *A copy of the warranty and service agreement must be provided by the tenderer. They must provide a declaration that they cover the conformity of the goods with the contract specifications.*
AWARD CRITERIA	
Core criteria	**Comprehensive criteria**
Option 1 **AC3(a) Longer warranties** Points will be awarded to each additional year of warranty offered that is more than the minimum technical specification. A maximum of x points [to be specified] may be awarded**.** **□ +4 years or more: x points** **□ +3 years: 0.75x points** **□ +2 years: 0.5x points** **□ +1 year: 0.25x points** **Verification:** *A copy of the warranty must be provided by the tenderer.*	
Option 2 **AC3(b) The longest warranty** Points will be awarded to the tenderer that provides the longest warranty amongst all bidders. A maximum of x points [to be specified] may be awarded. **Verification:** *A copy of the warranty must be provided by the tenderer.*	

2.2.14.1 Background for the proposed criteria

Repair and maintenance are key aspects for assuring a product's longevity according to its predicted lifetime. If the product lifetime is reduced due to failure, more environmental impacts will arise from manufacturing of new products as a cause of replacement.
Warranty coverage needs to be in place for accessing free repair and maintenance of imaging equipment products. However, the existing legal warranty scheme in the EU requires products to be covered for a period of 2 years[75] including repair for consumer products.
According to authors knowledge, there is no EU wide legislation which requires a minimum guarantee period for non-consumer products. Some Member States have specific legislation covering commercial warranties.[76]

Still, even in consumer products warranties, some particular aspects such as the use of non-OEM cartridges may prevent being able to benefit from the warranty terms, and it is thus important to ensure that the 2-years legal period includes using such cartridges. This will also incentivize the use of refilled and remanufactured cartridges, which according to evidence in the preliminary report[2] reduces the environmental impacts significantly as being one of the life cycle hotspots of imaging equipment products.

Placing requirements on extended product warranties is unlikely to result in any negative trade-offs with other impact areas. Conversely, the existence of warranties on products may encourage manufacturers to improve durability to reduce costs associated with product returns.

[75] https://europa.eu/youreurope/citizens/consumers/shopping/guarantees-returns/index_en.htm
[76] For instance the United Kingdom "The Sale of Goods Act"

Blue Angel, EPEAT and Nordic Swan include a criterion addressing early lifetime and warranties. The most important of these, from the perspective of informing the development of the EU GPP criteria can be found in the table below.

Table 24.: Product lifetime criterion in other initiatives

environmental initiative	Criterion Text
EPEAT	***4.4.1.1 Required—Early failure process:*** *Manufacturer must make available to the customer procedures as to how the manufacturer or its designee must troubleshoot, repair, or replace a product that fails prior to 3 years after date of sale for institutional products and 1 year after date of sale for consumer products. These procedures must be easily accessible to customers on the manufacturer's website or in the documentation that accompanies the product at the point of sale.*
Blue Angel[6]	***3.1.5.1 Information regarding supposed service life:*** *The distributor informs in the information and data sheet about the typical service life span or use intensity (e.g. in printed pages), which the device is designed for in its default configuration assuming typical user behaviour. The manufacturer must define the assumed typical use conditions in the information and data sheet.*

EPEAT includes a requirement which states that manufacturers should provide information to customers regarding procedures for troubleshooting, repair, or replacement of product that fails prior to 3 years after date of sale for institutional products and 1 year after date of sale for consumer products. Blue Angel states that manufacturers must provide information about the typical service life span or use intensity (e.g. in printed pages), which the device is designed for in its default configuration assuming typical user behaviour. As such neither of the major initiatives require a defined warranty period.

Although it may be problematic to require a certain warranty period, especially for smaller devices, for office use, though, there are some standard practices in terms of service provision and warranty, but these may be limited to certain types and/or sizes or to specific services. Considering the importance of warranty coverage for the provision of repair services, for the AHWG meeting discussions it was proposed to keep the existing EU GPP criterion in force with following modifications:

- The core criterion reduces the warranty period to two years to reflect current market practices.
- A new comprehensive criterion extends the required warranty period to three years and ensures that warranties cannot be automatically invalidated through usage of remanufactured consumables.
- In addition, award criterion was proposed, which rewards suppliers with longer standard warranty period.

Only one of the imaging equipment manufacturers (Kyocera) provides a two-year warranty as standard (i.e. no fees involved), with most of the remaining manufacturers offering extended warranties (i.e. additional purchase required) meeting the two-year requirement. The need to purchase an extended warranty will increase upfront purchase costs for public bodies but the extended coverage could save costs in the long term due to product failures being covered.

2.2.14.2 Background for the proposed verification

Suppliers can prove compliance against this criterion through documentation which details the warranty period, and any associated conditions, for each model of imaging equipment included in their offer.

Most of the large imaging equipment manufacturers operating in the EU market provide warranties on their products. The extent of these warranties can vary in terms of both scope and duration. Below table illustrates the standard and enhanced warranty periods as advertised by the largest imaging equipment manufacturers on the EU market.

Table 25.: Imaging equipment warranty periods

Imaging equipment manufacturer	Standard warranty duration (years)	Enhanced warranty duration (max) (years)
Brother	1	3
Canon	unclear	1
EPSON	1	3
HP	unclear	3
Konica Minolta	1	5
KYOCERA	2	5
Lexmark	1	5
OKI	1	3
RICOH	1	Unclear
SHARP	unclear	Unclear
TOSHIBA	unclear	Unclear
Xerox	1	Lifetime of product (where consumables purchased from Xerox)

2.2.14.3 Further background after AHWG meeting

There were a few comments received with regard to this criterion (see detailed comments and responses in annex 1). The wording of the criteria has been revised and clarified. Core criterion refers only to warranties while the comprehensive one covers further service agreements.

2.2.15 End-of-life management services

The existing EU GPP specification on imaging equipment does not place requirements on service providers to guarantee the provision of a take back system for used imaging equipment.

Second criteria proposal	
Core criteria	**Comprehensive criteria**
AWARD CRITERIA	
AC4 Take-back system for imaging equipment *This criterion should be used in conjunction with Contract Performance Clause CPC2.* Points must be awarded to a tenderer who offers a take back system for used imaging equipment, at no cost to the procuring authority, with the aim to channel such equipment for reuse of the equipment or its parts, or for material recycling with preference given to reuse. The tenderer may fulfil these obligations themselves or via a suitable third-party organisation. **Verification:** *The tenderer must provide documentation, which states that a free take back system will be provided. Equipment holding a relevant*	**AC4 End-of-life management of imaging equipment** *This criterion should be used in conjunction with Contract Performance Clause CPC2.* Points must be awarded to a tenderer who provide a re-use and recycling service of the whole product or of components requiring selective treatment in accordance to Annex VII of WEEE Directive for equipment that has reached the end of its service life at no cost to the procuring authority. The service shall comprise the following activities: - Collection; - Confidential handling and secure data erasure (unless carried out in-house); - Functional testing, servicing, repair and upgrading to prepare products for re-use[*] ; - Dismantling for component re-use, recycling and/or disposal.

Type I Eco-label fulfilling the specified requirements will be deemed to comply.	Preparation for re-use, recycling and disposal operations must be carried out in full compliance with the requirements in Article 8 and Annexes VII and VIII of the (recast) WEEE Directive 2012/19/EU and with reference to the list of components for selective treatment [see accompanying explanatory note]. The tenderer may fulfil these obligations themselves or via a suitable third-party organisation. **Verification:** *The tenderer must provide details of the arrangements for collection, data security, preparation for re-use, remarketing for re-use and recycling/disposal. This must include, during the contract, valid proof of compliance for the WEEE handling facilities to be used.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.* [*]Some Member States have developed standards and/or schemes that public authorities may wish to refer to in order to provide greater detail on how equipment shall be made suitable for reuse and resale.
	EXPLANATORY NOTE: Components requiring selective treatment in accordance to Annex VII of the WEEE Directive • Mercury containing components, • Batteries, • Printed circuit boards greater than 10 cm2, • Plastic containing brominated flame retardants, • Chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC) or hydrofluorocarbons (HFC), hydrocarbons (HC), • External electric cables, • Polychlorinated biphenyls (PCB) containing capacitors • Components containing refractory ceramic fibres • Electrolyte capacitors containing substances of concern • Equipment containing gases that are ozone depleting or have a global warming potential (GWP) above 15 • Ozone-depleting gases must be treated in accordance with Regulation (EC) No 1005/2009.
CONTRACT PERFORMANCE CLAUSES	
Core criteria	**Comprehensive criteria**
CPC2 Reporting on reuse/recycle activities of imaging equipment *This criterion should be used in conjunction with Award Criterion AC 5.* The contractor must provide records regarding the end-of-life of used imaging equipment.	

In particular the recording must detail:
- number of equipment taken back from the procuring authority,
- number of equipment/parts, as appropriate, channelled for reuse,
- number of equipment/parts, as appropriate, channelled for material recycling.

2.2.15.1 Background for the proposed criteria

As electronic products, imaging equipment falls within the scope of the Waste Electrical and Electronic Equipment (WEEE) 2012/19/EU Directive.[77] The WEEE Directive regulates the separate collection, treatment and recycling of end-of-life electrical and electronic equipment, which includes imaging equipment within category 3 "IT and telecommunications equipment".
It sets collection, recycling and recovery targets for all types of electrical goods, which EU member states are obligated to achieve. It requires that 80% of imaging equipment is recovered and 80% is prepared for re-use and recycling. For small equipment with no external dimension more than 50 cm the targets 75% for recovery and 55% for recycling[78].

The provision of a take-back scheme could contribute to improvement of environmental impacts associated with manufacture of new equipment due to better channeling of used products for reuse of parts or entire equipment after repair or refurbishment, if necessary, or for remanufacturing.

As this is not certain that such take back practices are well developed in the procurement, for the first proposal it was suggested to set this criterion as a comprehensive award one in order to promote such practices but not to be too demanding. In addition, a contract performance clause to monitor the criterion was suggested.

2.2.15.2 Background for the proposed verification

As a proof of verification the tenderer should provide documentation which confirms that such a free take back system will be provided by the tenderer or a third party sub-contracted by them. Documentation may consist of a manufacturer declaration, proof of compliance to an appropriate environmental scheme which includes the same requirement or other alternative means of proof that provide the necessary information.

2.2.15.3 Further background after AHWG meeting

Stakeholders comments on "take-back system for imaging equipment" centred on the fact that imaging equipment is already covered by the WEEE directive and so claimed that the criterion is superfluous. Other stakeholders suggested that the criterion should be separated into high-end and low-end equipment. These suggestions have been rejected as the criterion is and award criterion and so does not need to be met by all suppliers. In addition, the criterion aims to promote suppliers that extend their product end of life responsibilities.

One stakeholder raised a concern about the term "free" used in the criterion as it was not defined. Some clarifications have been added in the text.

Another stakeholder raised concerns about the provision of take back systems not being enough to optimise end of life practices. Considering this comment it was decided to keep the criterion on take-back system provision on the core level and to propose a more ambitious comprehensive criterion, which goes beyond the provision of a take-back system and covers

[77] European Commission, Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), available from http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32012L0019
[78] Summary document of the Waste electrical and electronic equipment rates and targets, available for download at: https://ec.europa.eu/eurostat/documents/342366/351758/Target-Rates-WEEE/b92a549c-7230-47ba-8525-b4eec7c78979.

additionally provision of re-use and recycling services. This proposal is aligned with the criterion included in the EU GPP criteria for Computers and Monitors[61].

2.2.16 Supply of paper and imaging equipment consumables

The goal of these criteria is to promote the use of environmental preferable paper and imaging equipment consumables, when those are supplied together with imaging equipment.

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATION	
(when copy and graphic paper supply is included in the imaging equipment supply contract) **TS15 (a) Supply of copy and graphic paper meeting the EU GPP criteria** Copy and graphic paper offered by the tenderer in the frame provision of imaging equipment must comply with Core Technical Specifications of the EU Green Public Procurement criteria for Copying and graphic paper[79]. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.*	*(when copy and graphic paper supply is included in the imaging equipment supply contract)* **TS15 (a) Supply of copy and graphic paper meeting the EU GPP criteria** Copy and graphic paper offered by the tenderer in the frame provision of imaging equipment must comply with Comprehensive Technical Specifications of the EU Green Public Procurement criteria for Copying and graphic paper[79]. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above*
(when imaging equipment consumables supply is included in the imaging equipment supply contract) **TS15 (b) Supply of consumables meeting the EU GPP criteria** Consumables offered by the tenderer in the frame of provision of imaging equipment must comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.*	*(when imaging equipment consumables supply is included in the imaging equipment supply contract)* **TS15 (b) Supply of consumables meeting the EU GPP criteria** Consumables offered by the tenderer in the frame of provision of imaging equipment must comply with Comprehensive Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.*
AWARD CRITERIA	
Core criteria	**Comprehensive criteria**

[79] Available at: http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

(when cartridges and containers supply is included in the imaging equipment supply contract) **AC5 Supply of remanufactured cartridges/containers** Points must be awarded in proportion to the commitment to provide the highest percentage (share) of remanufactured cartridges/containers which comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.*	*(when cartridges and containers supply is included in the imaging equipment supply contract)* **AC5 Provision of remanufactured cartridges/containers** Points must be awarded in proportion to the amount of pages printed by remanufactured cartridges/containers which comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.*
CONTRACT PERFORMANCE CLAUSES	
Core criteria	**Comprehensive criteria**
(when cartridges or copy and graphic paper supply is included in the imaging equipment supply contract) **CPC3 Reporting on supplied consumables** The contractor must provide records regarding the provision of consumables specified in TS Supply of consumables, as appropriate, for: - copy and graphic paper meeting the EU GPP criteria (TS15 (a)), - consumables meeting the EU GPP criteria (TS15 (b)), - remanufactured cartridges and containers (AC5).	*(when cartridges or copy and graphic paper supply is included in the imaging equipment supply contract)* **CPC3 Reporting on supplied consumables** The contractor must provide records regarding the provision of consumables specified in TS Supply of consumables, as appropriate, for: - copy and graphic paper meeting the EU GPP criteria (TS15 (a)), - consumables meeting the EU GPP criteria (TS15(b)), - remanufactured cartridges and containers (AC5), - number of pages printed by remanufactured cartridges/containers that comply with EU GPP criteria Area 2.

2.3 Criteria area 2 – Imaging Equipment consumables

Criteria under this section can be used when purchasing imaging equipment consumables (see scope in chapter 1.3.1.2).

2.3.1 Cartridges/containers page yield

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
TS16 Cartridges/containers page yield declaration The expected page yield* must be declared for all cartridges/containers that will be supplied for use in the relevant imaging equipment. **Verification:** *The tenderer must provide documentation, which identifies page yields and associated test procedures used to derive the values. Measurement of page yield for inkjet and toner consumables should be carried out in accordance with the latest version of the following standards:* – *ISO/IEC 24711,* – *ISO/IEC 19752,* – *ISO/IEC 19798,* – *DIN 33870-1,* – *DIN 33870-2.* *or through other reliable, accurate and reproducible methods, which take into account the generally recognised state of the art.* *Documentation may consist of a manufacturer declaration or other alternative means of documentation that provide the necessary information. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*	
*Page yield – Measured number of images that may be produced by the cartridge/container.	

2.3.1.1 Background for the proposed criteria

Impacts related to the use of cartridges are among them imaging equipment three life cycle environmental hotspots identified in the preliminary analysis[80]. Depending on the printing technology, the relative contribution of life cycle environmental impacts from the use of cartridges becomes the second most important after the use of paper. When paper use is excluded from the system boundaries, the embodied impacts from the cartridges (i.e. from manufacturing) can become at least as important as the energy consumption during use, in terms of Global Warming Potential, Primary Energy Demand, Ozone Depletion, Acidification Potential, Eutrophication Potential, Resource Depletion Potential, amongst others.

By requiring tenderers to report page yield (i.e. the measured number of images that may be produced by the cartridge/container), it is expected that a level playing field is created, which can incentivise longer yields maintaining same printing quality (including refilled and remanufactured cartridges). The latter is of special importance, as the evidence shows printing quality is very important for use of paper (see preliminary report[2]). By doing this, impacts from new cartridge manufacturing will be avoided.

Page yield information is important for procuring authorities as it can help identify costs per printed page. Cartridges/containers with higher page yields tend to have lower costs per printed page. As such, providing procurers with indications of how many pages may be printed with each cartridge/container will assist in printed page cost calculations.
Reporting measured cartridge yield is only found in the EU Voluntary Agreement (see Table 26).

[80] For more details see Preliminary report at the project website: http://susproc.jrc.ec.europa.eu/imaging-equipment/.

Table 26.: EU Voluntary Agreement Consumable Yield Criterion

Criterion Number and Title	Criterion Text
6.6.2	Signatories must make information on inkjet and toner cartridge yield available to Customers based on the measurement standards specified, for example, in ISO/IEC 24711:2006 (for ink), ISO/IEC 19752:2004 (for monochrome toner), ISO/IEC 19798:2006 (for colour toner), and through other company methods.

In spite of being an important parameter affecting the life cycle environmental impacts of imaging equipment products as identified in the preliminary report (task 3)[2], this is not a common metric to report for compliance with environmental schemes. However, this is a common metric to benchmark cartridges and due to its influence on their overall environmental impacts (i.e. the lower yield, the more cartridges to buy), this issue is considered important. However, it is essential that the test methods applied to measure the yield are declared and that evidence is provided on how the yield was derived. Measurement standards already exist[81,82]:

- ISO/IEC 24711 Method for the determination of ink cartridge yield for colour inkjet printers and multi-function devices that contain printer components;
- ISO/IEC 19798 Method for the determination of toner cartridge yield for colour printers and multi-function devices that contain printer components.

For the first proposal it was suggested to introduce a core and a comprehensive technical specification requiring provision of cartridge/container yield data. In addition an award criterion titled extended page yield was proposed. The text of the award criterion included a formula which was developed as part of this revision project to promote improved material efficiency in consumables (i.e.; higher page yield for procurers with high printout needs) comparing cartridges provided by different tenderers.

2.3.1.2 Background for the proposed verification

The "page yield" of a cartridge, identifies the number of printed pages that are likely to be produced before a consumable reaches its end of life. The verification of the proposed page yield criterion is relatively straightforward given the existence of the ISO and DIN standards. It is normally measured according to:

- ISO/IEC 24711 - Method for the determination of ink cartridge yield for colour inkjet printers and multi-function devices that contain printer components
- ISO/IEC 19752 - Information technology -- Office equipment -- Method for the determination of toner cartridge yield for monochromatic electrophotographic printers and multi-function devices that contain printer components
- ISO/IEC 19798 - Information technology -- Office equipment -- Method for the determination of toner cartridge yield for colour printers and multi-function devices that contain printer components

The ISO standards provide a common printed output so that comparisons of page yields across different cartridges and containers can be made. The ISO series of standards identify page yields under specific test conditions and actual page yields witnessed by users may differ. The

[81] ISO/IEC 24711:2007 Method for the determination of ink cartridge yield for colour inkjet printers and multi-function devices that contain printer components, available at: https://www.iso.org/standard/50016.html

[82] ISO/IEC 19798:2007 Method for the determination of toner cartridge yield for colour printers and multi-function devices that contain printer components; available at: https://www.iso.org/standard/50015.html

difference between measured page yields, according to one of the ISO standards, and actual page yield differ depending on a variety of factors including:

- Page coverage – the percentage of paper that is covered by ink or toner
- Colour use – greater use of one colour over another can result in decreased yields
- Cartridge failure – the premature end of life of a cartridge/container
- Humidity – the humidity of the air in the immediate vicinity of the imaging equipment
- Print frequency – infrequent use of ink cartridges often results in the use of some ink to keep print nozzles clear

The following list of DIN series of standards which cover remanufactured cartridges/containers also cover page yields, reflecting the requirements in the ISO series of standards:

- DIN 33870-1 - Office machines - Requirements and tests for the preparation of refilled toner modules for electrophotographical printers, copiers and facsimile machines - Part 1: Monochrome[83]
- DIN 33870-2 - Office machines - Requirements and tests for the preparation of refilled toner modules for electrophotographical printer, copiers and facsimile machines- Part 2: 4-Colour-printers[84]

Suppliers offering alternative means of verification would need to demonstrate how the alternative method produced comparable results to the more established page yield test standards.

As the EU Voluntary Agreement on imaging equipment includes information reporting requirements on cartridge yield[85,86], most large OEMs therefore already communicate page yield data for their cartridges and containers and so an EU GPP criterion on this issue will not add any extra costs to these large OEMs. Smaller cartridge/container remanufacturers may encounter some additional costs as a result of the proposed EU GPP criterion on cartridge/container page yield. The expected impact of these costs is likely to be small. ETIRA members[87] test their cartridges using either the ISO or DIN standards.[88]

2.3.1.1 Further background after AHWG meeting

Stakeholder comments with regard to technical specifications centred on the fact that the ISO standards should be better referenced. The respective references have been included in the criteria text. In addition, it was decided to remove the initially proposed award criterion on extended page yield mainly due to difficulty in verification as the criterion required comparing cartridges provided by different tenderers. In addition resource efficiency is considered to be already comprehensively addressed by other criteria.

2.3.2 Consumable mass resource efficiency

A criterion on consumable mass resource efficiency does not exist in the currently valid EU GPP criteria. Based on the preliminary analysis it was however considered justified to set requirements in this area. The proposed formulation is as follows:

Second criteria proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
	TS17 Consumable mass resource efficiency

[83] https://www.din.de/en/getting-involved/standards-committees/nia/standards/wdc-beuth:din21:181049829
[84] https://www.din.de/en/getting-involved/standards-committees/nia/standards/wdc-beuth:din21:193881977
[85] EUROVAPRINT, Members, available at http://www.eurovaprint.eu/pages/members/
[86] Page 14, Industry Voluntary Agreement to improve the environmental performance of imaging equipment placed on the European market, VA v.5.2 April 2015, available from http://www.eurovaprint.eu/fileadmin/eurovaprint_files/pdfs/VA_version_5.2_April.pdf
[87] ETIRA – the European Toner and Inkjet Remanufacturers Association, http://www.etira.org/
[88] http://www.etira.org/cartridge-remanufacturing/quality-first/

The consumable mass resource efficiency, calculated according to equation (1) * must not be lower than the threshold indicated in below table:

Consumable Type	Minimum consumable mass resource efficiency
Toner cartridge or container & drum	$(2 \times [10 \times \tanh^{89}(0{,}1+0{,}0003 \times (C_{Mass}-10))-0.5]+1)$
Ink cartridge or container	$(2 \times [15 \times \tanh(0{,}2+0{,}0004 \times (C_{Mass}-8))-1]+2)$

$$Consumable\ mass\ resource\ efficiency = \frac{Page\ Yield}{C_{MASS}} \quad (1)$$

Where:

- **Page yield** is the measured number of images that may be produced by the consumable
- **Consumable mass** ($\mathbf{C_{Mass}}$) is the mass (g) of each cartridge or container (plus drum unit, if applicable), as measured in their to be installed condition (i.e. full of ink or toner and any additional components not present whilst installed in the imaging equipment removed).

Verification:

The tenderer must provide result of consumable mass resource efficiency calculation together with documentation, which identifies all page yields, associated test procedures used to derive the values, and the mass of all cartridges, containers and drum units designed for use in each imaging equipment model. Documentation may consist of a manufacturer declaration or other alternative means of documentation that provide the necessary information.

* measured number of images that may be produced by a consumable per gram of the consumable material

AWARD CRITERIA

AC6 Electrophotographic consumables mass resource efficiency

Points must be awarded for electrophotographic consumables (cartridges, containers and drum units) that minimise material use per yielded page. A maximum of x points [to be specified] may be awarded to the tenderer which offers the highest overall consumable resource efficiency value across all electrophotographic consumables for each model of imaging equipment. The resource efficiency should be calculated in accordance with the equation given in TS17. The results for each consumable should be summed to arrive at a total value. When different consumables are purchased, the value should be an average value across all products to be supplied.

Verification:

The tenderer must provide result of the consumable mass resource efficiency calculation together with documentation, which identifies the following for all cartridges/container and any separate drum units used in relevant electrophotographic imaging equipment:

- *Page yields*
- *Mass of full cartridges/containers*
- *Mass of separate drum units*

Documentation may consist of a manufacturer declaration or other alternative means of proof that provide the necessary information.

[89] Tanh = hyperbolic tangent

2.3.2.1 Background for the proposed criteria

The amount of material used in consumables results in lifecycle impacts from extraction to disposal. The extent of these lifecycle impacts will depend on the exact material composition of the consumable (i.e. what materials are included) and the total volume of materials used.

Consumable mass resource efficiency
There is significant variation in the amount of material used within consumables that provide the same or similar functionality. Plastics account for most of the materials used in most consumables and so any reduction in weight will reduce the amount of plastics used.

The Nordic Swan Version 6.3 includes a requirement that consumables (including packaging) must meet defined material efficiency requirements. The Nordic Swan criterion states that all consumables that the end user can change by themselves shall be listed with gross weight (Kg) including packaging and number of pages according to ISO/IEC 19752 and ISO/IEC19798. The mass of the consumable plus packaging is then divided by the page yield (according to the ISO standards) and must meet the ratio requirements. The requirements can be seen in
Table 27.

Table 27.: Nordic Swan version 6.3 consumable efficiency requirements [90]

Images Per Minute (IPM)	Monochrome application (Kg/1000 pages according to ISO/IEC 19752)	Colour application (Kg/1000 pages according to ISO/IEC19798)
IPM > 19	≤ 0,65	≤ 2
IPM ≤ 19	≤ 1	≤ 3

There are no known criteria within any other established environmental schemes which address consumable mass resource efficiencies.
Due to a lack of data, it was not possible to assess the level of ambition associated with the Nordic Swan criterion. As such, further investigations were made as part of this EU GPP project into consumable material efficiency based on a dataset with 571 products resulting in the criteria formulas proposed.

Whilst many manufacturers publish the packaged weight of cartridges/containers there is little data available for cartridges/containers as separate products. Manufacturers could collate cartridge/container weight data from either production or end of life processes. As such, market availability of cartridge/container weight data could become readily available if disclosure was promoted via the EU GPP criteria.

For the first revision it was suggested to include a criterion on consumable mass resource efficiency. To facilitate the development of the requirement, consumable weight data was secured from an EU based remanufacturer.[91] Yield data was compared to full weight data (i.e. full levels of ink or toner) for each consumable in the dataset. To aid the analysis the consumables were grouped into five main types:

- Toner container
- Toner drum units
- Toner cartridges
- Ink containers

[90] Nordic Ecolabelling of Imaging equipment Version 6.3 20 June 2013 – 31 December 2019
[91] Embatex Iberia S.L, personal communications.

- Ink cartridges

Each of the five main types of consumables was further subdivided into mono/black and colour. Two formulae were developed which ensured that approximately half of the consumables (of each type) met the efficiency requirements.

The figures below show the results of the analysis as well as the proposed criterion limit line. Consumables above the red line would be compliant with the criterion limit, with those below the line not meeting the requirement.

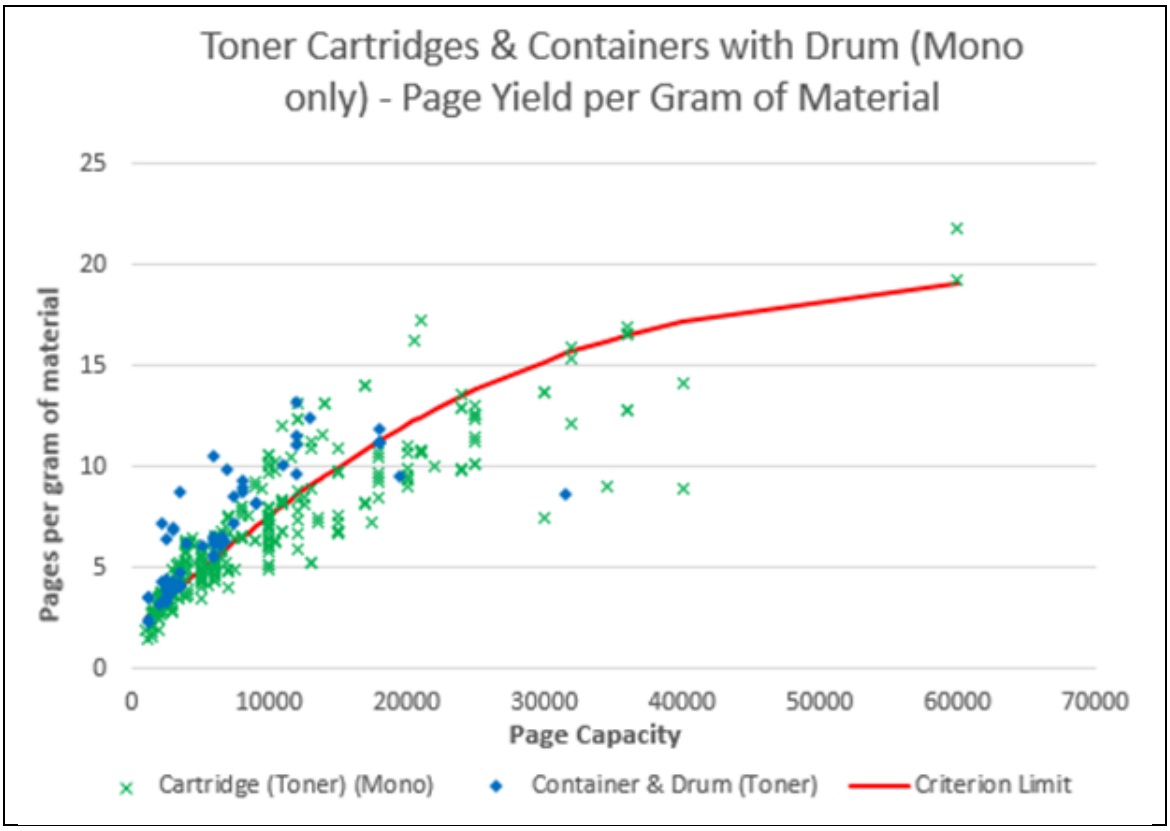

Figure 7.: Mass resource efficiency of mono toner cartridges and containers with associated drum units

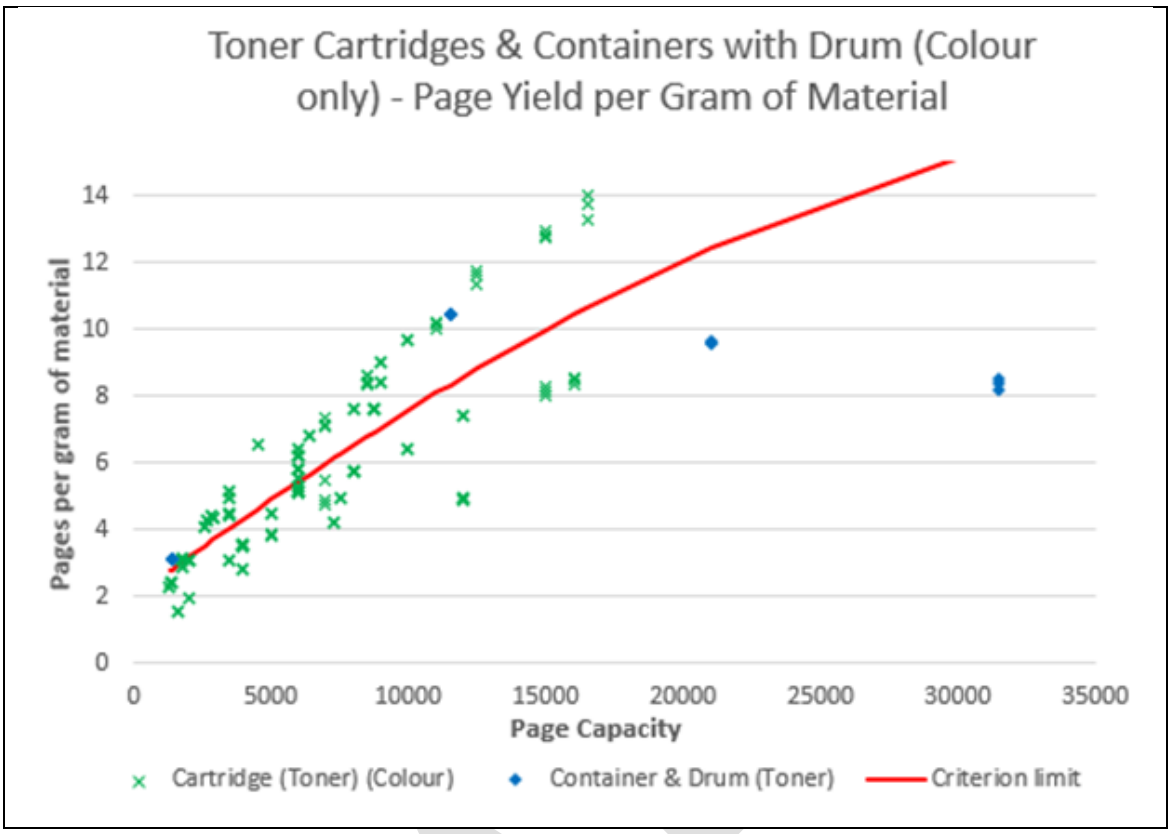

Figure 8.: **Mass resource efficiency of colour toner cartridges and containers with associated drum units**

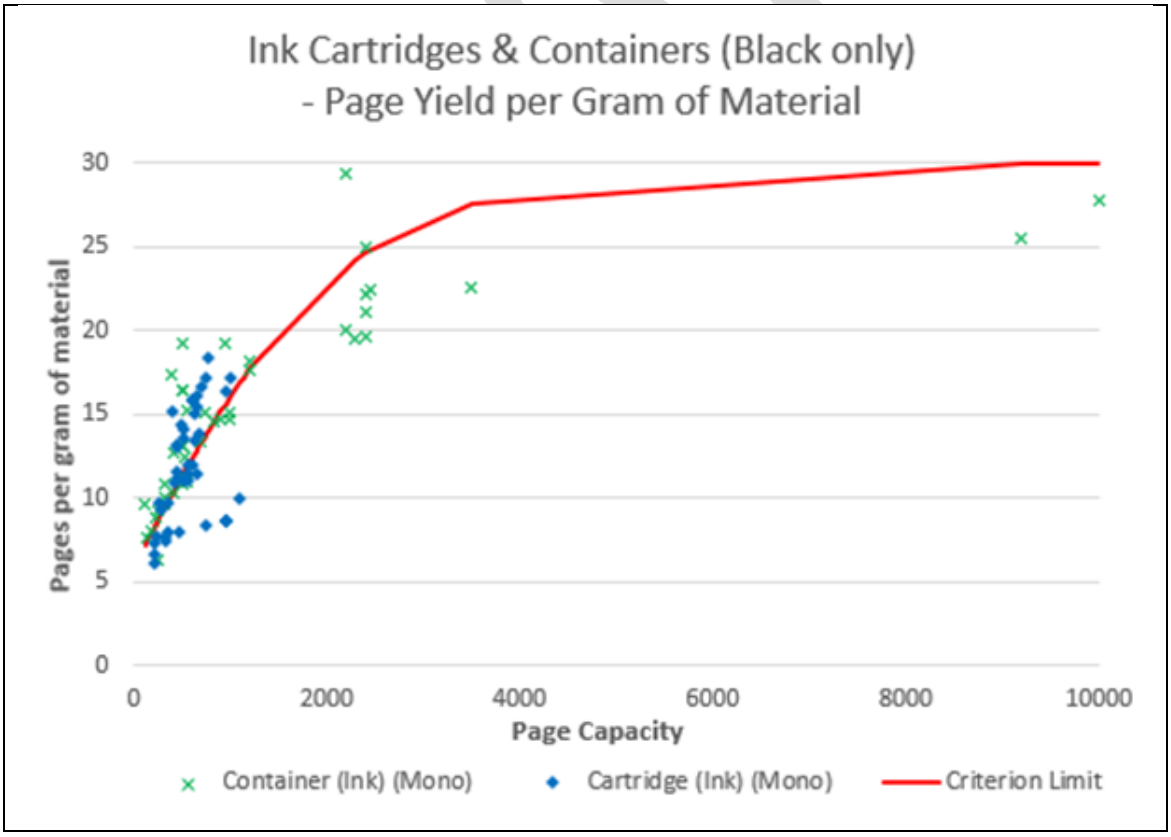

Figure 9.: **Mass resource efficiency of colour ink cartridges and containers (all)**

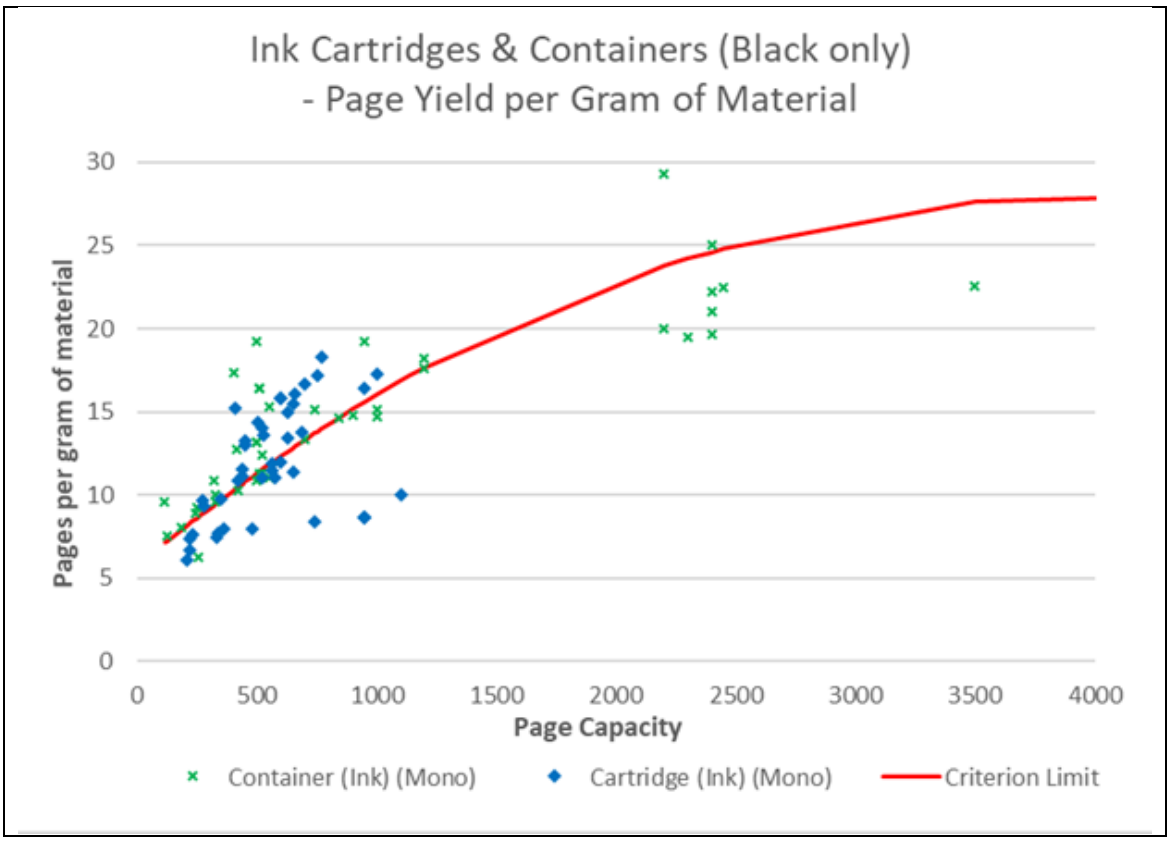

Figure 10.: Mass resource efficiency of black ink cartridges and containers (below 10,000 page yield)

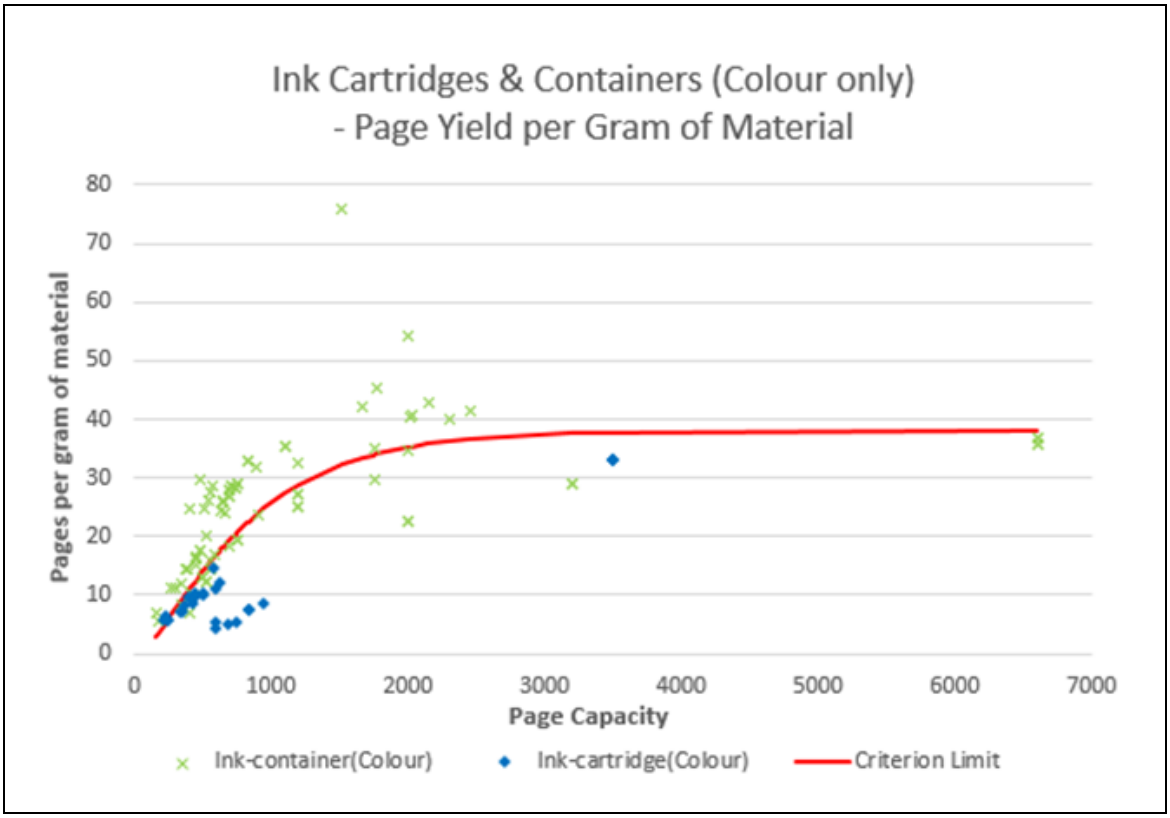

Figure 11.: Mass resource efficiency of colour ink cartridges and containers (below 10,000 page yield)

Given the ability to measure both consumable mass and yield it was therefore possible to propose a consumable mass resource efficiency criterion. A technical specification and award

criterion only at comprehensive level were proposed, reflecting some of the complexities that procurers may face when using this innovative approach to consumable resource efficiency. Approximately 50% of the toner cartridges and containers in the dataset (571 products) met the proposed comprehensive technical specification. Analysis of the inkjet consumables revealed that 54% of the mono and 71% of the colour consumables in the dataset (194 products in total) met the proposed comprehensive technical specification. The consumables in the dataset were assumed to be representative of products on the market. As such, it is assumed that 50% or above of consumables available on the market would be compliant with proposed criterion now. The proposed award criterion was suggested to only cover electrographic (i.e. toner) consumables, due to the relatively small material savings available from purchasing the most efficient inkjet consumables. This criterion aimed to provide extra points to the tenderer that offers the highest overall consumable mass resource efficiency across all consumables for all applicable imaging equipment included within a bid. The consumable mass resource efficiency should be calculated for each consumable in accordance with the equation given in the technical specification with the results for each consumable summed together. When different consumables are purchased, the value should be an average value across all products to be supplied.

An example of how this criterion should be calculated, using the equations in **Error! Reference source not found.** and **Error! Reference source not found.**, for four example laser printers consumable types is provided in **Error! Reference source not found.**.

Table 28.: TS 17 consumable mass resource efficiency calculation

Consumable mass resource efficiency	$= \frac{Page\ Yield}{C_{MASS}}$

Table 29.: TS 17 consumable mass resource efficiency threshold calculation

Toner cartridge or container & drum	$(2 \times [10 \times \tanh(0{,}1+0{,}0003 \times (C_{Mass}-10))-0.5]+1)$

Table 30.: Example consumable mass resource efficiency calculations

		Laser Printer 1	**Laser Printer 2**	**Laser Printer 3**	**Laser Printer 4**
Consumable Data	Consumable Type(s)	**Toner Cartridge**	**Toner Cartridge**	**Toner Container & Separate Drum Unit**	**Toner Container & Separate Drum Unit**
	Cartridge Yield (Pages)	2500	5000		
	Cartridge Mass (g)	780	780		
	Container Yield (Pages)			4500	6000
	Container Mass (g)			800	800
	Drum Unit (Pages)			20000	20000
	Drum Unit Mass (g)			583	583
Calculation: Consumable mass resource efficiency	Cartridge	3.2	6.4		
	Container			5.6	7.5

(Pages/g) (Equation in **Error! Reference source not found.**)	Drum			34.3	34.3
Threshold: Consumable mass resource efficiency Threshold (Pages/g) (Equation in **Error! Reference source not found.**)	Cartridge	6.4	6.4		
	Container			6.5	6.5
	Drum			20.0	20.0
Consumable(s) Compliant (i.e. result from formula in **Error! Reference source not found.** ≥ in **Error! Reference source not found.**)	Cartridge	No	Yes		
	Container			No	Yes
	Drum			Yes	Yes
	Container & Drum			No	Yes

The examples in **Error! Reference source not found.** illustrate that the consumables for Laser Printer 1 and Laser Printer 3 would not meet the TS17 "consumable mass resource efficiency" requirements but that the consumables for Laser Printer 2 and Laser Printer 4 would meet the requirements. The requirements are met when a sufficiently high number of pages can be printed per gram on material (e.g. plastics and metals) used in the construction of the consumables. For Laser Printer 3 and Laser Printer 4 it is shown that both the toner container and the separate drum unit need to meet the requirements in order for the consumable system to be complaint.

This formula takes into account the correlation between page yield and consumable mass but also considers the wide variety of page yields for different types of imaging equipment. For example, the consumable mass yield efficiency for lower speed imaging equipment will not be as high as for high speed imaging equipment due to average lower page yields.

The costs involved in manufacturers collecting cartridge/container weight data from either production or end-of-life operations is likely to be minimal.

Procuring authorities are unlikely to see significant costs implications from the provision of cartridge/container weight data. Some benefit could be achieved through a reduction in costs associated with disposal of waste materials. These waste disposal savings would be achieved where procuring authorities favour lower weight consumables and where they are responsible for the financial costs of consumable disposal.

Reduced number of materials

In addition to mass, the overall lifecycle impacts resulting from consumable composition are highly dependent on the **type of materials used** as well as their final end-of-life processing. Potential improvements in environmental impacts can be brought about by improving the product design with regard to consumable material composition.

The detailed composition of consumables (i.e. the number of materials used) is not covered in any other major environmental initiative.
For the first criteria proposal it was decided to include an award criterion to reward consumables that include the lowest number of material types. Reducing the number of material types within consumables is likely to result in higher recoverable material content during end of life processing.

Nevertheless, there are no standards which dictate how cartridge/container material content should be declared. In the .revised it is proposed to remove this requirement.

2.3.2.2 Further background after AHWG meeting

A stakeholder commented that the award criterion on reduced number of materials should be deleted as they saw it as a potentially misleading metric without including mass of the components and ability to separate for recycling. In the light of this comment and due to difficulty in verifying the compliance by the procuring authority, it was decided to delete this requirement.

2.3.3 Consumable hazardous substances content

The following criteria regarding hazardous substance content is proposed:

<table>
<tr><th colspan="2">Second criteria proposal</th></tr>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">TECHNICAL SPECIFICATIONS</td></tr>
<tr><td></td><td>
TS18 Consumable hazardous substances content
Colourants used in consumable products must not contain any intentionally added substances that meet the classifications in the table below.
<table>
<tr><th>Hazard class</th><th>Hazard category</th><th>CLP-regulation (EC) No. 1272/2008</th></tr>
<tr><td>Carcinogenicity</td><td>Carc. 1A, 1B</td><td>H350 May cause cancer</td></tr>
<tr><td>Carcinogenicity</td><td>Carc. 1A, 1B</td><td>H350i May cause cancer if inhaled</td></tr>
<tr><td>Carcinogenicity</td><td>Carc. 2</td><td>H351 Suspected of causing cancer</td></tr>
<tr><td>Germ cell mutagenicity</td><td>Muta. 1A, 1B</td><td>H340 May cause genetic damage</td></tr>
<tr><td>Germ cell mutagenicity</td><td>Muta. 2</td><td>H341Suspected of causing genetic defects</td></tr>
<tr><td>Reproductive toxicity</td><td>Repr. 1A, 1B</td><td>H360 May damage fertility or the unborn child</td></tr>
<tr><td>Reproductive toxicity</td><td>Repr. 2</td><td>H361 Suspected of damaging fertility or the unborn child</td></tr>
<tr><td>Specific target organ toxicity (Single exposure)</td><td>STOT SE 1</td><td>H370 Causes damage to organs</td></tr>
<tr><td>Specific target organ toxicity (Single exposure)</td><td>STOT SE 2</td><td>H371 May cause damage to organs</td></tr>
<tr><td>Specific target organ toxicity (Repeated exposure)</td><td>STOT RE 1</td><td>H372 Causes damage to organs through prolonged or repeated exposure</td></tr>
<tr><td>Specific target organ toxicity (Repeated exposure)</td><td>STOT RE 2</td><td>H373 May cause damage to organs through prolonged or repeated exposure</td></tr>
</table>
Consumables must also meet the following hazardous material requirements:
• Not contain any additional REACH Candidate List substances at a
</td></tr>
</table>

Second criteria proposal	
Core criteria	**Comprehensive criteria**
	concentration of greater than 0.1% (by weight) • Toners and inks must not contain any intentionally added mercury, cadmium, lead, nickel or chromium-VI-compounds. High molecular weight complex nickel compounds used as colourants are exempted. • Toner and inks must not contain azo dyes (dyes or pigments) that can release carcinogenic aromatic amines listed in Regulation (EC) 1907/2006 (REACH Regulation), Annex XVII, Appendix 8. • No biocides must be added to toners or inks unless an active substance dossier as defined under the Biocidal Product Regulation (BPR, Regulation (EU) 528/2012) for preservatives for products during storage (product type 6) has been submitted. Substances must not be used where they have been rejected from inclusion in the list of approved substances for product type 6. • Photoconductor drums must not contain intentionally added selenium, lead, mercury or cadmium (or any of their compounds). **Verification:** *The tenderer must provide documentation, such as a Safety Data Sheets (SDSs), which proves that the requirement has been met for the offered product(s). Documentation should clearly prove that each aspect of the criterion has been met. Proof of compliance may consist of test reports from third parties or manufacturer own tests illustrating the lack of any of the excluded substances listed in the criterion.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*

2.3.3.1 Background for the proposed criteria

Hazardous substances present in consumables are usually not assessed in Life Cycle Assessments. Still during operation of the imaging equipment products hazardous substances can be emitted, in the form of dust, volatile organic chemicals (VOCs), ozone, benzene, particulate matter and semi-volatile organic compounds (SVOCs).
Information about the hazardous material content of consumables is available in several widely used sources of information and environmental initiatives including:

- Material Safety Data Sheets
- Blue Angel RAL-UZ 205[6]
- Nordic Swan
- ECMA 370

The level of detail provided about hazardous material content of consumables varies across the main initiatives. The material safety data sheets and the ECMA 370 provide the least amount of information about consumable hazardous material content. The ECMA-370 declaration includes criteria relating to:

- cadmium content of photo conductors and inks/toners
- labelling of consumables and provision of Safety Data Sheet (SDS) where consumables are classified as hazardous or where they contain a substance(s) for which there are Community workplace exposure limits

- The Nordic Swan and the Blue Angel initiatives require significantly more information about hazardous material content. The Blue Angel RAL-UZ 205 specification includes a broad range of substance restrictions including those listed in

- Table 31 and Table 32.

Table 31.: Blue Angel exclusion of intentionally added substances in colourants

Hazard class	Hazard category	CLP-regulation (EC) No. 1272/2008
Carcinogenicity	Carc. 1A, 1B	H350 May cause cancer
Carcinogenicity	Carc. 1A, 1B	H350i May cause cancer if inhaled
Carcinogenicity	Carc. 2	H351 Suspected of causing cancer
Germ cell mutagenicity	Muta. 1A, 1B	H340 May cause genetic damage
Germ cell mutagenicity	Muta. 2	H341Suspected of causing genetic defects
Reproductive toxicity	Repr. 1A, 1B	H360 May damage fertility or the unborn child
Reproductive toxicity	Repr. 2	H361 Suspected of damaging fertility or the unborn child
Substances of the so-called candidate list according to REACH Article 59. The version of the candidate list at the point of application applies.		

Table 32.: Additional Blue Angel exclusion of intentionally added substances in colourants

Hazard class	Hazard category	CLP-regulation (EC) No. 1272/2008
Specific target organ toxicity Single exposure	STOT SE 1	H370 Causes damage to organs
Specific target organ toxicity Single exposure	STOT SE 2	H371 May cause damage to organs
Specific target organ toxicity Repeated exposure	STOT RE 1	H372 Causes damage to organs through prolonged or repeated expo-sure
Specific target organ toxicity Repeated exposure	STOT RE 2	H373 May cause damage to organs through prolonged or repeated exposure

In addition, the Blue Angel RAL-UZ 205 specification requires that no substances which contain mercury, cadmium, lead, nickel or chromium-VI-compounds are to be added to toners and inks. An exemption is included for high molecular weight complex nickel compounds used as colourants. There is also an exemption for production-related heavy metal (e.g. cobalt and nickel oxides and organotin compounds) contamination. Further restrictions are included for azo dyes (dyes or pigments) in toners and inks that can release carcinogenic aromatic amines as listed in Regulation (EC) 1907/2006 (REACH Regulation), Annex XVII, Appendix 8. Biocides which are not covered by an active substance dossier for preservatives for products during storage (product type 6) according to the Biocidal Product Regulation (BPR, Regulation (EU) 528/2012) are also not permitted under the Blue Angel rules. Furthermore, the Blue Angel RAL-UZ 205 specification also prohibits the inclusion of selenium, lead, mercury or cadmium (or any of their compounds) in photoconductor drums.

For the first proposal, it was decided to include a comprehensive technical specification on hazardous material content in consumables based on the Blue Angel criteria. The criterion was proposed to apply to all consumables covered in the scope (containers, cartridges, drum units, fusers units and transfer kits). No core level for this technical specification was proposed to reflect the fact that addressing the issue of consumable hazardous material content is ambitious. There are likely to be some costs to manufacturers associated with identifying the hazardous material content of their consumables. Many of these costs can already be assigned to legal requirements for the more basic hazardous material identifications. Some of the additional costs for more in-depth hazardous material content analysis has already been assigned to compliance with the Blue Angel and Nordic Swan eco-label criteria.

Disposal costs for hazardous material content can be higher than for non-hazardous material content. Costs for procuring authorities could therefore be reduced where they can avoid purchasing consumables that become classified as hazardous at their end-of-life.

2.3.3.2 Background for the proposed verification

Manufacturers will be able to verify compliance to the criteria through submission of documentation showing that relevant consumables have been tested to the appropriate test procedures, or equivalent, and meet the hazardous material content requirements (where relevant). This documentation could take the form of a manufacturer technical dossier or proven compliance to the Blue Angel RAL-UZ-205 specification.

2.3.3.1 Further background after AHWG meeting

One stakeholder commented that this criterion did not include all the exemptions found under Blue Angel. It has been identified that indeed one exemption on production-related contamination by heavy metals was omitted. This exemption has been added to the criterion.

Several stakeholders suggested that a requirement should be added for suppliers to provide Safety Data Sheets (SDSs), the verification section of the criterion has been amended to include the provision of SDSs.

2.3.4 Reuse and remanufacturability

The existing GPP specification on imaging equipment includes a requirement on consumable design for reuse/remanufacturing. The current criterion states that devices and practices that would prevent reuse/remanufacturing of toner and/or ink cartridge (i.e. anti-reutilisation devices/ practices) should not be present or applied in the imaging equipment.

Based on this, criteria were proposed for the AHWG meeting and revised as follows considering the received comments:

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS	
TS19 Design for reuse/remanufacturing Cartridges or containers must not be purposefully designed to limit the ability to reuse/remanufacture. Examples of features which are deemed to limit the ability to remanufacture, or promote non-reuse, include, but are not limited to: • Statements on the cartridge or container, or packaging, which declare, or imply, that the product is not designed to be remanufactured **Verification:** *The tenderer must provide documentation, which explicitly states that cartridges or containers are not purposefully designed to limit the ability to reuse/remanufacture.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*	**TS19 Design for reuse/remanufacturing** Cartridges or containers must not be purposefully designed to limit the ability to reuse/remanufacture. Examples of features which are deemed to limit the ability to remanufacture, or promote non-reuse, include, but are not limited to: • Cartridges or containers are not covered by patents or licence agreements which include statements that seek to limit remanufacturing • Statements on the cartridge or container, or packaging, which declare, or imply, that the product is not designed to be remanufactured **Verification:** *The tenderer must provide documentation, which explicitly states that cartridges or containers are not purposefully designed to limit the ability to reuse/remanufacture and identify how compliance to the two examples is achieved.* *Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*

Core criteria	Comprehensive criteria
AWARD CRITERIA	
	AC7 Advanced design for reuse/remanufacturing A maximum of x points [to be specified] may be awarded to the tenderer which meets the following advanced consumable design criteria and end of life consideration practices: • Consumable are designed to facilitate reuse/remanufacture through technical features which encourage re manufacturing The technical features may include the following among others: • Lack of a chip in the consumable which controls imaging functionality • Any installed chip includes functionality allowing a full reset to be initiated via either the imaging equipment controls or a network connected computer without the need for additional products • Consumable can be manually dismantled, where necessary with the use of universally available tools (e.g. openly available screw heads, pliers or tweezers), in order to replace worn parts and be refilled with toner material or ink **Verification:** *The tenderer must provide an annotated product schematic detailing which design features have been included to facilitate reuse/remanufacturing.*
AWARD CRITERIA	
	AC8 Facilitating reusability/remanufacturability A maximum of x points [to be specified] should be given where tenderers facilitate the reuse and/or remanufacture of consumables through any of the following actions: • The ability for non-OEM organisations to purchase the rights, from an OEM, at a reasonable cost, to reprogramme a consumable chip so that full imaging equipment functionality is supported • From the time a consumable is first placed on the EU market, replacement chips, which support full imaging equipment functionality, are available on the open market • Avoids placing any restrictions on the necessary remanufacturing steps needed to remanufacture any consumable **Verification:** *The tenderer must provide an annotated product schematic detailing which design features have been included to facilitate reuse/remanufacturing.*

2.3.4.1 Background for the proposed criteria

Relevant rationale regarding the use of remanufactured cartridges can be consulted additionally in chapter 2.2.6

In relation to the design aspects of the cartridges there are several different challenges limiting the ability to remanufacture imaging equipment consumables. These can be broken down into technical and non-technical barriers. The technical barriers include design features such as welded materials to limit separation and the inclusion on non-reprogrammable chips which facilitate communications between the consumable and the imaging equipment. Non-technical barriers include legal restrictions on remanufacturing such as patented remanufacturing processes and patents placed on parts needed to facilitate use after remanufacturing. Additional barriers stem from either real or perceived quality issues with remanufactured consumables and the lack of supporting criteria in public procurement contracts.

Including a criterion which limits negative influences on the ability to reuse/remanufacture consumables could result in more EU based remanufacturing.

Design for reuse is a criterion used in Blue Angel, EPEAT, the EU Voluntary Agreement, Nordic Swan and the Korean Ecolabel. In spite it is applied widely by environmental initiatives, the use of refilled and remanufactured cartridges is assumed not to constitute a significant part of the market. It has been estimated that, in the EU, remanufactured consumables account for 17% to 21% of the toner consumable market and 15% of the inkjet consumable market.[92]

The most widely used criteria which address remanufacturing limits in consumables can be found in the EU Voluntary Agreement, EPEAT and Blue Angel. These criteria are shown in the tables below.

Table 33.: Consumable reuse ability criterion in other initiatives

Environmental initiative	Criterion Text
EU Voluntary Agreement 2015[4]	*5.4.1 Any cartridge produced by or recommended by the OEM for use in the product must not be designed to prevent its reuse and recycling.* *The requirements of paragraph 5.4 must not be interpreted in such a way that would prevent or limit innovation, development or improvements in design or functionality of the products, cartridges, etc.*
EPEAT	*4.9.4.1 Required—Documentation that the cartridge or container is not designed to prevent its reuse and recycling* *Manufacturer must provide documentation that is readily available and provided to the purchaser stating that any cartridge or container produced by or recommended by the manufacturer for use in the product is not designed to prevent its reuse and recycling.* *Examples of documentation that will satisfy the requirements of this criterion and should be readily available and provided to the purchaser include, but are not limited to, an owner's manual; set-up instructions; or information on the manufacturer's Website, whereby a purchaser received a URL or hard/electronic copy of a product specification or a policy statement that is available on the manufacturer's Website.*
Blue Angel	*3.1.1.3 Reusability of components and assemblies* *(5) Can modules for colourants be refurbished?* *Reuse must not be precluded by constructive measures*

[92] *European Toner and Inkjet Remanufacturers Association, Key facts about the cartridge remanufacturing market, available from* https://www.etira.org/cartridge-remanufacturing/key-facts/

At least two major EU based environmental initiatives, Blue Angel and Nordic Swan, have also developed remanufactured cartridge/container specifications.[93,94] Both specifications include criteria which seek to reduce the potential negative environmental impacts associated with remanufactured cartridges/containers. The requirements focus on hazardous material content, emissions and the actual remanufacturing process as opposed to including detailed requirements concerning cartridge design to prevent reuse. The Blue Angel on the imaging equipment (RAL-171 and RAL-205 specifications) do include some requirements in this area. The specifications concentrate on encouraging cartridge design which facilitates recycling rather than reuse. However, the Blue Angel RAL-205 specification does require that consumables can be remanufactured and that reuse must not be precluded by constructive measures. No further details about what is meant by "constructive measures" is included. The EPEAT and EU Voluntary Agreement criteria also do not adequately identify what features of consumables could be deemed to inhibit remanufacturing.

Against this background, for the first proposal it was decided to include a technical specification that provides a basic level requirement to limit anti-reuse technologies. Two main features which appear to most limit remanufacturing are non-reprogrammable chips and patents or licence agreements which cover remanufacturing processes. Developing a criterion that limit the use of non-reprogrammable chips would significantly impact product availability. Including a core criterion that limits the use of patents or licence agreements which constrain remanufacturing is ambitious but achievable.

In addition, two award criteria were proposed. The award criterion "advanced design for reuse/remanufacturing" seeks to provide additional rewards for manufacturers that employ enhanced design for reuse/remanufacture features in their consumables. The award criterion on "facilitating reusability/remanufacturability" is designed to reward manufacturers that actively facilitate the remanufacturing of consumables.

The purchasing of remanufactured cartridges/containers can result in significant costs savings for procuring authorities. As an example, the French Ministry of Education saw cost reductions of 30 % over two and half years as a result of purchasing remanufactured cartridges.[95] The costs savings from purchasing remanufactured cartridges can be significantly reduced, or eliminated, where the quality of remanufactured cartridges is poor. The use of poor quality remanufactured cartridges/containers can lead to increased costs associated with paper use, engineer visits and additional cartridges/containers. Requiring that remanufactured cartridges/containers meet stablished quality standards can help to reduce these potential impacts.

2.3.4.2 Background for the proposed verification

Verification of the core criterion could be problematic as many technical features which are included in cartridges, and, to a lesser extent, in containers, may inadvertently limit remanufacturing but may also be required for function of the consumable. For example, many cartridges contain chips which communicate with the imaging equipment that they are installed within via direct contact or radio frequency. Cartridge chips tend to provide the following functions:

- Stores cartridge specific information including
- Model
- Page Yield
- Region

[93] Blue Angel, Remanufactured Toner Modules (DE-UZ 177), available from https://www.blauer-engel.de/en/products/paper-printing/tonermodule/aufbereitete-tonermudule

[94] Nordic Swan, 2012, *Nordic Ecolabelling of Remanufactured OEM Toner Cartridges: Version 5.3- 15 June 2012 – 31 December 2019*, available from http://www.nordic-ecolabel.org/product-groups/group/?productGroupCode=008

[95] UNEP, 2012, *The Impacts of Sustainable Public Procurement: Eight Illustrative Case Studies*, available from http://www.unep.fr/scp/procurement/docsres/projectinfo/studyonimpactsofspp.pdf

- Provides a means of authentication between the imaging equipment and cartridge
- Stores data on toner use as determined by the imaging equipment

Whilst these functions are important to assist the imaging equipment monitor toner or ink levels they also result in the need for chips to be either replaced or reprogrammed at cartridge end-of-life. The need for reprogramming or replacement occurs because the data written to the chip, by the imaging equipment, is permanent. As such, when the imaging equipment determines that the cartridge is empty this information is permanently written to the chip. Some chips are capable of being reprogrammed but most are not, therefore necessitating their replacement. If replacement chips are not available in the market place, then the ability to remanufacture is limited.

In the current core criterion proposal it is required from the tenderer to provide documentation, which explicitly states that cartridges or containers are not purposefully designed to limit the ability to remanufacture. In addition, in order to demonstrate compliance with the award criteria annotated product schematic detailing which design features have been included to facilitate remanufacturing, must be provided as well as a declaration stating that all the specific requirements have been met.

2.3.4.1 Further background after AHWG meeting

One stakeholder commented that technical specification on "design for reuse/remanufacturing" would limit industries intellectual property rights and potentially limit innovation; this was however not supported with further evidence and internal check did not result in identifying of potential issues.

It was further proposed to split the original criterion into core and comprehensive, with the comprehensive criterion including the more stringent requirements on consumable design and the core one – more basic.

Two stakeholders expressed concern over the award criterion on "advanced design for reuse/remanufacturing". The first stakeholder claimed that the criterion unfairly favoured remanufactured consumables and was unworkable for procurers. However the aim of the criterion is to promote remanufacturing, which can be done by any party, OEMs or remanufacturers. Another stakeholder expressed concern that some of the language in the criterion was not sufficiently robust. In the light of these comments, the language in the criterion and rationale has been further clarified.

2.3.5 Consumable quality

Second proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATIONS	
TS20 Consumable quality Any cartridges or containers described as remanufactured products must meet all requirements behind at least one widely recognised remanufactured cartridge/container quality standard. **Verification:** *The tenderer must provide documentation, which proves that cartridges or containers meet requirements of at least one recognised quality standard, such as DIN 33870 series, DIN 33871 series or equivalent. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*	

2.3.5.1 Background for the proposed criteria

Poor quality consumables can result in excessive waste generation as users dispose of them before their end of life. As such, the life-cycle hotspots of poor-quality consumables are the same as those found for all consumables but magnified due to their shorter lifespan. Improving

the quality of consumables therefore results in life cycle impacts that are shared over a greater period of time.

The quality of consumables is an important issue which is addressed in a number of different environmental initiatives like the Nordic Ecolabel[96] and Blue Angel[97]. The relevant Nordic Swan and Blue Angel criteria are shown in the tables below.

Coverage of quality issues for consumables in other initiatives is largely limited to remanufactured consumables rather than new-built consumables. Some remanufactured consumables have suffered with quality issues in the past, due to imperfect remanufacturing processes. For this reason, quality requirements placed on remanufactured consumables seek to ease concerns over reliability.

Table 34.: Consumable quality criterion in other initiatives

Environmental initiative	Criterion Text
Nordic Swan[94]	***R13 Production quality*** *The annual average level of complaints relating to Nordic Swan Ecolabelled products must not exceed 1%. Only complaints relating to Nordic Ecolabelling criteria must be included in this calculation.* *The level of complaints must be calculated monthly for each type of Nordic Swan Ecolabelled toner cartridge. These complaint figures must be used actively to assure and raise the quality. If the level of complaints exceeds 1% for a month, a report must be submitted detailing the reasons and remedial actions. If the level of complaints exceeds 2%, contact Nordic Ecolabelling.* *Specification of complaints must include types of product-related complaint, how claims are dealt with, the follow-up of production and contact with Nordic Ecolabelling.*
	R15 Print quality *All toner cartridges must be tested to and comply with one of the following standards/test methods:* • *DIN Technical Report No. 155:2007-09* • *ASTM F:2036 for monochrome printouts* • *DIN 33870-1 for monochrome printouts* • *DIN 33870-2 for colour printouts* *For applications and the extension of a licence, each Nordic Swan Ecolabelled toner cartridge type must be tested.* *During the licence period, print quality must be tested annually for 50% of the Nordic Swan Ecolabelled toner cartridge types.* *If the toner powder and/or the drum are changed during the licence period, the relevant cartridge type must be tested. Independent auditors (from a third-party company such as TÜV, STMC, Dekra, Intertek etc) must confirm that testing has been carried out in line with the requirement. The third-party company must confirm in writing that the auditor is familiar with the applied test method for print quality for remanufactured OEM toner cartridges, and provide a CV to support the expertise of the auditor in assessing how the applicant is applying the test methods used. Alternatively, the applicant may be certified under the STMC certification system. In both cases, documentation must show that the applicant has a valid declaration or STMC certificate. Specify the test standard and describe the test process in production.*

[96] *Available at: http://www.nordic-ecolabel.org/product-groups/group/?productGroupCode=008*
[97] *Available at: https://www.blauer-engel.de/en/products/office/toner-modules/toner-modules*

Blue Angel[93]	***3.1.2 Remanufacturing*** *The toner modules must be remanufactured in accordance with remanufacturing instructions detailing the remanufacturing process. The functionality of the toner modules must be ensured by tests and documented in accordance with DIN 33870-1 or DIN 33870-2. Remanufacturing must include and document the following process steps:* *• Incoming goods inspection and marking of quality-relevant components, such as purchased parts and raw materials.* *• Inspection of empty and used toner modules. The applicant must ensure the use of empty modules which had been marketed by original equipment manufacturers (OEM) or remanufactured in accordance with DIN 33870-1 and -2.* *Remanufacturing may include the following process steps:* *• Disassembly of the toner module to the extent required for compliance with quality requirements;* *• Cleaning of the components intended for reuse;* *• Filling of the toner containers with the specified amount and type of toner as shown in the parts list;* *• Assembly of the specified components according to the parts list;* *• Testing of the functionality of each toner module on a printer;* *• Optical test of the finished toner module;* *• Marking of the toner modules with a serial or lot number to ensure the traceability of the remanufacturing process.* *The remanufactured toner modules must contain a minimum of 75% (weight per-cent) recycled material, not counting the amount of toner filled in. Excluded are parts with a direct impact on the print quality (e.g. photoconductor drum).*

The Nordic Swan requires that the annual average level of complaints relating to Nordic Swan Ecolabelled production must not exceed 1%. In relation to consumables, the Nordic Swan asks that the level of complaints must be calculated monthly for each type of Nordic Swan Ecolabelled toner cartridge and associated production line. Furthermore, the label requires that if the level of complaints exceeds 1% for a month, a report must be submitted detailing the reasons and remedial actions. The report needs to include the types of product-related complaints, how claims are dealt with, the follow-up of production and contact with Nordic Ecolabelling.

Blue Angel requires that the functionality of the toner modules must be ensured by tests and documented in accordance with DIN 33870-1 or DIN 33870-2.
Some metrics exist to support measurements on consumable quality. The following DIN standards refer to remanufactured cartridges:

- DIN 33870-1 Office machines - Requirements and tests for the preparation of refilled toner modules for electrophotographical printers, copiers and facsimile machines - Part 1: Monochrome
- DIN 33870-2 Office machines - Requirements and tests for the refilled toner modules for electrophotographic printers, copiers and facsimile machines - Part 2: 4 colour printers
- DIN 33871-1 Office machines, inkjet print heads and inkjet tanks for inkjet printers - Part 1: Preparation of refilled inkjet print heads and inkjet tanks for inkjet printer
- DIN 33871-2 Office machines, inkjet print heads and inkjet tanks for inkjet printers - Part 2: Requirements on compatible ink cartridges (4-colour system) and their characteristic features

They address the performance to ensure consistent print quality and the good functioning. They specify the properties and functions after remanufacturing as well as the tests to be carried out to prove consistent printing quality and malfunction-free operation across the entire period of use of the toner cartridges, inkjet print heads and ink tanks.

There are also an ISO/IEC standards that address image quality outputs from printers and copiers:

- ISO/IEC 24700: Quality and performance of office equipment that contains reused components
- ISO/IEC 24790 Information technology -- Office equipment -- Measurement of image quality attributes for hardcopy output -- Monochrome text and graphic images

ISO/IEC 24700 specifies product characteristics for use in an original equipment manufacturer's or authorized third party's declaration of conformity to demonstrate that a marketed product that contains reused components performs equivalent to new, meeting equivalent to new component specifications and performance criteria, and continues to meet all the safety and environmental criteria required by responsibly built products. It is relevant to marketed products whose manufacturing and recovery processes result in the reuse of components.[98]

ISO/IEC 24790 specifies device-independent image quality attributes, measurement methods and analytical procedures to describe the quality of output images from hardcopy devices. The standard is relevant for applicable to human-readable monochrome documents produced from printers and copiers.[99] It is unclear how often this standard is used to support quality attributes from office based imaging equipment.

Against this background, for the first proposal it was decided to include a criterion (the same core and comprehensive) to request that remanufactured consumables (cartridges and containers) meet the requirements behind at least one quality standard. By allowing compliance to any recognized standard there is greater scope for suppliers to prove compliance. This would provide procuring authorities with further confidence that any remanufactured consumables purchased would not cause excessive costs through early failures. The use of quality standards amongst consumable remanufacturing organisations appears well established.

The costs associated with complying the DIN quality standards (DIN 33870 and DIN 33871) can be high but are often market access requirements due to customer concerns over cartridge/container quality. It costs approximately €3000 to test a cartridge against one of the DIN standards. As market access requirements the costs associated with compliance to these standards would unlikely to be increased by a EU GPP criterion.

Procuring authorities could save a significant amount of costs by procuring higher quality cartridges. Cartridge failures can result in extra costs through issues such as increased paper use, engineer visits, extra replacement cartridges.
Ensuring that remanufactured cartridges/containers comply with high quality standards provide assurance that early failure rates will be reduced and print quality will meet customer requirements.

With regards to new builds, large OEMs tend to rely on the fact that cartridges/containers are produced in facilities that meet ISO 9001 quality standards.[100,101, 102] However, the ISO 9001 standard does not apply to a finished product, it focuses on processes to help organisations achieve consistent results and to continually improve those processes.

[98] ISO/IEC 24700:2005 Quality and performance of office equipment that contains reused component, available from https://www.iso.org/standard/34909.html

[99] ISO/IEC 24790:2017 Information technology -- Office equipment -- Measurement of image quality attributes for hardcopy output -- Monochrome text and graphic images, available from https://www.iso.org/standard/69796.html?browse=tc

[100] Xerox, 2017, *Xerox-approved Quality and Reliability*, available from https://www.xerox.com/printer-supplies/compatible-cartridges/toner-quality/enus.html

[101] Canon, *ISO 9001 Quality Management System*, available from https://www.canon-europe.com/images/ISO9001_Nagahama_Canon_Inc_20140501_tcm13-28261.pdf

[102] Lexmark, 2010, *Genuine Lexmark Supplies, Service and Parts*, available from http://media.lexmark.com/www/mdbnk/md/LXPRINT-2011060915341025.PDF

The Nordic Swan specification for remanufactured OEM Toner Cartridges includes a requirement that reference to the above DIN 33870 standards. There are 9221 remanufactured toner cartridges registered against this Nordic Swan specification in Sweden alone.[103]

2.3.5.1 Further background after AHWG meeting

There was a large number of stakeholder comments on the consumable quality criterion. Some stakeholders commented that if the criterion does not address all types of consumables (i.e. new builds and remanufactured) then it should be deleted. However the criterion aims to provide assurances that any remanufactured cartridges/containers are of a suitably high quality. New builds do not need to meet this criterion. The criterion wording has been altered to ensure that scope is limited to remanufactured consumables.

Another stakeholder commented that there is a need to develop a global consumable quality standard, so that new build and remanufactured consumables can be accurately compared. The study team agree with this statement; however such a process it is beyond the scope of the project of the EU GPP criteria revision.

A further stakeholder suggested that the criterion should also address colour quality of consumables; however the GPP can only relay on the existing standards for measuring quality. Developing a new method goes beyond the scope of this revision.

2.3.6 End-of-life management

The existing GPP specification on imaging equipment does not place requirements on service providers to guarantee the provision of a take back system for consumables. For the AHWG meeting criteria were proposed for discussion. The criteria have been revised after the meeting:

<table>
<tr><td colspan="2">Second proposal</td></tr>
<tr><td>Core criteria</td><td>Comprehensive criteria</td></tr>
<tr><td colspan="2">TECHNICAL SPECIFICATION</td></tr>
<tr><td colspan="2">TS21 Take-back system for cartridges and containers and WEEE registration
This criterion should be used in conjunction with Contract Performance Clause CPC4.

A take back system for used cartridges and containers must be provided at no cost to the procuring authority, with the aim to channel them or their parts for reuse or for material recycling.
The tenderer must provide containers to procuring authority which are suitable for the accumulation of used cartridges and containers.
The tenderer may fulfil these obligations themselves or via a suitable third-party organisation.
In addition, the proof of WEEE registration of the producer of cartridges falling under the WEEE Directive must be provided.

Verification:
The tenderer must provide a declaration, which states that a free take back system will be provided for cartridges and containers. Cartridges and containers holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply. In addition, for cartridges falling under the WEEE Directive the tenderer must provide a proof that the producer is registered (i.e. WEEE registration number, or a WEEE registration certificate or any document proving that the producer is registered at that moment).</td></tr>
<tr><td></td><td>AC9 End-of-life management of cartridges
This criterion should be used in conjunction with Contract Performance Clause CPC4.</td></tr>
</table>

[103] http://www.svanen.se/en/Find-products/Product-search/?categoryID=53

	Points must be awarded to a tenderer who provide a re-use/remanufacturing and recycling service for used cartridges requiring selective treatment in accordance to Annex VII of WEEE Directive for products that has reached the end of its service life at no cost to the procuring authority. The service shall comprise the following activities: - Collection; - Dismantling for component re-use/remanufacturing, recycling and/or disposal. The tenderer must provide containers to procuring authority which are suitable for the accumulation of used cartridges. Preparation for re-use, recycling and disposal operations must be carried out in full compliance with the requirements in Article 8 and Annexes VII and VIII of the (recast) WEEE Directive 2012/19/EU. The supplier may fulfil these obligations themselves or via a suitable third-party organisation. **Verification:** *The tenderer must provide details of the arrangements for collection, data security, preparation for re-use, remarketing for re-use and recycling/disposal. This must include, during the contract, valid proof of compliance for the WEEE handling facilities to be used.* *Cartridges holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply.*
CPC4 Reporting on reuse/recycle activities of consumables The contractor must provide records, for bulk shipments (i.e. not for single consumable returns) regarding the free take back system for used consumables aimed to channel such equipment for reuse of the equipment or its parts, or for material recycling with preference given to reuse. In particular the recording must detail: - number of consumables taken back from the procuring authority, - number and type of parts, as appropriate, channelled for reuse/remanufacturing, - number and type of parts, as appropriate, channelled for material recycling.	

2.3.6.1 Background for the proposed criteria

The provision of a take-back scheme could contribute to improvement of environmental impacts associated with consumables manufacture due to better channelling of used consumables for remanufacturing and lower need to produce completely new products.

Most OEMs provide a take-back system for end-of-life consumables. The scope of the available take-back programmes can vary in terms of geographical and product coverage.
Majority of larger remanufacturers also offer take back programmes either directly or via agreements with other organisations.

In addition, given that end-of-life cartridges/containers often have residual value, due to their potential remanufacturability and subsequent resale; other organisations operating in the marketplace also offer cartridge/container take back systems.
It has been estimated that 370 million inkjet cartridges are placed on the European market each year with a total value of around €9.4 billion.[104] The 370 million units comprise of 13% reused cartridges, 2% from non-OEM 'clones and 85% OEM sources.[54] It has been further estimated that a total of 65 million inkjet cartridges are collected at end-of-life with 75% of these being remanufactured.[54]

The European toner cartridge market is estimated to be worth €10.2 billion annually, comprising of 135 million cartridges.[54] Approximately 20% of these cartridges are remanufactured, 4% non-OEM clones and 76% OEM. It is estimated that around 20% of toner cartridges are collected at end-of-life with 82% of these being remanufactured.[54]
The Blue Angel RAL-205, EPEAT and EU Voluntary Agreement all include requirements on consumable take back. The relevant criteria can be seen in the tables below.

Table 35.: Consumable Take Back criterion in other initiatives

Environmental initiatives	Criterion Text
Blue Angel[93]	***3.1.2 Take-back of modules and containers for colourants*** *The distributor commits to take back modules and containers for colourants which he supplied or recommended for use in the product documents in order to preferably channel such modules and containers to reuse or material recycling.* *This also applies to excess toner reservoirs. A third party (dealers or service agencies or companies engaged in the module reuse/recycling business) may be com-missioned to perform this task. The formers are to be provided with instructions for proper handling of excess toners. Non-recyclable product parts must be properly disposed of.* *Modules and containers are to be taken back free of charge by the return facility named by the distributor to which products can be returned personally or by shipment (return facilities abroad are only permissible if the products can be sent there free of charge). The product documents and the information and data sheet must include detailed information on the return options.*
EPEAT	*4.9.3.1 Required—Provision of take-back and end-of-life management for cartridges and containers* *Manufacturer provides a take-back service for toner and ink cartridges and containers for end-of-life management for at least registered and formerly registered products. In the case of containers, the manufacturer can advocate local recycling of toner and ink containers but offers take-back for such items if a local recycling option is not identified by the end user.* *Landfill disposal and incineration are not used as part of the manufacturer take-back program for registered and formerly registered products. Waste-to-energy conversion may be used as an acceptable, but not preferable, disposition process when necessary for some materials. Secondary or residual materials resulting from waste-to-energy processes are exempt from this requirement.* *Additionally, on an annual basis, manufacturer must provide on its Website the end-of-life management methods for all cartridges and containers that are collected through its take-back program. Manufacturers must report the following:* *a) Total tonnage of cartridges and containers collected annually (in metric tons)*

[104] European Commission, 2017, Study on the implementation of product design requirements set out in Article 4 of the WEEE Directive The case of re-usability of printer cartridges. Final report

	b) Total tonnage of materials sent to each of the following end-of-life management methods as a proportion of total collected weight of cartridges and containers *− Reuse of components* *− Materials recycling* *− Waste-to-energy* *− Material in storage, pending processing* *− Incineration (incineration cannot be used for registered or formerly registered products)* *− Landfill (landfill cannot be used for registered or formerly registered products)* *Manufacturers must declare the Website location of the preceding required information. Reporting must be done at the global level and/or at the region or country level and must be for all cartridges and containers collected through its take-back program for that geographic region.* *The take-back requirement is applicable only in those regions or countries for which the manufacturer has products declared on the MSE Registry. Cartridges or containers not manufactured under the registered trademark of the manufacturer provider of the imaging equipment are exempt from this requirement.* *Manufacturers that do not have any products on the Registry that use toner cartridges or containers can declare "Not applicable" for this criterion on the Registry.*
	4.9.3.2 Optional—Manufacturer recycles or reuses toner material collected through its cartridge and container take-back program Annual Corporate Declaration Criterion: In accordance with the priorities of the waste hierarchy, manufacturer ensures that toner material collected through its cartridge and container take-back program for at least registered and formerly registered products is reused or recycled and that none is disposed of through a landfill or incineration option. Disposal through waste to energy of up to 25% of the total weight of toner material collected through this program is allowed. More than 25% may be sent to waste to energy where applicable local, national, or regional regulations dictate that toner material, regardless of composition, must be sent to waste to energy. The manufacturer must provide on its Website information confirming conformance with this requirement. *The requirement is applicable only in those regions or countries for which the manufacturer has products declared on the MSE Registry. Cartridges or containers not manufactured under the registered trademark of the manufacturer provider of the imaging equipment are exempt from this requirement.*
	4.9.3.3 Optional—Manufacturer recycles or reuses plastics collected through its cartridge and container take-back program Annual Corporate Declaration Criterion: In accordance with the priorities of the waste hierarchy, manufacturer ensures that plastic collected through its cartridge and container take-back program for at least registered and formerly registered products is reused or recycled and that none is disposed of through a landfill or incineration option. Disposal through waste to energy of up to 25% of the total weight of plastic collected through this program is allowed. More than 25% may be sent to waste to energy where applicable local, national, or regional regulations dictate that plastic, regardless of composition, must be sent to waste to energy. The manufacturer must provide on its Website information confirming conformance with this requirement. *The requirement is applicable only in those regions or countries for which the manufacturer has products declared on the MSE Registry. Cartridges or containers not manufactured under the registered trademark of the manufacturer provider of the imaging equipment are exempt from this requirement.*
EU Voluntary Agreement 2015	***6.3 Cartridge disposal and treatment*** *For new product models first placed on the EU market after 1 January 2012, Signatories must provide end-users with information on suitable end-of-life management options for used cartridges. This information may be communicated via a company website.*

The Blue Angel specification states that distributors must provide a free take back system (either themselves or via a third party) for consumables (modules, containers and toner reservoirs) supplied for, or recommended for, use in the imaging equipment. The EPEAT specification requires that manufacturers (or dedicated third parties) must provide a take-back service for toner and ink cartridges and containers for all EPEAT registered imaging equipment (past and present). EPEAT also requires that landfill disposal and incineration are not used as part of the manufacturer take-back program. The Voluntary Agreement requires that manufacturers must provide information on potential end of life options for cartridges but does not require that a take back system is provided.

Against this background, for the first proposal it was decided to include a technical specification aligned with Blue Angel. The core and comprehensive criterion are similar but the comprehensive includes an expanded scope of products types that require inclusion under any take back program. The EPEAT requirement that landfill and incineration are not used in any consumable take back system was deemed potentially too ambitious for the EU market due to potential use of incineration in some EU consumable take back systems.

In addition, it was proposed to include a contract performance clause to ensure that used consumables can be collected effectively at their end of life.

OEMs tend to operate free take back systems, for a variety of business reasons, especially for larger users of cartridges and containers. Procuring authorities are unlikely to encounter any costs associated with end-of-life cartridges and containers. Procuring authorities may encounter additional costs associated with the disposal of other consumable items, such as fuser kits, transfer kits etc., that are not covered under some OEM take back systems.

2.3.6.2 Background for the proposed verification

It was proposed to include tenderer declaration or proof of compliance with relevant scheme as mean of verification. Reliance on supplier declarations was suggested as there are no formal standards covering provision of consumables take back initiatives. Continual verification may be required where additional information about take-back activities is required (e.g. as in CPC4 Reporting on reuse/recycle activities of consumables).

2.3.6.1 Further background after AHWG meeting

Some stakeholder suggested that the criterion should support the WEEE directive by requiring suppliers to confirm inclusion of wheelie bin marking (see **Error! Reference source not found.**) on consumables and provision of WEEE registration numbers. Inclusion of WEEE registration number was asked for. Therefore a modification was introduced in the technical specification to cover WEEE registration for cartridges falling under the WEEE Directive. It is asked that the tenderer must provide a proof that the producer is registered through submission of WEEE registration number, or a WEEE registration certificate or any document proving that the producer is registered at the moment of tendering process.

Figure 12: Wheelie bin marking

A stakeholder commented that the reporting provisions in CPC4 Reporting on reuse/recycle activities of consumables, were too stringent as it would not be possible to track returns of

single consumables (e.g. where they are returned through a postal service). As a result, the text has been modified so that the requirement is limited to bulk collections.

In addition in was decided to keep the same technical specification for take-back system applicable only to cartridges and containers and to propose a more ambitious comprehensive award criterion, which goes beyond the provision of a take-back system and covers additionally provision of re-use and recycling services. This proposal is aligned with the criterion included in the EU GPP criteria for Computers and Monitors[61].

2.4 Criteria area 3 – Print services

The scope of the revised EU GPP is proposed to be extended to criteria which can be used in the procurement of print services where the price is linked to the quantity of printed pages. These agreements can include the supply of IE products and /or paper and consumables, maintenance, end of life activities and optimisation of organisation's document output through Managed Print Service (MPS).

2.4.1 Commitment to reuse and repair imaging equipment products

For the AHWG meeting criteria regarding reuse and repair of imaging equipment products were proposed for discussion. The criteria have been revised after the consultation as follows:

Second proposal	
Core criteria	**Comprehensive criteria**
CONTRACT PERFORMANCE CLAUSE	
TS22(a) Commitment to reuse of imaging equipment Tenderers agree that fully functional imaging equipment owned by the purchasing authority and present at the procurer's premises must be retained for continued use rather than be replaced with new products (subject to procuring authority approval). This requirement does not apply if fewer overall imaging equipment products should be installed. This requirement does not apply where a supplier provides evidence showing that replacing an existing product with a more efficient product(s) would reduce overall environmental impacts. This requirement does not apply where a supplier provides adequate reasoning identifying why the use of older equipment cannot be supported **Verification:** *Tenderer must provide a declaration of compliance with this requirement.*	
TS22(b) Commitment to repair of imaging equipment Suppliers agree that imaging equipment that ceases to function during the contract will be brought back into full service using spare parts (subject to procuring authority approval). This requirement does not extend to: • Imaging equipment that is no longer able to provide the necessary levels of functionality stipulated by the procuring authority, • Imaging equipment that cannot be feasible brought back into full service through the substitution of non-functioning spare parts either due to lack of available spare parts or due to excessive costs, • Situation where the procuring authority wishes to reduce the total number of imaging equipment models in service. **Verification:** *Tenderer must provide a declaration of compliance with this requirement.*	

2.4.1.1 Background for the proposed criteria

The reuse of imaging equipment means that the overall lifecycle impacts of a product are being shared over a longer period of time (longer lifetime), thereby reducing impacts per unit of service. Energy use may become a larger factor where inefficient imaging equipment is used for longer periods of time. This issue will become less important as the efficiency gap between old and new products reduces over time (i.e. as efficiency improvements reduce over time).

There are no detailed criteria in major environmental initiatives which encourage purchasing or retention of used equipment. Some public bodies have begun to include these stipulations in

contracts.[105] It was decided for the first proposal that the EU GPP specification includes a criterion which commits new suppliers to retain fully functional imaging equipment already on the procuring authority's estate rather than install new products. The criterion also required that suppliers utilise the available spare parts for imaging equipment and repair products where feasible. This requirement therefore aimed to extend the lifetime of existing equipment on procurers estates and to reduce the number of new products needed to provide procurers services.

Imaging equipment service providers may face additional costs, and a fall in revenue, from reusing existing imaging equipment within a customer premises. However, financial impacts associated with the reuse of existing equipment are highly variable depending on different service operator practices and their own cost models.

Encouraging the reuse of existing imaging equipment may provide financial savings for procuring authorities as has been achieved with reuse of computers[106] but this will depend on which costs are assigned to them in a managed print service. For example, if procuring authorities only pay per printed page, with no costs associated for the installation of imaging equipment on their sites, then financial savings may be minimal for the procuring authority.

There is an increasing awareness in the imaging equipment service provider industry that the complete replacement of existing imaging equipment within an organisation is not always necessary at the start of a new contract. Instead, some service providers integrate existing imaging equipment in customers' premises into their new service provision. That is, imaging equipment that is already in use within customer's premises may be reused where the products are still fully operational.

2.4.1.1 Background for the proposed verification

A supplier declaration that they will commit to reuse or repair of equipment is likely to be sufficient for verification purposes but continued evaluation of the supplier during the course of the contract will also be necessary.

2.4.1.1 Further background after AHWG meeting

Some stakeholders provided comments suggesting that the scope of the TS22(a) criterion on "Commitment to reuse of imaging equipment" was too broad and needed to be further clarified for it to be effective in reducing environmental impacts. As a result, additional wording has been added to the criterion to allow exemptions where it is proven that retaining existing equipment would not reduce overall environmental impacts.

2.4.2 Supply of imaging equipment

The goal of this criterion is to promote the use of environmental preferable equipment, when those are supplied within a print service.
The following criterion was proposed for the AHWG meeting. No changes have been introduced after the consultation:

[105] Crown Commercial Service, 2016, "Multifunctional Devices, Managed Print and Content Services and Records and Information Management", available from https://ccs-agreements.cabinetoffice.gov.uk/contracts/rm3781
[106] http://ec.europa.eu/environment/gpp/pdf/news_alert/Issue57_Case_Study115_Durham.pdf

Second proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATION	
(when supply of imaging equipment is included in the print service contract) **TS23 Supply of imaging equipment meeting the EU GPP criteria** Imaging equipment offered by the tenderer in the frame of provision of printing services must comply with Core Technical Specifications included in the EU GPP Criteria Area 1 Imaging equipment. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.*	*(when supply of imaging equipment is included in the print service contract)* **TS23 Supply of imaging equipment meeting the EU GPP criteria** Imaging equipment offered by the tenderer in the frame of provision of printing services must comply with Comprehensive Technical Specifications included in the EU GPP Criteria Area 1 Imaging equipment. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.*

2.4.3 Supply of paper and imaging equipment consumables

The goal of these criteria is to promote the use of environmental preferable paper and imaging equipment consumables, when those are supplied within a printing service.

The following criterion is proposed:

Second proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATION	
(when copy and graphic paper supply is included in the print service) **TS24(a) Supply of copy and graphic paper meeting the EU GPP criteria** Copy and graphic paper offered by the tenderer in the frame provision of the printing service must comply with Core Technical Specifications of the EU Green Public Procurement criteria for Copying and graphic paper[107]. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.*	*(when copy and graphic paper supply is included in the print service)* **TS24(a) Supply of copy and graphic paper meeting the EU GPP criteria** Copy and graphic paper offered by the tenderer in the frame provision of the printing service must comply with Comprehensive Technical Specifications of the EU Green Public Procurement criteria for Copying and graphic paper[107]. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above*

[107] Available at: http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

Second proposal	
Core criteria	**Comprehensive criteria**
(when imaging equipment consumables supply is included in the printing service) **TS24(b) Supply of consumables meeting the EU GPP criteria** Consumables offered by the tenderer in the frame of provision of the printing service must comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above*	*(when imaging equipment consumables supply is included in the printing service)* **TS24(b) Supply of consumables meeting the EU GPP criteria** Consumables offered by the tenderer in the frame of provision of the printing service must comply with Comprehensive Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above*
AWARD CRITERIA	
Core criteria	**Comprehensive criteria**
(when cartridges and containers supply is included in the print service) **AC10 Supply of reused/remanufactured cartridges and containers** Points must be awarded for the commitment to provide the highest percentage (share) of reused/remanufactured cartridges/containers, which comply with Core Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables. **Verification:** *The tenderer must provide supporting documentation that the products to be supplied meet the criteria specified above.*	*(when cartridges and containers supply is included in the print service)* **AC10 Supply of reused/remanufactured cartridges and containers** Points must be awarded in proportion to the amount of pages printed by reused/remanufactured cartridges/containers which comply with Comprehensive Technical Specifications included in EU GPP Criteria Area 2 Imaging equipment consumables. **Verification:** *The tenderer must provide supporting documentation that the printing is done by reused/remanufactured cartridges/containers and that these meet the criteria specified above.*
CONTRACT PERFORMANCE CLAUSES	
Core criteria	**Comprehensive criteria**
(when imaging equipment consumables or copy and graphic paper supply is included in the printing service) **CPC5 Reporting on supplied consumables** The contractor must provide records regarding the provision of consumables specified in TS Supply of consumables, as appropriate, for: - copy and graphic paper meeting the EU GPP criteria (TS24 (a)), - consumables meeting the EU GPP criteria (TS24 (b)), - reused/remanufactured cartridges/containers (AC5).	*(when imaging equipment consumables or copy and graphic paper supply is included in the printing service)* **CPC5 Reporting on supplied consumables** The contractor must provide records regarding the provision of consumables specified in TS Supply of consumables, as appropriate, for: - copy and graphic paper meeting the EU GPP criteria (TS24(a)), - consumables meeting the EU GPP criteria (TS24(b)), - reused/remanufactured cartridges/containers (AC5), - number of pages printed by reused/remanufactured cartridges/containers (AC10) .

2.4.3.1 Background for the proposed criteria and verification

The initial proposals were aligned to the rationale explained in chapter 2.2.16.

2.4.3.2 Further background after AHWG meeting

During the AHWG meeting and following written consultation, stakeholders proposed to use printed pages by remanufactured cartridges and/or containers as an additional award criterion. Moreover, stakeholders did not see the need to have two identical criteria. The proposals from stakeholders were considered relevant, as this would introduce the paper yield element into the criteria, assuring reused/remanufactured cartridges/containers provide higher yields. Therefore, this was introduced as part of the comprehensive criterion.

2.4.4 Provision of managed print services

Managed printing services can reduce the amount of paper used by optimizing document output, can integrate other office service areas to optimize the use of energy and can improve employers education in terms of the products and consumables environmental impacts. Against this background it is proposed to include a comprehensive award criterion which promotes tenderers who offer such services.

Second proposal	
Core criteria	**Comprehensive criteria**
AWARD CRITERION	
	AC11 Provision of managed print services Points shall be awarded to the tenderers who offer provision of managed print service (MPS)[1]. MPS should cover the following areas: • *Assessment*: which involves a review of existing print environment of an organization and aims to provide recommendations for better device management, • *Optimization*: which entails consolidating and rationalizing devices and business processes to develop a comprehensive MPS strategy, • *Management*: which covers systematic reviews, monitoring of service level agreement and remote management. It aims to improve ongoing process and workflows. [1] Managed Print Services are defined as "the active management and optimization of document output devices and related business processes" **Verification:** *The tenderer must provide documentation which details the MPS conditions.*

2.4.4.1 Background for the proposed criteria

Managed print services, although not very commonly used by SMEs, are gaining more importance in the current practices (see Preliminary report for further details[2]). During and

following the AHWG meeting stakeholders provided information on number of environmental benefits linked to implementation of such systems. Among them there are:

- Eliminating shipping toner in excess: e.g. a printer shared by multiple users, when the printer says "toner is low", multiple users may be calling to request the same cartridge.
- Eliminating stock of cartridges at the customer. This is a common practice inherited from the time in which copiers where standalone devices (not connected to internet). The service providers ship a certain number of cartridges to the customer. The different users pick-up their cartridge as a per needed basis, but with no control of what is being installed, when and in which printer. There 2 costs here: there are cartridges in excess sitting at the customer, and there is a no control over this stock. Local stock is eliminated when the delivery is done automatically based on actual needs and when the cartridge is fully tracked to certify it is installed in the printer.
- Eliminating losing cartridges: 8% of cartridges never reach the printer[108]. These cartridges may get lost in the organization (and sometimes found 3 years afterwards), or they be deviated outside the organization when cartridge is shipped automatically.

2.4.5 Provision of consumable use information

For the first criteria version contract performance clause on provision of consumable information was proposed for discussion. The criterion has been revised after the consultation as follows:

Second proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATION	
	CPC6 Provision of consumable use information The print service provision must include dissemination of detailed consumable usage statistics to the procuring authority, on a regular basis, or when requested to do so by the procuring authority, during the life of the service contract. Consumable usage information must include, as appropriate, among the below listed: • Paper usage per each imaging equipment model within the fleet to include: – Number of sheets/rolls of paper, including size (i.e. A4, A3, etc.), – Identification of paper type (i.e. recycled, virgin, grammage, etc.) • Number of cartridges or containers used within each imaging equipment model within the fleet, • Yield per cartridge/container/drum unit per imaging equipment model in fleet, • Amount of other consumables used within each imaging equipment model within the fleet. • Number of new and remanufactured consumables used

[108] Personal communication with Nubaprint, October 2018.

Second proposal	
Core criteria	**Comprehensive criteria**
	• Number of mono and colour (per colour type) consumables used • Number of premature failures or dead on arrival consumables (per type) **Verification:** *The tenderer must provide documentation which contains the listed information.*

2.4.5.1 Background for the proposed criteria

There are no direct life cycle environmental hotspots associated with the provision of consumable use information. The information itself may help to reduce the environmental impacts of imaging equipment consumables through improved management practices.
Some public bodies require that the use of consumables within their organizations is monitored by suppliers.[109] No measurement metrics are needed to report on this criterion given that values are absolute figures. The inclusion of the requirement on the provision of consumable use information will assist procuring authorities to better manage environmental impacts. For example, procuring authorities would be provided sufficient information to be able to identify where high levels of impacts were occurring on their estates. There are no detailed criteria in major environmental initiatives covering this area for printing services.
The provision of consumable use information is unlikely to place additional costs on imaging equipment service providers as much of the required data is already collected.
The ability to understand consumable usage patterns over an estate provides significant costs savings opportunities for procuring authorities.
Imaging equipment service providers often provide detailed consumable usage information to customers as it is frequently needed for billing purposes.

2.4.5.2 Further background after AHWG meeting

One stakeholder raised a number of points on CPC6 Provision of consumable use information. The stakeholder suggested remote access may not be possible and physical access may be unfeasible so data provision may be difficult. The stakeholder also commented that service calls should not be included in the listed information but that premature failures of consumables (per type) should be included. Against this background, a reference to premature failures or dead on arrival consumables (per type), number of new/remanufactured consumables used and number of mono/colour consumables has been included. Reference to number of service calls per consumable type was not included as results could be misleading. For example, it is more likely that remanufactured consumables would be used in older equipment that may already be susceptible to more service calls.
Following stakeholder concerns, the criterion was also moved from core status to comprehensive status only.

2.4.6 Provision of environmental information during service contract

The following criterion is proposed with regard to the provision of environmental information during service contract:

[109] European Commission, 2015, GPP in Practice Issue 54, Resource efficient print and copy management solutions Consip (Italy), available from http://ec.europa.eu/environment/gpp/pdf/news_alert/Issue54_Case_Study110_italy_print_management.pdf

Second proposal	
Core criteria	**Comprehensive criteria**
CONTRACT PERFORMANCE CLAUSE	
	CPC7 Provision of environmental information during service contract The service provision must include, on request by the contracting authority, supply of the following information during the life of the contract: Details concerning the management of the imaging equipment and associated components at end of life. This must include: • Initial destination of products at end of life • Confirmation that the end of life service providers are certified on an ongoing basis to a recycling standard by independent certification bodies • Number of products sent for: • Reuse • Remanufacture then reuse • Recycling • Oher end of life options (to be specified (e.g. energy recovery, landfilling)) **Verification:** *The tenderer must provide documentation, which confirms that the required environmental information will be supplied, on request by the contracting authority, throughout the duration of the contract.*

2.4.6.1 Background for the proposed criteria

The provision of environmental information about impacts associated with a contract can help procuring authorities mitigate these impacts. For example, procuring authorities may seek to set targets for reduction of impacts from certain activities (e.g. energy use) but need to first identify current state of play (i.e. set a benchmark). Without understanding the current situation it is difficult for public bodies to develop savings targets.

It is unclear how many imaging equipment service providers operating within the EU market currently provide detailed environmental information during the provision of their services.
Some public bodies require, however, that suppliers monitor and report on environmental impacts throughout the duration of an imaging equipment service provision. Suppliers would need to identify their own metrics for measuring and reporting the required information. It is proposed that a new EU GPP contract performance clause on the provision of environmental information during imaging equipment service contracts is developed. This criterion will help procuring authorities to better manage the environmental impacts from their imaging equipment services. There are no detailed criteria in major environmental initiatives covering this area for printing services. The collection and distribution of the environmental information listed in the proposed criterion is unlikely to result in any significant costs to a service provider.

2.4.6.2 Background for the proposed verification

A supplier declaration confirming that they will provide the required environmental information during the life of the service contract is likely to be sufficient for verification purposes.

Continual assessment of the service provider against this criterion would be required within the contract performance clauses.

2.4.6.1 Further background after AHWG meeting

One stakeholder requested that the terms, "Recycling" and "other end of life options" should be clarified. The study team note that the criterion addresses whole products rather than material flows. As such, the end-of-life options are not as detailed as for material flow assessments. Other clarifications have been added to the text.

2.5 Horizontal Criteria

Criteria under this section can be used to all criteria areas (supply/lease of imaging equipment products, supply of consumables and procurement of printing services).

2.5.1 Tenderer Environmental Management activities

The following selection criterion is proposed regarding the tenderer environmental management activities:

Second proposal	
Core criteria	**Comprehensive criteria**
SELECTION CRITERIA	
SC2 Tenderer environmental management activities The tenderer must prove its commitment to reduce the environmental impact associated to their activities. **Verification**: *The tenderer must provide the document/reports of the following operational procedures which constitute the basis of an Environmental Management System:* • *identification of the most relevant environmental aspects relevant to their activities;* • *a precise action programme establishing targets on environmental performance regarding the identified environmental aspects* • *an internal evaluation process allowing verifying at least yearly organisation performances with regard to the targets defined in the action program and setting correction actions if needed.* *Tenderer registered under EMAS or certified according to ISO 14001 are deemed to comply. In this case, ISO 14001 certificate or EMAS registration must be provided as a means of proof.*	

2.5.1.1 Background for the proposed criteria

Ensuring that tenderers effectively identify, measure, evaluate and then reduce impacts stemming from their activities help to reduce overall environmental impacts associated with imaging equipment

There are no known environmental initiatives for imaging equipment which cover such environmental management activities. However, requirements regarding tenderers' abilities to manage their environmental impacts exist in other EU GPP criteria[110] and it is proposed to include a new selection criterion in this revised proposal criteria for imaging equipment.
This proposal aims to ensure that the tenderers commit to reduce the environmental impacts associated to their activities. Having an environmental management system (EMS) implemented is one of systematic ways to help organisations in minimizing the environmental impacts associated with their activities.

The proposed selection criterion is horizontal and can be used in all procurement routes covered by this GPP (supply/lease of imaging equipment products, supply of consumables and procurement of printing services).

2.5.1.2 Background for the proposed verification

[110] For instance in the currently revised criteria for Transport (for more information about them see the project's website: http://susproc.jrc.ec.europa.eu/Transport/documents.html) and the currently under revision EU GPP criteria for Food and catering services (for more information see http://susproc.jrc.ec.europa.eu/Food_Catering/stakeholders.html).

The costs borne by organizations in attempting to reduce the environmental impacts of their activities will be highly variable. Much will depend on the extent and degree to which they attempt to reduce their environmental impacts.

Although EMS is a very useful tool to develop systematic improvement processes, the EMAS/ISO certification might be particularly difficult to be achieved by SMEs which may lead to their exclusion from the tender process. It is therefore proposed that verification is based on plan-do-check-act (PDCA) principles, which constitute the basis of the management systems:

- Plan- identification of the most relevant environmental aspects relevant to their activities and setting a precise action plan
- Do - Implementation of the action plan
- Check- evaluation of the performance with regard to the targets
- Act- setting correction actions

2.5.1.3 Further background after AHWG meeting

One stakeholder requested that the criterion should be modified to clarify how the requirements can be evaluated. However, the verification text states clearly which different elements of the documentation shall be provided. In addition, registration under EMAS or certification with ISO 14001 are accepted as means of proof.

No changes have been introduced in this requirement as a result of the consultation.

2.5.2 Guaranteed provision of consumables and spare parts during contract

The following criterion is proposed regarding the guaranteed provision of consumables and spare parts during contract:

Second proposal	
Core criteria	**Comprehensive criteria**
TECHNICAL SPECIFICATION	
(*applicable for tenders where procurement of consumables is included*) **TS25(a) Guaranteed provision of consumables during contract** The tendered must ensure the provision of consumables for any imaging equipment that is retained for use for the duration of the contract. **Verification:** *The tenderer must provide a declaration of compliance with this criterion.*	
(*applicable for tenders where procurement of repair service is included*) **TS25(b) Guaranteed provision of spare parts during contract** The service must include the provision of spare parts for any existing installed imaging equipment that is retained for use for the duration of the contract. **Verification:** *The tenderer must provide documentation, which confirms that spare parts for any existing installed imaging equipment that is retained for use will be provided for the duration of the contract.*	

2.5.2.1 Background for the proposed criteria

The guaranteed provision of consumables and spare parts for existing equipment in stock for the duration of a contract is not addressed in the major environmental initiatives. However, the ability to secure them for the life of a contract would facilitate continued use of existing imaging equipment, resulting in lower environmental impacts

Other initiatives such as Blue Angel and EPEAT include requirements that distributors and manufacturers must provide spare parts. These requirements do not cover service providers, however, so whilst spare parts may be available service providers may not be willing or able to meet the requirements behind Blue Angel or EPEAT.

Guaranteeing the provision of consumables and spare parts for imaging equipment during the life of a contract may result in some additional costs for service providers, while procuring authorities are likely to see savings from the ability to continue to use existing imaging equipment through the life of a contract.

It is proposed that new EU GPP requirements guaranteeing the availability of consumables and spare parts for older equipment would help to extend the life of products and reduce overall impacts from an imaging equipment fleet.

2.5.2.2 Background for the proposed verification

A tenderer declaration that they will guarantee the provision of consumables during a contract will be required for verification purposes.

2.5.2.3 Further background after AHWG meeting

One stakeholder commented that the requirements in the criteria should be dealt with in a service level agreement following up certain indicators during the execution phase of the contract. The same stakeholder asked if it important that the spare parts are present at the procurers premises. Furthermore, the stakeholder suggested that the criterion could request guarantees that products were fixed within a certain period of time. However in the criterion there is no requirement for suppliers to store spare parts at procuring authority premises. The request refers to the tenderer capacity to provide spare parts, when needed. It was not possible to identify common response times for product breakdown and so no requirements on this issue were included. No changes have been introduced in this requirement as a result of the consultation.

2.5.3 User instructions for green performance management

The following criterion is proposed regarding the user instructions for green performance management:

<table>
<tr><th colspan="2">Second proposal</th></tr>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">TECHNICAL SPECIFICATION</td></tr>
<tr><td colspan="2">TS26 User instructions for green performance management
A guide must be provided with instructions on how to maximise the environmental performance of the particular imaging equipment provided by manufacturer and the best practices concerning the use of related consumables as a specific part of the user manual and/or in digital form accessible via the manufacturers' website. It should include at least the following elements: paper management functions, energy efficiency functions, more efficient use and better end-of-life management for consumables.
Verification:
Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply. Other appropriate means of proof will also be accepted, such as a declaration from the manufacturer, provided at the moment of equipment’s supply, that the above clause will be met.</td></tr>
</table>

2.5.3.1 Background for the proposed criteria

Criteria related to information for the user are very important as they raise the user environmental awareness and subsequent behaviour. It happens very often that the product has functions which could reduce significantly the overall environmental impacts of the device during its use; the user however is not always aware of the "green" features of the device and therefore may not apply them. The existing GPP criteria in force requires that a guide must be provided with instructions on how to maximise the environmental performance of the particular imaging equipment (covering paper management functions, energy efficiency functions and of any consumables such as ink and/or toner cartridges). It can be provided in written form as a specific part of the user manual and/or in digital form accessible via the manufacturer's website
It is suggested for this revision to keep current formulation and extend the criteria to cover also consumables.

2.5.3.2 Background for the proposed verification

A declaration from the manufacturer, provided at the moment of equipment's supply, that the above clause will be met should be accepted as a mean of proof. Products holding a relevant Type 1 Eco-label fulfilling the listed requirements will be also deemed to comply.

2.5.3.1 Further background after AHWG meeting

Minor wording clarifications have been introduced as a result of the consultation.

ANNEX 1: TABLE OF COMMENTS

Comments received during the 1 AHWG meeting and in written form (Criteria numbers in the Table of comments correspond to the initial proposal in the TR1.0)	JRC Dir. B response
General	
We cannot accept criteria that seek to undermine OEMs' ability to take legitimate steps to protect intellectual property rights, including taking technological measures to prevent infringement of IP rights, or to legitimately obtain patents for innovations. Criteria should not be designed to, or have the impact of, inhibiting OEMs' ability to make progress in technology or business models to the benefit of customers in the form of enhanced security, safety, reduced environmental impact, choice, welfare or otherwise and at the same time having the ability to compete fairly in the market. In addition, criteria that require the ability to roll back firmware updates are likely to have negative impacts on customers for which OEMs cannot be responsible such as impacting the performance of customer printers and exposing customers to IT security risks by rejection of functionality and security patches or enhancements.	**Comment rejected**. It is unclear which specific criteria would impact OEM's ability to protect intellectual property rights. Firmware updates can prevent the use of remanufactured non-OEM cartridges. The firmware roll-back criterion provides users with an immediate recourse where a firmware update has resulted in remanufactured consumables no longer functioning. OEMs would be able to provide customers with guidance surrounding the rollback of firmware or perhaps develop a system to quickly alter firmware updates where users complain that they have stopped the use of remanufactured consumables.
It would be useful to first assess the success of the current GPP criteria for Imaging Industry. This will help to draft realistic and improved criteria for the current Revision. *Proposal: We encourage the JRC and the EU Commission to shift Imaging Equipment products towards a resource-efficient, sustainable and fully circular market. We would like to highlight that the criteria for Imaging Equipment need to create a level playing for all OEM's and all aftermarket players.*	**Comment acknowledged**. The aim of this GPP criteria is to promote resource efficiency and transition to circular economy. In this sense remanufacturing activities carried out by OEM and non-OEM are supported versus the use of new-builds only. This information is very valid but it is very difficult to obtain. Within the framework of this revision different procurers were contacted and examples of contracts have been studied. Extensive assessment in EU28 exceeds the capacity of this project.
According to the EU Public Procurement Directive, all of the following principles must be met, the principle of: • non-discrimination • equal treatment • transparency • proportionality • mutual recognition	**Comment acknowledged**. The development of this project follows the principles of the EU Public Procurement Directive.
Imaging equipment is an internationally distributed product. Industry has been challenging to have its products meet Energy Star and Blue Angel. Though the requirements are getting stricter and stricter, forcing the industry to make additional investment, it is making efforts to continuously conform with them. If additional requirements or different evaluation methods are developed in the EU region where the same products are distributed under the certification of Blue Angel, the industry will be forced to cope with multiple requirements, which may cause further investment, or design change and increases environmental load on the manufacturers. *Proposal #1:* *1. One stakeholder requests to harmonize EU GPP criteria with Blue Angel, and partially with EPEAT or EU Voluntary Agreement.* *2. Criteria emulating previous EU Eco-label requirements should be adopted as Comprehensive Criteria.* *3. Definition of terms, interpretation of the requirements as well as criteria itself should be completely harmonized as a whole.* *4. For those criteria harmonized with other voluntary schemes, evidence should only be the website which shows certification of the products. Additional documents should not be requested by EU governments.* *For some Award Criteria, it may be reasonable to adopt the latest voluntary scheme criteria (BA, EPEAT, or VA) if they are revised after the EU GPP is issued.*	**Comment partially accepted**. Harmonisation has already been investigated and explained for each criterion. We are proposing a series of new criteria, thus full harmonization of all criteria isn't possible, but were done for those criteria found in other schemes, unless they were found ambiguous or not ambitious enough.
Proposal #2: We propose to base the criteria on existing regulatory requirements like REACH and to not go beyond these requirements. In particular, taking the information requirements of REACH article 33 and turning them into restrictions in public procurement criteria omits the detailed scientific assessment that would be required for REACH restrictions, is likely to result in requirements not based in science, would lead to confusion and will complicate uptake of the criteria by industry and procurers.	**Comment rejected**. Hazardous material content requirements are based on requirements in other initiatives which have large numbers of registered products. These registered products exhibit an enhanced level of environmental performance in terms of hazardous material content. The GPP goal is to go beyond the mandatory legislation.

Comments received during the 1 AHWG meeting and in written form (Criteria numbers in the Table of comments correspond to the initial proposal in the TR1.0)	JRC Dir. B response
Industry stakeholder welcomes the efforts of the European Commission regarding Circular Economy in general and Green Public Procurement (GPP) more specifically. We agree on the tremendous potential sustainable public procurement can have for a shift towards resource-efficient, sustainable and innovative economies throughout Europe and we underline the importance of public authorities using their purchasing power for giving preference to sustainable products and services. Stakeholder therefore also welcomes the current revision of the Green Public Procurement criteria for Imaging Equipment and the respective study prepared by the Joint Research Center (JRC). However, we deem it of high importance that the approach towards developing these criteria is based on scientific grounds and does not leave any room for bias: We note that a number of criteria appear to be based on a basic assumption that remanufacturing is always to be prioritized over OEM business models including the take back and recycling of cartridges without properly taking into account existing and future life cycle assessments.[1] OEMs maintain a robust recycling program for its ink and toner cartridges. Currently OEM studies [2] are all independently peer-reviewed and ISO-compliant full LCAs, show that OEM laser cartridges have at least as low or lower environmental impact than remanufactured cartridges, so there is no environmental advantage to remanufacturing. This result is true for all regions studied - Europe/Middle-East/Africa, North America, and Latin America. We call on the JRC to work from a balanced position, to equally consider the voices of all relevant stakeholders and to be open for scientific results regarding the whole life cycle impact of products and services and to set criteria that reflect this approach and that can be responsive to developments and information. Therefore, we note that in line with the respective EU Directive, public procurement should be based on the principles of equal treatment, non-discrimination, mutual recognition, proportionality and transparency.[3] One obstacle towards using sustainability criteria reported by public sector is too much complexity. We would like to put emphasis on easy verification of criteria. There are a few examples where the proposed criteria go beyond international standards or create the need for fairly complex calculations, e.g. the mass efficiency criteria, which we think will not increase the use of these criteria once adopted. We believe that the likelihood of usage of the criteria sets should be taken more into account by JRC when developing the criteria. Also, it should be possible to point to a web-link with the documentation rather than sending documents as such along with tender documentation. It should also be clarified that self-declarations based on international standards should be possible to use wherever there's a need to put forward a supplier declaration. [1] Award criteria 12 for example states 'Points must be awarded for the commitment to provide the highest percentage (share) of reused/remanufactured cartridges' which per se excludes some type of tenderers. See 'Revision of the EU Green Public Procurement (GPP) Criteria for Imaging Equipment. Technical Report. Draft criteria.', September 2018, JRC, p. 105. Available here: http://susproc.jrc.ec.europa.eu/imaging-equipment/docs/TR_GPP_EUIE_1st_AHWG_September_2018.pdf [2] http://www.eurovaprint.eu/fileadmin/eurovaprint_files/pdfs/2017/LCA_infographic_-_FINAL__1_.PDF http://www.eurovaprint.eu/fileadmin/eurovaprint_files/pdfs/2017/LCA_position_paper.pdf [3] See Directive 2014/24/EU Art. 1, available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0024&from=EN [4] Due to commercial reasons, we cannot share the numbers without permission. For more information please get in touch with IDC. *Proposal:* *- Use references to international standards whenever possible,* *- Try to align wording and requirements with generally accepted ecolables such as Blue Angel,* *- Limit the overall number of criterion,* *- Make sure to have in mind easy verification so that public procurers are inclined to use them and* *- Only use requirements/criterion based on scientific background in line with patent law and fair competition.*	**Comment partially accepted.** Study team looked at cited OEM LCA studies but also to non-OEM and other studies to have a fair representation. Conclusions are not the same as what you show in your two positioned papers based on one LCA study commissioned by HP. Therefore, we carried out an evaluation of LCA studies including both OEM and non-OEM, and it was clear that reuse and remanufacturing brings environmental benefits in comparison with use of only newbuilds. Thus, the criteria are developed to promote reuse and remanufacturing by both: OEMs and non-OEMs. The project teams aligned the criteria with BA wherever possible and included the references to international standards.

Comments received during the 1 AHWG meeting and in written form (Criteria numbers in the Table of comments correspond to the initial proposal in the TR1.0)	JRC Dir. B response
Proposal: The scope, definitions and criteria should be aligned with Blue Angel (BA) and the Voluntary Agreement to improve the environmental performance of Imaging Equipment (VA). Products having the BA label should comply with GPP Comprehensive Criteria. We kindly request to keep the GPP scope exclusions. If LFPs and scanners shall be added to the scope, these products should be excluded from noise emission and substance emission requirements, as there is no measurement procedure.	**Comment partially accepted.** The scope of the EU GPP criteria has been extended beyond the truncated scope found in the VA. Many of the criteria have been developed on the basis of criteria found in Blue Angel. However, other criteria have been included which promote enhanced environmental performance opportunities. LFPs and scanners excluded from noise emission and substance emission requirements.
Scope and definitions	
Products designed for Wide Format Printing (A2 or larger) are typically not designed for office. They are not in the scope of Ecolabel criteria such as Nordic Swan, Blue Angel, and the EU Ecolabel. Large format printers are a special product category. Large format printers evolved from the standard format printer for professional use – mainly for industries with applications for 2D CAD line drawing – i.e. architectural, engineering, MCAD and construction industries. They utilize the same printing technology as professional inkjet printers. But due to the fact they have to handle very large drawing or photo files they require an embedded computing capability. They also have to transport and precisely position media of all kinds in extra-large sizes from A0 format to paper rolls. They are also capable to receive print jobs from all kinds of LAN or wireless connected terminals.	**Comment rejected**. Large format printing equipment is expected to be used in office environments very relevant to GPP. Therefore, it is important to continue with their inclusion in scope. Moreover, ENERGY STAR v3.0 will include them in scope and will therefore have to comply to energy efficiency requirements, as shown in ES v3.0 final version: https://www.energystar.gov/sites/default/files/FINAL%20Version%203.0%20ENERGY%20STAR%20Imaging%20Equipment%20Program%20Requirements.pdf
A participant during the 1AHWG meeting asked to clarify the basis to remove speed exemption.	**Comment clarified.** Current speed exemption from scope is only linked directly to the large format printers exemption. Therefore, the same argument provided for including these products in scope is valid for the removal of speed exemption.
Cartridges and paper are the main factor when calculating the environmental footprint of printing. This is evidenced by many independent (=not paid for by OEM) studies. So cartridges must be in scope of any initiative aiming to reduce the CO2 emission of printing and efforts to save natural resources. *Proposal: Include cartridges and paper in scope. Include Blue Angel definition "Containers for colourants such as toners (e.g. toner bottles), inks (e.g. ink tanks) , etc. are in the scope." and "Module for Colourant" in BA.* *A complex module (of a printer, copier or a fax) which in addition to a container for colourants can include other components for transferring the colourant onto the media such as, for example, a photo semiconductor, a charging unit, a cleaning unit, an excess toner reservoir or an inkjet print head with nozzles and one or more integrated ink tanks.*	**Comment clarified.** Current proposed cartridges definition states clearly "[..] includes integrated components or moving parts integral to the imaging equipment's function beyond holding the ink or toner material." This includes what stakeholders points out as "[..] other components for transferring the colourant onto the media". Therefore, cartridge definition covers other components. The definition mentioned by stakeholder is Blue Angel's containers definition. Containers, differently to cartridges, do not include such additional components.
Proposal: Clones need to be better looked at within the whole GPP criteria, starting with a separate definition in the scope	**Comment partially accepted**. Issues related the illegal branded cartridges is beyond the scope of the EU GPP. In practical terms, it is not possible to deal with the problem of counterfeits through exclusion from the GPP scope. In the revised definitions it has been reflected, that new-builds may include clones/counterfeit. The scope reflects the main types: new-builds, remanufactured and refilled. New-builds include OEM and non-OEM (counterfeit/clones). All consumables shall comply with the requirements. In addition, as a pre-requisite all products offered by the tenderers have to comply with any legal obligations of the country where they are offered for purchase.
Proposal: Change the link of the definition of printing services from number of printed pages to number of cartridges used.	**Comment rejected:** This would create more confusion. The link to printed pages is typically observed more in printing contract services within the EU. Moreover, it tackles the largest environmental hotspot that is the number of printed pages. Criteria area on consumables ensures consumables' environmental impacts are also targeted.
Proposal: There should be split between 'Basic' Printing Services and 'Managed Printing Services'. Penetration of MPS in SMEs is very low. *To link definition to 'access' to printing services than to number of pages.*	**Comment acknowledged**: The definition of print services is kept general in order to accommodate different types of service agreements available in current practices. However, recognizing the importance of promoting managed print services in public procurement a new comprehensive award criterion has been added, which gives

Comments received during the 1 AHWG meeting and in written form (Criteria numbers in the Table of comments correspond to the initial proposal in the TR1.0)	JRC Dir. B response
Proposal: Definitions of printing services should be clarified as following: *Full services: Include the payment of total cost of ownership, via a sale renting leasing etc. Include 4s, HW, Sw, maintenance financing tech support, etc.* *Full services can be two types:* *Full replacement contract service: A contract where all printers are replaced at the same time, not taking into account different life loads and performance.* *Managed printing services: The initial assessment will be key to decide how resources can be better managed by changing devices, outplace them or keep them.* *Basic Printing services:* *In this case it only covers part of the service, and mainly consumable supply as being top priority. Only a maintenance contract can be included (technician support only).*	points to tenderers who offer MPS.
Market analysis	
The Preliminary report makes the wrong assumption that annual sales in the EU of Imaging Equipment products will continue to grow in the years to come (table 5 of the Preliminary report). An ever-increasing proportion of communications is now digital and not analogue. The digital revolution has a negative impact on the unit sales and printing volume of Imaging Equipment products. Average printing volume is going down. This trend has also an impact on LCA evaluations of Imaging Equipment. The market shift toward digital needs to be taken into consideration for all proposed GPP criteria. Overall, trends are not as positive as the data on estimated annual sales for imaging equipment used in the Preliminary Report (table 19, p. 69) indicates. The data on estimated annual sales for imaging equipment shown in the Preliminary Report is way above the figures by the International Data Corporation (IDC) referring to historical actuals, which means the report currently overestimates the market for 2030 by 55%. Many factors accelerating the decline of sales growth in the imaging equipment industry- the ongoing digitization of workflows, paper reduction, shift to digital signage, trade wars etc. – seem to have not been considered in the Preliminary report (table 19. P.69) which shows a 5-year compound annual growth rate (CAGR) of 28% when estimates by IDC show a decline. In a shrinking market place, to compete in the long-term OEMs have to improve design and functionality of the products and create new business models or product solutions. This important development should be taken into account when discussing Green Public Procurement of the future. *Proposal: Consider DIN A4 paper sales to establish market volumes of consumables. Moreover, WEEE data on consumables must add relevant data towards the future. Also, consumables sales should be quantified.*	**Comment clarified.** IE and consumables sales have been updated according to different data sources cited in the report. Updated estimations for IE show indeed previous figures were overestimated for most product types. However, inkjet MFDs show higher sales than previously calculated. This is because of their previous higher annual growth before 2015. This follows same trend as for laser MFDs. However, they show an overall trend of reduced sales as other IE types. Consumables follow same trends.
LCC	

Comments received during the 1 AHWG meeting and in written form (Criteria numbers in the Table of comments correspond to the initial proposal in the TR1.0)	JRC Dir. B response
Installation costs are not negligible. They represent up to 10-15% printer costs and also some waste generation impact for packing materials. If the points of installation are spread the costs grow. The repair and maintenance costs are dependent on the type of cartridge used, i.e. a remanufactured or an original. This has not been taken into account when estimating Life Cycle Costing, which has an effect on assumptions made later on the report. We urge the developers to read following study based in feedback from printer service technicians: https://www.marketstrategies.com/hp/EMEA-Technician2018.pdf *Proposal: Include installation costs.* *Also, to delete or modify a number of suggested criteria with this(*) in mind, and we suggest the developers to do so too.* **In the rational behind many of the suggested criterion there is no consideration made about the different performance of a printing system when consumables of different origins are used (ie remanufactured and original cartridges for instance),.*	**Comment clarified.** Installation costs are considered negligible because most of printers in scope do not require installation from a professional. In the case of larger printers requiring professional installation, the cost level is considered still marginal and when it amounts to a significant amount (e.g. up to several thousands of EUR), it is still not 10-15% of printer cost. In this latter case, the installation costs would be part of the purchase cost or the printing service cost. Waste generation costs are typically included in the purchase cost. Differences on maintenance costs because of the use of OEM and non-OEM cartridges are considered negligible. Moreover, failure rates reported in attached document provided by HP are reflected in a higher failure rate which have been quantified as running costs. Higher failure rate is reflected by earlier consumption of cartridges and subsequently potential higher running costs. However, due to the large purchase price difference between OEM and non-OEM cartridges, running costs from using OEM are slightly higher. LCC results show OEM costs as a conservative approach. Higher running costs from using OEM cartridges is in line with what found in the Revision of the VA IE. See: https://www.review-imagingequipment.eu/documents. It is arguable whether use of OEMs incur in higher reparation/maintenance costs considering study provided by OEM was commissioned by OEM and compared only OEM products vs. non-OEM cartridges. This cannot be used to draw overall conclusions for all repair and maintenance costs.
During the AHWG meeting, two stakeholders questioned the low significance of the repair/maintenance costs and the absence of installation costs in the overall LCC of imaging equipment.	**Comment rejected** The only evidence provided by stakeholder was the apparent significance of repair and maintenance costs because of the use of a non-OEM cartridge, which were higher than if using an OEM cartridge. The presented evidence is rather specific to a particular brand of cartridges used in the same brand of equipment and cannot thus be used as a representative of all cases. Moreover, the quantification of higher failure rates for non-OEM consumables has been applied to running costs and not to repair and maintenance costs. The presented evidence points at this difference in failures when using non-OEM consumables, and it has therefore been assessed that this should be reflected as running costs, and not as repair/maintenance costs. This is in line to what found during the revision study of the Voluntary Agreement on Imaging Equipment . Installation costs are assumed negligible, and this is also aligned with the referred revision study. In addition, the LCC was performed to get an overview of the hotspots and not for comparing use of OEM with non-OEM consumables. This is assessed and explained in the relevant criteria.
Key environmental impacts and improvements	
"The amount of paper the cartridge uses to deliver the printouts at the desired quality; the higher the quality the more the reductions of environmental impacts by using less paper." *Proposal: The text should be removed as there is not a standard on color. Either the text is removed or a quality standard is defined. This text opens a Pandora Box for OEMs to avoid European mandate on remanufacturing and only proposes a very subjective criteria not based on true technical specifications.*	**Comment rejected.** Different users may have different levels of expectations from their printouts. Subjectivity of this statement has been clarified in the report but the reference to quality and the amount of paper is kept, as this issue is considered of importance.
Proposal: In 1.7.4 Table 7 please add: *-Imaging Equipment Consumables:* *6. Prohibiting non-OEM patent-infringing compatibles*	**Comment rejected.** The legal issues related to patent infringement are beyond the EU GPP revision scope.
CRITERIA AREA 1 – IMAGING EQUIPMENT	
General	
We welcome that Energy Star is referenced broadly in the draft criteria, especially since the cooperation agreement between the EU and the US Environmental Protection Agency's Energy Star Program was terminated in beginning of 2018. Energy Star has wide acceptance in the industry and in society and it is often used (if not to say always referenced) in ecolabel schemes when addressing energy efficiency. Industry tests products against the relevant Energy Star standards, and self-declarations by industry should continue to be accepted as a verification method.	**Comment acknowledged.**

Comments received during the 1 AHWG meeting and in written form (Criteria numbers in the Table of comments correspond to the initial proposal in the TR1.0)	JRC Dir. B response
CPC1 Preliminary assessment of existing fleet and procurement needs	
This requirement seems unnecessary for small purchases. Should only be a requirement for large fleets. *Proposal: The procuring authority should preferably have an asset management system in place, the evaluation asked for usually has a cost if not part of a Managed Print Services offering.* *There should only be requirement for large product fleets. The term of "Refurbishment" is not listed under the "Rs". Clarify that an evaluation has a cost. Take account of use intensity as well as age*	**Comment rejected.** The criterion does not state that the assessment of the fleet needs to be free of charge. As such, no change is suggested. The criterion is relevant for all type of purchases regardless of the size. Is up to procurer if they need to be adviced prior to the purchase. Wording has been reviewed. An incoming service provider would not have access to historical usage statistics unless provided by the customer. No change is suggested.
TS1 Imaging equipment minimum energy efficiency	
Industry stakeholder supports continued reference to ENERGY STAR program. Add 3rd party suppliers (other than OEM manufacturers) since fusers can adjust temperatures, use of different colorant drives calibration cycles which impact energy performance. Equally impacts on reliability or print quality can cause HW failures and reprint, increasing energy consumption. Since EU resigned from the Energy Star program, industry has been confronting difficulties to show evidence. If EU utilizes Energy Star program outcomes, an alternative way to show compliance to the program should be proposed. *Proposal:* *Add: If 3rd party supplies are to be used the 3rd party supplier shall assure that the print system still complies with Energy Star energy efficiency specifications.* *Showing the US EPA E-Star website of identical products registered, or* *showing company's in-house test reports should be sufficient for verification. In that case, the energy efficiency values may slightly vary by voltage difference, the result needs be deemed to comply.*	**Comment rejected.** The requirement refers to supply of Imaging equipment, independent if this is a new OEM product or a reused/remanufactured one. For all products, the tenderer has the responsibility to provide product that will be compliant with the energy efficiency criterion. If 3rd party supplies are included in the product it is still the tenderer who has to ensure the compliance of the final product.
"The tenderer must provide test reports carried out according to the test methods laid down in the latest implemented version of ENERGY STAR. The tenderer must detail the measured TEC value and the ENERGY STAR TEC_MAX value for each applicable product and a calculation of the improvement in energy efficiency. These must be provided upon award of the contract or prior to that upon request." The alternative life cycle costing provision is questionable without a prescribed methodology/calculation. A LCC calculation would also include paper and cartridge use as well as services, so it's broader scope than Energy Star. The award criterion shall refer to BA's TEC measurement methodology in order to also allow Business Inkjet products to get award points for energy efficient products. Background data are outdated and will not be representative of ESTAR v3.0. The only credit is for TEC limits, which do not cover Inkjet technology. This is a discrimination issue and doesn't follow the "non-discrimination" principle of the EU Procurement Directive. *Proposal: Ink jet technology must also be able to participate in this award criteria. Thus, BA's TEC measurement technology shall be applied. Remove Life Cycle Costing.*	**Comment acknowledged**. The possibility to use Blue Angel TEC approach has been added in.the revised criteria proposal to cover also inkjet technology.
References to ENERGY STAR are reasonable, as there is not really an alternative methodology for the measurement of energy consumption. Moreover, for existing products, industry has ENERGY STAR test results ready. Getting new data will be costly. Only after an assessment of the revised final ENERGY STAR criteria for imaging equipment a decision should be taken to comply with ESTAR v.3.0. A revised ENERGY STAR needs to be in line with the objectives of the EU GPP. i.e. to promote the best environment performing products in each category and print capacity range (ipm). *Proposal: Self-declaration by industry must be accepted as verification method. Registration in the EU ENERGY STAR Database is impossible since the termination of the EU-US agreement (February 2018) and must thus, not be requested.*	**Comment acknowledged**.

Comments received during the 1 AHWG meeting and in written form (Criteria numbers in the Table of comments correspond to the initial proposal in the TR1.0)	JRC Dir. B response
AC1 Improvement in the imaging equipment energy efficiency beyond ENERGY STAR	
The alternative life cycle costing provision is questionable without a prescribed methodology / calculation. An LCC calculation would also include paper and cartridge use as well as services, so it's broader scope than Energy Star. *Proposal #1: The award criterion shall refer to BA's TEC measurement methodology in order to also allow Business Inkjet products to get award points for energy efficient products.* *Proposal #2: Add: If 3rd party supplies are to be used in the contract. The 3rd party supplier shall assure that the print system still qualifies for the additional points.* *Proposal #3: Add: (not applicable for ENERGY STAR 'Operational Mode' imaging equipment)* *Proposal #4: Add to first sentence: … as mentioned in the Blue Angel Change.* *Proposal #5: Remove: Life Cycle Costing… and the whole sentence*	**Comment partially accepted**. The possibility to use Blue Angel TEC approach has been added in the revised criteria proposal to cover also inkjet technology.
TS2 Duplex imaging capability	
Please clarify if thermal marking = thermal transfer, recommended to use only one word throughout the reports. Questionable, in BA and EPEAT all duplexing requirements are currently out of scope for most inkjet technologies, how is this addressed in the criterion? *Proposal: Modify, align with Blue Angel*	**Comment partially accepted**. The comprehensive criterion, which was referring to thermal marking, has been removed as there were only minor benefits as a result of the updated ENERGY STAR (v3.0) specification. The scope of the criterion has been clarified in the text.
TS3 N-up printing	
Proposal: Delete, it's already a standard option	**Comment rejected.** Whilst N-Up printing is a standard option on most imaging equipment, there is not enough evidence suggesting that it is a standard feature on all imaging equipment. N-Up printing can provide paper savings when used.
TS5 Capability to use remanufactured cartridges and containers	
The criterion is easy to use and both core and comprehensive criteria are common in the tenders of the Government of Flanders. It's a very easy and useful criterion, although procurers should think about the worth of the criterion for their own situation (but that goes for all criteria). In some situations, automatic duplex printing will call for a more 'heavy' device than necessary. Supported *Proposal:* *1. Keep as it is* *2. Harmonization with (draft) VA and BA RAL-UZ-205 3.1.1.3 table 3, no.4.* *3. Modify. Consider rewording: "do not prevent basic print functionality when using remanufactured …"* *4. Suggest to add a definition of remanufactured. This definition is proposed in the draft VA: Remanufactured cartridge: cartridge resulting from a commercial process where used OEM cartridges are centrally collected for refilling, relabeling and repackaging under different brands and resold to a new user. Some worn components may be replaced in order to return the cartridge to working condition.*	**Comment accepted.** Changes have been introduced in the text accordingly. Text added based on Blue Angel Table 3 No.4.
Job creation is also relevant. There are 4000 families of cartridges and 2000 components, making them complex to refurbish/refill/reuse. There is a huge waste of cartridges but these many part numbers represent a big barrier. 50 to 70 thousand more jobs could be created, done by an analysis done by ETIRA. Ecolabel for cartridges could make consumers aware of cartridges quality. There is a need for an European scheme because Blue Angel is still very German. But also OEMS ARUDs (anti reutilization devices) and FUD tactics (Creating Fear Uncertainty and	**Comment partially accepted**. The project aims to provide evidence on potential environmental and costs improvement, while job creation is out of scope of this study The language in criterion on "capability to use remanufactured cartridges and containers" conveys the same requirement without needing the reference the DIN standard. This provides some further flexibility. The background data has been updated. Cartridge chip issues are dealt with in other criteria as to do so in the core criterion would limit supplies availability. The text of the criterion has changed to reflect text in Blue Angel

Comments received during the 1 AHWG meeting and in written form (Criteria numbers in the Table of comments correspond to the initial proposal in the TR1.0)	JRC Dir. B response
Doubt) at consumer have shown a very strong potential to hinder reuse of cartridges. Neither VA (Under revision) has demonstrated any effectivity to reduce waste and promote reuse. So declarations are very weak and not enough. Verification through Ecolabel is useless as the Ecolabel no longer exists. Self-declaration by OEM will for obvious reasons not work. Instead, consumables must be free of chips etc to allow free reuse. *Proposal #1:* *Manufacturer has to give parts catalogues and reparation. Shop manuals for all cartridges that will include instructions to reset the chip.* *Owner's manual has to include a very strong wording to support cartridge remanufacturing. An independent environmental body supervises the adherence to promote remanufacturing* *devices can account for number of new vs reman through life of printer.* *We strongly believe that an Eco-label for cartridges is a must.* *Data also reflects the impact of cartridges can be as big or bigger, but in any case comparable to paper.* *Proposal #2:* *Should be completely harmonized with RAL-UZ205 3.1.1.3-Table 3-No.4.* *Proposal #3:* *Should read: "The products must accept remanufactured toner and/or ink cartridges. Devices and practices that would prevent use or unnecessarily hinder remanufactured cartridges should not be present or applied."*	(as per other stakeholder comments).
TS6 Reduced number of materials	
Most of plastics used in a product are casing parts in a weight basis and therefore these plastics have big contribution to recycling. On the other hand, weight of plastics used in other mechanical functional parts are rather small and such plastics have limited contribution to recycling. If unified polymer would be used in such mechanical functional parts, their functionality might be lost. *Proposal: The requirement should be completely harmonized with RAL-UZ 205 3.1.1.2-Table 2- No.1.*	**Comment accepted**. Criterion altered to align with Blue Angel Ral UZ 205 section 3.1.1.2 table 2.
Market innovation has to be driven to make long lasting printers and make a profit at a sale. *Concerning the term "flame retardants", this describes a function that can be performed by a wide range of different chemical substances. It does not describe a separate class or family of chemicals and there is no clear scientific or legal definition. It is the presence of any additive that can hinder recycling, it is discriminatory to mention only flame retardants in this way.* *Proposal: We recommend using the word "additive" instead*	**Comment partially accepted.** Comment on flame retardants partially accepted. Wording in the rationale and criteria have been revised accordingly.
"Are you aware of any examples of best practices regarding reduction of number of materials used to support design for recyclability, which could help shaping proposal for comprehensive criterion?" Answer: No This kind of criterion seems very hard to verify for a procurer, where no type I ecolabel is present. The text states that "the majority of all imaging equipment sold in the EU is compliant with the VA requirements". But it's not clear how a procurer will know for sure if the equipment is compliant with the VA requirements, if no compliance report is available. Is the signing of the voluntary agreement enough, or does the procurer need to dig deeper into the evidence?	**Comment clarified.** The rationale included in the TR shows that Blue Ange and EPEAT include criteria addressing reduced numbers of materials. Tenderers will be able to use these certificates as a proof of compliance; however other supporting documents will also be accepted. No change to the criterion, in this respect, is suggested.
TS7 Information on postconsumer recycled plastic used	
"Could you provide input how to verify compliance with this criterion in most credible and still workable way?" Answer: Without type I ecolabels doing the check for us, this will be very hard to verify. Especially as the IT chain is a very complex one, where different parts are manufactured in different places. Sometimes, even the same part doesn't come from the same supplier in the chain in every device. I can't give a good	**Comment clarified**. It was not possible to identify how the QA-CER could be easily used to support verification. Future work in this area could further investigate these kind of initiatives.

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workable way to deal with this, when there is no label available. "Are you aware of any examples of best practices regarding use of recycled plastics, which could be shared with the project team?" Answer: See https://qa-cer.be/ QA-CER assures the quality system related to the recycling process and use of recycled materials. Both the recycled content and the quality of the end product are addressed in order to support the principle of sustainability.	
Aligned with the VA, positive. However, it's questionable to add criteria on "post-consumer "recycled plastic due to lack of international standard. Also the levels are high compared to what was shown in the market analysis *Proposal #1: Exemptions from EPEAT need to be included such as "The following may be excluded from the calculation of percentage: printed circuit boards, labels, cables, connectors, electronic components, optical components, electrostatic discharges (ESD) components, electromagnetic interferences (EMI) components, and biobased plastic material."* *Proposal #2: The criteria should be completely harmonized with Blue Angel 3.1.1.2-Table 2- No.10 (the intervals of the ratio of TS7 is different from Blue Angel).* *Proposal #3: Exchange the first sentence to this:"For all products offered in the tender information shall be made available to customers on the minimum[1] of postconsumer recycled plastic content, calculated as a percentage of total plastic (by weight) in each product."* *Proposal #4: The following may be excluded from the calculation of the total plastic weight: printed circuit boards, labels, cables, connectors, electronic components, optical components, electrostatic discharge (ESD) components, electromagnetic interference (EMI) components, and bio-based plastic material. Products that do not contain plastics can declare "Not applicable" for this criterion.* *Footnote 1: in increments of 0%, 0-5%, 5-10%, 10-15 %, etc. A possible definition of postconsumer recycled plastic content can be found for example in EPEAT.* *A material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item; part of the broader category of "recovered" items.*	**Comment accepted**. The criterion text has been amended according the comment. Harmonized with Blue Angel 3.1.1.2-Table 2- No.10 and exemptions from EPEAT have been included.
AC2 Postconsumer recycled plastic minimum content	
Actual threshold of 1000 mgrs as oposed to 10 Mgras in new plastic is under discussion. *Proposal #1: Modify thresholds. E.g. the percentage of the postconsumer recycled plastic content to be awarded should be harmonized with EPEAT: ≦5%, >25% : 0.5 x points* *Also, reduction on thresholds of Flame retardants on Post Consumer plastic is strongly recommended* *Proposal #2: Add new ranges such as > 50% XX points, 40-49% 0.8x points, 30-39% 0.6x points, 20-29% 0.4x points, 0.1-19% 0.2x points* *Proposal #3: Suggest to setting a higher target than 25% , maybe in the form of an award criterion, maybe up to 50%*	This criterion has been removed due to difficulty in the verification process.
TS8 (a) Spare parts availability	
Comment #1: The spare parts will depend on the technology used and it's feasible to create a full list. The 3 and 5 years are same as in the draft VA; which we see as positive. Comment #2: 3 and 5 years copied from the VA, approved. A spare parts list should not be imposed as each product family can have a different design. An imposed list of spare parts reduces or hinders innovation. The criterion can lead to discrimination of certain product designs. Comment #3: Probably one of the most important hotspots to address. Today, figures show up a tremendous excess on installed capacity, making needs for change very weak. Also figures from MPS vendors show how devices are changed with very poor efficiency on mind, as 70% of devices are changed prior to reach half of the life expected, meaning new non necessary	**Comment partially accepted.** Proposed list of spare parts includes already exchange parts. Splitting parts in two sub-groups (spare and exchange) will make implementation and verification of the criterion more complicated. At the end, we are targeting all of these parts and current definition of spare parts in the report fits both. However, we are proposing to align with BA in core criterion and leave proposal for comprehensive with an exhaustive list and for 5 years both product groups. Core criterion has been modified. The report states specifically: "[..] A number of components that are deemed as applicable spare parts has been listed to add clarity. Applicable spare parts were defined as parts which were deemed to be at risk of failure during normal operation of imaging equipment over the expected lifetime." This clearly indicates these parts are

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manufacturing impacts are made. Comment #4: Spare parts listed should only be those that would shorten IE lifetime the list of spare parts needs to be further defined *Proposal #1: Delete comprehensive criterion, since the core criterion should be enough.* *Proposal #2: Modify and use as Core criteria only. Here's two suggestions:* *Rewrite, option 1:* *Spare parts list, examples where applicability depends on technology and non-exhaustive:* *• Storage devices* *• Scanning units* *Option 2: Align with BA UZ 205, including definitions of 'exchange parts' and 'spare parts', and do not include a list of parts.* *" (not relevant for lease contracts including maintenance)* *Proposal #3: Spare parts and exchange parts needed for repair of the devices must be available for the minimum time periods after the end of product manufacturing:* *For Electrophotography, Solid Ink and High- Performance Inkjet models - 5 years* *For Inkjet models - 3 years"* *Add exemption for low end products and suggest as Comprehensive, not Core criterion* *Delete list.. A spare part list can be shown as guidance, but shall not be mandatory.* *Proposal #4: Core should be completely harmonized with EU Voluntary Agreement - 6.2.* *Comprehensive should be completely harmonized with RAL-UZ205 3.1.1.3.* *no parts should account for more than an "X" % of the device price being X <30%*	deemed to be replaced within products' lifetime.
TS8 (b) Design for disassembly and repair	
Comment #1: There is no alignment with Blue Angel criteria for Design for disassembly. Comment #2: Blue Angel (3.1.1) has a broader scope. Even with the background information, I can't figure out whether for instance EPEAT and Blue Angel rule out devices when no ISO 180 documentation was provided on the paints and coatings. It's also not clear if these kind of tests are very standard in the sector. If a relevant Type I Ecolabel isn't present, are the requested verification tools common in the sector? Are they easy to interpret for a procurer? Comment #3: GPP criteria should be harmonized with current existing environment labels. *Proposal #1: The repair guidelines/manual could be available on-line upon request to professional repairers. Sending hard copy would create a waste stream.* *Proposal #2: TS7(a) should be TS8 (a). Suggest to delete in the first sentence in the Verification part: , which must include an exploded diagram of the product illustrating the parts that can be accessed and replaced, the tools required and how the repair process should be conducted.* *Proposal #3: Following wording should be removed and this requirement should be harmonized with RAL-UZ205 3.1.1.1 table 1 No. 1,2,4,5,7,9,11 and 12 (these points are all "must" items in BA).* *- Product must be accompanied by a repair manual with good quality information to support repair operations.* *Should be completely harmonized with RAL-UZ205 3.1.1.1-Table 1-No.1,* *2, 4, 5, 7, 9, 11, &12 (all the Must items).*	**Comment partially accepted**. The criterion has been reformulated and harmonized with Blue Angel RAL-UZ205 3.1.1.1 table 1 No. 1,2,4,5,7,9,11 and 12. Reference to exploded diagram is kept. Criterion rephrased.

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Proposal #4: Please harmonise with VA (5.4 Design for dismantling for repair, reuse, recycling and recovery for hardware?) *Proposal #5: Add definition of "good quality = …." If it' used.*	
TS8 (c) Design for recycling	
Comment #1: The requirements between this and Blue Angel are not consistent. It goes a step further. Comment #2: Testing for recyclability is onerous, no agreed upon method. Comment #3: Permanent marking such as engraving needs enough flat surface area. Blue Angel limits this for more than 200mm2. *Proposal #1: Suggest to delete 3rd sentence. Suggest to delete the verification using ISO testing or equivalent. this requirement should be harmonized with RAL UZ205 3.1.1.2 table2 No.9* *Proposal #2: Align with VA section 5.2.2.*	**Comment accepted**. Alterations made in light of stakeholder comments.
AC3 Cost competitiveness of spare parts	
It needs to be localized per country, and the procurer must take into account if the spare parts are offered by a supplier that offer services too or if that's handled by another company. Standardization of some parts become crucial as well as price of "Captive parts". Those are parts that cannot be repaired and only purchased to OEM. These captive parts pricing may represent a programed obsolescence and no parts should account for more than an "X"% of the device price being X <30%. Products must be accompanied by a repair manual, and the repair manual has to include cartridges repair. *Proposal: To modify as it follows:* *"The tenderer must provide a price list for the most common spare parts. For the common parts indicative labour costs for replacements carried out by the tenderer's authorised service providers must be provided, localized to where this is offered. The tenderer should also identify the length of time for which given cost data is valid. Points must be awarded according to the most cost-competitive offers.*	**Comment partially accepted.** It should apply to all spare parts listed in criterion *TS Spare parts availability* and to labour costs for local conditions. List already included in TS8(a) Spare parts availability, comprehensive criterion. Reference has been made. The inclusion of price threshold will make the criteria complex. It is already difficult to establish a list of relevant spare parts. Repair manual for cartridges is not considered relevant for procurers' needs.
TS9 Substance emissions	
Comment #1: 3rd party providers of consumables, i.e. remanufacturers for supplies for instance need to comply with these requirements as well as OEMs. *Comment #2: The emissions from a printer is measured as a print system (with a printer + specified supplies + paper).* *Proposal #1: Reports for devices of identical construction (appendix B-M in BA) shall be accepted.* *Proposal #2: Requirements concerning chemical safety should be common with any devices or consumables.* *Proposal #3:LFPs and scanners shall be excluded from noise emission and substance emission requirements, as there is no measurement procedure. Moreover, the requirements shall only apply to new products placed on the market, not to old ones (aligned with VA). Finally, as the testing procedures are very costly, reports for devices of identical construction (appendix B-M in BA) shall be accepted. Non-OEMs need to comply with these requirements as well.* *Proposal #4: Suggest to add in both Core and Comprehensive TS9:If 3rd party supplies are to be used in this*	**Comment partially accepted**. With regard to acceptance of test results for products of identical construction, the proposal has been accepted and a relevant change has been introduced in the criterion. Further, I t was investigated whether it was possible to add requirements for remanufactured consumables in the comprehensive criterion. At this stage, it does not appear as if this is possible due to practical reasons (i.e. testing would have to be conducted on complete system. Thirdly, scanners and LFPs have been removed from scope of this criterion. Finally, a clarification has been added in the criteria text regarding the "print phase".

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equipment the 3rd party supply vendor shall certify continued compliance with all emissions specifications. *OR If a 3rd party supplies is to be used in the equipment it's note sure the emissions standards set by BA will be met.* *OR (in the Verification;) ……will be deemed to comply when OEM cartridges are in use. The same requirements should be added to the non-OEM cartridges.* *Test reports for devices of identical construction (appendix B-M of BA)need be accepted.* *Question:* *Proposal #5: Does "Print phase" in the core criteria table mean only "Print phase"? Or does it mean "Print phase (=Pre-operating phase + Print phase)" as shown in the comprehensive criteria table? In the case of the latter, please add "(=Pre-operating phase + Printphase)" after "Print Phase". Add: … the requirements shall only apply to new products (i.e. placed on the market after the publication of these EU GPP recommendations 2019), not to old ones for Ecolabel the testing was done at a specific set-up, so a configuration change would change emissions profile proposed to use tests declarations only for comprehensive criteria. In Blue Angel it is verified for different printing capacities as well.* *if remanufactured cartridges are used, this should be included in the test set-up and covered in the substance emissions criterion. In Blue Angel, the emissions profile has to be from the product with the highest emissions.* *OK not to have the core criterion, just comprehensive* *For scanners and MFDs there aren't testing methodologies so what should be used for verification? This should only be applicable to new products placed on the market. She also proposed to use existing declarations for identical parts.*	
TS10 Noise emissions	
RAL UZ-171 is not necessarily easier than UZ-205 in terms of the noise criterion. Either criterion is partially stricter than the other as the criterion curves are different. Older products being sold now may have been evaluated for Blue Angel UZ171 and newer products, for UZ205. Therefore, either case should be regarded as meeting GPP Core criteria, and in both cases, +0.3db is necessary for Core criteria. It's aligned with the old BA RAL-UZ 171 limits, it can be supported since it's a core TS. Sound-power is used which is positive since the alternative sound-pressure can be measured both at an operator and a by-stander position and could cause confusion. Change to CORE criteria instead of the one now suggested as Core criteria. Sound-power is used which is positive since the alternative sound-pressure can be measured both at an operator and a by-stander position and could cause confusion. *Proposal #1:* ***Core**: Two criterion should be provided so that tenders can select either one depending on the product* *1) completely harmonized with RAL-UZ205 No. 3.5 + 3db* *2) completely harmonized with RAL-UZ171 No. 3.5 + 3db* ***Comprehensive:** Should be completely harmonized with RAL-UZ205 3.5.* *Modify section on core criteria* *Proposal #2: Change to a Core award criterion instead of a comprehensive TS* *LFPs and scanners shall be excluded from noise emission requirements, as there is no measurement procedure. Moreover, the requirements shall only apply to new products placed on the market, not to old ones (aligned with VA). Finally, as the testing procedures are very costly, reports for devices of identical construction (appendix B-M in BA) shall be accepted. Non-OEMs must comply with these requirements as well.*	**Comment partially accepted**. Harmonized with latest Blue Angel noise criteria

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SC1 Restricted Substance Controls, TS11 Substances of Very High Concern, TS12 Hazardous substances content	
Comment #1: This is a criterion that covers too much and is difficult to understand, A proof of implementation can be many different documents, so how will this requirement be validated between different tender responses? Comment #2: The wording is unclear. Beyond REACH and RoHS, to which substances the RSCs apply to? Is it applying to the IEC 62474 database, despite category 3 being for information purposes only? It is quoted in EPEAT Option Item 4.1.8.1 only. EPEAT qualification does not mean that a product does not have SVHCs. Since Pb has been added in June 2018, this criterion Is not achievable by OEMs This criterion would lead to zero compliance from industry. It doesn't follow the principle of non-discrimination. Comment #3: What is the basis to ban other A-substances as it is in Blue Angel. Only a small fraction of flame retardants is hazardous. The wording in current criterion puts all flame retardants as hazardous. It should be corrected. Comment #4: For televisions and monitors there is an ecodesign information requirement using an ISO 1043. JRC should check it out. *Proposal #1: Suggest to simplify current criterion to: "The tender must demonstrate implementation of a framework for management of substitution of hazardous substances." Keep the Verification part and add: "..such as GreenScreen (TM)". Specify that criterion applies to remanufactured consumables and spare part vendors too.* *Proposal #2: Please clarify the language of the text.* *Proposal #3: Should be deleted. Otherwise, should be moved to Award Criteria.* *Proposal #4: Delete and proceed to a market assessment on this criterion.* *Proposal #5: SC1 should be a comprehensive criterion. TS11 shall be deleted, as already covered by TS12.*	**Comment partially accepted.** This is a comprehensive selection criterion, which should promote tenderers who implement substance control systems. The procurers can decide whether or not to include such a requirement in their tenders. The criterion states, "The RSCs must apply, as a minimum, to REACH Candidate List substances and RoHS restricted substances". Suppliers may choose to include additional substances but there is no requirement to do so. No change is suggested. This criterion does not exclude the presence of SVHCs. Its aim is to promote implementation of substance control systems. The criterion has been modified to include a reference to white list based criteria as it is accepted that this is the preferable route forward. The IEC 62474 - Material Declaration for Products of and for the Electrotechnical Industry and associated database is regularly updated. With regards to ISO 1043 the standard is referenced in requirement on reparability and recyclability.
TS11 Substances of Very High Concern	
Comment #1: This is overstretching the REACH article 33 provision. It's a duplicate of a legal requirement for info into a ban. It will cause problems. The Candidate is updated every 6 months, so how does this align with GPP criteria being revised every 5 years? It's an information requirement, not a restriction. Comment #2: "Are stakeholders aware of any challenges relating to compliance with the selection and technical specification criteria, core or comprehensive level?" We have+ never undertaken any action to integrate this criterium in the current contracts. Therefore, we've not met any challenges in verifying compliance. As the chain is very long and wide. Again, without a label, I don't see verification going much further than a declaration by the producer (on TS11) *Proposal #1: ISO 1043 has more information available that would be useful for verification of this criterion.* *Proposal #2: Delete* *Proposal #3: This should be harmonised with BA BA SVHC prohibition is only for enclosures of 25 g or more.* *Proposal #4: 3rd party manufacturers should also comply with these requirements.*	**Comment clarified.** The compliance is requested at the moment of tendering. A clarification has been added in the verification text. There is a dynamic link in the criteria to the SVHC candidate list, so there is no problem when the list will be updated. Text added references latest SVHC list. Included core criterion based on Blue Angel Candidate List requirements.

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either remove TS11 or to make it comprehensive.	
TS12 Hazardous substances content	
TS12 is copying the latest published Blue Angel specification for imaging equipment. From the 1st Ad-Hoc Working Group meeting of the JRC, the only justification provided for the use of the Blue Angel was because "it is already working for more than a thousand products in Germany". We have looked at the Blue Angel criteria. It introduces a ban on halogenated polymers and halogenated organic compounds for their use as flame retardants. The only justification provided by the Blue Angel is the following: "In order to protect the natural environment as well as for health and safety reasons, the use of hazardous substances for production and use of the devices shall be reduced as far as possible." We would like to recall that flame retardants are incorporated into the various components of Electrical and Electronic Equipment (EEE) to meet international and EU fire safety standards. Imaging equipment carry a significant risk of ignition due to the presence of electrical circuits. To date, most imaging equipment have an integrated power supply, meaning that they are considered as an "enclosure" and have to meet at least stringent Class V1 to the UL 94 flammability standards, which would need the use of flame retardants. This means that banning a class of flame retardants (halogenated ones) will lead to their substitution for another class of flame retardants which behave differently. The combination of plastic matrices and the type of flame retardant is always based on the technical compatibility of the two materials. Halogenated flame retardants have a good technical compatibility with the polymer matrices used for the enclosure of imaging equipment (usually acrylonitrile butadiene styrene, or 'ABS'). In some cases, the plastics could be substituted by other plastics (polycarbonate/ABS blends) that could, in turn, be flame-retarded using phosphorus solutions. However, such a substitution would need to be properly assessed to verify that it would indeed lead to reduced environmental impacts and not to the opposite (e.g. using more plastics or more phosphorus, a Critical Raw Material…). While Blue Angel may be working for "more than a thousand products in Germany", we do not know if this led to reduced environmental impacts, since it was never assessed in the first place. This means that maybe there are products currently on the market, that bear the Blue Angel label, but that may have led to INCREASED environmental impacts. With no proper assessment of the impact of substitution within Blue Angel, we strongly advise against blindly copying the criteria into the GPP for imaging equipment. "Most electronics products, including imaging equipment, contain at least some hazardous ingredients. Of particular concern are for instance heavy metals (e.g. mercury, cadmium, lead) and flame retardants in plastics." Again, the term "flame retardants" describes a function that can be performed by a wide range of different chemical substances. It does not describe a separate class or family of chemicals and there is no clear scientific or legal definition. Proposal: We advise removing TS12 unless it is properly assessed, to avoid unfortunate substitution. Please remove the mentioning of flame retardants (Flame retardants with hazardous profiles are already restricted under REACH and RoHS. Not all "flame retardants in plastics" are "hazardous ingredients").	**Comment partially accepted.** More clarification on the rationale behind the hazardous substances requirements has been incorporated in the TR. With regard to toxicity of additives, specific substances have been mentioned based on evidence and general statements have been removed. Have added comment about white list based criteria as it is accepted that this is the preferable route forward. We have not been able to conduct a full investigation into substance restrictions in the various environmental initiatives.
TS13 Firmware Update Control	
"The possibility to control firmware would give the end-users control over any updates that interfered with the operation of their imaging equipment. This is an important consideration given that some manufacturer firmware updates sent to imaging equipment in use have resulted in the ability to no longer use remanufactured consumables." Invalidating a remanufactured cartridge may represent an environmental offense as gos directly against the sprit of the WEEE Furthermore collectors and Recycling platforms will have to manage a good they are not prepared f or that is a cartridge that is not empty . As it is well known toner dust is extremely flammable so the risk of treating non empty cartridges is	**Comment acknowledged.**

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increased exponentially.	
Comment #1: It is a brand new requirement that industry has never seen before. Reasonableness of this requirements needs to be shown. Users are given a choice to accept/ or not firmware updates automatically during set-up of the device and can opt-out at a later date. Firmware is generally updated with regular intervals to, for example, fix technical bugs, improve print quality and/or improve the functionality of existing features. However, one of the main functions of firmware updates is to provide security patches and enhancements which by their nature are intended not to be open for rolling back. Rolling back Firmware can expose printer to a risk of network security vulnerabilities. (i.e. cyber attack) Public sector have the obligation under GDPR to ensure that they take adequate technical and organizational measures to protect personal data. This includes IT security so decisions made to decline firmware updates could not only lead to increased risk of hacking but also put them in breach of GDPR. The Technical Report itself mentions at 2.2.13.1 that the market availability of this option has not been established and none of the main schemes used as background for this proposed criterion include this. The technical feasibility and reasonableness if this proposal has also not been assessed. Comment #2: This is a crucial criterion. All OEMs claimed firmware is necessary for innovation. ETIRA said this creates users problems because IE suddenly doesn't work with non-OEM cartridges. ETIRA said this firmware prevents using remanufactured cartridges. *Proposal #1: Should be deleted.* *Proposal #2: Automatic Firmware update must be set as OFF by default at installation.* *Customer must be informed about implications during the set-up/installation.* *A test of firmware actualization should be send to non OEM Remanufactured cartridges prior to the launch of the firmware update minimum with two weeks prevision.* *If the old version of the firmware is also posted on the Web, it should be regarded as conforming even if there is no rollback function. Not all products do have a rollback function.* *Proposal #3: Please add the following wording to the criteria: "With each firmware update, printer manufacturer should provide upfront instructions to printer user how to remedy a situation where remanufactured consumables no longer function as before the update."* *Proposal #4: Wording should be revised since it is confusing*	**Comment partially accepted.** Firmware updates can prevent the use of remanufactured non-OEM cartridges. The firmware roll-back criterion provides users with an immediate recourse where a firmware update has resulted in remanufactured consumables no longer functioning. OEMs would be able to provide customers with guidance surrounding the rollback of firmware or perhaps develop a system to quickly alter firmware updates where users complain that they have stopped the use of remanufactured consumables. Firmware updates are sent to imaging equipment for a number of reasons. On occasion these firmware updates stop previously functional remanufactured consumables from working. It is not feasible to expect OEMs to send firmware to remanufacturing organisations ahead of sending to users. If the previous version of the firmware is openly available and users are provided clear instructions on where this can be located, then it would meet the objectives of the criterion. It has been added additional text but also a clarification that the firmware needs to be made available from the time it is first released. This is to limit the chance that there is a delay in publishing the previous version of the firmware. On review it is recognised that the text of the criterion already states, "Instructions detailing how automatic firmware updates can be rolled back must be provided in the technical documentation". It is suggested that this is sufficient. Some OEMs have proposed alternative solutions for rolling back firmware updates that impact the usage of remanufactured consumables. The market availability of this option has not been well established and so it was included as a comprehensive rather than core criterion. The requirements of the General Data Protection Regulation ((EU) 2016/679) became enforceable in May 2018. It is assumed that any software placed on imaging equipment is already compliant with the requirements of the Regulation. The criterion does not require that users block firmware updates, but rather they have the ability to roll back firmware updates that may have caused interoperability issues with remanufactured consumables. Manufacturers would be free to point out that users should be aware of any potential GDPR related issues when downloading a previous version of firmware. Text of the criterion has been clarified.
TS14 Warranty and service agreements	
Warranties should be offered according to expected performance life. As it happens in the car industry, warranties should be related to performance exhaustion rather than time. This will represent a big opportunity to printer reuse a replacement rather than change. The performance must be in related to monthly duty cycle!!! *Proposal: Warranties should be related to performance exhaustion rather than time.*	**Comment rejected.** The proposal makes sense from an environmental perspective but it would not, currently, be possible to determine how long each imaging equipment should last. Such an analysis is beyond the capacities of this project.
The OEM cannot be responsible for damages that occur to the Imaging Equipment from the use of low quality non-OEM cartridges. Proposal #1: *Core: The legal warranty of the member state should be required* *Comprehensive: Wording needs to be improved as the current text doesn't work in practice.*	**Comment partially accepted.** The criteria reflect good practice on warranty provision. The core criterion is based on legal warranty requirements for consumers. In addition it should only be provided to the procurer, not shared with any 3rd parties, so there is no problem of confidentiality. The comprehensive criterion reflects best practice. The aim of GPP is to go beyond minimum legal requirements. In addition, there may be some member states that do not include legal warranties for business customers. As such, it would not be appropriate to reference legal minimum requirements.

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Proposal #2: *Core: Provide copy of service contract ⇒ Delete (Contract is confidential)* *Comprehensive: Should be limited to industrial product.* *Proposal #3: Harmonization with EPEAT #4.4.1.1.* *Products declared as industrial product are as follows:* *Proposal #4: Modify "malfunction" by "damage". The warranty gets invalidated if damages to the Imaging Equipment are resulting from the use of a non-OEM cartridge or container.* *A clear difference on quality evaluation should be placed between new and used cartridges.*	The word "damage" has been added beside the mentioning of "malfunction".
Since industry is far behind two years, having three years is not adequate "Service contract" includes fixed price contract, usage contract or combination of those. Under service contract, services listed are normally included. It should be noted that even if the criterion is part of the current EU GPP for IE, with the aim to move the market only a very limited number if companies offer two-year warranty still four years after the release of the current EU GPP IE criteria. *Proposal #1: Separate the criterion into one for services and one for warranty.* *One option for changed wording: change "malfunction" by "damage" suggests adding following words:* *"The tenderer must provide a minimum three-year warranty, under service contract, free of additional costs, effective from delivery of the product."* *Proposal #2: Suggested wording (not relevant for lease contracts including maintenance):* *"The tenderer must provide a minimum two-year warranty, free of additional costs, effective from delivery of the product. This warranty must cover repair or replacement. The warranty must guarantee that the products are in conformity with the contract specifications at no additional cost."* *Verification:* *A copy of the warranty and service agreement must be provided by the tenderer. They must provide a declaration that they cover the conformity of the goods with the contract specifications.*	**Comment accepted.** Criterion has been modified accordingly.
AC4(a) Longer warranties and services agreements	
Another practice I've seen on this, in the light of a framework agreement, is adding extra years of warranty as a required option. Could create competitive advantage for forerunners in industry. Still it could be considered to split into a service and a warranty criterion respectively. *Proposal: Recommendation (not relevant for lease contracts including maintenance):* *Additional points must be awarded for each additional year of warranty offered that is more than the minimum technical specification. A maximum of x points [to be specified] may be awarded.* *Where the warranty periods differ across product types then an average value across all applicable products must be used.* *+ 4 years or more: x points* *+ 3 years or more: 0.75 x points* *+ 2 years or more: 0.5 x points* *+1 year: 0.25 x points* *Verification:* *A copy of the warranty must be provided by the tenderer. It must provide a declaration that it covers the conformity of the goods with the contract specifications.*	**Comment acknowledged.** Technical specification comprehensive part adds 1 more year of warranty. The aim of the award criterion is to promote tenderers who go even beyond. The criterion states that "Points must be awarded separately for the warranty and then service agreement periods". So, in effective the criterion is already separated into warranty and service.

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AC4(b) Longest warranty and service agreement	
This is not a well-defined option. It is not clear how it would be implemented on a point bases and manufacturers are not given a clear target, prefer Option 1.	**Comment partially accepted.** The criterion has been modified to make it simpler and clearer.
AC5 Imaging equipment take-back system implementation	
Define "free", which parts of the system? How does this fit with the WEEE legislation? Does this mean that DG Env considers WEEE is not working in practice? Besides, one needs to differentiate between high end and low-end equipment. Assessment is required on this criterion. Today hardware is covered by WEEE, so if individual take back systems are recommended a wrong signal would be sent that WEEE doesn't work. There could be a distinction between large equipment and small equipment (large equipment should be taken back not small equipment).	**Comment partially accepted.** "free" has been modified to express that there is "No cost to the procuring authority". The criterion is AWARD and so does not need to be met by all suppliers. Suppliers that wish to extend their responsibilities on recycling could meet this criterion. Text added.
"Are you aware of such take back systems being currently used in public or private procurement?" The Government of Flanders is switching more and more to service contracts, although owned equipment probably will always be a part of the system, especially in smaller locations. For take back on the old equipment, a separate contract with a third party is in place as one option to deal with equipment at end-of-use. A difficulty we see in implementing a take back scheme in a contract for delivering goods, is that the goods are still in use at the end of the contract. That is how we, in the past ended up with a very divers fleet of imaging equipment. Questions we've been asking ourselves: - Can we demand take back after the contract ends, and if so, for how long? - Is a contract by contract approach to take back of IT equipment the way forward for us? Won't it e.g. make communication towards the users more difficult (whereto with your old equipment?) If a take back scheme is a good criterium, is probably very different for every organisation. A first step for us, is thus rather a rationalisation of contracts and the fleet. In that approach, a service driven solution is very important. Knowing what the company does with the equipment after the contract period stays important, but the take back is kind of a given.	**Comment clarified**. It is recognised that the provision of take back systems won't resolve all issues with how to best deal with equipment no longer required on procuring authority estates. The additional criterion, CPC2, requires that suppliers provide reports on what happens to used equipment. It is recognised that future work is needed in this area to help identify the most appropriate solutions for used equipment.
AC6 Supply of reused/remanufactured cartridges/containers	
Quality aspect of reused/remanufactured cartridges is missing. LCAs are showing that third party remanufactured cartridges can a negative environmental impact if they are of poor quality and/or not recycled properly at end of life. The only apparent justification in the Technical Report for this proposal is the bare assertion in preamble to 2.2.16 that reused/remanufactured cartridges are an "environmentally preferable" option. It is not accepted that this is the case. We consider that there's no scientific proof that a non-OEM remanufactured cartridge should be better for the environment. On the contrary, it is considered that in many cases full LCA analysis undermines this assumption. Furthermore, the proposal is too simplistic. Even leaving aside the merits of OEM v reman cartridges, it cannot be right simply to award points to every reman cartridge commitment, without regard to the quality of the reman cartridges on offer, otherwise a tenderer can acquire most points for the least environmentally preferable remans It should be noted that that the EU GPP Criteria Area 2 includes a Quality criteria (TS) that can only be fulfilled by a third party remanufactured (or similar) cartridge. We consider that there's no scientific proof that a non-OEM remanufactured cartridge should be better for the environment. Please see LCA's referenced in the general comment for the whole technical Report, It should be noted that that the EU GPP Criteria Area 2 includes a Quality criteria (TS) that can only be fulfilled by a third party remanufactured (or similar) cartridge This criterion therefore doesn't provide an objective basis against which all bidders can be assessed. It is based on an assumption that one part of the market is better than others which is accepted based on current information. Also, developments in the market (new products and business models) might make this assumption further out of date which will significantly undermine the value of these criteria. This type of criteria also have to be used along with some quality related criteria such as emissions/ Indoor air	**Comment rejected**. Conclusions in TR were not subjective but drawn upon two studies supporting that conclusion. Please look at studies reviewed in Preliminary Report (S8 and S9). These two present contradicting statements to OEM's studies (represented by S7 in Preliminary Report, as other LCA studies by HP are very similar in scope, results and interpretation). S7 shows marginal differences between OEM and non-OEM cartridges (~+10% impacts for non-OEMs for Climate Change and Total Energy Demand), which are constructed largely on the assumption that non-OEMs' printouts are of lower quality thus printing more pages. The scale to define printout quality is based on a 'psychometric research study of business laser printing users' that dates back to another 2008 LCA study commissioned by OEM. This scale is not described in detail but it is also not a harmonized metric that can be used without introducing subjective judgments by consumers. Therefore, it is inconclusive whether this sole measure, which has the largest influence on OEM studies to show slightly lower impacts for OEM cartridges, is enough to make such statement valid for all OEM cartridges. While the other two studies included in the Preliminary Report (S8 and S9) draw conclusions based on the reduction of materials consumption which are factual assertions. Thus it is concluded that HP studies cannot be used to draw these conclusions, and it is considered that the other two studies (S8 and S9) provide enough evidence on the use of remanufactured cartridges reduces life cycle environmental impacts because of the reduced number of materials used. Moreover, OEM's studies compare HP cartridges with specific remanufactured models and do not cover the whole spectrum of remanufactured cartridges. Finally, it is shown in the ongoing revision of the VA IE study that the production of ink and toner consumables are the hotspots for ink/toner consumables. Impacts from paper production depend on a number of factors such as the recycled content and use of additives which are not reflected in OEM studies. We suggest to stick this comparison to the resources saved during manufacturing/remanufacturing and combine this with the consumable yield criterion to ensure avoiding the use of large amounts of paper by using an existing harmonized metric.

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quality and page yield. This must be mentioned in the criterion *Proposal: Reject or insert quality request*	
CPC3 Reporting on supplied consumables	
Proposal: Modify, Add the type of cartridge used so the last sentence reads: *" – OEMs cartridges, reused/remanufactured by non OEMs " and delete the reference to AC5*	**Comment rejected:** In the framework of this GPP it is relevant to make a differentiation between new builds and reused/remanufactured. When in the text it is referred to 'reused/remaniufactured/ferilled' the term includes cartridged reused or remanufactured by OEM and non-OEM.
CRITERIA AREA 2 – IMAGING EQUIPMENT CONSUMABLES	
General	
This criteria area does not have any post-consumer recycled plastic content criteria. This could reduce the impacts of use of materials in consumables. *Proposal: To include a criterion*	***Rejected:** It is already difficult to verify this in larger products, thus it is not perceived viable to do it for consumables. This is a recurrent problem in other product groups.*
TS16 Cartridges/containers page yield declaration	
Data on Consumable efficiency has to be linked to printer life and analyze as a whole. New technologies (Business inkjet) are showing some inconsistent results as: -Real life page yields is much lower than the laboratory results up to 30% lower based on data gathered on more than 400.000 units. -Reliability and life of the device is much lower than expected, though to early to have a full evaluation, and some reparations as Print head change are costly. It looks as replacement accelerates on these devices. *Proposal: DIN 33871-2 is not for remanufactured cartridges, so please correct as follows:* *(.) The following list of DIN series of standards, three of which cover remanufactured cartridges/containers also cover.....(....)*	**Comment partially accepted**: The text has been corrected accordingly. The proposal to link efficiency with product life makes sense from an environmental perspective but it would not, currently, be possible to determine how long each imaging equipment should last. Such an analysis is beyond the capacities of this project.
How can different cartridges for the same model be compared? ISO standards are theoretical yields so MPS suppliers should measure yields throughout the contracts to confirm these yields. The manufacturers should report the actual yield of these cartridges. *Proposal #1: Point to international standards, Align with wording in latest draft VA proposal.* *Yields must be specified per the relevant ISO/IEC yield standards. These are globally accepted as the proper method to measure cartridge yield. Bottled supplies systems/ non cartridge doesn't follow ISO standards.* *Proposal #2: Harmonize with BA RAL UZ205 3.1.3. Suggested modification of the Verification:* *"Measurement of page yield for inkjet and toner cartridges should be carried out in accordance with the latest version of the following Standards namely, ISO/IEC 24711 (for ink), ISO/IEC 19752 (for monochrome toner), ISO/IEC 19798 (for colour toner), or through other reliable, accurate and reproducible methods, which take into account the generally recognised state of the art."* *Proposal #3: Suppliers shall make inkjet and toner cartridge yield information calculated in accordance with the foregoing Standards available to Customers via freely accessible web sites or user manuals.*	**Comment clarified** ETIRA references the ISO series of standards on their website. References to ISO series added to verification. The declaration must be filled in for all cartridges/containers that will be supplied for use in the relevant imaging equipment. "Relevant imaging equipment" means imaging equipment that is either being offered by the supplier, or where that does not exist, the imaging equipment for which the procuring authority is seeking consumables for. This criterion refers to theoretical yield, while the actual yield is covered by other criteria (Provision of consumable use information).
When reading the background documentation, I understand that there is no relevant Type I ecolabel. Suggesting that the criterion can be verified through a relevant Type I ecolabel is very confusing in this situation.	**Comment clarified.** This is a standard text for GPP criteria. Even though such a requirement is not covered through type I Ecolabels at this stage, we cannot exclude this will not be the case in the future.
AC7 Extended page yield	
Comment #2: Why compare highest yield vs. competitor's lowest yield? Why not highest to highest? if this is an attempt to get the average low OEM yield to increase, then result would also be an increase in average price to users too. Different yield points exist to satisfy customer needs at different price levels. Besides, the	This criterion was decided to be removed. For further details see the rational section in the main report body for this specific criterion.

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capacity variable would put 2-pc. systems at a disadvantage unless the imaging unit is allocated to the life (yield) of the cartridge. No discrimination via different cartridge technologies. Take into consideration customer needs. Customers will low printing needs don't need high yield cartridges. This would create unnecessary waste. *Proposal #1: Reject* *Proposal #2: Simplify this criterion that is too complex. Compare highest yield from each competitor and don't disadvantage 2 pieces cartridge technology.*	
TS17 Consumable mass resource efficiency	
Too difficult to calculate, not tech diagnostic. The weight of the cartridge doesn't drive life cycle impact same as paper usage and hence the dependence of total pager usage on the print quality. It is a brand new requirement that industry has never seen before. Reasonableness of this requirement needs to be shown. *Proposal #1: Provide results of Page Yield Mass Efficiency calculation. Ensure that 2-pc. systems are not at a disadvantage unless the imaging unit is allocated to the life (yield) of the cartridge.* *Proposal #2: Reject.* *Proposal #3: Need to ensure criterion is applied in a standard manner. Please do also ensure a level playing field. Inkjet technology must not be favored compared to laser technology;* *Proposal #4: Reject because it's not technology diagnostic and procurers are likely to receive replies that are not covering the same scope*	**Comments rejected.** In the background analysis (TR) it has been demonstrated that there is significant difference between consumables in terms of how much material they use for a given yield. Encouraging less material use per printed page will reduce the need to process materials in the manufacture and recycling/reuse of consumables. The requirements of the criterion are separated into toner and ink separately. Given the very different technologies of toner and ink it was not possible to derive a single formula covering all consumables. A single formula, set at the same level of ambition, would have favoured ink consumables.
AC8 Electrophotographic consumables mass resource efficiency	
Rationale for the requirement is not intelligible. The effect of the requirements looks slight. Not technology agnostic as it favors laser technologies. Design of lighter or heavier cartridge, doesn't drive entire lifecycle impacts. Moreover, reused/remanufactured cartridges/containers already save materials. *Proposal: Should include ink or should be deleted.*	**Comment partially accepted.** The criterion and rationale has been further clarified. . It is explained in the background analysis (section 2.3.2.1) that there is significant difference between consumables in terms of how much material they use for a given yield. Encouraging less material use per printed page will reduce the need to process materials in the manufacture and recycling/reuse of consumables.
AC9 Reduced number of materials of consumables	
This is a potentially misleading metric without including mass of the components and ability to separate for recycling. It is even noted (p. 85) that no standards exist *Proposal: Delete*	This criterion was decided to be removed. For further details see the rational section in the main report body for this specific criterion.
TS18 Consumable hazardous substances content	
The new build clones introduced mostly from free riders, represent a tremendous increase on risk. It is extremely difficult to control the entrance as they have no traceability so for collectors and recycling plants lack MSDS and recycling instructions. It is strongly suggested to avoid this. In case of doubt the tenderer should access the WEEE register but also the REACH and RoHS.	**Comment rejected.** The legal issues related to introduction of clones on the market cannot have to deal with other policy tools than GPP and through market surveillance.
We would like to point out that 3rd party supplies of consumables cannot refer to original OEM SDS's. All types of OEM's and others such as remanufactured cartridges need to be included in this criterion to ensure a level playing field. Besides, Safety Data Sheets need to be delivered by all aftermarket players. See our suggestion on an additional criterion. REACH Candidate list has no direct regulatory relevance for ink and toner. Since CLP regulation is referred to, does this criterion mirror the content and intended usage of that list? We ask for clarification. There may be such a case as interpretation of chemical safety is changing. For a procurer, this means that you have to know what are the colorants in the total of the product, and check information (e.g. MSDS documentation) on those colorants added to the products. In practice, we only use criteria like this if the Hazard classes / categories are mentioned on the MSDS	**Comment partially accepted**. Reference to SDS as a verification proof has been introduced in all hazardous substances related criteria. The criterion covers all types of consumables covered under the scope. Where requirement apply only to specific parts of the consumables (e.g. inks and toners), this is clearly indicated in the text. The content of the criterion is aligned with RAL-UZ205. The consumable hazardous substances content criterion is harmonised with all Blue Angel 3.2.3 criteria which address hazardous material content in consumables. Blue Angel can therefore be used as a verification tool.

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documentation of the end product. It's very hard to figure out if the MSDS documentation of all different components and substances, correctly links up to the end product. Well, there is that other option: a label. RAL-UZ 205 only covers supplies delivered with the HW at time of purchase. It doesn't cover aftermarket cartridges. Level playing field. No discrimination between OEMs and non-OEMs. *Proposal #1: Add a criterion: "Supplier to provide Safety Data Sheets (SDSs) for offered printer cartridges containing toner or ink (if hazardous, in local language) or upon request in English language."* *Verification: A SDS should be immediately available at first delivery of supply (required for hazardous toner/ink cartridges, in local language) or upon request (enough for non-hazardous). Get the confirmation before placing an order to ensure SDSs are available. The format and content of the safety data sheets are recommended to follow these specified in Annex II of REACH: Regulation (EU) 1907/2006* *Proposal #2: Modify; Major modifications are needed. Suggest to clarify when a hardware part of a consumable (looking at the definition of consumables in this report) is intended, and when it's the toner and ink contained in a cartridge that is intended. We suggest to delete the mentioning of REACH since REACH Candidate list had no direct regulatory relevance for ink and toner. The Verification should be simplified since we suggest to do major changes to this criteria:* *Proposal #3: Verification: The tenderer must provide documentation, which proves that the requirement has been met. Equipment holding a relevant Type I Eco-label fulfilling the specified requirements will be deemed to comply* *Proposal #4: Should be harmonized with RAL-UZ205 3.2.3.* *Add the exemption for the case where a substance listed is used as constituent because it is technically inevitable, an alternative is not available, and the document to show the rationale is prepared.* *Proposal #5: Suggest to clarify when a hardware part of a consumable (looking at the definition of consumables in this report) is intended, and when it's the toner and ink contained in a cartridge that is intended.* *All aftermarket cartridges need to be included in this criterion to secure a level playing field. Besides, Material Safety Data Sheets need to be delivered by all aftermarket players. Today MSDs are only delivered by OEMs.*	
TS19 Design for reuse and remanufacturing	
Comment #1: This is a reasonable approach, if the EU GPP Criteria for consumables are formulated in a relevant manner. Comment #2: How is this intended to be answered to by suppliers of non-originals, is it a generic "fulfilled"? Comment #3: It's a technical specification that would limit industries intellectual property right and potentially limit innovation. The European patent laws don't contain references to these type of restrictions so we question whether this is the intent of the developers. If this is the intent we strongly oppose, and would like to mention that there has been national court cases in the EU that also oppose this type of limitations of patent rights. No reason for limitation of the rights of patent owners from legal point of view, and no need to further limit the rights of patent owners beyond National court decisions in EU member states. Comment #4: NO "Intended for single use" or any other message against the WEEE hierarchy that can bring confusion to customer can be displayed in any cartridge or part. Comment #5: Industry is concerned about the restriction on the use of patents. This is putting IP rights and	**Comment partially accepted**. Criterion split into core and comprehensive. The core is basic and the comprehensive addresses specific concerns over patents stopping remanufacturing. Comment partially accepted. The criterion is partially aligned with Blue Angel and other schemes. The sole criterion of Blue Angel was considered too general. A consumable is not necessarily a single use product as it supports printing of multiple pages at different times. However, wording to this effect has been added to the comprehensive criterion. Containers appear to becoming more popular in the market in preference to cartridges. Limiting the scope to cartridges would reduce the effectiveness of the criterion. TS19 on "design for reuse and remanufacturing" does not include reference to chips. It would not be possible to place restrictions on chips in the core criterion. The comprehensive criterion could be altered to cover chips but compliance levels would still be restricted. The "chip issue" is dealt with in award criteria.

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innovation in danger. Comment #6: Industry believes the Blue Angel (or EPEAT) requirements are valid and feasible. Comment #7: Needs a clarification on how exactly the chip prevents the cartridge/container remanufacturing. This is missing. Get clarified about TS19, specifically about the example mentioned on patents. JRC said this is an example as considered the number one barrier. ETIRA said the chip is more important. ETIRA asked also about the license, how will this be verified? Proposal #1: *We suggest to align the criterion with BA section 3.1.1.3. (Table 3 Nr 5).* Proposal #2: *Delete containers.* *Proposal #3: The requirement shall be aligned with BA section 3.1.1.3. (Table 3 Nr 5).* *Proposal #4: Approve.* *Proposal #5: Delete the criterion.*	
AC10 Advanced design for reuse and remanufacturing & AC11 Facilitating reusability/remanufacturability	
There are several business model in the market already. This criterion is not realistic and too complex. Needs to be rewritten with objective text. Wordings such as "unrestricted", "easily", "reasonable cost" are not objective and cannot be measured. "Unrestricted" could mean unsafe. "Easily" doesn't exclude the use of some tools as a standard screw head, pliers or tweezers. "Reasonable cost" doesn't mean cheap. It is completely unreasonable for OEMs to guarantee that any third-party product will work in our devices, even if we tried to make it "easy". Why introduce a criterion that benefit one part of the suppliers for consumables (namely cartridges) on the basis of the loss of another part? We consider that this is not in line with basic PP principles. The issues associated with this proposal are far more complex than the drafting allows for and it is submitted that the criteria will be unworkable for public authorities in practice. For example: How are authorities to rank the different sub-criteria? How do they decide which gets more points: the cartridge without a chip or the one with a chip that has the specified functionality? How are authorities to balance the alleged “advantages” of these requirements over a consequent loss of quality/reliability/customer experience that may result from prioritizing these particular design features? The proposal seems to rely on an underlying assumption that a remanufactured cartridge will inevitably be an “environmentally preferable” option. We have already explained in answer to Criteria AC6 why it cannot be assumed that is the case. The criteria will have the practical effect of forcing one segment of the market (OEMs) to promote another (refillers/remans). This is contrary to principles of fair competition and not the function of the GPP. *Proposal: Reject. Stakeholder could support the following claim: "Consumable can be manually dismantled, where necessary with the use of universally available tools (e.g. openly available screw heads, pliers or tweezers), in* *order to replace worn parts and be refilled with toner material or ink."*	**Comment rejected.** The aim of the criterion is to promote remanufacturing, which can be done by any party, OEMs or remanufacturers. Criterion text have been changed in last paragraph to reflect stakeholder comment. Have also altered text in first point to make clearer and remove reference to unrestricted processes. Please refer to answer to criterion “Supply of reused/remanufactured cartridges/containers” concerning the validity of our assessment used as basis to incentivize remanufactured cartridges.
TS20 Consumable quality	
Comment #1: If it can’t include all types of manufacturing of cartridges it should be rejected. It could give the impression that only one type of cartridges (remanufactured) are able to fulfill quality criteria or it could be understood so that only remanufactured cartridges must prove their quality. Either way it’s imbalanced. When appropriate, the color quality of the remanufactured cartridges should be guaranteed. For end users, it is	**Comment partially accepted.** The criterion aims to provide assurances that any remanufactured consumables are of a suitably high quality. OEMs do not need to meet this criterion unless they are describing their consumables as "remanufactured". Added in some additional text to say criterion limited to remanufactured. We had previously discussed OEM quality standards with manufacturers and none were identified.

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important that the color quality of the remanufactured cartridge is as close as possible to the OEM one. Comment #2: The goal is to assess that the Color Space (gamut) of the remanufactured cartridges is closer or even better than the color Space of the OEM Cartridges. A proposal of Gamut index requirements concerning tenderers for color toner cartridges is exposed, and calculation of Gamut Comparison index is explained. In past procurements, we have used the Gamut Comparison index, and several of its derivative metrics to assess color quality of remanufactured toner cartridges. We compute the gamut comparison Index, as described in the Presentation of Dr Desphande in the ICCFrankfurt2013 Session and in its Phd Thesis. Because, as we know, there is not any available tool to make this calculations, we have developed some matlab functions to perform the above calculations and to draw some charts that emulate the gamut analysis functionalities of Gamutvision. Dr Desphande kindly grant us the right to use, under a NDA agreement, several of the routines that he did wrote as part of the preparation of his Phd Thesis. *Proposal #1: It would be quite useful to set up a web portal where upon entering an OEM cartridge profile, it computes the above mentioned indexes and charts. It's quite possible that the same procedure can be used for ink cartridges as well.* *Proposal #2: If it can't include all types of manufacturing of cartridges it should be rejected.* *Proposal #3: Specify that this criterion only concerns non-OEMs.* *Proposal #4: Proposal: Modify. If kept then the BA definition of remanufactured have to be added. Also the intended quality standard should be mentioned. If these are not added we propose to reject.* *Proposal #5: For color cartridges, a minimum requirement of color quality, should be attained* *This can be used as a minimum quality requirement in public tenders* *In case of toner color cartridges, the tenderer must provide as well, the value of the gamut comparison index between the OEM and the remanufactured cartridge. One of the requirements of the tender will be that the computed Gamut Comparison Index between the OEM and the remanufactured cartridge be higher than a specific threshold. This calculation will be done in accordance with the Presentation of Dr Desphande in the ICCFrankfurt2013 Session. Optionally the tenderer can provide as well, More specific metrics like [(Vx – Vi) / Vx]: how much of gamut x is outside the gamut y and [(Vy – Vi) / Vy]: how much of gamut y is outside the gamut x* *Proposal #6: As there is no general quality Standard implemented by OEM it is vital to develop a global quality Standard that can be used to build an ecolabel for cartridges recognised quality standard should mention the ones related to remanufactured, DIN Nordic and Blue angel, rather than other that only take into account yield to define quality (ISO) EMAS compliance should be awarded as a mean of improving transparency .*	Developing of new standard is beyond the scope of the EU GPP work. The use of recognised standards will be assured. We haven't listed out specific quality standards because many are not well used. ISO 9001 is a quality management system oriented standard and not a product oriented standard.
Also OEM and new non-OEM cartridges should be tested for quality. They should comply with ISO/IEC 29142-1: 2013 standard. The standard has itself obligations for how to show compliance.	**Comment rejected**. The study team have not been able to identify how frequently the ISO/IEC 29142-1: 2013 standard is used by OEMs. A cursory review of OEM webpages did not result in finding major usage of the standard. It is suggested that the standard is not referenced unless OEM stakeholders can identify usage levels.
TS21 Consumables Take-back	
It's important to stress this compliance requirement since it's fairly "new". The WEEE Recast Directive 2012/19/EU entered into force on 13 August 2012 and became effective on 14 February 2014.2 All EEE shall be classified within the categories set out in Annex III. Annex IV contains a non-exhaustive list of EEE which falls within the categories set out in Annex III (open scope). See Annex IX, Marking on EEE "Service contract" includes fixed price contract, usage contract or combination of those. Under service contract, services mentioned are normally included.	**Comment rejected**. WEEE already places these obligations on products in scope. This new criterion and section can be developed if required. Text added to limit scope of consumables in the core criterion. The requirement is applicable in any supplies.

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There might be a need to define consumables too. Moreover, how will it be ensured that clones are also a part of these criteria? *Proposal #1: Suggest to add criterion:* *Compliance of Supplies Producers or First importers to the WEEE Directive 2012/19/EU by compliance to national WEEE regulation and its rules, mainly:* *• wheelie bin marking on the supplies is required at time of POM* *• registration (in all/most countries either direct or via compliance scheme)* *Additional obligations are:* *• information to consumers that they must dispose of these products separately* *• financing of take-back.* *Some countries have a National EEE Producer Register, some require producers to be members of a Compliance Scheme, others to use a Service Producer depending on the area where the waste must be picked-up.* *Verification: Check on the supply that the "wheelie bin" marking is applied. Further verification will vary per member state rules. An example could be the presentation of a Registration Number or Membership Certification.* *Proposal #2: Change "suitable" to 3rd party certified recycler. Add: …free (from collection hub) … suggests adding following words – "under service contracts": A free take back system is provided for any cartridge or containers under service contract.* *Proposal #3: Suggest adding following words – "under service contracts": A free take back system is provided for any cartridge or containers under service contract. Most requirements are covered by WEEE. Criterion should be applied to OEMs and non-OEMs*	
CPC4 Reporting on reuse/recycle activities of consumables	
Recording of single returns seems not doable and the amount returned from PP as single returns should be very low *Proposal: Change "…must provide records based on bulk shipments…".*	**Comment accepted**: It would be difficult to identify where single return sent via post had originated. The text has been slightly modified to limit to bulk collections.
CRITERIA AREA 3 – PRINTING SERVICES	
TS22(a) Commitment to reuse of imaging equipment	
LCA's show that for managed print services the most environmental impacts occur in the use phase and not in production. Also, this criterion is useful only in one situation for the already existing printers as well as one exiting finance mode at the procuring entity. Usually, manufacturers guarantee certain periods or pages for equipment offered. If the products exceed the pages or period, manufacturers recommend replacing the products as they cannot ensure that the products work properly. "Service contract" includes fixed price contract, usage contract or combination of those. Under service contract, products tend to be used until the end of support period as much as possible. Isn't this sometimes a barrier to other useful initiatives? E.g. can a service provider just integrate every fully functional device in printing everywhere solution? *Proposal: Modify or reject section. If kept, add: ¨As long as the old equipment have the best environmental technology¨* *Add, after …new products: …under service contract as long as machine life can be supported. Add "in service parts retention period".*	**Comment partially accepted.** Additional wording has been added to state: "This requirement does not apply where a supplier provides evidence showing that replacing an existing product with a more effifient product(s) would reduce overall environmental impacts". Additional exemptions added.

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TS22(a) Commitment to reuse of imaging equipment & TS22(b) Commitment to repair of imaging equipment	
Too many exemptions, the whole idea of using a service should be that the service provider makes the decision on what's best in the long-run for the HW used delivering the service. "Service contract" includes fixed price contract, usage contract or combination of those. Under service contract, products tend to be fixed and used until the end of support period as much as possible *Proposal: Suppliers agree that imaging equipment that ceases to function during the contract will be brought back into full service using spare parts under service contract.*	**Comment partially accepted.** Text limiting spare parts to those under service contract added. Other alterations made to these criteria reflecting other stakeholder comments. This criterion has been modified to reflect the possibility that products are still operational products are replaced by a more energy efficient ones. "Subject to procuring authority approval" added to the criteria.
TS22(b) Commitment to repair of imaging equipment	
Should be harmonized with this guide. *Proposal: Even if this requirement exists, it should be within the service period determined in TS14.*	**Comment rejected.** This requirement is under printing services area. Therefore it could be used when procuring the service and as indicated in the text applies to the duration of the service contract.
TS23 Supply of imaging equipment meeting the EU GPP criteria	
Most of the eco label criteria are developed for office or home. Devices for printing service including high speed or high class printers are different from office equipment so that they cannot necessarily comply with the eco label or GPP criteria. This requirement may degrade the total efficiency of the printing service. *Proposal: Should be deleted.*	**Comment rejected.** The scope of the EU GPP criteria are provided at the beginning of the report. All criteria in the GPP specification relate to products in scope. If procurers intend to buy other products, which do not fall under the scope, these do not need to comply with the criteria.
AC12 Supply of reused/remanufactured cartridges and containers	
We can't accept that any type of cartridges (in this case reused/remanufactured) are considered environmentally preferably without scientific proof points. It's not proven that a certain type of cartridge is always better for the environment, so we suggest rejecting. See response to Criteria AC6 above which applies equally here. The difference between Core and Comprehensive needs to be clarified. *Proposal #1: We strongly propose to reject this criterion. But if it's kept ,we propose to request verification documents produced by an independent research Organisation.* *Proposal #2: Reject or modify if kept: Core => Comprehensive* *Proposal #3: Reject both Core and Comprehensive AC12, since these are not based on solid scientific background.*	**Comment rejected**. Conclusions in TR were not subjective but drawn upon two studies supporting that conclusion. Please look at studies reviewed in Preliminary Report (S8 and S9). These two present contradicting statements to HP's studies (represented by S7 in Preliminary Report, as other LCA studies by HP are very similar in scope, results and interpretation). S7 shows marginal differences between OEM and non-OEM cartridges (~+10% impacts for non-OEMs for Climate Change and Total Energy Demand), which are constructed largely on the assumption that non-OEMs' printouts are of lower quality thus printing more pages. The scale to define printout quality is based on a 'psychometric research study of business laser printing users' that dates back to another 2008 LCA study commissioned by HP. This scale is not described in detail but it is also not a harmonized metric that can be used without introducing subjective judgments by consumers. Therefore, it is inconclusive whether this sole measure, which has the largest influence on HP studies to show slightly lower impacts for OEM (HP) cartridges, is enough to make such statement valid for all OEM cartridges. While the other two studies included in the Preliminary Report (S8 and S9) draw conclusions based on the reduction of materials consumption which are factual assertions. Thus it is concluded that HP studies cannot be used to draw these conclusions, and it is considered that the other two studies (S8 and S9) provide enough evidence on the use of remanufactured cartridges reduces life cycle environmental impacts because of the reduced number of materials used. Moreover, HP's studies compare HP cartridges with specific remanufactured models and do not cover the whole spectrum of remanufactured cartridges. Finally, it is shown in the ongoing revision of the VA IE study that the production of ink and toner consumables are the hotspots for ink/toner consumables. Impacts from paper production depend on a number of factors such as the recycled content and use of additives which are not reflected in HP studies. We suggest to stick this comparison to the resources saved during manufacturing/remanufacturing and combine this with the consumable yield criterion to ensure avoiding the use of large amounts of paper by using an existing harmonized metric.
Not sure whether asking for remanufactured cartridge content is the right approach. What others do is to credit/award for the number of prints done by remanufactured cartridges.	**Comment partially accepted:** Suggestion has been included at comprehensive level.
CPC5 Reporting on supplied consumables	
"Service contract" includes fixed price contract, usage contract or combination of those. *Proposal #1: Suggest to change the last sentence to: "Estimated share of cartridges such as OEM cartridges,*	**Comment rejected**. In the framework of this GPP it is relevant to make a differentiation between new builts and reused/remanufactured. When in the text it is referred to ' reused/remaniufactured' the term includes cartridged reused or remanufactured by OEM and non-OEM. In relation to the scope of this requirement, the criterion states

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remanufactured and re-used." *Proposal #2: Suggests adding following words – "under service contracts":* *Proposal #3: The contractor, under service contract, must provide records regarding the provision of consumables specified in TS Supply of consumables, […]*	the following (when cartridges or copy and graphic paper supply is included in the printing service). Therefore it is clear that if should be used under a service contract.
CPC6 Provision of consumable use information	
These items should be decided between customers and OEM during the contract negotiation. Before this is accepted access to machines need to be considered. Remote access may not be possible and physical access may be unfeasible. Service calls should not be included in the listed information. Is it relevant to ask information about B/W and colour prints? *Proposal #1: Reject* *Proposal #2: Add to the "below list": Premature failures or DOA of OEM vs. reman supplies. Number of different types of cartridges provided. Service calls for printers using reman/refill vs. OEM supplies. Pages printed.* *Proposal #4: Suggest to add "service" first sentence: … life of the service contract" Add information about the system consumption of consumables.*	**Comment partially accepted:** Reference has been made to premature failures, number of new builds/remanufactured consumables used and number of mono/colour consumables. Reference to number of service calls per consumable type was not included as results could be misleading. For example, it is more likely that remanufactured consumables would be used in older equipment that may already be susceptible to more service calls.
CPC7 Provision of environmental information during service contract	
Should be selectable between the contractor and the service provider. Please clarify what is meant by 'other end of life options'. Landfill and (incineration) should be avoided. End of life for consumables should be included as information as well. Also, a clarification what 'Recycling' would mean to be clear it is not misinterpreted by incineration. *Proposal #1: Reject.* *Proposal #2: Include information about collection not only supplied by OEMs in printing services. Suggest to provide total number of cartridges/sku.*	**Comment rejected:** The procuring authority have a choice whether to include this criterion or not. No change is needed. The criterion addresses whole products rather than material flows. As such, the end-of-life options are not as detailed as for material flow assessments. Consumables information is requested in criterion CPC4. Other clarifications have been added to the text.
HORIZONTAL CRITERIA (APPLICABLE TO ALL CRITERIA AREAS)	
SC2 Tender environnemental management activities	
Proposal: Modify: Clarify how it should be evaluated	**Comment rejected.** The verification text states clearly the different elements of the documentation to be provided. In addition, registration under EMAS or certification with ISO 14001 is accepted as means of proof.
TS25(a) Guaranteed provision of consumables during contract & TS25(b) Guaranteed provision of spare parts during contract	

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Comment #1: This rather seems something you would deal with in a service level agreement following up certain indicators during the execution phase of the contract. By the way: Is it that important that the spare parts are present at the procurers premises? I would think you would just want to guarantee that broken devices or repaired are replaced within X hours after the defect was logged. For instance, a company has 10 clients within the same city, why having spare parts at all different locations while he can keep a smaller number of spare parts for all buildings on a central location or a van? Comment #2: GPP tenders must include criteria that prevent patent infringing non-OEM newbuilts from coming to Europe. Today many public bodies ignorantly purchase illegal cheap newbuilts and infringe patents. *Proposal: Please add social criteria. The generic EU framework directive includes social criteria too. Reuse cartridges are remanufactured in or near the EU, and not in USA or Asia like all OEM or non-OEM new builts. Promoting cartridge reuse brings back jobs from Asia and USA to Europe.*	**Comment clarified.** There is no requirement for suppliers to store spare parts at procuring authority premises. The request refers to the tenderer capacity to provide spare parts, when needed. The focus of this study is on criteria that show environmental benefits through the whole life cycle without entailing excessive costs. Reuse is one incentive, the legal issues are beyond the GPP revision project scope.
TS26 User instructions for green performance management	
Comment #1: Is this requirement relevant for all types of tenderers (suppliers, manufacturers, service providers)? I thought that legislation says a thing or two on this. In our experience, costs implementing and maintaining ISO 14001 are relatively high. Apart from the concept of proportionality, asking for ISO 14001 in some sectors goes against other actions to include more SME's in the government contracts. Comment #2: This criterion would have a huge cost if only supplied when consumables and spare parts are needed. It would be better to formulate criterion to assure forecast of supplies/spare parts in advance not as a reactive measure. Comment #3: The main question is: will it be useful? For instance, for printing, we've seen more effect in pushing the more green settings as standards in our network. What options do the users have left in such a situation? And will they come out for a training on that, as time is something everyone seems to be lacking. A prominent place for a short attractive video on the companies intranet pages, might attract more people (but to be sure, I would always run an idea like this past our communications team, which has an expert on behavioral change). *Proposal #1: Keep as it is* *Proposal #2: It should include at least the following elements: paper management functions, energy efficiency functions, more efficient use and better end-of-life management for consumables.* *Proposal #3: Selection shall be accepted.* *Proposal #4: Add differences on environmental issues between B/W and colour.* *Proposal #5: Include manual accessible online at manufacturer's website rather than printed.* *Proposal #6: Suggest including dynamic information as well. Based on his experience service providers try to educate users thus it is important to track use over time and communication with suppliers.* *Proposal #7: Suggest to add cost information (e.g. savings) about implementing green management. That would incentivize procurers.*	**Comment partially accepted:** The criterion doesn't require these information is provided at the supply of consumables or spare parts. It is meant to be supplied by equipment manufacturer when supplying the equipment. The elements considered are the basic environmental issues. This criterion is already included in the currently valid GPP. Criterion clarified with minor edits according to the comments The wording has been modified to give more flexibility in the format. Response to comment #3: The criterion has been revised in order to make it more flexible. The wording "in written from" has been deleted in order to allow the option for other forms of guidance (e.g. video spot, face-to-face, written form) to allow flexibility how this can be best organised.

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