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WORKING DOCUMENT ON COMMISSION REGULATION (EU) .../...

of XXX

laying down ecodesign requirements for imaging equipment and cartridges pursuant to Directive 2009/125/EC of the European Parliament and of the Council

Article 1

Subject matter and scope

1. This Regulation establishes ecodesign requirements for the placing on the market or putting into service of printers and cartridges.
2. This Regulation shall not apply to
 - (a) professional printing equipment
 - (b) fully-automated duplicator systems using the method of stencil duplicating with digital reproduction functionality
 - (c) large format printing equipment designed for printing on A2 media (420 mm x 594 mm) and larger.

Article 2

Definitions

For the purpose of this Regulation, the following definitions shall apply:

- (1) ‘printer’ means equipment that generates paper or other physical output media at least on A4 size (210 mm x 297 mm) format from electronic input. Printing equipment may have additional functions and may be marketed as a multifunctional device or multifunctional product;
- (2) ‘cartridge’ means a replaceable unit that contains materials intended for deposition onto paper or other physical output media, which must be inserted into or connected to a printer during printing.
‘professional printing equipment’ means a device designed and marketed specifically for producing deliverable for sale within the scope of Directive 2006/42/EC

For the purposes of the Annexes, additional definitions are set out in Annex I.

Article 3

Ecodesign requirements

The ecodesign requirements set out in Annex II shall apply from the dates indicated therein.

Article 4

Conformity assessment

1. The conformity assessment procedure referred to in Article 8 of Directive 2009/125/EC shall be the internal design control system set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.

2. For the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC, the technical documentation shall contain the reason why certain, if any, plastic parts are not marked as per the exemption set out in point A (1.4), point B (1.4), point D (1.4) and point E (1.4) of Annex II, and the details and the results of the calculations set out in Annex III to this Regulation.

3. Where the information included in the technical documentation for a particular model has been obtained:

(a) from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer, or

(b) by calculation on the basis of design or extrapolation from another model of the same or a different manufacturer, or both,

the technical documentation shall include the details of such calculation, the assessment undertaken by the manufacturer to verify the accuracy of the calculation and, where appropriate, the declaration of identity between the models of different manufacturers.

The technical documentation shall include a list of all equivalent models, including the model identifiers.

Article 5

Verification procedure for market surveillance purposes

Member States authorities shall apply the verification procedure laid down in Annex IV when performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC.

Article 6

Circumvention, software and firmware updates

The manufacturer, importer or authorised representative shall not place on the market or put into service products designed to alter their behaviour or properties when they are tested in order to reach a more favourable level for any of the parameters in the technical documentation or included in any documentation provided.

The declared parameters of the product shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except where the end-user explicitly consents prior to the update to such worsening of performance. Where software and firmware updates do result in a worsening of performance, a warning message about this effect shall appear and confirmation of the action shall be explicitly requested.

Where a software or firmware update results in a worsening of performance, the user should be able to deny this part of the update while still being able to benefit from other elements of the update. No performance change or security risk shall occur as a result of rejecting the update.

Software and firmware updates shall not result in non-compatibility of the printer with cartridges, except where the end user explicitly consents prior to the update to such non-compatibility. Where software and firmware updates do result in non-compatibility, a warning message about this effect shall appear and confirmation of the action shall be explicitly requested.

Where a software or firmware update results into cartridge non-compatibility, the user should be able to deny this part of the update while still being able to benefit from other elements of the update. No performance change and no security risk shall occur as a result of rejecting the update.

After the installation of software and firmware updates, users should be able to revert back to the previous software or firmware version after the installation of the update.

A software or firmware update shall in no circumstances have the effect of changing the product's performance to the extent that the product becomes non-compliant with the ecodesign requirements applicable for the declaration of conformity.

Article 7

Indicative benchmarks

The indicative benchmarks for the best-performing products and technologies available on the market at the time of adopting this Regulation are set out in Annex V.

Article 8

Review

The Commission shall review this Regulation in the light of technological progress [8 years after its entry into force].

The review shall in particular assess:

- Introduction of a digital product passport for printers and cartridges;
- Introduction of measures to enhance resistance of cartridges to shocks and drops;
- Introduction of measures to enhance material efficiency of cartridges in terms of pages per gram of material.
- Introduction of information requirements on the expected lifetime (duty cycle) of the product.

Article 9

Entry into force and application

This Regulation shall enter into force on the twentieth day following its publication in the Official Journal of the European Union.

It shall apply from [OJ note: 18 months from the entry into force of this Regulation].

This Regulation shall be binding in its entirety and directly applicable in all Member States.

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ANNEX I

Definitions applicable for the Annexes

For the purposes of the Annexes the following definitions shall apply:

- (1) 'inkjet printer' means a printer with an operating part, such as a print head, to apply ink on a substrate;
- (2) 'low-speed inkjet printer' means an inkjet printer with a printing speed in monochrome lower than 15 images per minute;
- (3) 'high-speed inkjet printer' means an inkjet printer with a printing speed in monochrome equal to or higher than 15 images per minute;
- (4) 'laser printer' means a printer principally using optoelectronic phenomena and electrostatic attraction to move toner to a substrate;
- (5) 'low-speed laser printer' means a laser printer with a printing speed in monochrome lower than 50 images per minute;
- (6) 'high-speed laser printer' means a laser printer with a printing speed in monochrome equal to or higher than 50 images per minute;
- (7) 'spare part' means a separate part that can replace a part necessary for the printer to function as intended in order to restore or upgrade the functionality of the printer;
- (8) 'professional repairer' means a natural or legal person that provides professional repair or maintenance of printers, either as a service or with a view to the subsequent re-selling of the repaired device;
- (9) 'professional remanufacturer' means a natural or legal person that provides professional remanufacturing of cartridges, either as a service or with a view to the subsequent re-selling of the remanufactured cartridge;
- (10) 'fastener' means a hardware device, including a device that serves an electrical function, or substance that mechanically, magnetically or by other means connects or fixes two or more parts or pieces;
- (11) 'required fastener' means any fastener to be disassembled according to the repair instructions provided by manufacturers, importers or authorised representatives to get access to a part which is meant to be replaced by a spare part;
- (12) 'reusable fastener' means a fastener that can be reused in the reassembly for the same purpose and that does not damage either the product or the fastener itself during the disassembly or reassembly process;
- (13) 'captive reusable fastener' means a fastener that remains attached/retained within the relevant assembly of the product even when unfastened and can be reused for the same purpose in the reassembly, without any damage either to the product or to the fastener that would make their multiple reuse impossible;
- (14) 'resupplied fastener' means a removable fastener, including an adhesive supplied in a quantity that is sufficient for the reassembly, that is supplied at no additional cost with the spare part which it is intended to connect or fix; 'removable fastener' means a fastener that is not a reusable fastener, but whose removal does not damage the product, or leave residue, which precludes reassembly;

- (15) 'step' means an operation that finishes with the removal of a part or with a change of tool; and includes any placement of a part away from its initial location, even if that entails partial disconnection or unplugging;
- (16) 'free access website' means a website that can be accessed without having to pay or to provide personal information, including an email address or phone number;
- (17) 'failure analysis' means a process of collecting and analysing data to identify the part of a printer which causes a malfunction;
- (18) 'disassembly' means a process whereby a product is separated into its parts and/or components in such a way that it could subsequently be reassembled and made operational;
- (19) 'duplex functionality' means the capability of printing on both sides of paper;
- (20) 'autoduplex functionality' means the capability of printing on both sides of paper automatically, without user intervention;
- (21) 'date of placement on the market or putting into service' means the date of placing on the market or putting into service of the first unit of a product model;
- (22) 'date of end of placement on the market or putting into service' means the date of placing on the market or putting into service of the last unit of a product model;
- (23) 'proprietary tool' means a tool that is not available for purchase by the general public or for which any applicable patents are not available to licence under fair, reasonable and non-discriminatory terms;
- (24) 'basic tool' means a screwdriver for slotted heads, a screwdriver for cross recess screws, a screwdriver for hexalobular recess heads, a hexagon socket key, a combination wrench, combination pliers, combination pliers for wire stripping and terminal crimping, half round nose pliers, diagonal cutters, multigrip pliers, locking pliers, a prying lever, tweezers, magnifying glass, a spudger or a pick;
- (25) 'commercially available tool' means a tool that is available for purchase by the general public and is neither basic tools nor a proprietary tool;
- (26) 'use environment' means an environment where the product is in use;
- (27) 'workshop environment' means an environment, that is neither a use environment nor a production-equivalent environment, and where machinery and/or tools are used under controlled conditions as suitable for the repair activities;
- (28) 'cartridge page yield' means the number of test pages that can be printed between cartridge installation and end-of-life;
- (29) 'remanufactured cartridge' means a cartridge 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 worn parts and filled in with new toner or ink.
- (30) 'ink collection unit' means a unit used to collect the waste ink during the printing process;
- (31) 'print head' means a unit that contains a series of nozzles used to spray drops of ink onto the paper;
- (32) 'paper cassette' means a component in a printer that holds and supplies paper for the printing process;

- (33) 'storage unit' means a unit used for storing, porting and extracting data files and objects, including temporary and permanent storage of information;
- (34) 'paper feed roller' means a cylindrical component that facilitates movement of paper through the printer, with a primary function to grip and move paper from the paper cassette into the printer;
- (35) 'control circuit board' means a unit used to provide electronic connection between the different printer components;
- (36) 'control panel' means a unit used to provide access to settings, information and features of a printer including as applicable a display and buttons;
- (37) 'toner collection unit' means a unit used to collect the waste toner during the printing process;
- (38) 'drum unit' means a cylindrical component coated with photosensitive material that transfers toner to paper by creating and developing an electrostatic image;
- (39) 'fuser unit' means a unit that bonds the toner particles to the paper using heat and pressure;
- (40) 'transfer belt' means a unit used to move the paper through the printer, passing it across the drum so that the toner can be transferred onto the paper;
- (41) 'laser unit' means a component that uses a laser beam to create an electrostatic image on the drum;
- (42) 'internal power supply' means a unit installed within the printer used to convert AC voltage from the mains to DC voltage for the purpose of powering the printer components;
- (43) 'PMMA' means PolyMethylMethAcrylate;
- (44) 'flame retardant' means a substance that markedly retards the propagation of a flame;
- (45) 'halogenated flame retardant' means a flame retardant that contains any halogen;
- (46) 'Printed Circuit Board'(PCB) means an assembly that mechanically supports and electrically connects electronic or electrical components using conductive tracks, pads and other features etched from one or more sheet layers of conductive metal laminated onto or between sheet layers of a non-conductive substrate;
- (47) 'original cartridge chip' means a cartridge chip designed or provided by a printer manufacturer that is unmodified or that has been reset or replaced with the authorisation of the printer original equipment manufacturer;
- (48) 'cartridge chip' means electronic circuitry mounted on a circuit board with the purpose of supporting communication between the cartridge and the printer;
- (49) 'primary charge roller' means a component that applies signals to the drum surface, either to allow the laser writing on it, or to erase any residual charges after printing;
- (50) 'remanufactured cartridge' means a cartridge that, after having been used at least once and collected after its use, is restored to its original condition and performance or better, for example by replacing wear parts and refilling with new toner or ink.

The definitions of 'mains', 'reactivation function', 'main function', 'information status display', 'network', 'remotely initiated trigger', 'model identifier', 'equivalent model', 'standby mode', 'active mode', 'off mode', 'networked standby' 'declared values' and 'HiNA equipment' in Article 2 of Commission Regulation (EU) 2023/826 apply.

The definition of 'external power supply' from Commission Regulation (EU)2019/1782 applies.

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ANNEX II
Ecodesign requirements

A. INKJET PRINTERS

1. RESOURCE EFFICIENCY REQUIREMENTS

1.1. Design for repair and reuse

(1) Availability of spare parts:

- (a) from one month after the date of placement on the market or putting into service, manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, when present in the printer:
 - i. Storage devices (hard disk drives and solid state drives);
 - ii. Roller kits, paper feed rollers;
 - iii. Print heads (not integrated into the ink cartridges);
 - iv. External power supplies / power cables;
 - v. Control circuit boards;
 - vi. Control panels;
 - vii. Ink collection unit;
 - viii. Internal power supplies;
 - ix. Displays greater than 100 cm².
- (b) from one month after the date of placement on the market or putting into service, manufacturers, importers or authorised representatives shall make available to professional repairers and end users at least the following spare parts, together with required fasteners, if not reusable, when present:
 - i. Ink collection unit;
 - ii. Print heads (not integrated into the ink cartridge);
 - iii. Paper cassettes;
 - iv. External power supplies/power cables;
- (a) from one month after the date of placement on the market or putting into service, manufacturers, importers or authorised representatives shall make available on a free access website the list of spare parts concerned by points (a) and (b) and the procedure for ordering them, until the end of the period of availability of these spare parts;
- (b) Spare parts concerned by point (a) and (b) shall not be assemblies comprising more than one of the listed spare part types, with the exception that displays may be part of a control panel;
- (c) The spare parts listed in point (a) and point (b) shall be available at least for seven years after the date of end of placement on the market or putting into service for low-speed inkjet printers and at least for ten years after the date of end of placement on the market or putting into service for high-speed inkjet printers.

(2) Access to repair and maintenance information

From one month after the date of placement on the market or putting into service, the manufacturer, importer or authorised representative shall, at least for the period specified under point 1 (e), provide access to the repair and maintenance information to professional repairers for relevant parts listed in point 1(a), under the following conditions, unless this information is made publicly available on the free access website referred to in point 1(c):

- (a) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information.

To accept such a request to register, the manufacturer, importer or authorised representative may only require the professional repairer to demonstrate that:

- (i) the professional repairer has the technical competence to repair inkjet printers and complies with the applicable regulations for repairers of electrical equipment in the Member State where the professional repairer operates. If an official registration system exists in the Member State concerned, reference to such system shall be accepted as proof of compliance;
 - (ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State.
- (b) the manufacturer, importer or authorised representative shall accept or refuse the registration within five working days from the date of request. In the case of refusal, a clear justification will be provided to the requestee outlining the reasons behind such decision, which shall be revoked, if the same professional repairer requests to be registered with updated information, which complies with the conditions for being granted access;
 - (c) the manufacturer, importer or authorised representative may charge reasonable and proportionate fees for access to the repair and maintenance information or for providing regular updates of this information. The registration as such shall be provided for free. A fee shall be considered reasonable in particular if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information; ;
 - (d) once registered, the professional repairer shall have access, within one working day after requesting it, to the requested repair and maintenance information. That information may be provided for an equivalent model or model of the same family, if relevant;
 - (e) The repair and maintenance information referred to in point (a) shall contain the level of detail needed to be able to replace relevant parts listed in point 1(a) and (b) and shall at least include:
 - i. the unequivocal product identification;
 - ii. a disassembly map or exploded view;
 - iii. wiring and connection diagrams, as required for failure analysis;
 - iv. electronic board diagrams;
 - v. a list of necessary repair and test equipment;

- vi. technical manual of instructions for repair, including marking of the steps;
 - vii. diagnostic fault and error information, including manufacturer-specific codes, where applicable;
 - viii. component and diagnosis information, such as minimum and maximum theoretical values for measurements;
 - ix. instructions for software and firmware, including reset software;
 - x. information on how to access data records of reported failure incidents stored on the device, where applicable, except for personal identifiable information, such as information related to user behaviour;
 - xi. information on how to access professional repair, including the internet webpages, addresses and contact details of professional repairers registered in accordance with point 2(a);
- (f) Without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (e) once the manufacturer, importer or authorised representative terminates access to that information after the end of the period of access to repair and maintenance information;

From one month after the date of placement on the market or putting into service, repair instructions and maintenance information for relevant parts listed in point 1(b) shall be available on the free access website referred to in point 1(c), at least for the period specified under point 1 (e). This information shall contain the level of detail needed to be able to replace relevant parts listed in point 1(b).

(3) Maximum delivery time of spare parts

During the period referred to in points 1(a) and 1(b), manufacturers, importers or authorised representatives shall ensure that the spare parts be delivered within 5 working days after having received the order.

(4) Information on the price of spare parts

During the period referred to in points 1(a) and (b), manufacturers, importers or authorised representatives shall provide, on the free access website referred to in point 1(c), indicative pre-tax prices at least in Euro, for spare parts listed in points 1(a) and (b) as well as the pre-tax price of fasteners and tools, if supplied with the spare parts.

(5) Disassembly requirements

Manufacturers, importers or authorised representatives shall ensure compliance with the following disassembly requirements:

- (a) with regard to the process for replacement of parts referred to in point 1(a):
 - i. fasteners are removable;
 - ii. the process for replacement is feasible with commercially available tools;
 - iii. the process for replacement can, as a minimum, be carried out in a workshop environment;
- (b) with regard to the process for replacement of parts referred to in point 1(b):

- i. fasteners are removable, resupplied or reusable;
- ii. the process for replacement is feasible without tools, with a tool or set of tools that is supplied with the product or spare part, or with basic tools;
- iii. the process for replacement can be carried out in a use environment;

(6) Requirements for preparation for reuse

Manufacturers, importers or authorised representatives shall ensure that printers include a function that resets the printer to its factory settings.

1.2. Design for longevity

(1) Availability of software and firmware updates

- (a) Manufacturers, importers or authorised representatives shall make available at no cost for all units of a product model the latest available software or firmware updates whose main purpose is to provide enhanced security for the device, corrections to bugs, errors or malfunction in the software or firmware;
- (b) the requirement referred to in point (a) shall apply both to updates offered voluntarily by manufacturers, importers or authorised representatives and to updates provided to comply with Union law.
- (c) The software and firmware updates referred to in point (a) shall be available at least for seven years after the date of end of placement on the market or putting into service for low-speed inkjet printers and at least for ten years after the date of end of placement on the market or putting into service for high-speed inkjet printers.

(2) Page count functionality

Manufacturers, importers or authorised representatives shall ensure that printers include a function that provides easy access for the end user to information on the total number of pages printed by the printer.

1.3. Recyclability of plastic components

(1) Marking of plastic components

- (a) Manufacturers, importers or authorised representatives shall ensure that plastic components heavier than 25 grams or measuring more than 50 square centimeters shall be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation marks ‘>’ and ‘<’ as specified in available standards. The marking shall be legible.

Plastic components shall be exempted from marking requirements if the following conditions are fulfilled:

- i. the marking is not possible because of the shape or size; or
- ii. the marking would impact on the performance or functionality of the plastic component.

Notwithstanding requirements under other Union legislation, marking is not required for the following plastic elements:

- i. Packaging, tape, labels and stretch wraps;
 - ii. wiring, cables and connectors, rubber parts and anywhere not enough appropriate surface area is available for the marking to be of a legible size;
 - iii. PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
 - iv. Transparent parts where the marking would obstruct the function of the part in question.
- (b) Components referred to under point (a) containing flame retardants shall additionally be marked with the abbreviated term of the polymer followed by hyphen, then the symbol 'FR' followed by the code number of the flame retardant in parentheses. The marking shall be clearly visible and readable.

(2) Recyclability of plastic components

- (a) Manufacturers, importers or authorised representatives shall ensure that plastic components weighing more than 100 grams shall:
- i. be manually separable with basic tools;
 - ii. not contain a total of halogenated flame retardants in a concentration above 0.1% weight by weight; and
 - iii. consist of one single polymer type or a polymer blend.
- (b) Plastic casing parts shall only consist of up to four separable polymer types or polymer blends.

1.4. Recyclability of other components

- (a) Without prejudice to Article 15(1) of Directive 2012/19/EU, manufacturers, importers or authorised representatives shall make available, on a free-access website, the dismantling information needed to access any of the product components referred to in point 1 of Annex VII of Directive 2012/19/EU.

The dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.

- (b) The information listed under points (a) shall be available for at least 15 years after the date of end of placement on the market or putting into service.
- (c) Manufacturers, importers or authorised representatives shall ensure that the printer is designed in a way that joining, fastening or sealing techniques do not prevent access to the following components and that the extraction method can be carried out with basic tools:
- i. batteries;
 - ii. printed circuit boards greater than 10 cm²;
 - iii. ink and toner cartridges;
 - iv. electronic displays greater than 100 cm²;

- v. external electric cables;
- vi. electrolyte capacitors containing substances of concern; and
- vii. plastics containing halogenated flame retardants.

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2. ENERGY EFFICIENCY REQUIREMENTS

2.1. Limits on power consumption in non-active modes

36 months after entry into force, manufacturers, importers or authorised representatives shall ensure that printers meet the following requirements:

(a) Power consumption in off mode:

Power consumption of equipment in off mode shall not exceed 0,20 W.

(b) Power consumption in standby mode:

The power consumption of equipment in any condition providing only a reactivation function, or providing only a reactivation function and an indication of enabled reactivation function, shall not exceed 0,30 W.

The power consumption of equipment in any condition providing only information or status display, or providing only a combination of reactivation function and information or status display, or providing only a reactivation function and an indication of enabled reactivation function and information or status display, shall not exceed 0,40 W.

(c) Power consumption in networked standby:

The power consumption of HiNA equipment or equipment with HiNA functionality, in networked standby shall not exceed 4,00 W.

The power consumption of networked equipment, other than HiNA equipment or equipment with HiNA functionality, in networked standby shall not exceed 1,00 W.

2.2. Availability of manual switch to off mode

Printers shall be equipped with a manual switch to turn the printer to off mode.

2.3. Time between active and automatic non-active mode

Printers shall be equipped with a default power management function which, when the printer is not providing its main function, and another energy-related product is not dependent on its functions, automatically switches the printer, after a maximum of ten minutes, into one of the following conditions:

- standby mode;
- off mode; or
- another condition which does not exceed the applicable power consumption requirements for standby mode when the equipment is connected to the mains power source.

2.4. Paper efficiency requirements

- (1) Manufacturers, importers or authorised representatives shall ensure that printers include a duplex functionality.

- (2) Manufacturers, importers or authorised representatives shall ensure that printers are equipped with autoduplex functionality where printers are meeting one of the following conditions:
- i. the printer can only print in monochrome and has a printing speed higher than 24 images per minute; or
 - ii. the printer can print in colour and has a printing speed higher than 19 images per minute.

3. REQUIREMENTS ON THE USE OF REMANUFACTURED CARTRIDGES

3.1. Printer notifications on remanufactured cartridges

Manufacturers, importers or authorised representatives shall ensure that printers do not display notifications concerning the quality or reliability of remanufactured cartridges with an original cartridge chip that has been reset or replaced in accordance with paragraph 1.2. of part B of this Annex.

4. INFORMATION REQUIREMENTS

- (1) Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on a free-access website the indicative percentage of recycled content for the product or a part thereof. If this information is not available, the recycled content should be indicated as “not known” or “not available”.
- (2) Manufacturers, importers or authorised representatives shall provide user instructions in the form of a user manual on a free access website and shall include:
 - (a) instructions for maintenance of cartridges and print heads, including instructions for the user to ensure automatic initiation of printhead cleaning cycles;
 - (b) instructions for the printer function that provides information on the total number of pages printed by the printer; and
 - (c) Instructions for the printer function that resets the printer to its factory settings; and
 - (d) Instructions for the manual switch to off mode.
- (3) Where a printer has a function that stops it from printing in monochrome when a colour cartridge is registered as empty, manufacturers, importers or authorised representatives shall provide information on this function on the sales packaging of the printer.
- (4) Where a printer has a function that stops it from printing if the printer is not connected to the internet, manufacturers, importers or authorised representatives shall provide information on this function on the sales packaging of the printer.
- (5) Manufacturers, importers or authorised representatives shall provide information on the reparability class of a printer as set out in Table 1 on the packaging of the product. The reparability class shall be determined on the basis of the reparability index as set out in Annex VI.
- (6) Manufacturers, importers or authorised representatives shall make publicly available on a free-access website information on the minimum guaranteed availability of software and firmware updates, availability of spare parts and availability of product support.

Table 1: Reparability classes of printers

Reparability Class	Reparability Index (R)
A (most repairable)	$R \geq 4,00$
B	$4,00 > R \geq 3,35$
C	$3,35 > R \geq 2,55$
D	$2,55 > R \geq 1,75$
E (least repairable)	$1,75 > R \geq 1,00$

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B. INKJET CARTRIDGES

1. RESOURCE EFFICIENCY REQUIREMENTS

1.1. Cartridge durability

(1) Minimum cartridge page yield

From the date of application indicated in Table 2, manufacturers, importers or authorised representatives shall ensure that inkjet cartridges comply with minimum page yield requirements corresponding to the printing speed of the printer the cartridge is compatible with as indicated in Table 2.

If an inkjet cartridge is marketed as compatible with printers falling in multiple printing speed categories, it shall comply with the minimum cartridge page yield corresponding to the printer with the highest printing speed.

Table 2. Inkjet cartridge minimum page yield

	Inkjet printing speed		
	0-15 ipm	>15-30 ipm	>30 ipm
Date of application	Minimum cartridge page yield		
From [OJ note: 18 months from the entry into force of this Regulation]	200	300	500
From [OJ note: 30 months from the entry into force of this Regulation]	240	360	600
From [OJ note: 42 months from the entry into force of this Regulation]	288	432	720

1.2. Ease of reuse and remanufacturing

(1) Cartridge chip resetting and replacement

Manufacturers, importers or authorised representatives shall make available to professional remanufacturers when present in the cartridge, cartridge chips as a spare part or the means to reset cartridge chips, for seven years after the date of end of placement on the market or putting into service.

A chip reset shall ensure that the cartridge is restored to its key functionalities including:

- full and continuous cartridge acceptance by the compatible printer;
- cartridge and printhead calibration, cleaning and alignment;
- no blocking of data collection agents;
- single installation message without use of terminology suggesting that the remanufactured cartridge may have a lower quality or reliability; and

- functioning ink or toner level gauge indicating the approximate page count or fill levels remaining, if provided with the original cartridge.

A chip reset shall not lead to any deterioration in the printing quality of the cartridge.

(2) Cartridge design for remanufacturing

- (a) Manufacturers, importers or authorised representatives shall ensure that the cartridges containing chips are designed in a way that the chip is easily accessible with the aim of chip replacement or resetting, without permanent damage to the cartridge.
- (b) Manufacturers, importers or authorised representatives shall ensure that the cartridge is designed in a way that it can be opened for remanufacturing or refilling without damaging it to a point where it cannot be reused.

The process for replacement of outer cartridge casings, print head and cartridge chip shall meet the following criteria:

- i. fasteners are removable or reusable;
- ii. the process for replacement is feasible with commercially available tools;
- iii. the process for replacement can, as a minimum, be carried out in a workshop environment;

(3) Access to remanufacturing information

From one month after the date of placement on the market or putting into service, the manufacturer, importer or authorised representative shall, at least for seven years after the date of end of placement on the market or putting into service, provide access to cartridge remanufacturing information to professional remanufacturers for cartridge chip resetting or replacement, and for cartridge disassembly concerned by points 1 and 2 in the following conditions:

- (a) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional remanufacturers to register for access to information; to accept such a request, the manufacturers, importers or authorised representatives may require the professional remanufacturers to demonstrate that:
 - (i) the professional remanufacturer has the technical competence to remanufacture inkjet cartridges and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;
 - (ii) the professional remanufacturer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State;
- (b) the manufacturer, importer or authorised representative shall accept or refuse the registration within 5 working days from the date of request. In the case of refusal, a clear justification will be provided to the requestee outlining the reasons behind such decision, which shall be revoked, if the same professional remanufacturer requests to be registered with updated information, which comply with the conditions for being granted access;

- (c) the manufacturer, importer or authorised representative may charge reasonable and proportionate fees for access to the cartridge remanufacturing information or for receiving regular updates of such information. The registration as such shall be provided for free. A fee is reasonable if it does not discourage access by failing to take into account the extent to which the professional remanufacturers uses the information;
- (d) once registered, a professional remanufacturer shall have access, within one working day after requesting it, to the requested remanufacturing information;
- (e) The cartridge remanufacturing information referred to in point (a) shall contain the level of detail needed to be able to disassemble, replace and as relevant reset cartridge casings, print head and cartridge chip and shall at least include:
 - i. the unequivocal product identification;
 - ii. a disassembly map or exploded view;
 - iii. a list of necessary remanufacturing and test equipment;
 - iv. technical manual of instructions for remanufacturing, including marking of the individual steps and wiring, connection or electronic diagrams as required;
 - v. instructions for software and firmware (including reset software);
 - vi. information on how to access professional remanufacturing, including the internet webpages, addresses and contact details of professional remanufacturers registered in accordance with point 2 (a);

2. INFORMATION REQUIREMENTS

From 18 months from the entry into force of this Regulation:

- (1) Manufacturers, importers or authorised representatives shall make publicly available on a free-access website and on the sales packaging of the cartridge, information on the total page yield of the cartridge.
- (2) The manufacturer, importer or authorised representative shall provide information on the sales packaging of the cartridge on where and how to return or dispose of empty cartridges to facilitate their refilling, remanufacturing or treatment in line with the waste hierarchy established in Article 4(1) of Directive 2008/98/EC.

C. LASER PRINTERS

RESOURCE EFFICIENCY REQUIREMENTS

1.1. Design for repair and reuse

(1) Availability of spare parts:

- (a) from one month after the date of placement on the market or putting into service, manufacturers, importers or authorised representatives shall make available to professional repairers at least the following spare parts, including required fasteners, if not reusable, when present in the printer:
 - i. Paper cassettes;
 - ii. Storage Devices (hard disk drives and solid state drives);
 - iii. Laser unit;
 - iv. Drum unit;
 - v. Fuser unit;
 - vi. Transfer belts, kits;
 - vii. Toner collection unit;
 - viii. Roller kits, paper feed rollers;
 - ix. Control circuit boards;
 - x. Internal power supplies;
 - xi. Control panel;
 - xii. Maintenance kit;
 - xiii. Displays greater than 100 cm².
- (b) from one month after the date of placement on the market or putting into service, manufacturers, importers or authorised representatives shall make available to professional repairers and end users at least the following spare parts, together with required fasteners, if not reusable, when present:
 - i. Toner collection unit;
 - ii. Paper cassettes;
 - iii. External power supply/power cable.
- (c) from one month after the date of placement on the market or putting into service, manufacturers, importers or authorised representatives shall make available on a free access website the list of spare parts concerned by points (a) and (b) and the procedure for ordering them, until the end of the period of availability of these spare parts;
- (d) Spare parts concerned by point (a) and (b) shall not be assemblies comprising more than one of the listed spare part types, with the exception that displays may be part of a control panel;

- (e) The spare parts listed in point (a) and point (b) shall be available at least for seven years after the date of end of placement on the market or putting into service for low-speed laser printers and at least for ten years after the date of end of placement on the market or putting into service for high-speed laser printers.

(2) Access to repair and maintenance information

From one month after the date of placement on the market or putting into service, the manufacturer, importer or authorised representative shall, at least for , at least for the period specified under point 1 (e), provide access to the repair and maintenance information to professional repairers for relevant parts listed in point 1(a), under the following conditions, unless this information is made publicly available on the free access website referred to in point 1(c):

- (a) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information.

To accept such a request to register, the manufacturer, importer or authorised representative may only require the professional repairer to demonstrate that:

- (i) the professional repairer has the technical competence to repair inkjet printers and complies with the applicable regulations for repairers of electrical equipment in the Member State where the professional repairer operates. If an official registration system exists in the Member State concerned, reference to such system shall be accepted as proof of compliance;
 - (ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State.
- (b) the manufacturer, importer or authorised representative shall accept or refuse the registration within five working days from the date of request. In the case of refusal, a clear justification will be provided to the requestee outlining the reasons behind such decision, which shall be revoked, if the same professional repairer requests to be registered with updated information, which complies with the conditions for being granted access;
 - (c) the manufacturer, importer or authorised representative may charge reasonable and proportionate fees for access to the repair and maintenance information or for providing regular updates of this information. The registration as such shall be provided for free. A fee shall be considered reasonable in particular if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information; ;
 - (d) once registered, the professional repairer shall have access, within one working day after requesting it, to the requested repair and maintenance information. That information may be provided for an equivalent model or model of the same family, if relevant;
 - (e) The repair and maintenance information referred to in point (a) shall contain the level of detail needed to be able to replace relevant parts listed in point 1(a) and (b) and shall at least include:

- i. the unequivocal product identification;
 - ii. a disassembly map or exploded view;
 - iii. wiring and connection diagrams, as required for failure analysis;
 - iv. electronic board diagrams;
 - v. a list of necessary repair and test equipment;
 - vi. technical manual of instructions for repair, including marking of the steps;
 - vii. diagnostic fault and error information, including manufacturer-specific codes, where applicable;
 - viii. component and diagnosis information, such as minimum and maximum theoretical values for measurements;
 - ix. instructions for software and firmware, including reset software;
 - x. information on how to access data records of reported failure incidents stored on the device, where applicable, except for personal identifiable information, such as information related to user behavior;
 - xi. information on how to access professional repair, including the internet webpages, addresses and contact details of professional repairers registered in accordance with point 2(a);
- (f) Without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (e) once the manufacturer, importer or authorised representative terminates access to that information after the end of the period of access to repair and maintenance information;

From one month after the date of placement on the market or putting into service, repair instructions and maintenance information for relevant parts listed in point 1(b) shall be available on the free access website referred to in point 1(c), at least for the period specified under point 1 (e). This information shall contain the level of detail needed to be able to replace relevant parts listed in point 1(b).

(3) Maximum delivery time of spare parts

During the period referred to in points 1(a) and 1(b), manufacturers, importers or authorised representatives shall ensure that the spare parts be delivered within 5 working days after having received the order.

(4) Information on the price of spare parts

During the period referred to in points 1(a) and (b), manufacturers, importers or authorised representatives shall provide, on the free access website referred to in point 1(c), indicative pre-tax prices at least in euro for spare parts listed in points 1(a) and (b) as well as the pre-tax price of fasteners and tools, if supplied with the spare parts.

(5) Disassembly requirements

Manufacturers, importers or authorised representatives shall ensure compliance with the following disassembly requirements:

- (a) with regard to the process for replacement of parts referred to in point 1(a):
 - i. fasteners are removable;
 - ii. the process for replacement is feasible with commercially available tools;
 - iii. the process for replacement can, as a minimum, be carried out in a workshop environment;
 - (b) with regard to the process for replacement of parts referred to in point 1(b):
 - i. fasteners are removable, resupplied or reusable;
 - ii. the process for replacement is feasible without tools, with a tool or set of tools that is supplied with the product or spare part, or with basic tools;
 - iii. the process for replacement can be carried out in a use environment;
- (7) Requirements for preparation for reuse**
- Manufacturers, importers or authorised representatives shall ensure that printers include a function that resets the printer to its factory settings.

1.2. Design for longevity

(1) Availability of software and firmware updates

- (a) Manufacturers, importers or authorised representatives shall make available at no cost for all units of a product model the latest available software or firmware updates whose main purpose is to provide enhanced security for the device, corrections to bugs, errors or malfunction in the software or firmware;
- (b) the requirement referred to in point (a) shall apply both to updates offered voluntarily by manufacturers, importers or authorised representatives and to updates provided to comply with Union law.
- (c) The software and firmware updates referred to in point (a) shall be available at least for seven years after the date of end of placement on the market or putting into service for low-speed laser printers and at least for ten years after the date of end of placement on the market or putting into service for high-speed laser printers.

(2) Page count functionality

Manufacturers, importers or authorised representatives shall ensure that printers include a function that provides easy access for the end user to information on the total number of pages printed by the printer.

1.3. Recyclability of plastic components

(1) Marking of plastic components

- (a) Manufacturers, importers or authorised representatives shall ensure that plastic components heavier than 25 grams or measuring more than 50 square centimeters shall be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation

marks ‘>’ and ‘<’ as specified in available standards. The marking shall be legible.

Plastic components shall be exempted from marking requirements if the following conditions are fulfilled:

- i. the marking is not possible because of the shape or size; or
- ii. the marking would impact on the performance or functionality of the plastic component;

Notwithstanding requirements under other Union legislation, marking is not required for the following plastic elements:

- i. Packaging, tape, labels and stretch wraps;
 - ii. wiring, cables and connectors, rubber parts and anywhere not enough appropriate surface area is available for the marking to be of a legible size;
 - iii. PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
 - iv. Transparent parts where the marking would obstruct the function of the part in question.
- (b) Components referred to under point (a) containing flame retardants shall additionally be marked with the abbreviated term of the polymer followed by hyphen, then the symbol ‘FR’ followed by the code number of the flame retardant in parentheses. The marking shall be clearly visible and readable.

(2) Recyclability of plastic components

- (a) Manufacturers, importers or authorised representatives shall ensure that plastic components weighing more than 100 grams shall:
- i. be manually separable with basic tools;
 - ii. not contain a total of halogenated flame retardants in a concentration above 0.1% weight by weight; and
 - iii. consist of one single polymer type or a polymer blend.
- (b) Plastic casing parts shall only consist of up to four separable polymer types or polymer blends.

1.4. Recyclability of other components

- (a) Without prejudice to Article 15(1) of Directive 2012/19/EU, manufacturers, importers or authorised representatives shall make available, on a free-access website, the dismantling information needed to access any of the product components referred to in point 1 of Annex VII of Directive 2012/19/EU.

The dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.

- (b) The information listed under points (a) shall be available for at least 15 years after the date of end of placement on the market or putting into service.

- (c) Manufacturers, importers or authorised representatives shall ensure that the printer is designed in a way that joining, fastening or sealing techniques do not prevent access to the following components, and that the extraction method can be carried out with basic tools:
- i. batteries;
 - ii. printed circuit boards greater than 10 cm²;
 - iii. ink and toner cartridges;
 - iv. electronic displays greater than 100 cm²;
 - v. external electric cables;
 - vi. electrolyte capacitors containing substances of concern; and
 - vii. plastics containing halogenated flame retardants.

2. ENERGY EFFICIENCY REQUIREMENTS

2.2. Limits on power consumption in non-active modes

36 months after entry into force, manufacturers, importers or authorised representatives shall ensure that printers meet the following requirements:

(a) Power consumption in off mode:

Power consumption of equipment in off mode shall not exceed 0,20 W.

(b) Power consumption in standby mode:

The power consumption of equipment in any condition providing only a reactivation function, or providing only a reactivation function and an indication of enabled reactivation function, shall not exceed 0,30 W.

The power consumption of equipment in any condition providing only information or status display, or providing only a combination of reactivation function and information or status display, or providing only a reactivation function and an indication of enabled reactivation function and information or status display, shall not exceed 0,40 W.

(c) Power consumption in networked standby:

The power consumption of HiNA equipment or equipment with HiNA functionality, in networked standby shall not exceed 4,00 W.

The power consumption of networked equipment, other than HiNA equipment or equipment with HiNA functionality, in networked standby shall not exceed 1,00 W.

2.3. Availability of manual switch to off mode

Printers shall be equipped with a manual switch to turn the printer to off mode.

2.4. Time between active and automatic non-active mode

Printers shall be equipped with a default power management function which, when the printer is not providing its main function, and another energy-related product is not dependent on its functions, automatically switches the printer, after a maximum of ten minutes, into one of the following conditions:

- standby mode;
- off mode; or
- another condition which does not exceed the applicable power consumption requirements for standby mode when the equipment is connected to the mains power source.

2.5. Paper efficiency requirements

- (1) Manufacturers, importers or authorised representatives shall ensure that printers include a duplex functionality.

- (2) Manufacturers, importers or authorised representatives shall ensure that printers are equipped with autoduplex functionality where printers are meeting one of the following conditions:
 - i. the printer can only print in monochrome and has a printing speed higher than 24 images per minute; or
 - ii. the printer can print in colour and has a printing speed higher than 19 images per minute.

3. REQUIREMENTS ON THE USE OF REMANUFACTURED CARTRIDGES

3.2. Printer notifications on remanufactured cartridges

Manufacturers, importers or authorised representatives shall ensure that printers do not display notifications concerning the quality or reliability of remanufactured cartridges with an original cartridge chip that has been reset or replaced in accordance with paragraph 1.2. of part D of this Annex.

4. INFORMATION REQUIREMENTS

- (1) Manufacturers, importers or authorised representatives shall provide in the technical documentation and make publicly available on a free-access website the indicative percentage of recycled content for the product or a part thereof. If this information is not available, the recycled content should be indicated as “not known” or “not available”.
- (2) Manufacturers, importers or authorised representatives shall provide user instructions in the form of a user manual on a free access website and shall include:
 - (a) instructions for maintenance of cartridges and print heads, including instructions for the user to ensure automatic initiation of printer cleaning cycles;
 - (b) instructions for the printer function that provides information on the total number of pages printed by the printer; and
 - (c) Instructions for the printer function that resets the printer to its factory settings; and
 - (d) Instructions for the manual switch to off mode.
- (3) Where a printer has a function that stops it from printing in monochrome when a colour cartridge is registered as empty, manufacturers, importers or authorised representatives shall provide information on this function on the sales packaging of the printer.
- (4) Where a printer has a function that stops it from printing if the printer is not connected to the internet, manufacturers, importers or authorised representatives shall provide information on this function on the sales packaging of the printer.
- (5) Manufacturers, importers or authorised representatives shall provide information on the reparability class of a printer as set out in Table 1 on the packaging of the product. The reparability class shall be determined on the basis of the reparability index as set out in Annex VI.
- (6) Manufacturers, importers or authorised representatives shall make publicly available on a free-access website information on the minimum guaranteed availability of software and firmware updates, availability of spare parts and availability of product support.

Table 1: Reparability classes of printers

Reparability Class	Reparability Index (R)
A (most repairable)	$R \geq 4,00$
B	$4,00 > R \geq 3,35$
C	$3,35 > R \geq 2,55$
D	$2,55 > R \geq 1,75$
E (least repairable)	$1,75 > R \geq 1,00$

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D. TONER CARTRIDGES

RESOURCE EFFICIENCY REQUIREMENTS

1.1. Cartridge durability

(1) Minimum cartridge page yield

From the date of application indicated in Table 2, manufacturers, importers or authorised representatives shall ensure that toner cartridges comply with minimum page yield requirements corresponding to the printing speed of the printer the cartridge is compatible with as indicated in Table 2.

If a toner cartridge is marketed as compatible with printers falling in multiple printing speed categories, it shall comply with the minimum cartridge page yield corresponding to the printer with the highest printing speed.

Table 2. Toner cartridge minimum page yield

	Laser printing speed		
	0-30 ipm	>30500 ipm	>50 ipm
Date of application	Minimum cartridge page yield		
From [OJ note: 18 months from the entry into force of this Regulation]	1500	5000	10000
From [OJ note: 30 months from the entry into force of this Regulation]	1800	6000	12000
From [OJ note: 42 months from the entry into force of this Regulation]	2160	7200	14400

1.2. Ease of reuse and remanufacturing

(1) Cartridge chip resetting and replacement

Manufacturers, importers or authorised representatives shall make available to professional remanufacturers when present in the cartridge, cartridge chips as a spare part or the means to reset cartridge chips, for seven years after the date of end of placement on the market or putting into service.

A chip reset shall ensure that the remanufactured cartridge is restored to its key functionalities including:

- full and continuous cartridge acceptance by the compatible printer;
- cartridge and printhead calibration, cleaning and allignment;
- no blocking of data collection agents;

- single installation message without use of terminology suggesting that the remanufactured cartridge may have a lower quality or reliability; and
- functioning ink or toner level gauge indicating the approximate page count or fill levels remaining, if provided with the original cartridge.

A chip reset shall not lead to any artificial deterioration in the printing quality of the cartridge.

(2) Cartridge design for remanufacturing

- (a) Manufacturers, importers or authorised representatives shall ensure that the cartridges containing chips are designed in a way that the chip is easily accessible with the aim of chip replacement or resetting, without permanent damage to the cartridge.
- (b) Manufacturers, importers or authorised representatives shall ensure that the cartridge is designed in a way that it can be opened for remanufacturing or refilling without damaging it to a point where it cannot be reused.

The process for replacement of the outer cartridge casing, drum, primary charge rollers and the cartridge chip shall meet the following criteria:

- i. fasteners are removable or reusable;
- ii. the process for replacement is feasible with commercially available tools;
- iii. the process for replacement can, as a minimum, be carried out in a workshop environment;

(3) Access to remanufacturing information

From one month after the date of placement on the market or putting into service, the manufacturer, importer or authorised representative shall, at least for seven years after the date of end of placement on the market or putting into service, provide access to cartridge remanufacturing information to professional remanufacturers for cartridge chip resetting or replacement, and for cartridge disassembly concerned by point 1 and 2 in the following conditions:

- (a) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional remanufacturers to register for access to information; to accept such a request, the manufacturers, importers or authorised representatives may require the professional remanufacturers to demonstrate that:
 - (i) the professional remanufacturer has the technical competence to remanufacture toner cartridges and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;
 - (ii) the professional remanufacturer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State;

- (b) the manufacturer, importer or authorised representative shall accept or refuse the registration within 5 working days from the date of request. In the case of refusal, a clear justification will be provided to the requestee outlining the reasons behind such decision, which shall be revoked, if the same professional remanufacturer requests to be registered with updated information, which comply with the conditions for being granted access;
- (c) the manufacturer, importer or authorised representative may charge reasonable and proportionate fees for access to the cartridge remanufacturing information or for receiving regular updates of such information. The registration as such shall be provided for free. A fee is reasonable if it does not discourage access by failing to take into account the extent to which the professional remanufacturers uses the information;
- (d) once registered, a professional remanufacturer shall have access, within one working day after requesting it, to the requested to the requested remanufacturing information;
- (e) The cartridge remanufacturing information referred to in point (a) shall contain the level of detail needed to be able to disassemble, replace and as relevant reset cartridge casings, print head and the cartridge chip and shall at least include:
 - i. the unequivocal product identification;
 - ii. a disassembly map or exploded view;
 - iii. a list of necessary remanufacturing and test equipment;
 - iv. technical manual of instructions for remanufacturing, including marking of the individual steps and wiring, connection or electronic diagrams as required;
 - v. instructions for software and firmware (including reset software);
 - vi. information on how to access professional remanufacturing, including the internet webpages, addresses and contact details of professional remanufacturers registered in accordance with point 2 (a);

2. INFORMATION REQUIREMENTS

From 18 months from the entry into force of this Regulation:

- (1) Manufacturers, importers or authorised representatives shall make publicly available on a free-access website and on the sales packaging of the cartridge, information on the total page yield of the cartridge.
- (2) The manufacturer, importer or authorised representative shall provide information on the sales packaging of the cartridge on where and how to return or dispose of empty cartridges to facilitate their refilling, remanufacturing or treatment in line with the waste hierarchy established in Article 4(1) of Directive 2008/98/EC.

ANNEX III

Measurements and calculations

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the Official Journal of the European Union, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art, and are in line with the conditions set out in this annex.

The following general conditions shall apply when testing networked equipment:

- (a) To measure the energy consumption in standby mode of networked equipment that has such mode, all network ports of the unit shall be deactivated or disconnected, as applicable;
- (b) If the equipment relies on active wired connection to one or more network ports for the intended use, manual deactivation of those network ports is allowed instead of wire disconnection;
- (c) The following procedure shall be used for measuring energy consumption in networked standby and for testing the power management function:

- (1) If the equipment has one type of network port and if two or more ports of that type are available, one of those ports is randomly chosen and that port is connected to the appropriate network complying with the port's maximum specification. If the equipment has multiple wireless network ports of the same type, the other wireless ports shall be deactivated if possible. If the equipment has multiple wired network ports of the same type, the other network ports shall be disconnected. If only one network port is available, that port is connected to the appropriate network complying with the port's maximum specification;

The tested unit is switched on. The device that provides the remotely initiated trigger that will reactivate the tested unit is connected to the appropriate network, switched on, and ready to provide the trigger when required to. Once the tested unit is switched on and working properly, it is allowed to go into networked standby and the power consumption is measured. Then the appropriate trigger is given to the unit through the network port and a check is made on whether the equipment is reactivated.

- (2) If the equipment has more than one type of network port, for each type of network port the following procedure is repeated. If two or more network ports of a type are available, one port is chosen randomly for each type of network port and that port is connected to the appropriate network complying with the port's maximum specification.

If for a certain type of network port only one port is available, that port is connected to the appropriate network complying with the port's maximum specification. Wired network ports not used shall be disconnected and wireless ports not used shall be deactivated.

The tested unit is switched on. The device that provides the remotely initiated trigger that will reactivate the tested unit is connected to the appropriate network, switched on, and ready to provide the trigger when required to. Once the tested unit is switched on and working properly, it is allowed to go into networked standby and the power consumption is measured. Then the appropriate trigger is given to the unit through the network port and a check is made on whether the equipment is reactivated. If one physical network port is shared by two or more types of (logical) network ports, that procedure is repeated for each type of logical network port, with the other logical network ports being logical-disconnected.

Measurements shall be made at an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

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ANNEX IV

Verification procedure for market surveillance purposes

The verification tolerances defined in this Annex relate only to the verification by Member State authorities of the declared values and shall not be used by the manufacturer, importer or authorised representative as an allowed tolerance to establish the values in the technical documentation or in interpreting these values with a view to achieving compliance or to communicate better performance by any means.

Where a model has been designed to alter its behaviour or properties when it is tested in order to reach a more favourable level for any of the parameters specified in this Regulation, included in the technical documentation or in any of the documentation provided, the model and all equivalent models shall be considered not compliant.

As part of verifying the compliance of a product model with the requirements laid down in this Regulation pursuant to Article 3(2) of Directive 2009/125/EC, the Member States authorities shall apply the following procedure for the requirements referred to in Annex II:

1. The Member State authorities shall verify one single unit of the model pursuant to points 2(a), (b), (c) and (d).
2. The model shall be considered to comply with the applicable requirements if:
 - (a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values), and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to point (g) thereof;
 - (b) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values;
 - (c) when the Member State authorities check the unit of the model, it complies with the requirements of Annex II;
 - (d) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as set out in Table 2;
3. If the results referred to in point 2(a), (b), (c) are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.
4. If the result referred to in point 2(d) is not achieved, the Member State authorities shall select three additional units of the same model for testing.
6. The model shall be considered to comply with the applicable requirements if, for these units tested pursuant to point 4, where applicable, the arithmetical mean of the determined values complies with the respective verification tolerances set out in Table 2.

7. If the result referred to in point 6 is not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.
8. The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay once a decision has been taken on the non-compliance of the model.

The Member State authorities shall use the measurement and calculation methods set out in Annex III.

The Member State authorities shall only apply the verification tolerances that are set out in Table 2 and shall use only the procedure described in points 1 to 8 for the requirements set out in this Annex. For the parameters in Table 2, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

Table 2
Verification tolerances

<i>Parameters</i>	<i>Verification tolerances</i>
Power consumption in off mode	The determined value(*) shall not exceed the declared value by more than 0,10 W.
Power consumption in standby mode	The determined value(*) shall not exceed the declared value by more than 0,10 W.
Power consumption in networked standby	The determined value(*) shall not exceed the declared value by more than 0,10 W if the declared value is smaller than 1 W and by more than 10 % otherwise.
Time needed for the equipment to reach the applicable low power mode or condition	The determined value(*) shall not exceed the declared value by more than 10 %

ANNEX V

Benchmarks

At the time of entry into force of this Regulation, the best available technology on the market or putting into service was identified as follows.

Inkjet printers:

- (a) Off mode power : 0,1 W
- (b) Networked standby mode: 0,7 W
- (c) Automatic transition between active mode and networked standby mode: 1 minute

Laser printers:

- (a) Off mode power : ..
- (b) Networked standby mode: ..
- (c) Automatic transition between active mode and networked standby mode: ..

Inkjet cartridges:

Page yield: 2500 pages

Toner cartridges:

Page yield: 30000 pages

DRAFT

Method for the calculation of the Reparability Index of printers

The **Reparability Index** is an aggregated and normalised score, as a calculated value derived from six scoring parameters where:

- S_{DD} is the “Disassembly Depth” score.
- S_F is the “Fasteners (type)” score.
- S_T is the “Tools (type)” score.
- S_{PT} is the “Spare Parts Target Group” score.
- S_{PD} is the “Spare Parts Duration” score.
- S_{SU} is the “Software Updates (duration)” score.

The same scoring methodology shall apply to both inkjet and laser printers. The Reparability Index (R) shall be calculated as follows:

$$R = (S_{DD} * 0,20) + (S_F * 0,15) + (S_T * 0,15) + (S_{PT} * 0,10) + (S_{PD} * 0,20) + (S_{SU} * 0,20)$$

The “Disassembly Depth” (S_{DD}), “Fasteners (type)” (S_F) and “Tools (type)” (S_T) scores are based on the aggregation of the following priority part level scores.

For inkjet printers:

- ICM is the ink collection mechanism.
- PH is the print head.
- PCS is the paper cassettes.
- IPS is the internal power supply.
- STR is the storage unit.
- PFR is the paper feed rollers.
- CCB is the control circuit board.
- CP is the control panel.

For laser printers:

- TCU is the toner collection unit.
- PCS is the paper cassettes.
- STR is the storage unit.
- PFR is the paper feed rollers.
- DU is the drum unit.
- FU is the fuser unit.
- TB is the transfer belt.
- LU is the laser unit.
- IPS is the internal power supply.
- CCB is the control circuit board.

- CP is the control panel.

If any of the priority parts listed above is present in a product more than once, only the one which delivers the lowest score shall be considered in the calculation of the “Disassembly Depth” (S_{DD}), “Fasteners (type)” (S_F) and “Tools (type)” (S_T) scores.

The “Disassembly Depth” (S_{DD}) score shall be calculated as follows:

For inkjet printers:

- (a) If the internal power supply is not present in the product, the following formula shall be used:

$$S_{DD} = (DD_{ICM} * 0,15) + (DD_{PH} * 0,30) + (DD_{PCS} * 0,10) + (DD_{STR} * 0,10) + (DD_{PFR} * 0,10) + (DD_{CCB} * 0,10) + (DD_{CP} * 0,15)$$

- (b) If the internal power supply is present in the product, the following formula shall be used:

$$S_{DD} = (DD_{ICM} * 0,15) + (DD_{PH} * 0,25) + (DD_{PCS} * 0,10) + (DD_{STR} * 0,10) + (DD_{PFR} * 0,10) + (DD_{CCB} * 0,10) + (DD_{CP} * 0,15) + (DD_{IPS} * 0,05)$$

For laser printers:

- (c) If the internal power supply is not present in the product, the following formula shall be used:

$$S_{DD} = (DD_{TCU} * 0,15) + (DD_{PCS} * 0,05) + (DD_{STR} * 0,05) + (DD_{PFR} * 0,05) + (DD_{DU} * 0,15) + (DD_{FU} * 0,10) + (DD_{TB} * 0,15) + (DD_{LU} * 0,10) + (DD_{CCB} * 0,10) + (DD_{CP} * 0,10).$$

- (d) If the internal power supply is present in the product, the following formula shall be used:

$$S_{DD} = (DD_{TCU} * 0,15) + (DD_{PCS} * 0,05) + (DD_{STR} * 0,05) + (DD_{PFR} * 0,05) + (DD_{DU} * 0,15) + (DD_{FU} * 0,10) + (DD_{TB} * 0,10) + (DD_{LU} * 0,10) + (DD_{CCB} * 0,10) + (DD_{CP} * 0,10) + (DD_{IPS} * 0,05).$$

Disassembly Depth (DD) assessment at part level

The Disassembly Depth score (DD_i) for each priority part i shall be calculated based on the number of steps required to remove a part from a product, without damaging the product. The counting of the steps for each part starts from the product fully assembled, with the charger disconnected and any SIM card installed. Points ranging from 1 to 5 are assigned as follows:

- $DD_i \leq 2$ steps = 5 pt.
- 5 steps $\geq DD_i > 2$ steps = 4 pt.
- 10 steps $\geq DD_i > 5$ steps = 3 pt.
- 15 steps $\geq DD_i > 10$ steps = 2 pt.
- $DD_i > 15$ steps = 1 pt.

For the calculation of disassembly steps, the following rules shall apply:

- the disassembly depth count is completed when the target part is separated and individually accessible.

- where multiple tools need to be used simultaneously, the use of each tool counts as a separate step.
- operations related to cleaning, removing traces or heating are counted as steps.
- the disassembly depth shall be calculated on the basis of the repair and maintenance information, and of the description of the disassembly steps for each priority part given in the technical documentation;
- where remote notification or authorisation of serial numbers is necessary for the full functionality of the spare part and the device, each of these actions is counted as five additional disassembly steps.

The “Fasteners (type)” (S_F) score is calculated as follows:

For inkjet printers:

- (a) If the internal power supply is not present in the product, the following formula shall be used:

$$S_F = (F_{ICM} * 0,15) + (F_{PH} * 0,30) + (F_{PCS} * 0,10) + (F_{STR} * 0,10) + (F_{PFR} * 0,10) + (F_{CCB} * 0,10) + (F_{CP} * 0,15)$$

- (b) If the internal power supply is present in the product, the following formula shall be used:

$$S_F = (F_{ICM} * 0,15) + (F_{PH} * 0,30) + (F_{PCS} * 0,10) + (F_{STR} * 0,10) + (F_{PFR} * 0,10) + (F_{CCB} * 0,10) + (F_{CP} * 0,15) + (F_{IPS} * 0,05)$$

For laser printers:

- (c) If the internal power supply is not present in the product, the following formula shall be used:

$$S_F = (F_{TCU} * 0,15) + (F_{PCS} * 0,05) + (F_{STR} * 0,05) + (F_{PFR} * 0,05) + (F_{DU} * 0,15) + (F_{FU} * 0,10) + (F_{TB} * 0,15) + (F_{LU} * 0,10) + (F_{CCB} * 0,10) + (F_{CP} * 0,10).$$

- (d) If the internal power supply is present in the product, the following formula shall be used:

$$S_F = (F_{TCU} * 0,15) + (F_{PCS} * 0,05) + (F_{STR} * 0,05) + (F_{PFR} * 0,05) + (F_{DU} * 0,15) + (F_{FU} * 0,10) + (F_{TB} * 0,10) + (F_{LU} * 0,10) + (F_{CCB} * 0,10) + (F_{CP} * 0,10) + (F_{IPS} * 0,05).$$

Fasteners (type) (F) assessment at part level:

The “Fasteners (type)” scores (F_i) for each priority part i are assigned according to the level of removability and reusability of the fasteners used in the device assembly. Points ranging from 1 to 5 are assigned as follows:

- Captive Reusable Fasteners = 5 pt.
- Reusable Fasteners = 4 pt.
- Resupplied Fasteners = 3pt.
- Removable Fasteners = 1 pt.

The assessment of the type of fasteners is based on the disassembly process to remove the specific priority part, starting from the previous priority part in disassembly sequence already removed.

In case different types of fasteners are encountered in the disassembly of a priority part, the worst score shall be considered.

The F_i scores shall be calculated on the basis of the repair and maintenance information, and of the description of the fasteners for each priority part given in the technical documentation.

The “**Tools (type)**” (S_T) score shall be calculated as follows:

For inkjet printers:

- (a) If the internal power supply is not present in the product, the following formula shall be used:

$$S_T = (T_{ICM} * 0,15) + (T_{PH} * 0,30) + (T_{PCS} * 0,10) + (T_{STR} * 0,10) + (T_{PFR} * 0,10) + (T_{CCB} * 0,10) + (T_{CP} * 0,15)$$

- (b) If the internal power supply is present in the product, the following formula shall be used:

$$S_T = (T_{ICM} * 0,15) + (T_{PH} * 0,30) + (T_{PCS} * 0,10) + (T_{STR} * 0,10) + (T_{PFR} * 0,10) + (T_{CCB} * 0,10) + (T_{CP} * 0,15) + (T_{IPS} * 0,05)$$

For laser printers:

- (a) If the internal power supply is not present in the product, the following formula shall be used:

$$S_T = (T_{TCU} * 0,15) + (T_{PCS} * 0,05) + (T_{STR} * 0,05) + (T_{PFR} * 0,05) + (T_{DU} * 0,15) + (T_{FU} * 0,10) + (T_{TB} * 0,15) + (T_{LU} * 0,10) + (T_{CCB} * 0,10) + (T_{CP} * 0,10).$$

- (b) If the internal power supply is present in the product, the following formula shall be used:

$$S_T = (T_{TCU} * 0,15) + (T_{PCS} * 0,05) + (T_{STR} * 0,05) + (T_{PFR} * 0,05) + (T_{DU} * 0,15) + (T_{FU} * 0,10) + (T_{TB} * 0,10) + (T_{LU} * 0,10) + (T_{CCB} * 0,10) + (T_{CP} * 0,10) + (T_{IPS} * 0,05).$$

Tools (type) (T) assessment at part level

The “Tools (type)” scores (T_i) for each priority part i are assigned according to the complexity and availability of the tools needed for its replacement. Points ranging from 1 to 5 are assigned as follows:

- No tools = 5 pt.
- Basic tools = 4 pt.
- A set of tools that is supplied (or offered to be supplied at no additional cost) with the spare part = 3 pt.
- A set of tools that is supplied (or offered to be supplied at no additional cost) with the product = 2 pt.
- Commercially available tools = 1 pt.

The assessment of the type of tools is based on the disassembly process to remove the specific priority part, starting from the previous priority part in disassembly sequence already removed.

Where different types of tools are needed for the disassembly of a priority part, the lowest score shall be considered.

The T_i scores shall be calculated on the basis of the repair and maintenance information, and of the description of the tools for each priority part given in the technical documentation.

Spare parts target group

The “**Spare Parts Target Group**” (S_{PT}) score shall be calculated at product level as follows:

For inkjet printers:

- Spare parts for all priority parts are available to users and professional repairers = 5 pt.
- Spare parts for the ink collection mechanism, print head, paper cassettes, internal power supply (if present), storage, paper feed rollers and control panel are available to users and professional repairers; spare parts for all other parts are available to professional repairers = 4 pt.
- Spare parts for the ink collection mechanism, print head, paper cassettes, internal power supply (if present), storage and paper feed rollers are available to users and professional repairers; spare parts for all other parts are available to professional repairers = 3 pt.
- Spare parts for the ink collection mechanism, print head, paper cassettes, storage and paper feed rollers are available to users and professional repairers; spare parts for all other parts are available to professional repairers = 2 pt.
- Spare parts for the ink collection mechanism, print head, paper cassettes and storage are available to users and professional repairers; spare parts for all other parts are available to professional repairers = 1 pt.

For laser printers:

- Spare parts for all priority parts are available to users and professional repairers = 5 pt.
- Spare parts for the toner collection unit, paper cassettes, storage, paper feed rollers, drum unit, fuser unit, transfer belt, laser unit and internal power supply (if present) are available to users and professional repairers; spare parts for all other parts are available to professional repairers = 4 pt.
- Spare parts for the toner collection unit, paper cassettes, storage, paper feed rollers, drum unit, fuser unit and transfer belt are available to users and professional repairers; spare parts for all other parts are available to professional repairers = 3 pt.
- Spare parts for the toner collection unit, paper cassettes, storage and paper feed rollers are available to users and professional repairers; spare parts for all other parts are available to professional repairers = 2 pt.
- Spare parts for the toner collection unit and paper cassettes are available to users and professional repairers; spare parts for all other parts are available to professional repairers = 1 pt.

Spare parts duration

The “**Spare Parts Duration**” (**S_{PD}**) score shall be calculated at product level as follows:

For inkjet printers:

- Spare parts are available for more than ten years for printers of speed below 15 images per inutem and for more than thirteen years for printers of speed above or equal to 15 images per minute = 5 pt.
- Spare parts are available for ten years for printers of speed below 15 images per minute and for 13 years for printers of speed above or equal to 15 images per minute = 4 pt.
- Spare parts are available for nine years for printers of speed below 15 images per minute and for 12 years for printers of speed above or equal to 15 ipm = 3 pt.
- Spare parts are available for eight years for printers of speed below 15 images per minute and for 11 years for printers of speed above or equal to 15 images per minute = 2 pt.
- Spare parts are available for seven years for printers of speed below 15 images per minute and for ten years for printers of speed above or equal to 15 images per minute = 1 pt.

For laser printers:

- Spare parts are available for more than ten years for printers of speed below 50 images per minute and for more than 13 years for printers of speed above or equal to 50 images per minute = 5 pt.
- Spare parts are available for ten years for printers of speed below 50 images per minute and for 13 years for printers of speed above or equal to 50 images per minute = 4 pt.
- Spare parts are available for nine years for printers of speed below 50 images per minute and for 12 years for printers of speed above or equal to 50 images per minute = 3 pt.
- Spare parts are available for eight years for printers of speed below 50 images per minute and for 11 years for printers of speed above or equal to 50 images per minute = 2 pt.
- Spare parts are available for seven years for printers of speed below 50 images per minute and for ten years for printers of speed above or equal to 50 images per minute = 1 pt.

Software Updates (duration)

The “**Software Updates (duration)**” (**S_{SU}**) score shall be calculated at product level as follows:

For inkjet printers:

- Software and firmware updates are available for more than ten years for printers of speed below 15 images per minute and for more than 13 years for printers of speed above or equal to 15 images per minute = 5 pt.

- Software and firmware updates are available for ten years for printers of speed below 15 image per minute and for 13 years for printers of speed above or equal to 15 images per minute = 4 pt.
- Software and firmware updates are available for nine years for printers of speed below 15 images per minute and for 12 years for printers of speed above or equal to 15 images per minute = 3 pt.
- Software and firmware updates are available for eight years for printers of speed below 15 images per minute and for 11 years for printers of speed above or equal to 15 images per minute = 2 pt.
- Software and firmware updates are available for seven years for printers of speed below 15 images per minute and for ten years for printers of speed above or equal to 15 images per minute = 1 pt.

For laser printers:

- Software and firmware updates are available for more than ten years for printers of speed below 50 images per minute and for more than 13 years for printers of speed above or equal to 50 images per minute = 5 pt.
- Software and firmware updates are available for ten years for printers of speed below 50 images per minute and for 13 years for printers of speed above or equal to 50 images per minute = 4 pt.
- Software and firmware updates are available for nine years for printers of speed below 50 images per minute and for 12 years for printers of speed above or equal to 50 images per minute = 3 pt.
- Software and firmware updates are available for eight years for printers of speed below 50 images per minute and for 11 years for printers of speed above or equal to 50 images per minute = 2 pt.

Software and firmware updates are available for seven years for printers of speed below 50 images per minute and for ten years for printers of speed above or equal to 50 images per minute = 1 pt.