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# Assessment of the European Union Green Public Procurement criteria for four product groups

*Electrical and electronic equipment used in the health care sector,*
*Copying and graphic paper,*
*Waste water infrastructure,*
*Water-based heaters*

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# Contents

## Abstract

In the European Union (EU), sustainable consumption is promoted by the 'Circular Economy Action Plan'. In particular, the voluntary scheme of the EU Green Public Procurement (EU GPP) provides guidance to reduce the environmental impacts of the public sector. To this end, the European Commission proposes EU GPP criteria for 20 product groups. The fitness for use of EU GPP criteria needs to be periodically assessed, because technological developments, changes in the regulatory and strategic context, and other factors could affect their suitability and effectiveness. For this reason, this report assesses the fitness for use of EU GPP criteria for four product groups: 1) electrical and electronic equipment used in the health care sector (Health Care EEE), 2) copying and graphic paper, 3) water-based heaters and 4) waste water infrastructure. The study was developed within an administrative arrangement between the Joint Research Centre (JRC) and the Directorate-General for Environment (DG ENV), which is responsible for the EU GPP policy. The performed desk research revealed that all the investigated sets of EU GPP criteria are not up to date. In particular, this is mainly due to: (a) the new regulatory and strategic context for Health Care EEE, water-based heaters and waste water infrastructure, (b) the introduction of new technologies for water-based heaters, (c) specific industry practices for copying and graphic paper, and (d) lack of references in the verification process for waste water infrastructure. The presence of no up-to-date criteria could negatively affect the uptake of the EU GPP policy.

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## Executive summary

### *Policy context*

Public authorities in the European Union (EU) are major consumers. The European Union Green Public Procurement (EU GPP) policy provides guidance on how to reduce the environmental impacts caused by the consumption of the public sector (COM(2008) 400 final). Its role is particularly relevant within the 'Circular Economy Action Plan' (COM(2020) 98 final), which fosters sustainable consumption. The European Commission has developed EU GPP criteria for 20 product groups.

The fitness for use of EU GPP criteria needs to be periodically assessed, because technological developments, changes in the regulatory and strategic context, and other factors could affect their suitability and effectiveness. To this end, this report assesses the fitness for use of EU GPP criteria for four product groups: 1) electrical and electronic equipment used in the health care sector, 2) copying and graphic paper, 3) water-based heaters and 4) waste water infrastructure.

The study was developed in the context of the Administrative Arrangement 'Scientific support to the EU Ecolabel and Green Public Procurement (SupELGPP 2018)' between the Directorate-General for Environment (DG ENV) and the Joint Research Centre (JRC).

### *Key conclusions*

The results of the assessment of the current EU GPP criteria for **electrical and electronic equipment used in the health care sector (Health Care EEE)** showed that the current criteria are not up to date, mainly because:

- the scope lacks new technologies that might have entered into the market in recent years;
- the criteria do not refer to the new Medical Devices Regulation (EU) 2017/745, and refer to regulatory tools and standards that are no longer in force;
- the possibility to include new ambitious criteria needs to be assessed in line with new EU policies like the 'European Green Deal' and the 'Circular Economy Action Plan'.

The results of the assessment of the current EU GPP criteria for **copying and graphic paper** showed that the current criteria are not up to date, mainly because:

- the scope is not in line with industry practices;
- the definition of criteria based on source of fibres (recycled vs virgin) is not in line with current fibre labelling rules;
- the 'verification of legal virgin fibres' is not in line with the current practice.

The results of the assessment of the current EU GPP criteria for **waste water infrastructure** showed that the current criteria are not up to date, mainly because:

- there are new policy developments, including circularity aspects, and emerging pollutants and microplastics to be taken into consideration;
- the scope does not cover climate change mitigation and adaptation objectives;
- the ambition of some thresholds related to water treatment efficiency could be increased, to be in line with levels set by some Member States;
- the verification process lacks references.

The results of the assessment of the current EU GPP criteria for **water-based heaters** showed that the current criteria are not up to date, mainly because:

- the scope lacks technological advances that entered into the market in recent years;
- a higher ambition level could be set regarding minimum energy efficiency for all boiler types;
- new criteria could be considered, especially on water heating energy efficiency, smart monitoring and circularity aspects;

- criteria refer to regulatory tools, standards, and ISO 14024 Type I ecolabel criteria that are no longer in place;
- of the development of new policies, especially Regulation 2015/1189 and the ongoing revision of Regulations 811/2013 and 813/2013.

***Main findings***

In summary, the EU GPP set of criteria of all investigated product groups **are not up to date**. Table 1 gathers the main reasons for this.

**Table 1**. Main reasons for the current European Union Green Public Procurement (EU GPP) criteria of the investigated product groups being not up to date

| **Reason** | **Health Care EEE** (*) | **Copying and graphic paper** | **Waste Water Infrastructure** | **Water-based heaters** |
|---|---|---|---|---|
| Changes in the regulatory and strategic context | X | | X | X |
| New standards available | X | | | X |
| New technologies in the market | X | | | X |
| Changes in practices of the industry and the market | | X | | |
| New concerns regarding emerging contaminants | | | X | |
| More ambitious criteria and/or threshold needed | X | | X | X |

(*) 'Health Care EEE' stands for electrical and electronic equipment (EEE) used in the health care sector.

Source: JRC analysis

***Related and future JRC work***

The JRC could provide scientific support to develop new criteria for the above-mentioned product groups. Future revision of the EU GPP criteria could be integrated into sectoral legislation, as mentioned in the 'Circular Economy Action Plan' (COM(2020) 98 final).

***Quick guide***

The assessment was carried out by desk research, investigating numerous scientific fields due to the diverse nature of the four product groups. Several concepts are clarified below:

- *Virgin fibres* are fibres obtained from raw materials (e.g. virgin timber) usually harvested from forests, while *recycled fibres* are those obtained from reprocessing products made of fibres (e.g. paper, paperboard).
- *Circularity aspects* refer to features that a product should meet to satisfy the principles of the circular economy, which is a model of production and consumption that involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended.
- *ISO 14024 Type I ecolabel* is a third-party assessment of a product based on a number of criteria involved in the environmental impact of a product or material throughout its life cycle.

# 1 Introduction

Public authorities in the European Union (EU) are major consumers. The European Union Green Public Procurement (EU GPP) policy provides guidance on how to reduce the environmental impacts caused by the consumption of the public sector ([1]). Although the EU GPP is a voluntary tool, it stimulates eco-innovation, by setting verifiable environmental criteria for public procurement of products and services. Its role is particularly relevant within the Circular Economy Action Plan ([2]), which fosters sustainable consumption.

The European Commission has developed EU GPP criteria for 20 product groups ([3]). The fitness for use of these criteria needs to be periodically assessed because changes occurred in recent years could affect their suitability and effectiveness. These changes could be related to technological developments, the regulatory and strategic context, and other factors.

This report aims to assess the fitness for use of the EU GPP criteria for four product groups:

— Electrical and electronic equipment used in the health care sector (Health Care EEE) – published in 2014 (see Section 2);

— Copying and graphic paper – published in 2008 (see Section 3);

— Waste water treatment infrastructure – published in 2013 (see Section 4);

— Water-based heaters – published in 2014 (see Section 5).

The study was carried out by desk research, and developed in the context of the Administrative Arrangement 'Scientific support to Green Public Procurement (GPP 2018)' between the Directorate-General for Environment (DG ENV) and the Joint Research Centre (JRC).

The assessment of each product group followed the same framework:

- introduction to the specific product group;
- background;
- regulatory and strategic context;
- analysis and discussion of current criteria;
- results of the assessment for the specific product group.

Footnotes contain hidden hyperlinks, which lead to specific webpages last consulted on 18 October 2021.

The distribution of responsibility of the authors across the sections of this report is as follows:

- Section 2: Maria Grazia La Placa and Felice Alfieri;
- Section 3: Antonio Delre and Malgorzata Agata Kowalska;
- Section 4: Felice Alfieri, Antonio Delre and Candela Vidal Abarca Garrido;
- Section 5: Giorgia Faraca.

([1]) Public procurement for a better environment. – COM(2008) 400 final. Available at this link.
([2]) A new Circular Economy Action Plan for a cleaner and more competitive Europe – COM(2020) 98 final. Available at this link.
([3]) European Union Green Public Procurement (EU GPP) criteria for all available product groups. Available at this link.

# 2 Electrical and electronic equipment used in the health care sector (Health Care EEE)

## 2.1 Introduction to the product group

The current EU Green Public Procurement (GPP) criteria for electrical and electronic equipment used in the health care sector (Health Care EEE) ([4]) were published for the first time on the European Commission website ([5]) in 2014. These EU GPP criteria were developed to provide guidelines and encourage the purchase of Health Care EEE with reduced environmental impacts, focusing on the energy performance aspects of medical equipment, while ensuring that the safety and well-being of patients and medical, technical and maintenance staff is always a priority.

Section 2 reports on the assessment of the fitness for use of the existing EU GPP criteria for electrical and electronic equipment used in the health care sector.

## 2.2 Background

The existing EU GPP criteria for electrical and electronic equipment used in the health care sector, together with the accompanying Technical Background Report (Dalenstam et al., 2014), were developed, between 2011 and 2014, by the Swedish Environmental Management Council (SEMCo) in agreement with the Directorate-General for Environment (DG ENV) and in collaboration with stakeholders from industry, non-governmental organisations (NGOs), procurement and health care professionals and academia.

The scope of these criteria includes both high- and low-voltage health care EEE and it encompasses medical devices that cover the complete care cycle (prevention, diagnosis, treatment, monitoring, alleviation and rehabilitation). As the volume of Health Care EEE is extensive, specific principles of prioritisation based mainly on the environmental aspect (energy consumption) were selected in order to narrow the scope.

The general principles for prioritising a product were as follows:

— the equipment should be classified as a medical device according to the Medical Devices Directive (93/42/EEC);

— the equipment should have a high energy consumption compared to others;

— the volumes of equipment should be high and therefore their total energy consumption should be high.

([4]) EU GPP criteria for electrical and electronic equipment used in the health care sector. Available at this link.
([5]) European Union Green Public Procurement (EU GPP) criteria for all available product groups. Available at this link.

The scope includes 20 product groups consisting of different types of energy-using equipment, as reported below:

- CPV 33157000-5: anaesthesia equipment- ventilator (intensive care ventilator excl. transport ventilator, anaesthesia ventilator excl. home ventilators),
- CPV 33195100-4: bed side monitoring equipment,
- CPV 33115100-0: computed tomography (CT),
- CPV 33123200-0: electrocardiographic (ECG) equipment, diagnostic,
- CPV 33168100-6: endoscopic equipment (camera unit, endoscope, light, air pump),
- CPV 39330000-4: flusher disinfector,
- CPV 33181100-3: haemodialysis equipment,
- CPV 33161000-6: HF, RF surgery, diathermy equipment, bipolar, mono polar,
- CPV 33152000-0: incubators for babies, permanent,
- CPV 33194110-0: infusion pumps and syringe pumps,
- CPV 33157400-9: intensive care equipment – active respiratory gas humidifier,
- CPV 33169100-3: laser instruments for surgery,
- CPV 33111610-0: magnetic resonance imaging (MRI),
- CPV 39711120-6: medical freezers,
- CPV 31524110-9: medical lighting- surgical lamps,
- CPV 33191110-9: medical steriliser,
- CPV 33160000-9, 33162000-3: patient warming systems (blankets, pads, mattresses),
- CPV 33112200-0: ultrasound, excl. therapeutic,
- CPV 33191000-5: washer disinfector,
- CPV 33111000-1, 33111650-2: X-ray (including mammography, excl. osteoporosis).

Note that the acronym CPV refers to Common Procurement Vocabulary ([6]).

Laboratory/in-vitro equipment, dental equipment and implants are excluded from the scope. Cathlab, IT, linear accelerators, and nuclear medicine scans PET/SPECT ([7]) equipment were also excluded because stakeholders pointed out that there are not many in health care. Moreover, the scope does not include medical refrigerators, although, as listed above, it does cover medical freezers.

([6]) Common Procurement Vocabulary – Commission Regulation (EC) 213/2008. Available at this link.
([7]) PET: Positron Emission Tomography. SPECT: Single Photon Emission Computed Tomography.

The document reporting the voluntary EU GPP criteria for electrical and electronic equipment used in the health care sector is not published as a Staff Working Document (SWD) of the European Commission and presents a different format from the one that has been in use for this purpose since 2016. After consultation with DG ENV, the SWD format was adopted by the European Commission to improve the structure and clarity of the EU GPP criteria. The current structure of the document is as follows:

- Definition and Scope
- Key environmental impact
- The EU GPP Criteria
  - ➢ Criteria for all type of equipment

    **Core criteria**

    Selection Criteria (SC)

    - SC1. Chemical management system

    Technical Specifications (TS)

    - TS2. User instructions for green performance
    - TS3. Product longevity and warranty
    - TS4. Training for energy efficiency optimisation
    - TS5. Installation with energy efficiency optimisation

    Contract Performance Clause (C)

    - C6. Information on content of Candidate List Substances of Very High Concern

    Award Criteria (AC)

    ➢ Energy performance Requirement

    - AC7. Energy performance of health care EEE except from CT, haemodialysis equipment, MRI, medical sterilizers and disinfectors
    - AC8. Energy performance for Computed Tomography (CT)
    - AC9. Energy performance for haemodialysis equipment
    - AC10. Energy performance for Magnetic Resonance Imaging (MRI)
    - AC11. Energy performance for medical
    - AC12. Energy performance for flusher and washer disinfectant equipment
    - AC13. Automatic low power mode for medical sterilizer, disinfector, CT, ECG diagnostic, MRI, and ultrasound
    - AC14. Equipment with a metering device

    ➢ Water efficiency requirement for different types of equipment

    - AC15. Water consumption for haemodialysis equipment
    - AC16. Water consumption for flusher and washer disinfectant equipment

    **Comprehensive Criteria**

    Award Criteria (AC)

    - AC17. Refrigerants in medical freezers
    - AC18. Gas consumption for anaesthesia equipment – low flow equipment
- Explanatory note
- Cost consideration

According to the most recent update from GPP National Action Plans (NAP) in March 2021, only a few Member States have introduced or are considering the introduction of GPP criteria for electrical and electronic equipment used in the health care sector for greening their public procurement ([8]). In Portugal the GPP criteria were introduced in March 2019 (APA, 2019). In the Czech Republic the GPP criteria are currently under development, while in Latvia and Malta the implementation of the EU GPP criteria is recommended.

([8]) National Green Public Procurement Action Plans (policies and guidelines) – March 2021. Available at this link.

## 2.3 Regulatory and strategic context

The European legislative framework governing medical devices comprises different directives that ensure their safety and efficacy:

- Medical Devices Directive (93/42/EEC) ([9]),
- In vitro Diagnostic Medical Devices Directive (98/79/EC) ([10]),
- Active Implantable Medical Devices Directive (90/385/EEC) ([11]).

To keep up with scientific and technological developments, two new regulations entered into force on May 2017 and will progressively replace the existing directives in the coming years after a transition period:

- Regulation (EU) 2017/745 ([12]) on Medical Devices repealing Directives 93/42/EEC and 90/385/EEC,
- Regulation (EU) 2017/745 ([13]) on In vitro Diagnostic Medical Devices repealing Directives 98/79/EC.

The Parliament and the Council adopted Regulation 2020/561 ([14]) amending Regulation (EU) 2017/745 as regards its date of application and postponing it to May 2021.

Although these Directives focus on patient safety, some environmental considerations are also included. In Annex I to the Medical Devices Regulation ((EU) 2017/745), in the chapter Requirements regarding Design and Manufacture, it is reported that particular attention shall be paid to the choice of materials and substances used as regards toxicity and flammability. It also states that the devices must be designed and manufactured in such a way as to reduce the risks posed by substances and particles that may be released from the device. Specific requirements are also indicated for substances which are carcinogenic, mutagenic or toxic to reproduction (CMR) in accordance with Annex VI to the CLP Regulation ((EC) 1272/2008) ([15]) on Classification, Labelling and Packaging and also for substances with endocrine-disrupting (ED) properties identified in accordance with Articles 57 and 59 of the REACH Regulation ((EC) 1907/2006) ([16]). Guidelines on phthalates and special attention on nanomaterials are also included. Moreover, reference is made to the design of the devices which should facilitate their safe disposal and the safe disposal of related waste. In the chapter on the information supplied with the device, indications are reported on the reuse and the reconditioning procedure of the medical devices, including appropriate disinfection and re-sterilisation.

Medical devices fall within the scope of the RoHS Directive (2011/65/EU) ([17]) that sets out rules on the restriction of the use of hazardous substances in electrical and electronic equipment (EEE) in order to contribute to human health and environmental protection, considering also the recovery and disposal of EEE waste. The most recent consolidated version ([18]) of this Directive incorporates several amendments and applies to medical devices which are placed on the market from 22 July 2014. The RoHS Directive includes a list of restricted substances and the review and amendment of this list shall be coherent with other legislation related to chemicals, in particular the REACH Regulation.

([9]) Medical Devices – Council Directive 93/42/EEC. Available at this link.
([10]) In vitro Diagnostic Medical Devices – Directive 98/79/EC. Available at this link.
([11]) Approximation of the laws of the Member States relating to active implantable medical devices – Council Directive 90/385/EEC. Available at this link.
([12]) Medical Devices – Regulation (EU) 2017/745. Available at this link.
([13]) In vitro Diagnostic Medical Devices – Regulation (EU) 2017/745. Available at this link.
([14]) Amendment to Regulation (EU) 2017/745 on medical devices, as regards the dates of application of certain of its provisions – Regulation (EU) 2020/561. Available at this link.
([15]) Classification, labelling and packaging of substances and mixtures – Regulation (EC) 1272/2008. Available at this link.
([16]) Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) – Regulation (EC) 1907/2006. Available at this link.
([17]) Restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment – Directive 2011/65/EU. Available at this link.
([18]) Consolidated version of Restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment – Directive 2011/65/EU. Available at this link.

The restricted substances and their maximum concentration values tolerated by weight are listed below:

— lead (0.1%),

— mercury (0.1%),

— cadmium (0.01%),

— hexavalent chromium (0.1%),

— polybrominated biphenyls (PBB) (0.1%),

— polybrominated diphenyl ethers (PBDE) (0.1%),

— bis(2-ethylhexyl) phthalate (DEHP) (0.1%),

— butyl benzyl phthalate (BBP) (0.1%),

— dibutyl phthalate (DBP) (0.1%),

— diisobutyl phthalate (DIBP) (0.1%).

The restriction of phthalates (DEHP, BBP, DBP, DIBP) applies to medical devices from 22 July 2021. For specific medical devices certain exemptions from the restriction are set out in Annexes III and IV.

Professional refrigerators (refrigerated storage cabinets) that are also used in hospitals are regulated by Commission Regulation 2015/1095/(EU) implementing Directive 2009/125/EC with regard to ecodesign requirements ([19]).

Since the electric and electronic equipment can contain several hazardous substances it is important that these products are correctly taken care of in their end-of-life stage. In this context, the WEEE Directive (2012/19/EU) ([20]) on waste electrical and electronic equipment acts to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of WEEE. Following this Directive, the producer shall provide information for treatment facilities in order to ensure the environmentally sound reuse and recycling of materials, including maintenance, upgrade and refurbishment. The WEEE Directive applies to medical devices that are not infective prior to end-of-life.

Recently, the European Commission (EC) launched a 'Circular Economy Action Plan' (COM(2020) 98 final) ([21]) which presents a set of initiatives to establish a policy framework that will make sustainable products and services the norm and help to reach the 'European Green Deal' (COM(2019) 640 final) ([22]) objectives.

Following the 'Circular Economy Action Plan', the EC is proposing a 'Sustainable Products Policy Initiative' ([23]) to limit single use and tackle premature obsolescence, promote high-quality remanufacturing and recycling, and also establish minimum mandatory green public procurement criteria and targets in sectorial legislation.

In line with the new sustainable products policy initiative, the Commission will present a 'Circular Electronics Initiative' mobilising existing and new instruments and in particular focusing on:

- a new and/or revised Ecodesign Directive ([24]) for electronics and ICT to ensure that devices are designed for energy efficiency and durability, reparability, upgradability, maintenance, reuse and recycling;
- electronics and ICT as a priority sector for implementing the 'right to repair', including a right to update obsolete software;
- improving the collection and treatment of waste electrical and electronic equipment;
- reviewing EU rules on restrictions of hazardous substances in electrical and electronic equipment and providing guidance to improve coherence with relevant legislation, including REACH and Ecodesign.

([19]) Ecodesign requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers – Commission Regulation (EU) 2015/1095. Available at this link.
([20]) Waste electrical and electronic equipment (WEEE) – WEEE Directive 2012/19/EU. Available at this link.
([21]) A new Circular Economy Action Plan for a cleaner and more competitive Europe – COM(2020) 98 final. Available at this link.
([22]) The European Green Deal – COM(2019) 640 final. Available at this link.
([23]) Sustainable Products Policy Initiative. Available at this link.
([24]) Framework for the setting of ecodesign requirements for energy-related products – Directive 2009/125/EC. Available at this link.

In relation to substances of major concern, the EC published the 'Chemicals Strategy for Sustainability' (COM(2020) 667 final) ([25]), which targets a toxic-free environment, where chemicals are produced and used in a sustainable way, avoiding harm to the planet and to current and future generations. Within this strategy, the EC will:

- propose to create a legally binding hazard identification of endocrine disruptors (EDs);
- ensure that EDs are banned in consumer products as soon as they are identified;
- introduce EDs as a category of substances of very high concern (SVHC).

The extent to which the aforementioned initiatives will address the Health Care EEE product group is still unclear.

## 2.4 Analysis and discussion of current criteria

In this section the fitness of the existing EU GPP Health Care EEE criteria will be analysed.

### 2.4.1 Scope and criteria

A decade has passed since the start of the development of the EU GPP criteria for Health Care EEE. The highly technological nature of this product group would suggest a probable need for a substantial scope and criteria revision for this product group. However, further investigation and market data would be necessary to define the revision in more detail.

Moreover, products within the scope have been mainly prioritised based on their energy consumption in the use phase. The relevance of other life cycle aspects and impacts should be further reassessed based on the review of more recent LCA literature.

As mentioned above in Section 2.2, since these EU GPP criteria for Heath Care EEE are the first for this product group, mainly core criteria have been set. Only two comprehensive criteria have been included as award criteria due to a lack of market data at the criteria development stage.

The comprehensive criteria concern medical freezers that contain refrigerants with Global Warming Potential over a specific threshold value and gas consumption for anaesthesia equipment.

Several award criteria are also part of the core criteria and these address: 1) the energy performance criteria of the different energy-using equipment within the scope, and 2) the water efficiency criteria for medical devices that can lead to high water consumption, such as haemodialysis and washer disinfectant equipment.

On the basis of this preliminary analysis, it seems that the revision should principally focus on the current energy and chemicals criteria, in addition to new criteria which are discussed in Section 2.4.1.3.

#### *2.4.1.1 Energy criteria*

The following aspects were considered when setting the energy performance measurement methods for each type of equipment:

- different modes of use (e.g. active mode, ready mode, standby mode, off mode, low-power mode),
- use scenario,
- test conditions.

([25]) Chemicals Strategy for Sustainability – COM(2020) 667 final. Available at this link.

Different modes of use

The definitions of different modes were chosen from Commission Regulation 1275/2008 ([26]) with regard to ecodesign requirements for standby and off mode.

For the following medical equipment:

- ECG (electro-cardio- graphic) equipment (diagnostic),
- endoscopic equipment (camera unit, endoscope, light, air pump),
- HF surgery, diathermy equipment,
- infusion pumps and syringe pumps,
- laser instruments for surgery, continuous lasers,
- medical lighting (surgical lamps),
- patient warming systems (blankets, pads, mattresses),
- equipment with forced air device,
- ventilator, intensive care ventilator (excluding transport ventilator), anaesthesia ventilator (excluding home ventilators),
- X-ray incl. mammography, excl. osteoporosis,

in the 'off mode' are also considered conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to Directive 2004/108/EC. This Directive stopped being in force in April 2016 and has been repealed by Directive 2014/30/EU ([27]). A correction should be made in the EU GPP criteria document.

Use scenario

Regarding this aspect, two different scenarios have been included in the energy performance criteria. A 'customised scenario' stated by the procurer to indicate the expected daily use patterns of the equipment and the 'pre-determined' use scenario which is a recommendation to the procurer based on the average use scenarios of European hospitals. The energy use of the equipment is stated by the tenderer in the different modes. In contrast to the EU GPP Health Care EEE criteria, Portugal has only included the pre-determined scenario in the national GPP strategy for this product group (APA, 2019).

Test conditions

The power consumption of the equipment during each mode should be measured under specific test conditions according to different standards reported in the EU GPP criteria document.

Several standards (around 22) are reported in the document. However, the reference to these standards is not complete as there is no information regarding the year of publication. This affects the accuracy of the citations as the reader will have difficulty assessing which version they refer to.

Most of the standards included in the criteria document have been updated or are in the process of being revised. There are several standard versions available after the publication date of the EU GPP Health Care EEE criteria (e.g. IEC 60601-2-16:2019; ISO 80601-2-12:2020; EN IEC 60601-2-22:2020).

Moreover, there are also standards that have been withdrawn, for instance EN ISO 8185 concerning the test conditions for respiratory gas humidifiers. Therefore the standards referred to in the EU GPP criteria should be updated.

Methods for measuring energy efficiency for medical imaging equipment have been developed by the European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry (COCIR) through a Self-Regulatory Initiative (SRI) ([28]) and incorporated into the EU GPP criteria. The SRI Status Report

([26]) Ecodesign requirements for standby and off mode, and networked standby, electric power consumption of electrical and electronic household and office equipment. Commission Regulation (EC) 1275/2008. Available at this link.

([27]) Harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast) - Directive 2014/30/EU. Available at this link.

([28]) Self-Regulatory Initiative for ecodesign of medical imaging equipment defined by COCIR, which is the European Trade Association representing the medical imaging, radiotherapy, health ICT and electromedical industries. Available at this link.

is published annually and it is reviewed by an independent third party, PriceWaterhouseCoopers (PwC), to ensure that the collection and processing of data provide robust and representative results.

There are several SRI Status Report versions available after the publication of the EU GPP Health Care EEE criteria and the most recent one is related to 2018. In the most recent versions of the COCIR SRI report, a methodology for estimating circularity in the medical imaging sector has been introduced, as well as a project to introduce the management of hazardous chemicals. The latest version of the COCIR SRI report could be considered as a reference for the revision.

The SRI covers the following imaging equipment included in the criteria:

— computer tomography (CT),

— ultrasound equipment, excl. therapeutic,

— magnetic resonance imaging (MRI).

Note that this SRI is not a recognised voluntary agreement under the ecodesign legislation ([29]).

#### *2.4.1.2 Chemical aspects*

Two EU GPP Health Care EEE criteria have been developed regarding the content of hazardous substances in medical devices (see Section 2.2):

— SC1. Chemical management system;

— C6. Information on content of Candidate List Substances of Very High Concern.

They are both informative criteria and refer only to the Candidate List Substances of Very High Concern (SVHC). Criteria with higher levels of ambition are not included.

Although hazardous substances are highly regulated with the current legislation, there is still room for improvement and also to align with more ambitious criteria introduced in other EU GPP criteria. For instance, alignment with the EU GPP criteria for computers could be envisaged on specific aspects, taking into account the differences between the two product groups and the technological feasibility of the product.

The EU GPP criteria for computers, monitors, tablets and smartphones ([30]) include a restricted substance controls criterion. Following this criterion, the tenderer must demonstrate the use of a Restricted Substance Control (RSC) framework along the supply chain and, besides the substances on the Candidate list, the RSC must outline the substances restricted under RoHS and under REACH (Annex XVII). Alignment with this criterion could be considered for the EU GPP criteria for Health Care EEE.

Another step towards more ambitious provisions could be the introduction of additional criteria for restrictions and the phasing out of hazardous substances that are present in Health Care EEE.

Substances of particular concern that are often found in medical devices are commonly used as plastic softeners, in the production of certain plastics (e.g. polycarbonates, epoxy resins) and as flame retardants. Among these there are phthalates, bisphenol A (BPA) and halogenated compounds, which have adverse effects on human health and the environment. For instance, bisphenol A (BPA) is an endocrine disruptor known to be present in incubators for babies, infusion pumps, ventilators and dialysis equipment included in the scope.

By introducing additional criteria on the restriction of substances, the GPP can contribute to a quicker phase-out of hazardous chemicals and encourage manufacturers to develop safer alternatives in addition to those already available ([31])([32])(DEPA, 2014). As a possible reference, the EU GPP criteria for computers contains criteria for the restriction of chlorinated and brominated substances in plastic parts and restriction of substances of very high concern (SVHC). An alignment with these criteria could be considered.

The European Commission asked the Öko Institut together with various partners to assess different types of substances and in particular the restriction of hazardous substances in electrical and electronic equipment ([33]). This assessment started in 2020 and ended in July 2021. Several studies have recently been

([29]) Recognised voluntary agreements under the ecodesign legislation. Available at this link.
([30]) EU GPP criteria for computers, monitors, tablets and smartphones – Commission SWD(2021) 57 final. Available at this link.
([31]) Swedish Environmental Management Council - Substitution list. Available at this link.
([32]) French National Institute for Industrial Environment - Chemical substitution. Available at this link.
([33]) Öko Institut - Study to support the review of the list of restricted substances. Available at this link.

carried out in this context. MedTech Europe has asked RINA to carry out an assessment of the potential impact of the restriction and substitution of hazardous substances used in medical devices, to estimate the time required for substitution (Goodman et al., 2020). These studies should be taken into account at the revision stage.

A risk/benefit analysis on the use of hazardous substances in medical devices and a verification on how to substitute these substances should be carried out at product level and at component/part level. More accurate information on the whole supply chain should be collected. The choice of safer alternatives should be generally evaluated in order to avoid substitution by equally hazardous substances and to ensure that the safety and well-being of patients and medical, technical and maintenance personnel is always a priority.

#### *2.4.1.3 Additional criteria*

Material efficiency / circularity

In the current EU GPP criteria for Health Care EEE there is a lack of requirements regarding circular economy / material efficiency strategies (durability, repair, refurbishment, remanufacturing, recycling and recovery rate). Among the technical specifications, only a criterion regarding product longevity (see TS3 in Section 2.2) was introduced to increase the lifespan of the equipment by longer spare part availability and therefore saving material resources.

COCIR carried out a study on reuse and refurbishment activities to reduce the environmental impact of medical imaging devices. The data collected showed that reuse and refurbishment of parts is one of the most significant elements of contributors to the circular economy in the medical imaging devices sector (COCIR, 2018).

The Global Diagnostic Imaging healthcare IT & Radiation Therapy Trade Association (DITTA) has developed the 'Good Refurbishment Practices' together with COCIR in Europe and other member associations in Japan and the USA ([34]).

In 2016, the standard IEC PAS 63077 on 'Good refurbishment practices for medical imaging equipment' was published. Between 2018 and 2019 it was developed from a Publicity Available Specification (PAS) to an international standard, IEC 63077, and finally to European standard EN IEC 63077:2019. The standard covers several types of equipment: X-ray; X-ray for computed tomography; magnetic resonance; ultrasonic diagnostic equipment; SPECT/CT and others.

In line with the development of this new standard, and with what is set out in the WEEE Directive (2012/19/EU) and in new initiatives such as the Sustainable Products Policy Initiative and the Circular Electronics Initiative (Section 2.3), the inclusion of criteria related to the purchase of refurbished equipment should be considered. It will contribute to aspects of the circular economy that are currently only touched upon by the TS3 Product longevity and warranty criterion.

Another aspect that could be factored into the tendering procedure and therefore introduce in the EU GPP criteria is the leasing of the medical devices. The introduction of a leasing service related criterion could be a viable alternative for saving material resources and help overcome durability, spare parts availability, reparability and upgradeability aspects.

Heat dissipation

During the development of the existing criteria, proposals regarding heat dissipation for Magnetic Resonance and Computed Tomography were discussed but the inclusion was not finalised. Further analysis in this area will be necessary for a possible introduction of this additional criterion.

Digitalisation

Digital solutions are also starting to play a key role in the healthcare sector and some initiatives are under development ([35]). A change to leverage digital technologies would be in line with the EU Digital Strategy ([36]).

The medical devices industry needs to embrace digital transformation in their product development initiatives. It should be evaluated whether the digital transformation will affect the market of the products within the scope and the effect of this transformation in terms of environmental impacts.

([34]) DITTA Good Refurbishments Practice of Medical Imaging Equipment. Available at this link.
([35]) Digital solutions in the healthcare sector. Available at this link.
([36]) EU Digital Strategy. Available at this link.

#### *2.4.1.4 Additional aspects*

The Criteria document has a layout and structure that differs from the European Commission's Staff Working Documents (SWDs) currently used for the EU GPP criteria. Therefore it should be modified to align with the EU GPP criteria format adopted since 2016.

Furthermore, some of the award criteria are presented as 'requirements' and not as 'criteria' as they should be. Indeed, this is the case of the Energy Performance Requirement and Water Efficiency Requirement for different types of equipment, as reported in Section 2.2.

### 2.4.2 Regulatory context and standard references

The EU GPP criteria document refers only to the Medical Devices Directive (93/42/EEC), but, as mentioned in Section 2.3, the new Medical Devices Regulation ((EU) 2017/745) repeals and progressively replaces this Directive. Moreover, the document refers to a regulatory tool relating to electromagnetic compatibility (Directive 2004/108/EC, as mentioned in Section 2.4.1.1) that is no longer in force.

The document refers to some standards that are not valid anymore, as is the case for instance of the one concerning the test conditions for the respiratory gas humidifier (see Section 2.4.11). Additionally, the reference to the standards lack of dates of application, which would improve the accuracy of citation.

Other regulatory initiatives, listed in Section 2.3, could affect the electrical and electronic equipment used in the health care sector in the near future (to be approved between 2021 and 2022).

## 2.5 Results of the assessment of the current EU GPP criteria for Health care EEE

The current EU Green Public Procurement (GPP) criteria for electrical and electronic equipment used in the health care sector (Health Care EEE) provide guidelines and encourage the purchase of Health Care EEE with reduced environmental impacts, focusing on the energy performance aspects of medical equipment, while ensuring that the safety and well-being of patients and medical, technical and maintenance personnel are always a priority.

Section 2 reports on the assessment of the fitness for use of the existing EU GPP criteria for electrical and electronic equipment used in the health care sector. The study was carried out by desk research.

The results of the assessment of the current EU GPP criteria for Health care EEE showed that the **current criteria are not up to date**, mainly for the following reasons:

- Several years have passed since the development of the criteria and it is likely that new technologies have entered the market. For this reason, a scope revision might be needed in terms of product group covered and environmental impact.
- The EU GPP criteria document does not refer to the new Medical Devices Regulation ((EU) 2017/745) which repeals and progressively replaces the Medical Devices Directive (93/42/EEC). Moreover, the criteria refer to regulatory tools and standards that are no longer in place. For this reason, the EU GPP criteria should be updated according to the current regulatory framework and standards.
- The possibility to include new and more ambitious criteria needs to be assessed in line with the new policy areas of focus (lifetime extension, refurbishment; restriction of hazardous substances) introduced by new policy initiatives as the 'Green Deal' and the 'Circular Economy Action Plan'.

# 3 Copying and graphic paper

## 3.1 Introduction to the product group

The current 'EU Green Public Procurement (GPP) criteria for copying and graphic paper' ([37]) were published on the European Commission web site ([38]) in 2008. These criteria define environmentally friendly procurement choices for the purchase of copying and graphic paper.

Section 3 reports on the assessment of the fitness for use of the existing EU GPP criteria for copying and graphic paper.

## 3.2 Background

The current GPP criteria for copying and graphic paper were released in 2008 with the support of the 'background product report' (ICLEI, 2008). The scope of these criteria encompasses unprinted paper for writing, printing and copying purposes (with the grammage up to 170 g/m$^2$) sold in sheets or reels.

The document containing the current EU GPP criteria for copying and graphic paper has a different format to the Staff Working Documents (SWDs) used for this purpose since 2016. After consultation with the Directorate-General for Environment (DG ENV), the SWD format was adopted by the European Commission to improve the structure and clarity of the EU GPP criteria. The structure of the current document is shown below. The EU GPP criteria are addressed under points 3 and 4, and include 'recovered fibres' as recycled fibres ([39]):

1. Scope
2. Key environmental impacts
3. Paper based on recovered fibres – criteria
    a. Core criteria
        i. Normal office use
        ii. Professional use
    b. Comprehensive criteria
        i. Normal office use
        ii. Professional use
    c. Explanatory notes
4. Paper based on sustainable and/or legal virgin fibre – criteria
    a. Core criteria
    b. Comprehensive criteria
    c. Explanatory notes
5. Cost Considerations
6. Relevant EU legislation and information sources

([37]) EU GPP criteria for copying and graphic paper. Available at this link.
([38]) European Union Green Public Procurement (EU GPP) criteria for all available product groups. Available at this link.
([39]) 'Recycled fibres' means fibres diverted from the waste stream during a manufacturing process or generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product. These fibres can no longer be used for their intended purpose. It excludes reutilisation of materials generated in a process and capable of being reclaimed within the same process that generated them (paper machine broke — own produced or purchased) (Annex I to Commission Decision (EU) 2019/70 on EU Ecolabel criteria for graphic paper. Available at this link).

Table 2 reports the information published in GPP National Action Plans (NAP) on March 2021 about the Member States that take into account GPP criteria for copying and graphic paper.

**Table 2.** EU Member States where Green Public Procurement (GPP) criteria for copying and graphic paper are taken into account

| **Countries where the EU GPP criteria are developed nationally** | **Countries where the EU GPP criteria are under development nationally** | **Countries where the EU GPP criteria are recommended** |
|---|---|---|
| Austria, Belgium, Croatia, Cyprus, Czech Republic, Estonia, France, Italy, Lithuania, The Netherlands, Slovakia, Slovenia, Spain, Sweden. | Ireland, Portugal. | Denmark, Finland, Latvia, Malta, Norway. |

Source: National Green Public Procurement Action Plans (policies and guidelines) – March 2021. Available at this link.

## 3.3 Regulatory and strategic context

This chapter broadly presents relevant regulatory and strategic changes that influence the validity and applicability of the current EU GPP criteria for copying and graphic paper. For the purposes of this report, the key legislative changes are bundled into key thematic areas.

General policy changes and Circular Economy Action Plan

Since 2019, the EC has launched several strategies, plans and initiatives, which follow the 'EU Green Deal' communication ([40]), and which broadly affect the 'EU GPP criteria for copying and graphic paper'.

The 'Circular Economy Action Plan' ([41]) foresees in particular measures to make sustainable products the norm in the EU, and states that the EC will propose minimum mandatory EU GPP criteria and targets in sectoral legislation.

The GPP is currently regulated by the 'Public Procurement Directive' ([42]), released in 2014, and the EC's communication 'Public Procurement for a better environment' ([43]) released in 2008. The latter is seen as 'a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured.'

Forestry strategy

The 'New EU Forest Strategy for 2030' ([44]), released on 16 July 2021, defines the priorities of European forest management in the coming years. Among other things, this strategy promotes an optimal use of wood according to the 'cascading principle', which prioritises the reuse and recycling of long-lived wood-based materials, rather than the harvest of virgin wood coming from sustainably managed forests. The 'New EU Forest Strategy for 2030' is also in line with the EC communication 'Stepping up EU Action to Protect and Restore the World's Forests' ([45]), which aims to minimise the risk of deforestation and forest degradation associated with products placed on the EU market. Additionally, the 'New EU Forest Strategy for 2030' states that the EC will develop:

- a definition and adopt guidelines for *closer-to-nature forestry* practices, by Q2 2022;
- the voluntary *closer-to-nature forest* management certification scheme, as an EU quality label, by Q1 2023.

According to the Strategy, *closer-to-nature forestry* is an example of sustainable practices. 'It seeks multifunctional forests by combining biodiversity (even in planted forests), carbon stock preservation and timber-related revenues. Despite not having a universally accepted definition yet, *closer-to-nature forestry* is a concept discussed by private and public organisations, both within the EU and globally.'

([40]) The European Green Deal – COM(2019) 640 final. Available at this link.
([41]) A new Circular Economy Action Plan for a cleaner and more competitive Europe – COM(2020) 98 final. Available at this link.
([42]) Public procurement – Directive 2014/24/EU. Available at this link.
([43]) Public procurement for a better environment. – COM(2008) 400 final. Available at this link.
([44]) New EU Forest Strategy for 2030 – COM(2021) 572 final. Available at this link.
([45]) Stepping up EU Action to Protect and Restore the World's Forests – COM(2019) 352 final. Available at this link.

In line with this regulatory and strategic context, the European Commission proposed a Regulation ([46]) to contrast EU-driven deforestation and forest degradation, at global scale. Among other things, this proposal is based on the fitness check ([47]) of two Regulations currently on force:

- the 'EU Timber Regulation' ([48]), which obliges operators who place timber and timber products on the EU market to exert due diligence to minimise the risk of importing illegally harvested timber;
- the 'EU Forest Law Enforcement, Governance and Trade (FLEGT) Regulation ([49]), which sets a license scheme for imports of timber into the European Community.

Pulp and paper making process

Within the 'Industrial Emissions Directive' ([50]), Best Available Techniques were established for the production of pulp, paper and board ([51]).

The pulp and paper manufacturing sector is covered by the legislative framework of the EU Emission Trading System (ETS), which is regulated by the 'ETS Directive' ([52]). The Directive was revised for phase 4 in 2018 to meet an emissions reduction ambition of -40% relative to the 1990 level. However, in September 2020, the EC presented an impact-assessed plan ([53]) to reach a greenhouse gas emission reduction of 55% by 2030.

The use of hazardous substances and mixtures that might be present in final products is currently regulated under the REACH ([54]) and the CLP ([55]) Regulations, while the use of biocidal products falls under the scope of the 'Biocidal Products Regulation' (Regulation (EU) 528/2012 ([56])).

Ecolabelling schemes

Lately, the paper-related criteria of the most relevant European ISO 14024 Type I ecolabels were revised, as follows:

- European Union Ecolabel criteria for graphic paper, tissue paper and tissue products ([57]), published in 2019;
- Nordic Ecolabel criteria for copy and printing paper ([58]), published in 2020;
- Blue Angel Ecolabel criteria for:
  - printing paper/publication paper (100% recycling) ([59]), published in 2020;
  - recycled paper ([60]), published in 2018.

([46]) Proposal on making available on the Union market as well as export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010 – COM(2021) 706 final. Available at this link.
([47]) Fitness check of the EU Timber Regulation – SWD(2021) 328 final. Available at this link.
([48]) Obligations of operators who place timber and timber products on the market – Regulation (EU) 995/2010. Available at this link.
([49]) FLEGT licensing scheme for imports of timber into the European Community – Council Regulation (EC) 2173/2005. Available at this link.
([50]) Industrial emission (integrated pollution prevention and control) – Directive 2010/75/EU. Available at this link.
([51]) Best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the production of pulp, paper and board - Commission Implementing Decision 2014/687/EU. Available at this link.
([52]) System for greenhouse gas emission allowance trading within the Union – Directive 2003/87/EC. Available at this link.
([53]) Stepping up Europe's 2030 climate ambition - Investing in a climate-neutral future for the benefit of our people - COM(2020) 562 final. Available at this link.
([54]) Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) – Regulation (EC) 1907/2006. Available at this link.
([55]) Classification, labelling and packaging (CPL) of substances and mixtures – Regulation (EC) 1272/2008. Available at this link.
([56]) Making available on the market and use of biocidal products – Regulation (EU) 528/2012. Available at this link.
([57]) EU Ecolabel criteria for graphic paper, tissue paper and tissue products – Commission Decision (EU) 2019/70. Available at this link.
([58]) Nordic Ecolabel criteria for copy and printing paper (version 5.0). Available at this link.
([59]) Blue Angel Ecolabel for graphic paper and cardboard made from 100% recovered paper (recycled paper and cardboard) (version 4). Available at this link.
([60]) Blue Angel Ecolabel for recycled paper (version 2). Available at this link.

## 3.4 Analysis and discussion of current criteria

This section analyses aspects of technical validity of the current 'EU GPP criteria for copying and graphic paper'.

### 3.4.1 Product group name and scope

This product group is identified as 'copying and graphic paper', with the scope encompassing unprinted paper for writing, printing and copying purposes (up to 170 g/m$^2$) sold in sheets or reels. Finished converted paper products such as writing pads, drawing books, calendars, manuals, etc. are not included in the scope.

The last revision of the 'EU Ecolabel criteria for graphic paper, tissue paper and tissue products' (Kowalska et al., 2019) revealed that:

- the wording 'graphic paper' better accommodates industry practice and nomenclature used in the relevant standards;
- the grammage upper limit was misleading and not related to industry practice; defining the scope based on the intended product use (i.e. graphic purposes) was welcomed by the majority of stakeholders;
- there is no technical justification to set the grammage limit for the given type of paper, i.e. graphic board with a grammage higher than 170 g/m$^2$ might be used for printing, copying and writing purposes;
- neither the Nordic Ecolabel nor the Blue Angel Ecolabel propose weight-based restrictions for copying and graphic paper – although it should be noted that the scopes of these other labels are not always comparable.

### 3.4.2 Approach to the criteria

As shown in Section 3.0, the 2008 EU GPP criteria are organised depending on whether:

(a) the paper is based on recovered (recycled) fibre or virgin fibre;

(b) the criteria is at core or comprehensive level;

(c) the paper is used for normal office purposes or professional purposes.

The current distinction between recycled and virgin fibres (a) is not in line with the recently voted Commission Decisions for wood-based product groups, i.e. Commission Decision (EU) 2016/1332 ([61]) and Commission Decision (EU) 2019/70, which define EU Ecolabel criteria for furniture and graphic paper, respectively. These Commission Decisions and the current Nordic Ecolabel criteria recognise the equivalence between recycled and sustainable forest management (SFM) certified fibres.

During the development of the 'EU Ecolabel criteria for graphic paper, tissue paper and tissue products', the possibility to establish a minimum requirement for the recycled fibre content (i.e. 70%) in the product was broadly discussed ([62]). The negative reaction of stakeholders to the proposal to set a minimum recycled fibre content was mainly linked to differences in the availability of recovered paper across Europe. Indeed, the Nordic countries in the EU are major producers of wood material in the EU due to vast forest reserves. Despite reaching high recycling rates, these countries are not highly populated and much of the paper production is exported. For this reason, the Nordic countries would be unable to meet the proposed threshold without importing recovered paper.

The Confederation of European Paper Industry (CEPI) reports that the European paper recycling rate is already relatively high (74%) (CEPI, 2021). This leads to a 'representative fibre' undergoing a high number of recycling cycles during its lifetime. According to feedback collected from stakeholders during the development of the 'EUEL criteria for graphic paper', there is a continual need for fresh virgin fibres to enter the paper cycle. Some industry stakeholders underlined a perceived reduction in the overall quality of the recovered fibres, which makes the production of good quality paper products with high recycled fibres content in Europe more challenging.

([61]) Ecological criteria for the award of the EU Ecolabel for furniture – Commission Decision (EU) 2016/1332. Available at this link.
([62]) For more information, please see documents related to the paper products project, which are available at this link.

Another challenge to mandatory minimum recycled contents is the fact that the consumption rates of graphic paper, which is the most suitable source of recovered fibre, are significantly declining across Europe. Both carton board and tissue producers use large amounts of old newspapers as input material. China is currently the biggest destination for European recycled paper, which in general can be considered to later return to Europe as packaging of products imported from China. The use of brown fibre (packaging) is considered to be of limited suitability to manufacture graphic paper and so can only be recirculated into the packaging paper stream. Here, it is important to stress that the European recovery rate of 74% provided by CEPI refers to the recycling rate in general without further distinction between paper product categories. All in all, even considering that some manufacturers have products with 100% recycled fibre content, the market availability was assessed as not always sufficient across Europe to require a mandatory minimum recycled content under the EU Ecolabel.

For verification purposes, the provision on SFM placed in the 'EU Ecolabel criteria for graphic paper, tissue paper and tissue products' is based on the certification and labelling requirements of SFM schemes that are the most representative for the market, such as Forestry Stewardship Council (FSC), and Programme for the Endorsement of Forest Certification (PEFC).

There are three FSC labels that can potentially be applied to paper products (FSC, 2017):

- *FSC 100%*, where 100% of all fibres used are from forests covered by FSC SFM certificates;
- *FSC Mix*, within the percentage system, where at least 70% of fibres are from forests covered by FSC SFM certificates and/or recycled material and the remaining fibres are from acceptable 'controlled sources';
- *FSC Recycled*, within the percentage system, where 100% of the content is from recycled fibres.

It should be noted that companies could obtain the *FSC Mix* and *FSC Recycled* labels by using both the percentage and the credit systems. The former was specified in the list above, the latter is the FSC 'control system that allows a proportion of outputs of a product group to be sold with a credit claim corresponding to the quantity of claim-contributing inputs and the applicable conversion factor(s)'.

There are two types of PEFC label that can be applied to paper products (PEFC, 2020):

- *PEFC certified*, where at least 70% of the fibre content is from forests covered by PEFC SFM certificates and/or recycled material (less than 100%) and any remaining fibre content is from acceptable 'controlled sources';
- *PEFC Recycled*, where 100% of the content is from recycled fibres.

The distinction between core and comprehensive criteria (b) is defined by COM(2008) 400 final on 'Public procurement for better environment'. However, the distinction between office and professional purposes (c) is not defined in the document or self-explanatory. This unclear distinction leads to confusion for the criteria application.

### 3.4.3 Fibre aspects

The current requirements regarding type of fibres are reported below in blue italic font. The list follows the structure of the current EU GPP criteria as reported in Section 3.0:

3. Paper based on recovered (recycled) fibres – criteria
    a. Core criteria
        i. Normal office use → *100% of the fibres are recycled*
        ii. Professional use → *at least 75% of the fibres are recycled*
    b. Comprehensive criteria
        i. Normal office use → *100% of the fibres are recycled AND at least 65% of them are from post-consumer sources*
        ii. Professional use → *at least 75% of fibres are recycled AND at least 80% of them are from post-consumer sources*
4. Paper based on sustainable and/or legal virgin fibre – criteria
    a. Core criteria → *100% of virgin fibres are from legal sources*
    b. Comprehensive criteria → *100% of virgin fibres are from legal sources*

The unsuitable distinction between recycled fibres and virgin fibres was already discussed in Section 3.4.2. Once this distinction is overcome, the availability of paper for recycling and certified virgin material must be considered as well. No mandatory minimum requirement for recycled fibre content should be set because this action would favour some regions (i.e. paper producers in areas with large population centres and thus locally available paper for recycling) over others (Kowalska et al., 2019). Furthermore, the criteria should not distinguish between pre-consumer and post-consumer recycled fibres because mill broke, which is a pre-consumer paper waste generated at the production site, is not included in any statistics, and is anyway directly recirculated into the paper production process. Additionally, the 'EU Ecolabel criteria for graphic paper' and the two most used certification schemes (FSC and PEFC) do not make this distinction.

### 3.4.4 Verification of legal virgin fibres

The currently valid EU GPP Criterion 4.1 (Sustainable and/or legal virgin fibre option - Core GPP criteria) specifies that: 'Certificates of chain of custody [CoC] *for the virgin fibre certified as FSC, PEFC or any other sustainable forest management standard where the percentage of certified wood is indicated, will be accepted as proof of compliance for that percentage. The legal origin of wood can also be demonstrated with a tracing system being in place. These voluntary systems may be 3rd party certified, often as part of ISO 9001:2008 and/or ISO 14001:2004 or EMAS management system. If wood stems from a country that has signed a Voluntary Partnership Agreement (VPA) with the EU, the FLEGT license may serve as proof of legality.*'

Article 3 of the EU Timber Regulation defines as 'legally harvested timber' imported into the EU the following two categories:

- Timber embedded in timber products listed in Annexes II and III to the FLEGT Regulation ([63]), which originate in partner countries listed in Annex I to the FLEGT Regulation, and which comply with the FLEGT Regulation and its implementing provisions.
- Timber of species listed in Annex A, B or C to the Regulation on the 'protection of species of wild fauna and flora by regulating trade therein' ([64]) and which complies with that Regulation and its implementing provisions.

Only the Republic of Indonesia is currently listed in Annex I to the FLEGT Regulation, because it is the only country where licensing authorities were established. Seven other VPAs were signed, but only that with the Socialist Republic of Vietnam has already entered into force ([65]), whereas the date of entry into force of the remaining six VPAs is still unknown. This is the case of the VPAs signed with the Republic of Ghana ([66]), the Republic of the Congo ([67]), the Republic of Cameroon ([68]), the Central African Republic ([69]) and the Republic of Liberia ([70]).

According to the FLEGT Regulation, the FLEGT licensing scheme shall apply only to imports from partner countries, and any other imports from partner countries that are not covered by a FLEGT licence shall be prohibited. As mentioned in Section 3.3, the EU Timber Regulation and the FLEGT Regulation are currently undergoing a fitness check.

Verification via ISO 9001:2008 and/or ISO 14001:2004 or the EMAS management system is nowadays considered not sufficient because sustainable forestry is not the subject matter of these schemes.

Current SFM third-party certifications were analysed in detail in Section 3.4.2. The 'Study on certification and verification schemes in the forest sector and for wood-based products' clearly defines traceability and CoC, stating that they are not synonymous. 'The CoC system includes measures that define the responsibility for

([63]) FLEGT licensing scheme for imports of timber into the European Community – Council Regulation (EC) 2173/2005. Available at this link.
([64]) Protection of species of wild fauna and flora by regulating trade therein – Regulation (EC) 338/97. Available at this link.
([65]) Voluntary Partnership Agreement between the European Union and the Socialist Republic of Viet Nam on forest law enforcement, governance and trade. Available at this link.
([66]) Voluntary Partnership Agreement between the European Community and the Republic of Ghana on forest law enforcement, governance and trade in timber products into the Community. Available at this link.
([67]) Voluntary Partnership Agreement between the European Union and the Republic of the Congo on forest law enforcement, governance and trade in timber and derived products to the European Union (FLEGT). Available at this link.
([68]) Voluntary Partnership Agreement between the European Union and the Republic of Cameroon on forest law enforcement, governance and trade in timber and derived products to the European Union (FLEGT). Available at this link.
([69]) Voluntary Partnership Agreement between the European Union and the Central African Republic on forest law enforcement, governance and trade in timber and derived products to the European Union (FLEGT). Available at this link.
([70]) Voluntary Partnership Agreement between the European Union and the Republic of Liberia on forest law enforcement, governance and trade in timber products to the European Union. Available at this link.

the custody of materials and products when these are transferred from one organisation to another within the relevant supply chain. Its purpose is to ensure that specified characteristics (e.g. that the product is certified) are indeed those delivered in the output. Traceability, on the other hand, is [simply] the ability to trace the history or location of a product. It delivers the ability to follow the movement of a product and its components through specified stages of production, processing, and distribution.' (EC, 2021) Therefore, certification that the timber is legally sourced is part of the CoC, but should not be confused with it.

Last but not least, under the current EU GPP criterion, there is no minimum requirement on fibres coming from SFM, which is considered a best practice across different ecolabelling schemes (i.e. EU Ecolabel or Nordic Swan). The current EU Ecolabel horizontal criterion that addresses forestry materials sets a threshold of 70% SFM fibres or recycled certified fibres, or a mix of both.

All in all, the GPP criterion and its verification do not represent best practice and should be rephrased.

### 3.4.5 Chemical aspects

The current requirements on chemical content are reported in blue italic font in the list below, which follows the document structure as reported in Section 3.0:

3. Paper based on recovered (recycled) fibres – criteria
    a. Core criteria → *Elementary Chlorine Free (ECF), but Totally Chlorine Free (TCF) is also accepted*
    b. Comprehensive criteria → *Must comply with EU Ecolabel criteria (invalid link given)*
4. Paper based on sustainable and/or legal virgin fibre – criteria
    a. Core criteria → *at least Elementary Chlorine Free (ECF)*
    b. Comprehensive criteria → *at least Elementary Chlorine Free (ECF). Totally Chlorine Free (TCF) will also be accepted*

The requirements on the chemical content are not suitable because for recycled fibres they send the reader to an invalid webpage, which used to lead to old EU ecolabel criteria. The technical aspect of the requirements remains valid.

### 3.4.6 References and regulatory and strategic context

The EU GPP criteria document refers to criteria of the EU Ecolabel, Nordic Ecolabel and Blue Angel Ecolabel whose links to the corresponding webpages are currently invalid. Additionally, the document refers to regulatory tools for biocidal products and dangerous substances that are no longer in force ([71]).

The regulatory and strategic context suggests an update of the GPP criteria for copying and graphic paper. Among the many regulatory tools listed in Section 3.5.3, those which affect, or most likely would affect, the current criteria are reported in Table 3 along with the date of their release.

**Table 3.** Most relevant policies affecting, or most likely to affect, the EU Green Public Procurement (GPP) criteria for copying and graphic paper

| **Regulatory tool** | **Status** | **Expected disclosure** |
|---|---|---|
| New EU Forest Strategy for 2030 COM(2021) 572 final | Publicly available | Already available |
| FLEGT(*) Regulation (EC) 2173/2005 | In force | Already available |
| Timber Regulation (EU) 995/2010 | In force | Already available |
| Commission Decision (EU) 2019/70 of 11 January 2019 establishing the EU Ecolabel criteria for graphic paper and the EU Ecolabel criteria for tissue paper and tissue products | In force | Already available |
| Regulation on deforestation | Proposal adopted by the European Commission (COM(2021) 706 final) | Depending on the work of the European Parliament and the Council |

(*) FLEGT stands for Forest Law Enforcement, Governance and Trade.

Source: JRC analysis

([71]) The second phase of the 10-year work programme referred to in Article 16(2) of Directive 98/8/EC of the European Parliament and of the Council concerning the placing of biocidal products on the market – Commission Regulation (EC) No 2032/2003. Available at this link.

## 3.5 Results of the assessment of the current EU GPP criteria for copying and graphic paper

The current EU Green Public Procurement (GPP) criteria for copying and graphic paper define environmentally friendly procurement choices for the purchase of unprinted paper for writing, printing and copying purposes (up to 170 g/m$^2$) sold in sheets or reels.

Section 3 reports the assessment of the fitness for use of the existing GPP criteria for copying and graphic paper to assess their suitability and relevance. The study was carried out by desk research.

The results of the assessment of the current EU GPP criteria for copying and graphic paper showed that the **current criteria are not up to date**, mainly for the following reasons:

- The scope is not in line with industry practices.
- The definition of criteria based on source of fibres (recycled vs virgin) is not in line with current fibre labelling rules.
- The 'verification of legal virgin fibres' is not in line with the current practice which is simply based on the FLEGT licence and compliance with the Regulation on the 'protection of species of wild fauna and flora by regulating trade therein'. Chain of Custody, provided by dedicated Sustainable Forest Management third parties, ensures that product characteristics are those delivered in the output of the supply chain.
- The definition of criteria based on paper purpose (normal vs professional) is misleading for the application of the criteria.

# 4 Waste water infrastructure

## 4.1 Introduction to the product group

The current 'EU Green Public Procurement (GPP) criteria for waste water infrastructure' (EC, 2013) were published on the European Commission website ([72]) in 2013. These criteria provide recommendations to build and operate waste water infrastructures in an environmentally friendly manner.

Section 4 reports on the assessment of the fitness for use of the existing EU GPP criteria for waste water infrastructure.

## 4.2 Background

The 'EU GPP criteria for waste water infrastructure' were commissioned by the European Commission's Directorate-General for Regional and Urban Policy (DG REGIO). These GPP criteria are not published as a Staff Working Document (SWD) used for this purpose since 2016. After consultation with Directorate-General for Environment (DG ENV), the SWD format was adopted by the European Commission to improve the structure and clarity of the EU GPP criteria.

The accompanying Technical Background Report (Landabaso and Fichter, 2013) provides full details on the reasons for selecting these criteria and references for further information.

The criteria document is structured in the following way:

- The first Section gives an introduction to the purpose and general idea of using the EU GPP criteria for waste water infrastructure projects.
- The second Section briefly describes the type of waste water infrastructure that is considered and included in the EU GPP criteria.
- The third Section provides an overview of the key environmental impacts related to waste water infrastructure projects.
- The fourth Section outlines the different phases in developing waste water infrastructure projects and describes the EU GPP related activities in the different phases, including a 'decision tree' and examples of an evaluation model that can be used in connection with the tendering of a waste water infrastructure project.
- The fifth Section sets out the recommended EU GPP criteria.
- The sixth Section describes how Life Cycle Costing (LCC) can be used in the EU GPP.
- The seventh Section provides relevant European legislation and information sources.

In terms of scope, the 'EU GPP criteria for waste water infrastructure' address the planning, design, construction, operation and decommissioning of sewerage networks, and waste water and sludge treatment plants.

According to the most recent update from GPP National Action Plans (NAP) in March 2021, only a few Member States have introduced or are considering the introduction of GPP criteria for waste water infrastructure for greening their public procurement. Greece, Latvia and Portugal recommend them, The Netherlands already developed them, while the Czech Republic and Portugal have criteria under development ([73]).

([72]) European Union Green Public Procurement (EU GPP) criteria for all available product groups. Available at this link.
([73]) National Green Public Procurement Action Plans (policies and guidelines) – March 2021. Available at this link.

## 4.3 Regulatory and strategic context

The 'EU Urban Waste Water Treatment Directive' (UWWTD) (91/271/EEC) ([74]) is the legal basis for the way in which all treatment plants in the EU must deliver primary, secondary and tertiary treatments.

The UWWTD is under revision and a recent evaluation (Commission SWD (2019) 700 final) ([75]) identified certain shortcomings and new societal needs that must be addressed. The Commission has planned the adoption of a revised directive on waste water treatment for the first quarter 2022 ([76]). However, based on an internal exchange with colleagues in DG ENV, the revision process could potentially be extended up to 2025.

As highlighted in Commission SWD(2019) 700 final, storm water overflows are not sufficiently addressed and are referred to only in a footnote of the UWWTD. The Court of Justice of the European Union has pointed out the need to develop guidance in this area. Urban run-off, which is only covered by the UWWTD in connection with combined sewage systems, is an increasingly important source of heavy metals, plastics and microplastics. The load of these pollutants to the waste water facilities increases during the heavy precipitations, which are becoming more frequent with the changing climate. Moreover, the increased soil sealing due to urban area expansions is also leading to higher storm-water flows to sewerage networks, even without changings in frequency and intensity of rainfalls.

Commission SWD(2019) 700 final also highlighted that, regarding circular economy potential, the UWWTD contains limited provisions on waste water and sludge reuse or recovery of valuable components. Moreover, according to the Commission assessment (SWD(2019) 700 final), the UWWTD requirements in this field have never been strictly enforced, partly due to the lack of strong harmonised standards at EU level and the potential risks to human health.

According to Commission SWD(2019) 700 final, the scientific community, policy makers and the general public see the growing evidence of contaminants of emerging concern, including pharmaceuticals and microplastics in water bodies as an increasingly important issue. The need for action on pharmaceuticals and microplastics was also noted in the Commission's 2019 Strategic approach to pharmaceuticals in the environment and its 2018 Plastics strategy.

Policy initiatives such as the 'New Circular Economy Action Plan' ([77]) and the 'zero pollution strategy' ([78]) provide relevant inputs for the revision of the UWWTD and the 'Sewage Sludge Directive' (SSD) (86/278/EEC) ([79]). The former is under revision, the latter is under evaluation to comply with these EU strategies.

Within this new EU framework, Regulation (EU) 2020/741 ([80]) already sets minimum requirements for water reuse for agricultural irrigation. The new rules will apply from 26 June 2023 and are expected to stimulate and facilitate water reuse in the EU.

The Regulation sets out:

- harmonised minimum water quality requirements for the safe reuse of treated urban waste waters in agricultural irrigation;
- harmonised minimum monitoring requirements, notably the frequency of monitoring for each quality parameter, and validation monitoring requirements;
- risk management provisions to assess and address potential additional health risks and possible environmental risks;
- permitting requirements;
- provisions on transparency, whereby key information about any water reuse project is made available to the public.

([74]) Urban waste-water treatment – Council Directive 91/271/EEC. Available at this link.
([75]) Evaluation of the Council Directive 91/271/EEC of 21 May 1991, concerning urban waste-water treatment – Commission SWD (2019) 700 final. Available at this link.
([76]) Water pollution – EU rules on urban wastewater treatment (update). Available at this link.
([77]) A new Circular Economy Action Plan for a cleaner and more competitive Europe – COM(2020) 98 final. Available at this link.
([78]) Pathway to a Healthy Planet for All. EU Action Plan: Towards Zero Pollution for Air, Water and Soil – COM(2021) 400 final. Available at this link.
([79]) Protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture – Council Directive 86/278/EEC. Available at this link.
([80]) Minimum requirements for water reuse – Regulation (EU) 2020/741. Available at this link.

This new regulation will create incentives for the reuse of water from waste water treatment plants (WWTPs).

Sludge reuse in agriculture is by contrast governed by the SSD, but over the past decades Member States have either set stricter requirements than those imposed by the Directive or have simply banned sludge use in agriculture due to the need for further investigations on the matter.

A 2014 evaluation (Lyons et al., 2014) found that:

- the Directive has achieved its initial objectives by increasing the amount of sludge used in agriculture and by reducing environmental harm;
- there were several areas where the SSD did not fully match the needs and realities of the current situation.

Therefore, a study was launched in 2020 to build on and complement previous evaluation results. The results of the evaluation, expected in the last quarter of 2022, will inform the Commission's decision on the need to progress with an impact assessment for a proposal to revise the SSD, as outlined in the New Circular Economy Action Plan.

The best available techniques reference document (BREF) on waste incineration ([81]) sets emission requirements for sewage sludge incineration.

The EU Taxonomy Delegated Act ([82]) establishes the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation. Additionally, it establishes criteria for determining whether that economic activity causes no significant harm to any of the other environmental objectives. This Delegated Act introduces technical screening criteria for construction, extension and operation of waste water collection and treatment, alongside with renewals of these infrastructures.

The current and upcoming policy framework has an impact on the EU GPP criteria for waste water infrastructure, developed in a different EU policy context, where the legislation almost only focused on the performance of end-of-pipe treatments. In this context, the EU GPP could represent not only an opportunity to go beyond minimum environmental requirements, but also an opportunity for a 'transitional' voluntary application of measures that are reasonably expected to be introduced at mandatory level in EU legislation, in particular by the UWWTD revision.

Since WWTPs are associated with offices and other buildings housing the water treatment process units, it is also important to highlight the possible links and overlaps with the 'EU GPP criteria for office building design, construction and management', currently under revision.

## 4.4 Analysis and discussion of current criteria

### 4.4.1 General remarks

The current EU GPP criteria target the following key environmental impacts during the operation of urban waste water treatment:

— energy consumption especially in the operation phase, which contributes to greenhouse gas emissions;

— emission of nutrients with the treated waste water;

— emission of pathogens and/or hazardous substances with the treated waste water;

— emissions from sludge incineration.

However, the Commission, the European Environmental Agency (EEA) and the scientific community in general have highlighted the role of the WWTPs also regarding the following environmental issues:

— climate change mitigation and adaptation;

— circularity of resources, including water and nutrients;

— contaminants of emerging concern including microplastics and pharmaceutical contaminants.

([81]) Best available techniques (BAT) for waste incineration. Commission Implementing Decision (EU) 2019/2010. Available at this link.

([82]) Technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives – Commission Delegated Regulation (EU) .../... Available at this link.

Turning WWTPs into efficient renewable energy generators can contribute to climate change mitigation (Loderer and Hananel, 2018). In 2019, the Interreg project REEF 2W recommended extending the EU GPP criteria for WWTPs to promote energy-neutral or energy-positive plants as well as energy efficiency ([83]). Regarding climate change adaptation, WWTPs can have an important role in storm water management (EEA, 2019).

Regarding circular economy potential, WWTPs have important potential in terms of recovery of nutrients, and reuse of water and sludge, especially phosphorus ([84]).

As reported in a recent EEA Briefing (EEA, 2019), research has shown that many of the chemicals in waste waters now arise from use in homes and leaching from products, or are directly added in the case of cleaning products and excreted pharmaceuticals. Concern is growing over the presence of mixtures of chemicals in the environment — the 'cocktail effect' — that may be impacting aquatic life (EEA, 2019).

An example of a possible new concern is antimicrobial resistance ([85]), which arises from the use of antimicrobials, such as antibiotics, in human and veterinary medicine. Use and excretion of antimicrobial agents has resulted in the evolution of resistant bacteria, viruses and microbes, which can cause disease and are now resisting medicinal treatment.

Also, microplastics have aroused increasing concern as they pose threats to aquatic species as well as human beings. They not only contribute to accumulation of plastics in the environment, but due to absorption they can also contribute to the spread of micropollutants in the environment. Studies indicated that WWTPs play an important role in releasing microplastics to the environment. Therefore, effective detection of these microplastics and understanding their occurrence and fate in WWTPs are of great importance for microplastics control (Jing et al., 2019).

Future developments could include sustainable urban drainage systems (or nature-based solutions) for the adaptation to extreme rainfall events, because they facilitate the correct functioning of the waste water processes.

A comparison between the scope of the current EU GPP criteria and possible new areas of focus is summarised in Table 4.

**Table 4.** Comparison between existing areas under scope and new possible areas of focus of the EU Green Public Procurement (GPP) criteria for waste water infrastructure

| **Areas of focus of the EU GPP criteria** | **New possible areas of focus** |
|---|---|
| 1. Energy Consumption especially in the operation phase which contributes to greenhouse gas emissions<br>2. Emission of nutrients with the treated waste water<br>3. Emission of pathogens and/or hazardous substances in the treated waste water<br>4. Emission from sludge incineration<br>5. Water consumption/water reuse | 1. UWWTD (*) as energy producers<br>2. Storm water management<br>3. Contaminants of emerging concern. In particular:<br>o Pharmaceutical ([86])<br>o Microplastics<br>4. Circular economy integration:<br>o Water and sludge reuse<br>o Nutrients recovery |

(*) UWWTD stands for Urban Waste Water Directive.

Source: JRC analysis

([83]) The energy potential of the wastewater sector: the REEF 2W approach, Brussels, 6 June 2019. Available at this link.
([84]) EU Region Week 2020: Recovered phosphorus from municipal wastewater. Available at this link.
([85]) World Health Organization – Antimicrobial resistance. Available at this link.
([86]) The current criteria have only a limited focus on a couple of pharmaceutical substances to be monitored.

Examples of solutions implemented in some Member States are described in Table 5 based on the case studies from the EEA Briefing 'Urban waste water treatment for 21st century challenges'.

**Table 5.** Examples of new waste water treatment challenges and solutions implemented by different EU Member States

| The challenge | Solutions implemented by countries |
|---|---|
| Storm water management: adapting to climate change | WWTPs in Malmö, Sweden, discharge to coastal areas. An open storm water system designed to accommodate a 15-year rainfall event includes 6 km of canals and water channels, 10 retention ponds, 30 green roofs and a botanical roof garden on an old, industrial roof. Rainfall is collected in natural ditches and reservoirs before being directed into a conventional sewer system. The system is integrated within green spaces that can be temporarily flooded to help manage water by slowing its entry into the conventional storm water system. This system avoids energy use by diverting storm water away from collection systems and waste water treatment. |
| Improving resource and energy efficiency | In the Netherlands, the Amersfoort urban WWTP (315 000 p.e.(*)) receives domestic and light industrial effluent. The treatment process comprises physical treatment, and carbon, nitrogen and phosphorus removal. The final effluent is discharged to the River Eem. In 2016, Amersfoort was converted into a regional sludge processing hub for several WWTPs in the area, supported by the EU LIFE programme (with EUR 10.5 million). It uses innovative technologies to recover phosphorus and nitrogen from sludge for commercial nutrient use, producing a fertiliser as well as biogas. It is 100% energy self-sufficient and exports energy to power 600 city dwellings. |

(*) p.e. stands for people equivalent.

Source: JRC analysis

In terms of waste water treatment efficiency, the current EU GPP criteria mainly refer to the thresholds set in the UWWTD.

According to the UWWTD evaluation (Commission SWD(2019) 700 final) for Biochemical Oxygen Demand (BOD), based on local conditions, a number of Member States have set stricter threshold values compared to the UWWTD requirements (DE, CZ, SE, DK, IE, UK). As regards the nutrients, the United Kingdom and a number of Member States have also set stricter thresholds based on local conditions for N (SE, AT, DK, BE, FI, IE) and the United Kingdom and some Member States have also set substantially stricter standards for P (FI, SE, IE. It was found that lower concentrations seem to be achievable at acceptable costs. Overall, the threshold levels for BOD, N and P are still considered to be accurate to a large extent or to some extent. No clear alternative values were suggested for BOD, N and P. Some stakeholders suggested that Chemical Oxygen Demand (COD) should be replaced by Total Organic Carbon (TOC); however, the UWWTD evaluation does not provide any justification on this matter.

### 4.4.2 Verification

In terms of verification, in the current version of the criteria there is no reference to standardised testing methodologies. Verification procedures are mainly based on tenderer self-declarations without the requirement for third-party verification. In support of the verification, the applicability of ecolabels and certifications should be further considered as acceptable proof. However there is a current lack of ecolabelling schemes applicable to waste water treatment In this context, a revision process could explore the possibility of using the 'EU Environmental Technology Verification (ETV) Programme' ([87]) as a way of verifying the performance of innovative water treatment technologies.

The ETV is a new tool to help innovative environmental technologies reach the market. Claims about the performance of innovative environmental technologies can be verified by qualified third parties called 'Verification Bodies'. The 'Statement of Verification' delivered at the end of the ETV process can be used as evidence that the claims made about the innovation are both credible and scientifically sound. With proof of

([87]) EU Environmental Technology Verification. Available at this link.

performance credibly assured, innovations can expect an easier market access and/or a larger market share and the technological risk is reduced for technology purchasers.

In the area of water treatment and monitoring there is a list of technologies (unfortunately still not very extensive) that have been verified under the ETV Programme. For each technology, a proof of verification document 'Statement of Verification' is available on the ETV website. This is a short document that includes a brief description of the technology verified, the verified performance parameters, a summary of the procedures followed by the Verification Body and any other information to understand and use the performance claim. Although with variations in formatting, the cover page must display the main elements concerning the verified technology.

### 4.4.3 References and regulatory and strategic context

The regulatory and strategic context suggests an update of the GPP criteria for waste water infrastructure. Among the many regulatory tools listed in Section 4.3, those which should most affect the current criteria are reported in Table 6 alongside with the timing of their release.

**Table 6.** Most relevant policies affecting the EU Green Public Procurement (GPP) criteria for waste water infrastructure

| **Regulatory tool** | **Status** | **Expected disclosure** |
|---|---|---|
| Regulation (EU) 2020/741<br>about minimum requirements for water reuse for agricultural irrigation | In force | Already available |
| Urban Waste Water Treatment Directive (UWWTD) (91/271/EEC) | Under revision | By 2025 |
| Sewage Sludge Directive (SSD)<br>(86/278/EEC)<br>(Regulation (EU) 995/2010) | Under evaluation | By end of 2022 |
| EU Taxonomy - COMMISSION DELEGATED REGULATION (EU) .../... supplementing Regulation (EU) 2020/852 | Already available but not in force until it is published in the Official Journal) | Already available |

Source: JRC analysis

## 4.5 Results of the assessment of the current EU GPP criteria for waste water infrastructure

The current EU Green Public Procurement (GPP) criteria for waste water infrastructure provide recommendations to build and operate waste water infrastructures in an environmentally friendly manner.

Section 4 reports on the assessment of the fitness for use of the existing EU GPP criteria for waste water infrastructure. The study was carried out by desk research.

Although the new Urban Waste Water Treatment Directive and new Sewage Sludge Directive will not be available in the short term (see Table 6), the results of the assessment of the current EU GPP criteria for waste water infrastructure showed that the **current criteria are not up to date**, mainly because:

- criteria need to be updated according to new policy developments;
- the scope of the criteria does not cover climate change mitigation and adaptation objectives;
- criteria about emerging pollutants and microplastics should be considered;
- criteria on circularity aspects should be set, e.g. recovery of nutrients such as P and N as well as water reuse;
- some thresholds in terms of water treatment efficiency could need a revision due to the higher ambition level already set by some Member States;
- the verification process lacks references.

# 5 Water-based heaters

## 5.1 Introduction to the product group

The current EU Green Public Procurement (GPP) criteria for water-based heaters ([88]) were published on the European Commission website ([89]) in 2014. The criteria cover environmentally sound procurement actions for water-based heaters.

Section 5 reports on the assessment of the fitness for use of the existing EU GPP criteria for water-based heaters.

## 5.2 Background

The EU GPP criteria for water-based heaters were commissioned by the European Commission's Directorate-General for Environment (DG ENV). These GPP criteria are not published as a Staff Working Document (SWD) of the European Commission and thus present a different format to the one in use since 2016, when, after consultation with DG ENV, the SWD format was adopted by the European Commission to improve the structure and clarity of the EU GPP criteria.

The Technical Background Report (Rodriguez Quintero et al., 2014) accompanying the GPP criteria provides full details on the reasons for selecting these criteria and references for further information.

The Technical Background Report is structured in the following way:

- The first Section gives an introduction and a background to the project, including market and cost considerations.
- The second Section briefly describes the type of water-based heaters that are considered and included in the scope of the EU GPP criteria.
- The third Section outlines the general guidelines for the assessment and verification of the EU GPP criteria.
- The fourth Section sets out the recommended EU GPP criteria, subdividing them into selection criteria, technical specifications and award criteria.

In terms of scope, the EU GPP criteria for water-based heaters address the procurement actions related to the purchase and installation of products that are used to generate heat as part of a water-based central heating system, where the heated water is distributed by means of circulators and heat emitters in order to reach and maintain the indoor temperature of an enclosed space such as a building, a dwelling, or a room, at a desired level. The operation of the heat generator can be based on a number of processes and technologies, such as:

- combustion of gaseous, liquid or solid fossil fuels,
- combustion of gaseous, liquid or solid biomass,
- use of the Joule effect in electric resistance heating elements,
- capture of ambient heat from an air, water or ground source, and/or waste heat,
- cogeneration (the simultaneous generation in one process of heat and electricity),
- solar (auxiliary).

The maximum output power of the water-based heaters included in the scope is 400 kW. Combination heaters are included in the scope, provided that their primary function is to provide ambient heat.

In practice, gas/liquid boilers, biomass boilers, heat pumps, combined heat and power and solar thermal are all included in the product scope. The fact that the scope is open to all types of technologies regardless of the type of fuel consumed reflects the discussions with stakeholders and implies that any technology is acceptable in principle, provided that the water-based heater meets all the relevant criteria, in particular (but not only) the ones on energy efficiency and greenhouse gas emissions.

([88]) EU GPP criteria for water-based heaters. Available at this link.
([89]) European Union Green Public Procurement (EU GPP) criteria for all available product groups. Available at this link.

In terms of criteria, the following are currently set:

**Core criteria**

Selection Criteria (SC)

- SC1. Ability of the tenderer – only in the case of installation works

Technical Specifications (TS)

- TS1. Minimum energy efficiency
- TS2. Greenhouse gas emission limits
- TS3. Product longevity and warranty
- TS4. Installation instructions and user information

Award Criteria (AC)

- AC1. Additional energy efficiency
- AC2. Additional greenhouse gas emission reduction
- AC3. Noise emission limits
- AC4. Product design
- AC5. Organic gaseous carbon (OGC) emissions
- AC6. Particulate matter (PM) emissions

**Comprehensive criteria**

Technical Specifications (TS)

- TS5. Primary and secondary refrigerants
- TS6. Nitrogen oxides (NOx) emission limits
- TS7. Carbon monoxide (CO) emission limits
- TS8. Organic gaseous carbon (OGC) emission limits
- TS9. Particulate matter (PM) emission limits

According to the most recent update from GPP National Action Plans (NAP) in March 2021 ([90]), the Member States that have developed national GPP criteria on heaters (either heating and cooling for buildings or water-based heaters) are France, Lithuania and Slovenia. In Portugal, GPP criteria for water-based heaters are under development; Latvia and Portugal recommend using the EU GPP criteria for water-based heaters. Switzerland is developing a Life Cycle Costing (LCC) tool for heating systems.

## 5.3 Regulatory and strategic context

There are a number of European directives and regulations dealing with energy efficiency and other environmental aspects of water-based heaters.

The 'Boiler Efficiency Directive' (92/42/EEC) ([91]) sets minimum efficiency requirements for boilers that are fired with liquid or gaseous fuels only. It includes boilers with a rated output between 4 kW and 400 kW. Efficiency requirements at rated output are set for standard boilers, low-temperature boilers and gas-condensing boilers at 84%, 87.5% and 91%, respectively.

Regulation (EU) 813/2013 ([92]) sets ecodesign requirements for space heaters and combination heaters, including water-based heaters, and specifically refers to space heating energy efficiencies, water heating energy efficiencies, sound power levels and nitrogen oxides emission limits to be met by different types of boilers. This Regulation, in contrast to the current EU GPP criteria, does not apply to heaters specifically designed for using gaseous or liquid fuels predominantly produced from biomass, or to heaters using solid fuels.

Ecodesign requirements for solid fuel boilers are set in Regulation (EU) 2015/1189 ([93]), which addresses space heating energy efficiency and space heating emissions of PM, OGC, CO, and NOx, on top of a requirement on product information.

([90]) National Green Public Procurement Action Plans (policies and guidelines) – March 2021. Available at this link.
([91]) Efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels – Council Directive 92/42/EEC. Available at this link.
([92]) Ecodesign requirements for space heaters and combination heaters – Commission Regulation (EU) 813/2013. Available at this link.
([93]) Ecodesign requirements for solid fuel boilers – Commission Regulation (EU) 2015/1189. Available at this link.

The energy efficiency of water-based heaters is also addressed in Regulation (EU) 811/2013 on the energy labelling of space heaters and combination heaters ([94]). However, this Regulation only applies to heaters with a rated heat output of less than 70 kW and, in contrast to the current EU GPP criteria, does not apply to heaters specifically designed for using gaseous or liquid fuels predominantly produced from biomass, or to heaters using solid fuels.

In 2017, a revised 'Energy Labelling Framework Regulation' ([95]) entered into force, and energy-related products are required to display labels on an updated scale from A (most efficient) to G (least efficient). This system replaces the previous system of A+++ to G labels, which is less effective because of the development in the market of more energy-efficient products. Labels previously in use have to be rescaled by the European Commission, i.e. recalibrated, to conform with the new Regulation. The Commission will adopt a separate delegated act for each specific product group to supplement the Regulation.

Both Regulation 811/2013 and Regulation 813/2013 are currently under revision. A preliminary review study (conducted by VHK for the Directorate-General for Energy (DG ENER)) was finalised in July 2019 ([96]). A follow-up study touches upon the main topics identified by the review study and is expected to be finalised by November 2021. The timeline of the revision is not yet known.

The 'Energy Performance of Buildings Directive' ([97]) sets out minimum requirements and a common framework for calculating energy performance, in order to improve the energy performance of buildings in the EU. According to this Directive, space heating is one of the areas on which Member States shall set system requirements. Moreover, the introduction of intelligent metering systems is encouraged.

The 'WEEE Directive' ([98]) addresses the increasing amount of waste electrical and electronic equipment (WEEE) generated in Europe, attempting to improve resource efficiency through recycling. Whilst boilers are not classified as WEEE, heating regulators and thermostats are ('Monitoring and Control Instruments'), and therefore producers are required to take responsibility for the treatment and recycling of these products at the end of their life.

The 'RoHS Directive' ([99]) prevents the use of certain hazardous materials in electrical and electronic equipment (EEE), such as lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE). Similarly to the case of the WEEE Directive, this RoHS Directive does not necessarily relate directly to boilers; however, it applies to other elements of the heating system, for example thermostats and other control devices.

Also in terms of hazardous substances, the Montreal Protocol ([100]) aims at protecting the stratospheric ozone layer by banning (from 2000) the production and consumption of compounds that deplete ozone in the stratosphere, including chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons, which were used as refrigerants in heat pumps. In addition, the 'Fluorinated Greenhouse Gases Regulation' ([101]) aims at mitigating climate change and protecting the environment by reducing emissions of fluorinated greenhouse gases such as hydrofluorocarbons (HFCs), which have been used as refrigerants to substitute CFCs and HCFCs since the Montreal Protocol. In particular, this Regulation bans in phases from 2015 to 2025 the sale of new items containing F-gases, including heat pumps, where safer, more climate-friendly alternatives exist.

With respect to the use of renewable energy sources, the new 'Renewable Energy Directive' ([102]) promotes the use of renewable energy through the setting of overall and Member-State-specific targets. For the EU as a whole, the target is at least 32% of energy from renewable sources by 2030. Linked to this Directive, the 'Energy Efficiency Directive' ([103]) promotes energy efficiency across the EU through a common framework of measures covering every stage of the energy chain, from generation to distribution and final consumption, including a 32.5% energy efficiency target by 2030.

([94]) Energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control and solar device – Commission Delegated Regulation (EU) 811/2013. Available at this link.
([95]) Framework for energy labelling – Regulation (EU) 2017/1369. Available at this link.
([96]) Ecoboiler Review. Available at this link.
([97]) Energy performance of buildings – Directive 2010/31/EU. Available at this link.
([98]) Waste electrical and electronic equipment – Directive 2012/19/EU. Available at this link.
([99]) Restriction of the use of certain hazardous substances in electrical and electronic equipment – Directive 2011/65/EU. Available at this link.
([100]) The Montreal Protocol. Available at this link.
([101]) Fluorinated greenhouse gases – Regulation (EU) No 517/2014. Available at this link.
([102]) Promotion of the use of energy from renewable sources – Directive (EU) 2018/2001. Available at this link.
([103]) Energy efficiency – Directive 2012/27/EU. Available at this link.

Finally, the 'Taxonomy Climate Delegated Act' ([104]) specifies the technical screening criteria which determine that an economic activity is substantially contributing to climate change mitigation and adaptation. In this Climate Delegated Act, technical screening criteria are set out for four economic activities that are relevant to water-based heaters:

- Manufacture of energy-efficient equipment for buildings, referring to 'space heating and domestic hot water systems rated in the highest two populated classes of energy efficiency' in accordance with the Energy Labelling Framework Regulation, to 'products for heat metering and thermostatic controls', and to 'products for smart monitoring and regulating of heating system, and sensoring equipment'.
- Installation and operation of electric heat pumps, which is considered environmentally sustainable if the Global Warming Potential of the refrigerant does not exceed 675.
- Installation, maintenance and repair of renewable energy technologies, referring to 'installation, replacement, maintenance and repair of heating, ventilation and air-conditioning and water heating systems with highly efficient technologies'.
- Installation, maintenance and repair of instruments and devices for measuring, regulation and controlling the energy performance of buildings, referring to 'installation, maintenance and repair of zoned thermostats and smart thermostat systems' and to 'installation, maintenance and repair of smart meters for gas, heat, cool and electricity'.

## 5.4 Analysis and discussion of current criteria

In this section the fitness of the existing EU GPP criteria for water-based heaters will be analysed. The ecodesign 'review study' ([105]) on space and combination heaters (2017-2019) as well as documents produced in the follow-up study were the main reference which existing GPP criteria were compared to.

### 5.4.1 Product scope

A decade has already passed since the start of the development of the EU GPP criteria for water-based heaters. Task 2 (EC, 2019a) of the review study shows that in roughly 10 years (data from 2016, compared to the data from 2004 used in the GPP preliminary report (Wolf et al., 2011)), the main change in market composition has been for oil boilers (-63% of unit sales), for solid boilers (+50%) and for heat pump boilers (+400%). Gas-fired boilers keep leading the market, representing 83% of unit sales. Innovative boiler types that are promising in terms of energy consumption are hybrid heat pumps (e.g. condensing gas boiler and electric heat pump in one compact device) and passive flue-heat recovery devices. These types are not covered by the current EU GPP criteria.

Moreover, Task 6 (EC, 2019b) of the review study proposes to extend the product scope of the ecodesign and energy labelling Regulations to heaters with a rated heat output ≤ 1 MW (the current EU GPP criteria refer to a rated heat output ≤ 400 kW). Such an extension is estimated to possibly cover 15% more of the energy consumption covered by current Regulations 811/2013 and 813/2013.

In view of the changes in market conditions, and of a possible review of the scope of Regulations 811/2013 and 813/2103, a revision of the scope of GPP criteria could be necessary.

### 5.4.2 GPP criteria

Regulations 811/2013 and 813/2013 set requirements on the following aspects that are also addressed by GPP criteria: space heating energy efficiency, product information, NOx emissions, and sound power level. The review study on space and combination heaters found that improvements could be made, mainly in the area of space heating energy efficiency.

([104]) Technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives – Commission Delegated Regulation (EU) .../... Available at this link.

([105]) Impact Assessment/Consultation for Space and Water Heaters. Available at this link.

#### *5.4.2.1 Energy efficiency criteria*

According to Task 6 of the review study, the average seasonal space heating efficiency ηs was, in 2004, when boilers were first mentioned in plans for the new Ecodesign Directive, 80.5%. In 2014, when GPP criteria were published, ηs was 90%; in 2016, one year after the implementation of Regulations 811/2013 and 813/2013, ηs was 91-93%.

The EU GPP core criteria set a minimum energy efficiency of 90%, which is lower than the average in 2016. Indeed, heaters in current class A+++ have ηs > 150% (excluding solid fuel boilers). Moreover, the class rescaling needed according to the new Energy Labelling Framework Regulation would probably move the ηs=90% of class A to a lower class (the review study suggests a new class D, and even a new class F for low-temperature heat pumps), also considering that new (e.g. hybrid) products have higher efficiency. The ηs=96% of the EU GPP comprehensive criteria would fall into the new class C (new class F for low-temperature heat pumps).

Finally, the ecodesign requirements for solid fuel boilers ([106]) were adopted one year after the EU GPP criteria, and their outcome could therefore not be taken into account. The EU GPP core criterion sets a minimum ηs of 75% for solid fuel boilers, while the ecodesign requirements set, as from 2020, a ηs of 75% for boilers with a rated heat output ≤ 20 kW and a ηs of 77% for a rated heat output ≥ 20 kW.

GPP criteria are meant to target products or services 'with reduced environmental impacts' and to 'stimulate innovation in environmental technologies' ([107]). Therefore, the criterion on the average seasonal space heating efficiency should be tailored to cover at least the average efficiency of the market, and cannot be lower than or equal to ecodesign requirements.

#### *5.4.2.2 Additional criteria*

One aspect that is not covered by the current EU GPP criteria is the minimum water heating energy efficiency, for which requirements are set out in both Regulation 811/2013 and Regulation 813/2013.

Another aspect that could possibly deliver improvements in terms of the environmental impacts of water-based heaters is smart monitoring and/or the use of high-efficiency thermostats/sensors, which are mentioned in the Taxonomy Climate Delegated Act as well as in the Energy Performance of Buildings Directive. The review study on space and combination heaters states that temperature and flow controls can mean a saving of 50% in space heating energy for heat pumps, and of 8-10% for gas boilers.

Aspects related to the circular economy could also be worth exploring, e.g. the use of recycled (and recyclable) plastics in heat pumps, given the policy and social attention to the use of plastic nowadays ([108]). Finally, the criteria set in the Taxonomy Climate Delegated Act([104]) could be worth exploring for possible alignment.

#### *5.4.2.3 Verification*

Most of the verification requirements in the current EU GPP criteria make reference to the holding of the EU Ecolabel (Commission Decision 2014/314/EU ([109])) or another relevant ISO Type I ecolabel ([110]) fulfilling the requirements in the criteria. However, the EU Ecolabel criteria for this product group expired on 29 May 2018, and this product group is no longer available on the list of the EU Ecolabel website. Moreover, no other ISO Type I ecolabel currently provides labelling criteria for water-based heaters ([111]).

The EU GPP criteria also mention that, alternatively to compliance with another ISO Type I ecolabel, other appropriate means of proof can also be accepted, such as results of tests conducted in accordance with the testing procedure indicated in respective EN standards (or other equivalent). Table 1 in the Explanatory Note section of the current EU GPP criteria lists the relevant standards for test methods for each EU GPP criterion. Table 7 in this report summarises whether such standards are still valid or have been modified. Out of 25 test standards listed, only 8 (30%) are still valid. Moreover, the review study on space and combination heaters lists the standards that would need to be reviewed when the revision of Regulations 811/2013 and 813/2013 are completed. Table 7 includes which test standards in the EU GPP criteria would be affected by this revision.

([106]) Ecodesign requirements for solid fuel boilers – Commission Regulation (EU) 2015/1189. Available at this link.
([107]) Public procurement for a better environment. – COM(2008) 400 final. Available at this link.
([108]) A new Circular Economy Action Plan for a cleaner and more competitive Europe – COM(2020) 98 final. Available at this link.
([109]) Criteria for the award of the EU Ecolabel for water-based heaters – Commission Decision 2014/314. Available at this link.
([110]) As reported in the ISO 14024:2018 Environmental labels and declarations – Type I environmental labelling – Principles and procedures.
([111]) The following ISO Type I schemes were consulted: Nordic Swan, Blue Angel, the Good Environmental Choice, the Austrian Ecolabel

Additionally, the reference to the listed standards lack of dates of application, which would improve the accuracy of citation.

**Table 7.** Comparison between existing areas within the scope and new possible areas of focus for the EU Green Public Procurement (GPP) criteria for water-based heaters

| **Standard referred to in current GPP criteria (number and title)** | **Still valid?** | **To be reviewed after revision of Regulations 811/2013 and 813/2013?** |
|---|---|---|
| EN 676: Automatic forced draught burners for gaseous fuels | Withdrawn in 2020. New version available. | yes |
| EN 15502-1: Gas-fired heating boilers – Part 1: General requirements and tests | Withdrawn in 2015. New version available (from 2020 and 2021). | yes |
| EN 267: Automatic forced draught burners for liquid fuels | Withdrawn in 2020. New version available. | yes |
| EN 303-1: Heating boilers - Part 1: Heating boilers with forced draught burners - Terminology, general requirements, testing and marking | Withdrawn in 2017. New version available. | yes |
| EN 303-2: Heating boilers – Part 2: Heating boilers with forced draught burners – Special requirements for boilers with atomizing oil burners | Withdrawn in 2017. New version available. | yes |
| EN 303-4: Heating boilers - Part 4: Heating boilers with forced draught burners - Special requirements for boilers with forced draught oil burners with outputs up to 70 kW and a maximum operating pressure of 3 bar - Terminology, special requirements, testing and marking | Valid. | no |
| EN 304: Heating boilers – Test code for heating boilers for atomizing oil burner | Withdrawn in 2017. New version available. | yes |
| EN 303-5: Heating boilers – Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW – Terminology, requirements, testing and marking | Withdrawn in 2021. New version available. | no |
| EN 14918: Solid biofuels - Determination of calorific value | Withdrawn in 2017. New version available. | no |
| EN 60335-2-35: Household and similar electrical appliances – Safety – Part 2-35: Particular requirements for instantaneous water heaters | Withdrawn in 2016. New version available. | no |
| EN 12309 series: Gas-fired absorption and adsorption air-conditioning and/or heat pump appliances with a net heat input not exceeding 70 kW | Valid. | yes for the following parts: 1, 2, 4, 6, 7 |

| **Standard referred to in current GPP criteria (number and title)** | **Still valid?** | **To be reviewed after revision of Regulations 811/2013 and 813/2013?** |
|---|---|---|
| DIN 4702-8: Central heating boiler; determination of the standard efficiency and the standard emissivity | Withdrawn. | not under scope |
| EN 14511 series: Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling | Withdrawn in 2018. New version available. | yes for the following parts: 1, 2, 3 |
| EN 14825: Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling – Testing and rating at part load conditions and calculation of seasonal performance | Withdrawn in 2020. New version available. | yes |
| EN 50465: Gas appliances – Fuel cell gas heating appliances – Fuel cell gas heating appliance of nominal heat input inferior or equal to 70 kW | Withdrawn in 2015. New version available. | yes |
| ISO 3046-1: Reciprocating internal combustion engines – Performance – Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods – Additional requirements for engines for general use | Valid. | no |
| EN 14792 Stationary source emissions – Determination of mass concentration of nitrogen oxides (NOx) – Reference method: Chemiluminescence | Withdrawn in 2017. New version available. | no |
| EN 15058: Stationary source emissions – Determination of the mass concentration of carbon monoxide (CO) – Reference method: Non-dispersive infrared spectrometry | Withdrawn in 2017. New version available. | no |
| EN 12619: Stationary source emissions – Determination of the mass concentration of total gaseous organic carbon at low concentrations in flue gases – Continuous flame ionisation detector method | Valid. | no |
| EN 13284-1: Stationary source emissions – Determination of low range mass concentration of dust – Part 1: Manual gravimetric method | Withdrawn in 2017. New version available. | no |
| EN 15036: Heating boilers - Test regulations for airborne noise emissions from heat generators | Valid. | yes |
| ISO EN 3743: Acoustics - Determination of sound power levels of noise sources - Engineering methods for small, movable sources in reverberant fields | Valid. | no |

| Standard referred to in current GPP criteria (number and title) | Still valid? | To be reviewed after revision of Regulations 811/2013 and 813/2013? |
|---|---|---|
| EN ISO 3744: Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane | Valid. | no |
| EN ISO 3746: Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane | Valid. | no |
| EN 12102 Air conditioners, liquid chilling packages, heat pumps and dehumidifiers with electrically driven compressors for space heating and cooling - Measurement of airborne noise - Determination of the sound power level | Withdrawn in 2021. New version available. | yes |

Source: JRC analysis

## 5.5 Results of the assessment of the current EU GPP criteria for water-based heaters

The current EU Green Public Procurement (GPP) criteria for water-based heaters provide recommendations related to the purchase and installation of products that are used to generate heat as part of a water-based central heating system in an environmentally friendly manner.

Section 5 reports on the assessment of the fitness for use of the existing EU GPP criteria for water-based heaters. The study was carried out by desk research.

The results of the assessment of the current EU GPP criteria for water-based heaters showed that the **current criteria are not up to date**, mainly because:

- the product scope of the criteria should be re-evaluated, to take into account technology advances in the market, e.g. innovative boiler types such as hybrid heat pumps and passive flue-heat recovery devices;
- the EU GPP criterion on minimum energy efficiency could be made more ambitious for all boiler types;
- the addition of new criteria could be considered, especially on water heating energy efficiency, smart monitoring and circularity aspects (e.g. recycling of plastic);
- EU Ecolabel criteria or other ISO 14024 Type I ecolabel criteria mentioned in the verification of the EU GPP criteria are not available any more;
- 70% of the standards mentioned in the verification of the EU GPP criteria have changed;
- the criteria should consider the new policy developments (especially Regulation 2015/1189 and the ongoing revision of Regulations 811/2013 and 813/2013).

# 6 Conclusions

The European Commission has developed European Union Green Public Procurement (EU GPP) criteria for 20 product groups. These criteria need to be periodically assessed to analyse their fitness for use, because changes have occurred in recent years that could affect their suitability and effectiveness. These changes could be related to technological developments, the regulatory and strategic context, and other factors.

Via desk research, this report assessed the fitness for use of the EU GPP criteria for four product groups:

- Electrical and electronic equipment used in the health care sector (Health Care EEE) – published in 2014 (see Section 2);
- Copying and graphic paper – published in 2008 (see Section 3);
- Waste water treatment infrastructures – published in 2013 (see Section 4);
- Water-based heaters – published in 2014 (see Section 5).

The assessment showed that **the EU GPP criteria of all investigated product groups are not up to date.** Table 8 gathers the main reasons for this.

**Table 8.** Main reasons for the current European Union Green Public Procurement (EU GPP) criteria of the investigated product groups being not up to date

| **Reason** | **Health Care EEE** (*) | **Copying and graphic paper** | **Waste Water Infrastructures** | **Water-based heaters** |
|---|---|---|---|---|
| Changes in the regulatory and strategic context | X | | X | X |
| New standards available | X | | | X |
| New technologies in the market | X | | | X |
| Changes in practices of the industry and the market | | X | | |
| New concerns regarding emerging contaminants | | | X | |
| More ambitious criteria and/or threshold needed | X | | X | X |

(*) 'Health Care EEE' stands for electrical and electronic equipment (EEE) used in the health care sector.

Source: JRC analysis

## References


APA, 2019 *Critérios decontratação pública ecológica, no âmbito da ENCPE 2020, para Equipamentos Elétricos e Eletrónicos (EEE) na Saúde. Estratégia Nacional para as Compras Públicas Ecológicas 2020 - ENCPE 2020.* Agencia portuguesa do Ambiente, Serviços Partilhados do Ministério da Saúde, Entidades de Serviços Partilhados da Administraçáo Pública, Instituto dos Mercados Públicos do Imobiliário e da Construçáo. Available at https://encpe.apambiente.pt/sites/default/files/documentos/Manual_GT2_EEEs_Saude_Divulgacao.pdf

CEPI, 2021. *Key statistics 2020 – European pulp & paper industry.* Confederation of the European Paper Industry (CEPI). Available at https://www.cepi.org/wp-content/uploads/2021/07/Key-Stats-2020-FINAL.pdf

COCIR, 2018. *COCIR self-regulatory initiative for the ecodesign of medical imaging equipment - Status report 2018.* European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry. Available at https://www.cocir.org/fileadmin/6_Initiatives_SRI/SRI_Status_Report/COCIR_SRI_Status_Report_2018_-_June_2019.pdf

Dalenstam, E., Tordnell, N., Azzopardi, M., Sennström, L., 2014. *Technical Report – Criteria for Electrical and Electronic Equipment used in the Health Care Sector (Health care EEE).* The Swedish Environmental Management Council (SEMCo) Report and European Commission. Available at https://ec.europa.eu/environment/gpp/pdf/criteria/health/TR%20Health%20Care%20EEE.pdf

DEPA, 2014. Nielsen, B. S., Nørgaard Andersen, D., Giovalle, E., Bjergstrøm, M., Larsen, P. B., *Alternatives to classified phthalates in medical devices.* Danish Environmental Protection Agency. 2014. Environmental Project No. 1557, 2014. ISBN no.978-87-93178-27-4 Available at https://www2.mst.dk/Udgiv/publications/2014/03/978-87-93178-27-4.pdf

EC, 2013. *Green Public Procurement Criteria for Waste Water Infrastructure*. Directorate-General for Regional and Urban Policy, European Commission, Luxemburg, 2013. ISBN 978-92-79-30646-4, doi 10.2776/31609. Available at https://ec.europa.eu/environment/gpp/pdf/waste_water_criteria.pdf

EC, 2019a. Review Study existing ecodesign & energy labelling SPACE HEATERS & COMBINATION HEATERS. Review study of Commission Regulation (EU) No. 813/2013 (Ecodesign) and Commission Delegated Regulation No. (EU) No. 811/2013 (Energy Label) - Task 2 Market Analysis. European Commission, Directorate-General for Energy. Available at https://www.ecoboiler-review.eu/Boilers2017-2019/downloads/Boilers%20Task%202%20final%20report%20July%202019.pdf

EC, 2019b. Review Study existing ecodesign & energy labelling SPACE HEATERS & COMBINATION HEATERS. Review study of Commission Regulation (EU) No. 813/2013 (Ecodesign) and Commission Delegated Regulation No. (EU) No. 811/2013 (Energy Label) - Task 6 Options. European Commission, Directorate-General for Energy. Available at https://www.ecoboiler-review.eu/Boilers2017-2019/downloads/Boilers%20Task%206%20final%20report%20July%202019.pdf

EC, 2021. *Study on certification and verification schemes in the forest sector and for wood-based products.* Directorate-General for Environment, European Commission, Luxemburg, 2021. ISBN 978-92-76-40787-4, doi 10.2779/126030, Catalogue number KH-02-21-994-EN-N. Available at https://op.europa.eu/en/publication-detail/-/publication/afa5e0df-fb19-11eb-b520-01aa75ed71a1/language-en

EEA, 2019. *Urban waste water treatment for 21st century challenges.* European Environment Agency, European Union, Copenhagen. Briefing no. 5/2019. HTML TH-AM-19-004-EN-Q, ISBN 978-92-9480-079-4, ISSN 22467-3196, doi: 10.2800/369815. Available at https://www.eea.europa.eu/publications/urban-waste-water-treatment-for/urban-waste-water-treatment

FSC, 2017. *Requirements for Sourcing FSC Controlled Wood.* Forest Stewardship Council. FSC-STD-40-005 V3-1 Available at https://fsc.org/en/document-centre/documents/resource/373

ICLEI, 2008 ICLEI – Local Governments for Sustainability & Ecoinstitut *Copying and Graphic Paper – Background Product Report..* 2008, European Commission, DG Environment-G2, B-1049, Bruxelles. Available at https://ec.europa.eu/environment/gpp/pdf/toolkit/paper_GPP_background_report.pdf

Jing Sun, Xiaohu Dai, Qilin Wang, Mark C.M. van Loosdrecht, Bing-Jie Ni, 2019. *Microplastics in wastewater treatment plants: Detection, occurrence and removal*. Water Research, 152, 21-37. doi:10.1016/j.watres.2018.12.050

Kowalska, M., Donatello, S. and Wolf, O., 2019. *EU Ecolabel criteria for Graphic Paper, Tissue Paper and Tissue Products*., EUR 29656 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-00024-2 (online), doi:10.2760/71692 (online), JRC115764.

Landabaso, M., Fichter, M., 2013. *GPP Criteria for Waste Water Infrastructure Technical Background Report.* Directorate-General for Regional and Urban Policy, European Commission. Available at https://ec.europa.eu/environment/gpp/pdf/waste_water_tech.pdf

Loderer, C. and Hananel, C., 2018. Policy brief – The potential of the wastewater sector in the energy transition. PowerStep H2020 Project. Available at https://www.kompetenz-wasser.de/wp-content/uploads/2018/06/policy-brief.pdf

Lyons, L., Damuseau, D., Modi, S., Won Chung, F. J., Demidova, O., Mudgal, S., Kong, M. A., Mitsios, A., Pahal, S., Lecerf, L., Van Acoleyen, M., Lambert, S., Fedrigo, D., Watkins, E., 2014. *Ex-post evaluation of certain waste stream Directives – Final report.* Directorate-General for Environment, European Commission, Luxemburg. Available at https://ec.europa.eu/environment/pdf/waste/target_review/Final%20Report%20Ex-Post.pdf

PEFC, 2020. *PEFC ST 2001:2020. PEFC Trademarks Rules – Requirements.* Programme for the Endorsement of Forest Certification (PEFC). Available at https://cdn.pefc.org/pefc.org/media/2020-02/d1ad5a21-0267-4db4-a41b-07fd577ffdea/3abf07e8-b7f9-5f42-ba2a-9ca608ee415f.pdf

Goodman, P., Tyrwhitt Jones, E., Robertson, C., 2020. Impact of the RoHS Directive – Scope and Additional Substance Evaluation. RINA Report No. 2019-0921 Rev. 1 – January 2020 Project No. REG02864-001. Available at https://rohs.exemptions.oeko.info/fileadmin/user_upload/RoHS_Pack_15/4th_Consultation_PartII/contribution_Medtech_RoHS_15_REG02864_Impact_Report_Issue_2.1_FINAL_20200130.pdf

Rodriguez Quintero R, Genty A, Rodriguez Vieitez E, Wolf O., 2014. *Development of Green Public Procurement Criteria for Water-based Heaters. Technical report and draft criteria proposal.* EUR 26885. Luxembourg. Publications Office of the European Union; 2014. JRC92299. ISBN 978-92-79-43551-5 (PDF), ISSN 1831-9424 (online), doi:10.2791/13474. Available at https://ec.europa.eu/environment/gpp/pdf/Technical%20report%20water-based%20heaters.pdf

Wolf, O., Rodriguez Vieitez, E., van Elburg, M., van den Boorn, R., Kemna, R., 2011. Development of European Ecolabel and Green Public Procurement Criteria for Hydronic Central Heating Systems – Draft Report. Product definition and scope, economic and market analysis, technical analysis. Directorate-General Joint Research Centre. Available at https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/contentype/product_group_documents/1581683490/ProductDefinition-Market-TechAnalysis.pdf

## List of abbreviations and definitions

| | |
|---|---|
| BOD | Biochemical Oxygen Demand |
| CLP | Classification, Labelling and Packaging |
| CoC | Chain of Custody |
| DG ENER | Directorate-General for Energy |
| DG ENV | Directorate-General for Environment |
| ED | Endocrine Disruptor |
| EEA | European Environment Agency |
| ETV | Environmental Technology Verification |
| EU GPP | European Union Green Public Procurement |
| FLEGT | Forest Law Enforcement, Governance and Trade |
| FSC | Forestry Stewardship Council |
| Health Care EEE | Electrical and Electronic Equipment used in the Health Care sector |
| ICT | Information Communication Technology |
| JRC | Joint Research Centre |
| PEFC | Programme for the Endorsement of the Forest Certification |
| REACH | Registration, Evaluation, Authorisation and Restriction of Chemicals |
| RoHS | Restriction of the use of certain Hazardous Substances |
| SFM | Sustainable Forest Management |
| SRI | Self-Regulatory Initiative |
| SSD | Sewage Sludge Directive |
| UWWTD | Urban Waste Water Treatment Directive |
| WEEE | Waste Electrical and Electronic Equipment |
| WWTP | Waste Water Treatment Plant |

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