



Development of EU Ecolabel Criteria for Flushing Toilets and Urinals

TECHNICAL REPORT

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ABBREVIATIONS

List of acronyms

ASME	– American Society of Mechanical Engineers
BAT	– Best Available Technology
BMA	– English Bathroom Manufacturers Association
BNAT	– Best Not Yet Available Technology
BREF	– Reference Document on Best Available Techniques
CLP	– Classification, Labelling and Packaging of substances and mixtures
EN	– European standard
EU	– European Union
GPP	– Green Public Procurement
ISO	– International Organization for Standardization
JRC-IPTS	– Joint Research Centre's Institute for Prospective Technological Studies
LCA	– Life Cycle Analysis
MS	– Member State
REACH	– Registration, Evaluation, Authorisation and Restriction of Chemicals
RoHS 2	– Directive 2011/65/EU on Restriction of Hazardous Substances
UK	– United Kingdom
WC	– Water Closet
WELL	– Water Efficiency Label
WELS	– Water Efficiency Labelling and Standards Scheme
WEPLS	– Water Efficient Product Labelling Scheme

Units

cm	– Centimetre
g	– Gram
l	– Litre
MPa	– Megapascal

1. INTRODUCTION

The EU Ecolabel¹ is an element of the European Commission's action plan on Sustainable Consumption and Production and Sustainable Industrial Policy² adopted on 16 July 2008. This is a voluntary scheme established to encourage manufacturers to produce goods and services that are environmentally friendlier. The EU Ecolabel flower logo facilitates consumers and organisations (i.e. public and private purchasers) to recognise the best environmentally performing products and making environmentally conscious choices more easily. A product (good or service) awarded with this label must meet high environmental and performance standards. The EU Ecolabel covers a wide range of products, and its scope is constantly being widened. The consultation of experts and all interested parties is a key point in the process of establishing the criteria.

Green Public Procurement (GPP) is defined in the Commission Communication on Public procurement for a better environment³ 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." GPP is a voluntary instrument, which public authorities can use to provide industry with incentives for developing and marketing environmentally sounder products.⁴

The EU Ecolabel and GPP criteria have been developed in parallel in the framework of the project.⁵

The primary goal of establishing EU Ecolabel and GPP criteria for flushing toilets and urinals is to increase their water efficiency during operation, as water consumption in the use phase has been identified to contribute most to the environmental impact caused by this product group. Further, other aspects related to the product's life cycle, which improvement can bring environmental benefits, are also considered.

Establishing ecological criteria for flushing toilets and urinals and promoting appropriately the awarded products, if accepted by a wider range of producers and users, will contribute to greener product purchases, which shall reduce the consumption of water. Besides, this should also result in other environmental benefits, like lower water pollution and

¹ EU Ecolabel website: http://ec.europa.eu/environment/ecolabel/about_ecolabel/what_is_ecolabel_en.htm

² Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – on the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan, COM (2008) 397, available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0397:FIN:en:PDF>

³ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Public procurement for a better environment, COM (2008) 400, available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0400:FIN:EN:PDF>

⁴ GPP website: http://ec.europa.eu/environment/gpp/what_en.htm

⁵ The final results of the study are available at the project's website: <http://susproc.jrc.ec.europa.eu/toilets/>

eutrophication (in relation with wastewater), energy saving and lower related air emissions (in relation with water supply, wastewater treatment and product production), lower resource consumption and potentially higher resource efficiency management (in relation with product materials, longevity and recyclability issues), etc. Finally, the environmentally friendlier products should also bring private and public customers direct cost savings (e.g. lower water bills).

The following Technical Report presents the proposal for EU Ecolabel criteria on Flushing Toilets and Urinals (EU GPP criteria are dealt with in a separate document) and explains the rationale behind each criterion.

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2. PROJECT BACKGROUND

The European Commission's Directorate General for the Environment has initiated a project directed towards developing a joint evidence base for the EU policy making in the area of water-using products. This study is being carried out by the Joint Research Centre's Institute for Prospective Technological Studies (JRC-IPTS) and the AEA consultancy, in cooperation with all interested parties. All the results are presented on a dedicated website: <http://susproc.jrc.ec.europa.eu/toilets>

The purpose of this pilot project is to develop the EU Ecolabel and Green Public Procurement criteria for flushing toilets and urinals. In addition, the evidence base gathers information and data to assist the potential future development of other environmental policy instruments such as Implementing Measures under the Ecodesign Directive⁶. However, Implementing Measures for flushing toilets and urinals are not developed as part of this project now but might be introduced in the future.

In the framework of the criteria development process two open working group meetings took place:

- 1st open working group meeting held on 18th October 2011 in Brussels, Belgium,
- 2nd open working group meeting held on 6-7th June 2012 in Seville, Spain.

The purpose of these meetings was the presentation of the study results and an in-depth discussion with all interested parties. The discussion and stakeholders' feedback received during the meetings and additionally in a written form along the open consultation phase aided in drafting the proposed EU Ecolabel criteria.

The following tasks have been performed in the frame of the project:

- 1) Scoping,
- 2) Product definition,
- 3) Economic and market analysis,
- 4) User behaviour,
- 5) Base case assessment,
- 6) Best Available Technology (BAT) and Best Not Yet Available Technology (BNAT).

All respective reports have been prepared for these tasks and constitute the Preliminary Report accompanying the Draft Criteria Proposal. They can be downloaded from the previously mentioned project's website.

An important outcome of the environmental assessment of flushing toilets and urinals is that the main environmental impact is the consumption of water during the use phase. Establishing EU Ecolabel criteria to award water efficient products is expected to result in environmental benefits of water saving, and consequently reducing environmental impacts caused particularly by water consumption, water pumping, wastewater treatment, etc.

Two key elements appear to affect the water (and related energy) consumption of flushing toilets and urinals: their design and the user behaviour. The influence of design on water consumption is quite obvious since flushing toilets and urinals generally use, when flushed, a predetermined (fixed) quantity of water, which varies from product to product. User behaviour is also a crucial aspect and must be without any doubts emphasised. The user behaviour analysis⁷ carried out showed how the average water consumption differs among the EU Member States (MS). Also the consumption between citizens of one single country may vary very significantly. A number of parameters play a key role in these observed variations, including cultural aspects. Consumers' behaviour is also connected with their environmental consciousness. It can be seen that user behaviour is a very complex issue and assumptions had to be made in the frame of the study. This needs to be taken into account when analysing the project's results.

⁶ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast).

⁷ Draft report – Task 2: Economic and market analysis & Task 3: User Behaviour, available at: <http://susproc.jrc.ec.europa.eu/toilets/stakeholders.html>

3. DEFINITION AND SCOPE

The scope and definitions of the product group ‘flushing toilets and urinals’ are based on the available national and international classifications, standards and legal acts. The proposed definitions and scope for the product group further rely on stakeholders’ feedback given through the questionnaires, the discussions conducted at the 1st and 2nd open working group meetings and all the written comments received. The preliminary definitions⁸ have been revised in the light of this feedback and the current version is presented below.

3.1 Product group scope

Proposed scope

The product group ‘flushing toilets and urinals’ shall comprise: flushing toilet equipment, and urinal equipment as specified in product definitions . The product group shall cover products for domestic and non-domestic use.

The following products shall be excluded from the product group ‘flushing toilets and urinals’:

- (a) toilet seats and covers, only when placed on the market or marketed independently from a flushing toilet or urinal equipment;
- (b) toilet equipment which do not use water, use chemical and water for flushing and toilets that require energy to aid the flushing system.

Rationale

As a matter of fact, toilet and urinal suites and flush-free urinals are the functioning units and as such represent the core of the scope. Nevertheless, there is a need for including in the product group both suites/one-piece products and independent equipment such as toilet receptacles, urinals and flushing systems, which make functioning units only when combined. The rationale is explained below.

Flushing systems and receptacles (toilet receptacles or urinals) can be sold either jointly as a suite (combination) or a one-piece product (with integral flushing system) or independently as stand-alone items. It is worth noting that the market structure (sales of stand-alone items vs. suites/one-piece) widely differs from one MS to another and the whole spectrum of market shares between stand-alone items and suites can be observed across the EU. Based on stakeholder information, as extreme cases, all flushing toilets are sold in the UK as suites/one-piece whereas in Germany 95% of flushing toilet market is reported to be made of

stand-alone items (separate flushing systems and receptacles). At the EU level, it is estimated that about one third of flushing toilets and urinals are sold as a suite/one-piece while the remaining of the market (about two thirds) consists of separate receptacles and flushing systems. As a consequence and in order not to discard two thirds of the market, stand-alone items, in addition to suites/one-piece, need also to be considered for being included in the scope. However, we may ask which stand-alone items should be in the scope, having in mind that the aim is to achieve water saving.

Indeed, most of the environmental impact of flushing toilets and urinals comes from water consumption in the use phase, i.e. water flushing. The flushing part (flushing system) of the whole appliance (functioning unit) is then of the utmost importance to be considered when devising the EU Ecolabel criteria for this product group. Nevertheless, stand-alone toilet receptacles and urinals also contribute to the water saving objective: if a receptacle is not designed to perform properly with a low water flush, combining it with a low water consumption flushing system will generally result in real conditions in extra flushing (users will be forced to flush twice or three times to do the job), thus defeating the purpose of saving water. In addition, when stand-alone items are purchased, feedback from manufacturers indicates that the receptacle is always chosen first (because of design preferences) and then matched to a suitable flushing system. As a result, both flushing systems and receptacles need to be in the scope. In particular, stand-alone receptacles should be ecolabelled for the two following reasons: low water consumption flushing systems shall be combined with low-flush receptacles to achieve the water saving objective; and for purchasers interested in ecolabelled products and buying separately flushing systems and receptacles, signalling which receptacles are ecolabelled is the key.

It should be noted that some other schemes like the Australian/New Zealand WELS apply the same strategy with addressing both suites and stand-alone items in a same product group.

In terms of exclusion, stand-alone toilet seats and covers (sold separately) are not included in the scope of the product group since they cannot contribute to any water saving. Nevertheless, toilet seats and covers when sold together with the receptacle are included in the scope because in that case they make part of the product. In addition, toilet equipment which do not use water, use chemical and water for flushing, and toilets that require energy to aid the flushing system are excluded because the focus of the project is the achievement of water saving from the traditional water flushing toilets. Other toilet equipment (e.g. chemical toilets, vacuum toilets) are considered as niche products which meet special needs.

⁸ Presented in the Technical Background Reports for the 1st open working group meeting and available at the project's website: <http://susproc.jrc.ec.europa.eu/toilets/stakeholders.html>

3.2 Product definitions

Proposed definitions

The following definitions shall apply for product group 'flushing toilets and urinals':

- (1) 'flushing toilet equipment' means either a toilet suite, a toilet receptacle or a toilet flushing system;
- (2) 'toilet suite' means a sanitary appliance combining into a functioning unit a flushing system and a toilet receptacle for receiving and flushing away human urine and faeces and directing it into a drainage system;
- (3) 'toilet receptacle' means a sanitary appliance for receiving and flushing away human urine and faeces and directing it into a drainage system;
- (4) 'urinal equipment' means either a urinal suite, a urinal, a flush-free urinal or a urinal flushing system;
- (5) 'flushing urinal equipment' means either a urinal suite, a urinal or a urinal flushing system;
- (6) 'urinal suite' means a sanitary appliance combining into a functioning unit a flushing system and a urinal for receiving and flushing away urine and directing it into a drainage system;
- (7) 'urinal' means a sanitary appliance for receiving urine and water used for flushing and directing both into a drainage system;
- (8) 'slab urinal' means a sanitary appliance with or without flushing system comprising a floor channel and a slab or sheet fixed to a wall, for receiving urine and water used for flushing and directing both into a drainage system;
- (9) 'flush-free urinal' means a sanitary appliance for receiving urine and directing it into a drainage system, which functions without water;
- (10) 'flushing system' means, for both flushing toilet and flushing urinal equipment, either a flushing cistern with integral warning pipe connection – or a device deemed to be a no less effective device and inlet/outlet devices, or a pressure flush valve;

- (11) 'water-saving device' means a flushing device that permits a part of the full flush volume to be delivered either as double-action mechanisms (interruptible) or double-control mechanisms (dual flush);
- (12) 'full flush volume' means the total volume of water discharged from the flushing system during a flush cycle;
- (13) 'reduced flush volume' means the part of the full flush volume of water discharged by a water-saving device during a flush cycle no greater than two thirds of the full flush volume;
- (14) 'average flush volume' means the arithmetic average of one full flush volume and three reduced flush volumes calculated by following the methodology set out in Appendix 1 to the Anex;
- (15) 'on-demand flush control' means a flushing device of a sanitary appliance, which can be operated either manually by the user through a handle, lever, button, foot pedal or any equivalent flush actuator, or by a sensor detecting the use of the sanitary appliance;
- (16) 'adjusting device' means a device which allows the full flush volume and, if relevant, the reduced flush volume of a flushing system to be adjusted.

Rationale

The main terms related to the product group and appearing in the EU Ecolabel Decision have been defined in Article 2 of the Decision to avoid any misleading statement. The defined terms include each category of flushing toilet equipment and urinal equipment covered, the different flush volumes referred to and the specific devices mentioned in the requirements.

To define the toilet receptacle category, the wording 'toilet receptacle' has been preferred to 'WC pan' because the former is more general than the latter, even if WC pan – defined in EN 997 as bowl-shaped appliance for reception and flushing away of human solid and liquid excrement – is from far the most widespread type of toilet receptacles.

The different classes (and types) of equipment are not specifically defined given that the requirements are not differentiated by class (or type). Nevertheless, a statement at the beginning of the Annex to the Decision defining the criteria has been added to clarify the issue of classes and types, which stipulates: "In test standards, toilet suites, toilet receptacles, urinals and flushing systems are distinguished by class and/or type. The relevant class(es) and/or type(s) of the product shall be declared to the competent body

assessing the application and all the tests to be performed shall be done for each class and/or type declared by the applicant according to the relevant Standard."

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4. PROPOSED ECOLABEL CRITERIA

This section presents the draft EU Ecolabel criteria proposed for Flushing Toilets and Urinals. Their selection is based on JRC-IPTS work conducted in the frame of the Toilets project⁹, stakeholders' written feedback and the discussions conducted at the 1st open working group meeting for the criteria development. Further, taking into account the recommendation of the EU Ecolabel Regulation¹⁰ to seek for harmonisation of the EU Ecolabel scheme and national ecolabelling schemes in Member States (MS), existing national and also industrial criteria schemes were considered.

Criteria are proposed for the following aspects:

- 1) Water efficiency
- 2) Product performance
- 3) Excluded or limited substances and mixtures
- 4) Sustainably managed wood as raw materials
- 5) Product longevity
- 6) Reduced end-of-life impacts
- 7) Installation instructions and user information
- 8) Information appearing on the EU Ecolabel

Table 1 indicates the applicability of the different criteria to each category of flushing toilet and urinal equipment.

Table 1. Applicability of the different criteria to each category of flushing toilet and urinal equipment

Criteria \ Flushing toilet and urinal equipment	Toilet suites	Toilet receptacles	Toilet flushing systems	Urinal suites	Urinals	Flush-free urinals	Urinal flushing systems
1(a) – Full flush volume	x	x	X	x	x		x
1(b) – Water saving	x	x	x	x	x		x
1(c) – Average flush volume	x	x	x				
1(d) – Flush volume adjustment	x		x	x			x

⁹ For details please see the project's website: <http://susproc.jrc.ec.europa.eu/toilets/>

¹⁰ Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel, available online at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:027:0001:0019:EN:PDF>

Criteria \ Flushing toilet and urinal equipment	Toilet suites	Toilet receptacles	Toilet flushing systems	Urinal suites	Urinals	Flush-free urinals	Urinal flushing systems
2(a) – Flushing system requirements	x		x	x			x
2(b) – Flush performance	x	x		x	x		
2(c) – Flush-free urinal requirements						x	
3(a) – Hazardous substances and mixtures	x	x	x	x	x	x	x
3(b) – Substances listed in accordance with Article 59(1) of Regulation (EC) 1907/2006 of the European Parliament and of the Council ¹¹	x	x	x	x	x	x	x
4 – Sustainably managed wood as raw materials	x	x	x	x	x	x	x
5(a) – Reparability and availability of spare parts	x	x	x	x	x	x	x
5(b) – Warranty	x	x	x	x	x	x	x
6 – Reduced end-of-life impacts	x	x	x	x	x	x	x
7 – Installation instructions and user information	x	x	x	x	x	x	x
8 – Information appearing on the EU Ecolabel	x	x	x	x	x	x	x

In addition, as a general statement, the Annex to the EU Ecolabel Decision contains the following text:

"Where the applicant is required to provide declarations, documentation, analyses test reports, or other evidence to show compliance with the criteria, these may originate from the applicant or his supplier or both.

Where possible, the testing shall be performed by laboratories that meet the general requirements of European Standard EN ISO 17025 or equivalent.

Where appropriate, test methods other than those indicated for each criterion may be used if the competent body assessing the application accepts their equivalence.

¹¹ OJ L 396, 30.12.2006, p. 1.

Where appropriate, competent bodies may require supporting documentation and may carry out independent verifications.

The applicant shall declare the product's compliance with the legal requirements of the country (countries) in which it is intended to be placed on the market.

In test standards, toilet suites, toilet receptacles, urinals and flushing systems are distinguished by class or type, or both. The relevant class(es) or type(s) of the product shall be declared to the competent body assessing the application and all the tests to be performed shall be done for each class and/or type declared by the applicant according to the relevant Standard."

Each criterion and the assessment and verification procedure is presented in the following sections. The rationale is reported after each single criterion.

4.1 Criterion 1 – Water efficiency

The assessment conducted in the frame of the project showed that the highest environmental benefit, which can be achieved for flushing toilets and urinals, is related to water saving. Beyond resource saving, water saving would also result in less environmental impacts related to water supply and wastewater treatment (energy saving¹² and lower related air emissions, lower water pollution) and in economic savings for the users with direct cost savings (lower water bills).

The criteria proposed for water efficiency aim at reducing water consumption through application of both already known and innovative technologies which are related to water flush volumes and flush control. Nevertheless, it must be kept in mind that though water-saving products shall allow reducing environmental impacts from water consumption in domestic and non-domestic premises, at the same time they shall ensure that other fundamental requirements in terms of cleaning performance, hygiene and safety (i.e. prevention against blocking) are not altered.

Water efficiency criteria address all flushing toilet equipment and flushing urinal equipment (urinal suites, urinals and urinal flushing systems), but flush-free urinals are not concerned given that they do not require water to operate (they only use a little water for cleaning purposes).

¹² Energy consumption is due to abstraction, treatment, pumping and distribution of water in public water supply systems and later drainage including pumping and treatment of wastewater in public wastewater treatment plants. For example, according to stakeholder's feedback received in the related Ecotapware project (see:

4.1.1 Criterion 1(a) – Full flush volume

Proposed criterion

The full flush volume, independent of the water pressure, of flushing toilet and flushing urinal equipment, when placed on the market, shall not exceed the value presented in Table 2.

Table 2: Maximum limit for full flush volume of flushing toilet and flushing urinal equipment

Product	Full flush volume [l/flush]
Flushing toilet equipment	6.0
Flushing urinal equipment	1.0

Proposed assessment and verification

The applicant shall declare that the product complies with these requirements and specify the nominal full flush volume (in l/flush) of the product together with results of tests conducted in accordance with the testing procedure indicated in respective EN standards for the given kind of product (see Table 3). For slab urinals, the full flush volume refers to the water flushed for 60 cm width of continuous wall.

Table 3: EN standards for measuring the full flush volume of flushing toilet and urinal equipment

Product	Standard	Standard title
Toilet suites and toilet receptacles	EN 997	WC pans and WC suites with integral trap
Urinal suites and urinals	EN 13407	Wall-hung urinals - Functional requirements and test methods
Flushing systems made of a flushing cistern	EN 14055	WC and urinal flushing cisterns
Flushing systems made of a manual pressure flush valve	EN 12541	Sanitary tapware – Pressure flushing valves and automatic closing urinal valves PN 10
Flushing systems made of a contact-free pressure flush valve	EN 15091	Sanitary tapware - Electronic opening and closing sanitary tapware

Rationale

The outcomes of this study and the review of existing research confirm that increasing water efficiency during the use phase is the most important issue in the life cycle of flushing toilets and urinals. This is related to the long lifetime of these water-using products. The proposed criterion is set in order to contribute to reducing water consumption in domestic and non-domestic premises.

The maximum water flush volume is defined as the nominal water volume delivered by a single full flush (in l/flush). Nominal values (with supply off) rather than actual values (with supply on) are chosen since EN standards only refer to the measurement of nominal volumes.

The proposed thresholds are the outcomes of the technical analysis made, the stakeholders' consultation and the review of existing national and industrial labelling schemes for this product group. The stakeholders emphasised that flush volume reduction is on the other hand also constrained by possible limitations of the drainage systems of existing buildings.

As a first remark, labelling schemes and national laws address mainly flushing toilet equipment but less often urinal equipment, which means that toilet flush volume thresholds are to a certain extent more developed and mature. In that context, a maximum flush volume of 6 l/flush for flushing toilet equipment is commonly asked for across the voluntary schemes (e.g. Catalan ecolabel, EUnited WELL scheme, EU Ecolabel for tourist accommodation and campsites). It is also remarkable that this threshold is also retained in case of mandatory requirements (e.g. in the UK, Spanish municipalities, etc.). Among stakeholders, it is commonly agreed that 6 l/flush maximum volume represents a right starting point. However, we may ask whether this threshold could not be lower.

In terms of market shares (2010), it is interesting to note that almost all flushing toilet equipment sold has a maximum flush volume of 6 l/flush (>95%) while it is estimated that only a few (<5%) have a maximum flush volume below 6 l/flush (e.g. 4 or 5 l). The result is that setting a maximum flush volume of 6 l/flush is not selective and is meant as a default limit ensuring that no products with "abnormal" water consumption can be awarded the EU Ecolabel while setting a maximum flush volume below 6 l/flush (e.g. 5 l/flush) might only address niche products.

When looking at best available technologies on the market, we can find some flushing toilet equipment with as low as 4 l/flush which are mainly installed in Nordic countries (e.g. Sweden, Finland). These low-flush toilets are also recommended in the United Kingdom, where the UK new housing market is predominantly specifying dual flush WCs with 4 l/flush maximum flush volume (and 2.6 l/flush for the reduced flush) as the norm. However, the

installation of low-flush toilets has been very limited in the EU up to now, and this seems to be due to downstream limitations, i.e. the drainage system of the building.

The EU situation of building drainage systems is quite complex. Indeed, though four main drainage system types found in the EU are described in EN 12056 Standard series on “Gravity drainage systems inside buildings”, as reported by stakeholders there actually exists across Europe a whole continuum of drainage systems with specific designs. Some MS also simply do not follow any EN Standard so far (e.g. Portugal, Spain, Greece, Slovakia), even if there is generally a trend to take on board the latest EN Standard developments. This means that the drainage systems are very heterogeneous in the EU and may or not allow low-flush toilets (below 6 l/flush) depending on the local conditions: in general, this question can only be answered at the building level. As a general fact, any drainage system in Europe should be able to function with a flush volume of 6 l, even if in some very limited and specific cases, some problems (e.g. blocking) might still occur with flush volume of 6 l or less.

According to stakeholders, the most common drainage systems of existing buildings in most continental Member States (e.g. Netherlands, Germany, France, Belgium, etc.) are reported to be type I, which means that according to the EN Standard they cannot support low flush volumes and require at least 6 l/flush. In some cases (e.g. the Netherlands¹³), installing flushing toilet equipment with less than 6 l/flush can even be not allowed. In some other cases, there is more flexibility. For instance, Portuguese drainage systems are reported to be on type I basis and then do not allow flushing toilets with less than 6 l/flush. However, it is still possible to install in Portugal low-flush toilets with type I-like drainage system provided that the drainage slope has been designed appropriately. In the United Kingdom, though most of the drainage systems are type III and then in theory do not allow for the use of low-flush toilets as well, the UK Building Regulations recognises that lower WC flush volumes can be used as long as there are not any drainage problems. Lastly, some Member States, mainly Nordic countries (e.g. Sweden, Finland), use also type II drainage systems, which fully allow the use of low-flush toilets.

Another point raised by some stakeholders is that there is a potential conflicting demand for the diameter of drainage system piping: protection against heavy rain requires bigger diameters while lower flushing volumes need smaller diameters.

Regarding flushing urinal equipment, products with a maximum flush volume of 1 l/flush are defined as top category products in some labelling schemes (e.g. EUnited WELL scheme, Australian/New Zealand WELS). In addition, a first estimate of market shares (2010) indicate that about 21% of single flushing urinal equipment, which represent about 80% of the urinal

market, have a maximum flush volume of 1 l/flush or less. With considering the whole urinal market including flush-free urinals (estimated market share of 5%), this means that at least 22% of urinal equipment¹⁴ may achieve a maximum flush volume of 1 l/flush, in line with the EU Ecolabel target. Best available technologies show some flushing urinal equipment with a maximum flush volume as low as 0.5 l/flush. However, the market share of these products is very low (about 1%) and when aggregating these products with flush-free urinals, the total market share of urinal equipment with a maximum flush volume of 0.5 l/flush or less will not exceed 5-6%. Thus proposed by one stakeholder reduction of a maximal flush volume below the value of 1 l/flush is at the moment not feasible, and could be analysed within the next revision process of the EU Ecolabel for the analysed product group. In addition, some stakeholders mentioned that some very water efficient products such as flush-free urinals have created sewage problems (crystallisation) when installed with inappropriate piping systems. This again underlines the importance of considering the characteristics of the drainage system when lowering the flush volumes.

A two-tier approach (for both flushing toilet and urinal equipment) with setting the maximum flush volume thresholds at certain level during a transitory period of three years and then lowering the thresholds was also discussed with stakeholders. In the case of flushing toilet equipment, the option would have been to go from 6 to 5 l/flush, and 1 to 0.5 l/flush for flushing urinal equipment. In particular, this would have assumed a significant increase of the market shares of 0.5 l/flush flushing urinal equipment in the coming years and a future improvement of the drainage systems of buildings allowing more and more the installation of flushing toilets with less than 6 l/flush. The two-tier approach and the underlying assumptions were rejected by all stakeholders.

As a compromise, it is proposed to set the maximum full flush volume of flushing toilet equipment at 6 l/flush and 1 l/flush for flushing urinal equipment. On that basis, selectivity and high environmental performance is well achieved for urinal equipment as a whole. For flushing toilet equipment, the threshold as such is not ambitious but does not exclude any MS *a priori*, and additional criteria (water saving and average flush volume) will complete the requirements and ensure selectivity and high environmental performance of the ecolabelled products.

It should be mentioned that only upper limits for the flush volumes have been devised but no requirements on lower limits (minimum water volumes to be flushed) have been set. Indeed,

¹³ See art. 3.34 of the Dutch Building Code which stipulates that drainage systems have to comply with the Dutch standard NEN 3215, in which paragraph 4.1.7 states that a minimum flushing volume of 6 l/flush is required to assure a proper functioning of toilets.

¹⁴ In the estimate of 22%, other urinals like stall and slab urinals (which represents 10% of the market) are not considered since they usually consumes more water. However, some stall and slab urinals may also be able to achieve a maximum flush volume of 1 l/flush or less.

this question is not an issue for the Ecolabel but more a technical or legislation issue. Minimum flush volume would depend on the drainage system design, which varies from country to country and even from region to region. The vast majority of stakeholders agreed not to consider minimum flush volumes.

4.1.2 Criterion 1(b) – Water saving

Proposed criterion

Toilet suites delivering a full flush volume of more than 4.0 litres and toilet flushing systems shall be equipped with a water-saving device. When placed on the market, the reduced flush volume, independent of the water pressure, delivered when the water-saving device is operated shall not exceed 3.0 l/flush.

Toilet receptacles shall allow the use of a water-saving device, of which the reduced flush volume, independent of the water pressure, delivered when the water-saving device is operated shall not exceed 3.0 l/flush.

Urinal suites and urinal flushing systems shall be equipped with an individual on-demand flush control. For slab urinals with flushing system, there shall be an individual on-demand flush control for not more than 60 cm width of continuous wall.

Urinals shall allow the use of an individual on-demand flush control. Slab urinals without flushing system shall allow individual on-demand flush controls to be placed in not more than 60 cm width of continuous wall.

Any sensor-based flush control shall prevent any false triggering and ensure that the flush is delivered only after the actual use of the product.

Proposed assessment and verification

The applicant shall declare that the product complies with these requirements and provide documentation describing the technology or device applied in the product. For flushing toilet equipment, the applicant shall specify the reduced flush volume (in l/flush) of the product together with results of tests conducted in accordance with the testing procedure indicated in respective EN standards for the given kind of product (See Table 4). For products equipped with sensor-based flush control, the applicant shall provide a brief description of the measures taken when designing the product to prevent false triggering and ensure flush actuation only after actual product use.

Table 4: EN standards for measuring the reduced flush volume of flushing toilet equipment

Product	Standard	Standard title
Toilet suites and toilet receptacles	EN 997	WC pans and WC suites with integral trap
Toilet flushing system made of a flushing cistern	EN 14055	WC and urinal flushing cisterns

Rationale

Limiting the full flush volume of flushing toilet equipment at 6 l/flush (see Criterion 1(a)) is already the mainstream: it is not enough in terms of water saving and there is a need for additional saving. This can be reasonably achieved with the use of a water-saving device. The water-saving device, when operated, limits the flush volume released with delivering a so-called 'reduced' flush volume (vs. full flush). A reduced flush volume is indeed sufficient for draining liquid waste (urine), which remains the major use of the toilet equipment (vs. solid waste drainage which requires the full flush). Two main technologies have been identified as water-saving device: interruptible flush control and dual flush control. Both technologies are not incompatible per se and then can be combined. No figures are available on the market shares of interruptible flush control. Regarding dual flush market shares, it is estimated in 2010 that 55% of flushing toilets are single flush, 42% are 6/3 l or 6/4 l (full/reduced flush) dual flush and the remaining flushing toilets (about 2-3%) are dual flush with lower flush volumes than 6/3 l (e.g. 5/3 l, 4/2.5 l, etc.).

Different options have been analysed to define the requirements on water saving for flushing toilet equipment, both in terms of technology and maximum reduced flush threshold. As regards the type of water-saving device, prescribing certain technologies, based on what is actually available on the market, e.g. a dual flush control (which is the common water-saving device implemented nowadays) or the combination of a dual and interruptible flush control, has been considered. For instance in the EUnited WELL scheme, dual flush control is acknowledged as BAT (best available technology). BAT analysis showed that about 45 % of the market should be able to meet dual flush control requirement. The combination of a dual and interruptible flush control is much more restrictive in terms of market shares (though no market share estimates can be given), but leaves the freedom to the user between choosing two water flush volumes (full vs. reduced) while also letting him/her the possibility to adjust the flush volume according to his/her need. In that case, both reduced and full flush volumes are to be seen as maximum volume flushed per cycle but the volume actually flushed can be lower depending on the user's request. This latter option has been, however, discarded since

the market share of such system is unknown and in any case estimated to be relatively low. Manufacturers also pointed out that there is a risk of misuse of the interruptible device by the user which might lead at the end to extra flushing (at the opposite of what is actually looked for) or even worse to drainage system blockage (due to insufficient flush volumes). The former option (dual flush control requirement) has also not been kept because too technology specific and excluding potentially valid technology (e.g. interruptible flush control). Finally, a neutral approach asking for a water-saving device but without prescribing any particular technology has been retained. This respects the general technology-neutral principle of the EU Ecolabel, gives more flexibility to manufacturers and also fosters the development of new water-saving technologies. In that case, the decision on how to fulfil the requirement is left to the manufacturer, who has to demonstrate how water saving is really achieved.

To set the threshold on the maximum reduced flush volume, it needs to be noted that only dual flush toilets actually provide benchmark values regarding reduced flush volumes. Indeed interruptible flush toilets usually do not. Thus, the threshold for the maximum reduced flush volume is based on dual flush toilets. When looking at BAT in terms of reduced flush volume, it appears that best dual flush toilets provide 2.5 l/flush but the vast majority provide 3 l/flush. In consequence, the threshold set for the maximum reduced flush volume has been based on this latter value (3 l/flush).

The combination of Criteria 1(a) and 1(b) leads to the selection of 6/3 l (or less) dual flush flushing toilet equipment. 45% of the market is estimated to be dual flush but this also includes 6/4 l dual flush. The market share of 6/3 l (or less) dual flush is not known exactly; nevertheless, as a first approximation, about 40% of the market might be assumed to meet both Criteria 1(a) and 1(b). The selectivity is not enough for the EU Ecolabel, which has a target of 10-20% best products. A third criterion has then been added on the average flush volume (see Criterion 1(c)) to achieve more selectivity and water saving while giving flexibility to manufacturers.

As a remark, few toilet suites available on the market can deliver a single flush of 4 l (or less). Such equipment is considered as achieving high water saving and is then derogated to have a water saving device. The obligation of the water-saving device only applies to toilet suites delivering a full flush volume of more than 4 l.

In addition, a distinction is needed between toilet suites and toilet flushing systems on one hand and toilet receptacles on the other hand. Indeed, toilet suites and toilet flushing systems may (or not) be equipped with a water-saving device while toilet receptacles, by definition, are never equipped with such device. As a result, the criterion only requires for toilet receptacles that by design they allow the use of a water-saving device.

Regarding flushing urinal equipment, the need for having an individual flush control per urinal is well established in order to save water by avoiding flushing other urinals which have not been used. This requirement is also commonly found in other labelling schemes like the EU Ecolabel for tourist accommodation and campsites, the EUnited WELL scheme and the Australian/New Zealand WELS. Individual on-demand flush control requirement for flushing urinal equipment ensures that a flushing urinal is flushed after using it only. In particular, flushing urinal equipment based on timed flushing (e.g. mechanisms relying on a time clock or a fill-and-empty basis) or which may allow unneeded flushing (e.g. flushing of a non-used urinal because the system flushes more than one urinal at the same time) are not water-saving products and shall not be awarded the EU Ecolabel.

Like for toilet receptacles, a distinction is needed between urinal suites and urinal flushing systems on one hand and urinals on the other hand. Indeed, urinal suites and urinal flushing systems may (or not) be equipped with an individual on-demand flush control while urinals, by definition, are never equipped with any flush control device. As a result, the criterion only requires for urinals that by design they allow the use of an individual on-demand flush control.

For the specific cases of urinals and urinal suites made of a continuous wall, there is a need to define the width of continuous wall which should be considered as equivalent to a single urinal and then to be flushed by an individual on-demand flush control. The selected length of 60 cm has been based on the experience from other schemes and is for instance the same as the one used for setting the Australian/New Zealand WELS requirements.

For sensor-based flush controls (it mainly concerns flushing urinal equipment but may also equip flushing toilet equipment), it is important that they prevent any false triggering and ensure that the flush is delivered only after the actual use of the product. In particular, a person only passing by the equipment shall not trigger the flush. Some tentative requirements for the sensor design were proposed for discussion (e.g. adjustable detection field not greater than 30 cm from the front of the product, flush actuation due to a presence detected for at least five seconds) but these suggested prescriptions were considered to be too specific and generally rejected by stakeholders. Finally, it was decided that it is up to the manufacturer to demonstrate that some measures (with describing them) have been taken when designing the product to prevent false triggering and ensure flush actuation only after actual product use.

4.1.3 Criterion 1(c) – Average flush volume

Proposed criterion

The average flush volume of flushing toilet equipment, when placed on the market, calculated by following the methodology set out in Appendix 1 shall not exceed 3.5 l/flush. Toilet suites delivering a full flush volume of 4.0 litres or less are exempted from this requirement.

Proposed assessment and verification

The applicant shall declare that the product complies with those requirements and specify the calculated average flush volume (in l/flush) of the product together with results of tests conducted in accordance with the methodology set out in Appendix 1.

Rationale

The Appendix mentioned above can be found in Section 6, Appendix 1: Methodology to measure and calculate the average flush volume.

As explained in Criterion 1(b), additional water saving (and selectivity) is needed for flushing toilet equipment. This can be achieved with setting a requirement for the average flush volume by taking into account that different flush volumes (namely full and reduced) can be delivered depending on the user's choice. The principle is to define a composite flush (the average flush volume) as a mix of full and reduced flush volumes based on assumptions related to the use of the flushing toilet equipment. Setting an average flush volume gives flexibility to manufacturers with letting them to play on the different flush volume levels (full and reduced flushes). The two main questions related to the average flush volume requirement are: 1) the definition of the average flush volume itself; and 2) the average flush volume threshold.

As a matter of fact, there is no commonly agreed definition of what an average flush volume should be. The definition of the average flush relies on the assumptions on the actual use of the product, i.e. on a defined period of time how many times a user would need a reduced flush and the same for the full flush. Or in other words, on average, for every full flush how many reduced flushes would there be delivered? This question is far from being trivial and we can observe across the different schemes a large spectrum of different assumptions. For instance, the Australian/New Zealand WELS and Catalan Ecolabel set the average flush as the average of four reduced flushes plus one full flush. The UK WEPLS defines it as the average of three reduced flushes plus one full flush. The US WaterSense gives the average of two reduced flushes plus one full flush. Furthermore, when looking at real user behaviour, it is not uncommon to find that a more realistic average flush would tend to be more the

average of one reduced flush plus one full flush (see for instance the trial data gathered by the UK Environment Agency). Based on the discussions with stakeholders, it was decided to set the average flush volume as "the arithmetic average of one full flush volume and three reduced flush volumes" as defined in Article 2 of the Decision. In addition, a full protocol for measuring the average flush volume has been devised and is described in the aforementioned Appendix 1. In particular, the average flush volume is based on actual flush volumes (and not nominal flush volumes) with the water supply shut on and with a limited tolerance (the tolerance is set at 0.05 l).

Regarding the average flush volume threshold, many stakeholders asked for loose values (between 3.75 l/flush and 4.5 l/flush). However, these loose values would correspond with 6/3 l dual flush toilet (3.75 l/flush) or 6/4 l dual flush toilet (4.5 l/flush), which would simply add nothing compared to Criteria 1(a) and 1(b). Additionally, there was a proposal to base the protocol for measuring the average flush volume on the Australian/New Zealand WELS requirements, setting the threshold at 3.6 l/flush. The reason of such proposal was the possible adjustment of the EU Ecolabel criteria to the lowest requirements laid down in the Netherlands. Changing the protocol would however allow the criteria to be fulfilled by the 6/3 dual flush toilets allowing no additional value to be put on the EU Ecolabel product. The average flush volume has been introduced as supporting requirement (completed with criterion on water saving and full flush volume) to increase the selectivity and environmental performance of the EU Ecolabel products, without *a priori* exclusion of any Member State. These thresholds (6/3 and 6/4) are simply not acceptable and a stricter value is merely needed to really achieve additional water saving and higher product selectivity. The further reduction of the average value to 3 l/flush, as proposed by one stakeholder, would reduce the possibility to apply for the EU Ecolabel for this product group to the negligible market share. For all the above mentioned reasons, Criterion 1(c) proposes already challenging compromise to set a maximum average flush volume as 3.5 l/flush for flushing toilet equipment, which corresponds with e.g. the average flush volume of a 5/3 l dual flush toilet. Dual flush toilet with lower flush volumes (e.g. 4/2.5 l dual flush) will obviously comply with the requirement (for instance, a 4/2.5 l dual flush toilet has a 2.875 l average flush). The requirement of 3.5 l/flush also opens the possibility of awarding flushing toilet equipment like 6/2.5 l dual flush (average flush of 3.375 l) which are not yet proposed on the market but could be developed in the future. Indeed, there are no technical reasons not to go down the reduced flush volume for 6 l full flush toilet equipment from 3 to 2.5 l/flush (even if EN 14055 so far recommends not doing so). We can already note that 2.5 l reduced flush is already offered for 4 l full flush toilet equipment.

In general, it is acknowledged that less than 10-20% products can currently achieve 3.5 l/flush but setting a value of 3.75 l/flush will be of no value (as explained above) and setting a

value between 3.5 and 3.75 l/flush will not help and be *de facto* the same as a 3.5 l/flush limit because there are no products between 5/3 l and 6/3 l dual flush toilet. In addition, such a threshold of 3.5 l/flush will definitely foster innovation.

Furthermore, 4 l (or less) single flush toilet suites are derogated from the average flush requirement because they are considered already as high water saving products. Indeed, we are sure that each flush cycle cannot deliver more than 4 l (which is not the case of e.g. 5/3 l dual flush toilet, which in the worst case can be actually flushed each time by the user with the full flush, i.e. 5 l, even if not needed).

4.1.4 Criterion 1(d) –Flush volume adjustment

Proposed criterion

Flushing systems shall be equipped with an adjusting device so that the flush volumes can be adjusted by the installer to take into account the local conditions of the drainage system. The full flush volume after adjustment, with following the installation instructions, shall not exceed 6 l/flush for flushing toilet equipment or 4 l/flush if the toilet suite is not equipped with a water-saving device, and 1 l/flush for flushing urinal equipment. The reduced flush volume after adjustment, with following the installation instructions, shall not exceed 3 l/flush for flushing toilet equipment.

In the case of flushing systems made of a flushing cistern, the maximum full flush volume after adjustment should be indicated on the flushing cistern by a water line or a water mark.

Proposed assessment and verification

The applicant shall declare that the product complies with those requirements and provide documentation describing the technology or device applied in the product.

Rationale

The adjustment requirement, which is also included in other schemes like the Blue Angel, is intended to take into account the local conditions of the drainage systems. The presence of adjusting device allows the installer to modify the water volume flushed and may result in some cases in additional water saving. For flushing cisterns, adjusting devices include devices equipping either the inlet valve (which modify the filling level) and/or the outlet mechanism (which modify the residual water level). For pressure flush valves, adjusting devices include devices equipping the valves which make adjustable the duration of the automatic closure and then the water volume flushed. At stakeholder request, the criterion clearly indicates that the adjustment shall be done according to the installation instructions and, for cisterns, that the maximum full flush volume after adjustment shall be indicated on it

by a water line or a water mark. Indeed for cisterns, it is often technically possible to go beyond the manufacturer recommendations in terms of adjustment, but a permanent warning mark should be deemed to be sufficient to remind not to go beyond.

For flushing toilet equipment, the maximum full flush volume after adjustment is set at 6 l/flush, given that any drainage system type, according to EN 12056 Standard, allows 6 l/flush toilet equipment. One stakeholder mentioned that in countries where the full flush should not be lower than 6 l/flush, this might cause problems. It has to be underlined that the number of MS potentially concerned is rather limited (Netherlands, France to some extents) and there is in principle no contradiction given that the adjustment option leaves the possibility to set the toilet flush volume at 6 l/flush without breaking the rules. The maximum reduced flush volume after adjustment is limited at 3 l/flush. UK stakeholders asked for increasing the threshold up to 4 l/flush given that it is of common practice in the UK to sell 6/4 dual flush toilets. However, there are no technical reasons to go in that direction: the 3 l/flush limit is compatible with any drainage system or product performance requirements and does not contradict the relevant standards which specify only that the reduced flush volume shall not be greater than two-thirds of the maximum flush volume. The limit of 3 l/flush shall ensure that water saving is really achieved with the reduced flush. In the specific case where the flushing toilet equipment is, by derogation, not equipped with a water-saving device and then cannot deliver any reduced flush, it is of first importance that the single flush volume cannot exceed 4 l/flush after adjustment; otherwise any potential water saving would be jeopardised.

For flushing urinal equipment, the maximum flush volume after adjustment is set at 1 l/flush because such volume is assumed to be sufficient to avoid any drainage problem with urinal equipment, while preserving water saving.

Note that all the limits mentioned above are consistent with the ones defined in Sections 4.1.1 *Criterion 1(a) – Full flush volume* and 4.1.2 *Criterion 1(b) – Water saving*.

4.2 Criterion 2 – Product performance

4.2.1 Criterion 2(a) – Flushing system requirements

Proposed criterion

Flushing systems shall comply with the requirements of the respective EN standards listed in Table 5. The sections of the relevant EN standards in Table 5 below concerning the full flush and reduced flush volumes are excluded from this criterion.

Proposed assessment and verification

The applicant shall declare that the product complies with those requirements and provide results of tests conducted in accordance with the testing procedure indicated in respective EN standards for the given kind of product (see Table 5).

Table 5: EN standard compliance for the flushing system

Flushing system	Standard	Standard title
Toilet and urinal flushing cisterns	EN 14055	WC and urinal flushing cisterns
Toilet and urinal manual pressure flush valves	EN 12541	Sanitary tapware – Pressure flushing valves and automatic closing urinal valves PN 10
Toilet and urinal contact-free pressure flush valves	EN 15091	Sanitary tapware - Electronic opening and closing sanitary tapware

Rationale

Ecolabelled products should not only be recognised as best environmentally performing products but must also meet user expectations in order to be widely accepted. For flushing toilet and urinal equipment, it is important that the flushing system performs well. As a minimum, compliance of the flushing systems with respective EN standards is then required.

4.2.2 Criterion 2(b) – Flush performance

Proposed criterion

The flush performance of toilet and urinal suites, toilet receptacles and urinals shall comply with the requirements of the respective EN standards listed in Table 6.

Proposed assessment and verification

The applicant shall declare that the product complies with those requirements and provide results of tests conducted in accordance with the testing procedure indicated in respective EN standards for the given kind of product (see Table 6). Toilet suites and toilet receptacles not covered by any EN standard shall demonstrate flush performance levels similar to those of equivalent class and type covered by Standard EN 997. In that case the applicant shall provide results of tests conducted in accordance with the testing procedure indicated in Standard EN 997 for products of equivalent class and type. Urinal suites and urinals not covered by any EN standard shall demonstrate flush performance level similar to those of equivalent class and type covered by Standard EN 13407. In that case the applicant shall

provide results of tests conducted in accordance with the testing procedure indicated in Standard EN 13407 for products of equivalent class and type.

Table 6: EN standard compliance for the flushing performance of the product

Product	Standard	Standard title
Toilet suites and toilet receptacles	EN 997	WC pans and WC suites with integral trap
Urinal suites and urinals	EN 13407	Wall-hung urinals - Functional requirements and test methods

Rationale

Again, ecolabelled products should not only be recognised as best environmentally performing products but must also meet user expectations in order to be widely accepted. It is important that flushing toilet and urinal equipment fulfils its function properly, i.e. a single flush removes all the waste from the receptacle (e.g. pan, bowl or trough), washes it properly without over splashing and leaves an appropriate water volume (seal depth) in the trap. The function is the same for every flushing toilet as it is the same for every flushing urinal. As a minimum, compliance with respective EN standards is then required. Technical requirements on flush performance with testing methods are included in respective EN standards¹⁵.

However, EN standards do not exist for all products. For toilet suites and receptacles, EN 997 addresses WC suites and WC pans, but for instance squat flushing toilets are not covered. For urinal and urinal suites, only wall-hung urinals (and urinal suites) are covered in EN 13407; but slab, stall or trough urinals are not covered. This comes from the fact that WC suites and pans and wall-hung urinals are, by far, the most commonly sold toilet and urinal equipment, respectively. Nevertheless, even if other equipment has marginal market shares, they exist and are still purchased, and it is desirable that all ecolabelled flushing toilet equipment can fulfil similar flush performance requirements and the same applies for ecolabelled flushing urinal equipment.

It should be noted that the requirements and test methods defined in the EN standards (EN 997 and 14307) depend on the class/type of products and may be different from one product to another. In the detail, as shown in Table 7, the test methods and requirements for flush performance in EN 997 are different for class 1 and class 2 WCs. For instance for waste removal, there are differences in terms of flush volumes used (full flush vs. reduced flushed for paper removal test), test media used (12 sheets vs. 6 sheets for paper removal test, 50 plastic balls vs. 4 test specimens for solid waste removal test), number of trials required (4/5 vs. 6 in a row or 8/10 for paper removal test, 5 vs. 6 in a row or 8/10 for solid waste removal

test) and performance required (85% vs. 100% for solid waste removal test). Furthermore, regarding class 1 WCs, WCs of types 5 and 6 (nominal flush of 5 l and 6 l, respectively) are not subject to solid waste removal test (namely 'Fifty plastic balls test') but only to the 'After-flush volume test' which gives more flexibility on waste removal requirements. Regarding after-flush volume, over-splashing and water seal, test methods and requirements are also different (e.g. no after-flush volume test for some types of class 1 WC; no over-splashing test for Class 2 WC; different number of trials for water seal test, etc.). The only test method and requirements which are similar for class 1 and class 2 WCs concern the wash of bowl.

Table 7: WC flush performance testing according to EN 997

Tests		Class 1 WC	Class 2 WC
Paper removal	Test method	Toilet paper test	Paper discharge for reduced flush volume test
	Test requirement	Removal of all 12 toilet paper sheets (4 times out of 5 tests)	Removal of all 6 toilet paper sheets (for the first 6 tests or for a minimum of 8 times out of 10 tests)
Solid waste removal	Test method	Fifty plastic balls test ¹	Solids discharge and after-flush volume for maximum flush volume test
	Test requirement	Minimum removal of 85 % of the balls (after five tests, each with 50 balls)	Removal of all 4 test specimens (for the first 6 tests or for a minimum of 8 times out of 10 tests)
After-flush volume	Test method	After-flush volume test ²	Solids discharge and after-flush volume for maximum flush volume test
	Test requirement	After-flush volume ≥ 2.5 l or 2.8 l, as appropriate (10 or 20 tests)	After-flush volume $\geq 40\%$ of the full-flush volume (in each of the 6 or 10 tests)
Wash of bowl	Test method	Sawdust test	Wash of bowl
	Test requirement	Average unflushed area ≤ 50 cm ² (after 5 tests)	Average unflushed area ≤ 50 cm ² (after 5 tests)
Over-splashing	Test method	Over-splashing test	None
	Test requirement	No splashing (a few small drops are allowed) beyond the rim of the bowl (1 test)	None
Water seal	Test method	Depth of water seal	Water trap seal tests
	Test requirement	Water seal ≥ 50 mm (1 test)	Water seal ≥ 50 mm (2 random tests)

¹ Only for Class 1 WC of types 4, 7 and 9 (nominal flush of 4 l, 7 l and 9 l, respectively).

² Only for Class 1 WC of types 5 and 6 (nominal flush of 5 l and 6 l, respectively).

As well, as shown in Table 8, the test methods and requirements for flush performance in EN 13407 are different for class 1 and class 2 wall-hung urinals: class 2 wall-hung urinals are simply not subject to any test, except for the water seal depth. Furthermore, regarding class

¹⁵ A table indicating which tests should be conducted for various kinds of products with indication of the respective EN standards will be available in user manual.

1 wall-hung urinals, only those of types I and IV are required to pass the waste removal test and only those of types I and II the water seal test.

Table 8: Wall-hung urinal flush performance testing according to EN 13407

Tests		Class 1 wall-hung urinal	Class 2 wall-hung urinal
Waste removal	<i>Test method</i>	<i>Flushing of three plastics balls test¹</i>	<i>None</i>
	<i>Test requirement</i>	Minimum removal of 2 balls out of 3 (each of 5 tests)	None
Wash of bowl	<i>Test method</i>	<i>Sawdust test</i>	<i>None</i>
	<i>Test requirement</i>	Average unflushed area ≤ 80 cm ² (after 5 tests)	None
Over-splashing	<i>Test method</i>	<i>Over-splashing test</i>	<i>None</i>
	<i>Test requirement</i>	No splashing (a few small drops are allowed) beyond the edge of the bowl (1 test)	None
Water seal	<i>Test method</i>	<i>Depth of water seal²</i>	<i>Water trap seal tests³</i>
	<i>Test requirement</i>	Water seal ≥ 50 mm (1 test)	Water seal ≥ 75 mm (1 test)

¹ Class 1 wall-hung urinals of types II and III are excluded from the test.

² Class 1 wall-hung urinals of types III and IV are excluded from the test.

³ Class 2 wall-hung urinals of types III are excluded from the test

For toilet suites and receptacles other than WC suites and pans, it is proposed that these products achieved the same level of flush performance than the WC suites/pans of equivalent class and type and use the EN 997 requirements and test methods in terms of flush performance as a basis.

For urinals and urinal suites and other than wall-hung urinals and urinal suites, it is proposed that these products achieved the same level of flush performance than the wall-hung urinals/urinal suites of equivalent class and type and use the EN 13407 requirements and test methods in terms of flush performance as a basis.

4.2.3 Criterion 2(c) – Flush-free urinal requirements

Proposed criterion

Flush-free urinals shall meet the requirements defined in Appendix 2.

Proposed assessment and verification

The applicant shall declare that the product complies with those requirements and provide results of tests conducted in accordance with the testing procedure set out in Appendix 2. Any equivalent methodology demonstrating that the requirements set out in Appendix 2 are met shall also be accepted.

Rationale

The Appendix mentioned above can be found in Section 7. *Appendix 2: Requirements to be met by flush-free urinals and test methods.*

Like for the other products, ecolabelled flush-free urinals should not only be recognised as best environmentally performing products but must also meet user expectations in order to be widely accepted. It is important that flush-free urinals function properly.

As a matter of fact, there is no EN standard for testing flush-free urinals and the certification of such products is left to the discretion of Member States with different rules applying from MS to MS. To circumvent this problem, it has been first proposed for the EU Ecolabel to follow the requirements laid down in American Standard ASME A112.19.19-2006 on 'vitrous china nonwater urinals'. However, this American-based proposal was rejected by the vast majority of stakeholders, who asked instead for a harmonized European solution. Since developing a EN Standard on flush-free urinals is out of the scope of the project, a compromise was to develop a set of principles, laid down in Appendix 2 to the criteria, which defines the general requirements to be met by flush-free urinals and describes briefly the testing methods to follow. Nevertheless, the testing methods presented in Appendix 2 are not mandatory and any equivalent methodology demonstrating the fulfilment of the requirements shall also be accepted. These testing methods should be seen as a help for both applicants and assessing competent bodies on which tests may be performed when verifying the product compliance in terms of quality/functionality.

From stakeholders' discussion, it appeared that ecolabelled flush-free urinals should pass the following tests:

- *load resistance test*: the product should not crack or become detached from the wall when a user applies a pressure on the equipment;
- *draining test*: when the product is used, all urine should drain away;
- *leak tightness test*: the product should not leak and any fluid poured into it should be evacuated only through the outlet connection;
- *backflow prevention of foul air and water test*: the product should avoid any backflow of foul air or water, which would lead otherwise to bad odours for the user.

All these requirements and the relevant tests to be performed have been included in Appendix 2. In a mid term perspective, developing a EN Standard on flush-free urinals should also be considered as an option. According to the information received from one stakeholder, the standard EN 1253 -2 currently under revision could be used as a test procedure to prevent the backflow of foul air/water. This methods has however not been applied to a waste fitting of a flush-free urinals and still needs to be validated.

4.3 Criterion 3 – Excluded or limited substances and mixtures

4.3.1 Criterion 3(a) – Hazardous substances and mixtures

Proposed criterion

According to the Article 6(6) of Regulation (EC) No 66/2010 the EU Ecolabel may not be awarded to any product or any article of it as defined in Article 3(3) of Regulation (EC) No 1907/2006 or homogenous part of it that contains substances meeting criteria for classification with the hazard statements or risk phrases as specified in Table below in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council¹⁶ or Council Directive 67/548/EC¹⁷, substances referred to in Article 57 of Regulation (EC) No 1907/2006¹⁸. In case the threshold for classification of a substance or mixture with a hazard class differs from the one of a risk phrase then the former prevails. The risk phrases in Table below generally refer to substances. However, if information on substances cannot be obtained, the classification rules for mixtures apply. Substances or mixtures which change their properties through processing and thus become no longer bioavailable, or undergo chemical modification in a way that removes the previously identified hazard are exempted from criterion 3 (a).

Hazard statements and Risk Phrases:

Hazard Statement	Risk Phrase
H300 Fatal if swallowed	R28
H301 Toxic if swallowed	R25
H304 May be fatal if swallowed and enters airways	R65
H310 Fatal in contact with skin	R27
H311 Toxic in contact with skin	R24
H330 Fatal if inhaled	R23/26
H331 Toxic if inhaled	R23
H340 May cause genetic defects	R46
H341 Suspected of causing genetic defects	R68
H350 May cause cancer	R45
H350i May cause cancer by inhalation	R49
H351 Suspected of causing cancer	R40
H360F May damage fertility	R60
H360D May damage the unborn child	R61

¹⁶ OJ L 353, 31.12.2008, p.1.

¹⁷ OJ 196, 16.8.1967, p. 1

¹⁸ OJ L 396, 30.12.2006, p.

Hazard Statement	Risk Phrase
H360FD May damage fertility. May damage the unborn child	R60/61/60-61
H360Fd May damage fertility. Suspected of damaging the unborn child	R60/63
H360Df May damage the unborn child. Suspected of damaging fertility	R61/62
H361f Suspected of damaging fertility	R62
H361d Suspected of damaging the unborn child	R63
H361fd Suspected of damaging fertility. Suspected of damaging the unborn child.	R62-63
H362 May cause harm to breast fed children	R64
H370 Causes damage to organs	R39/23/24/25/26/27/28
H371 May cause damage to organs	R68/20/21/22
H372 Causes damage to organs through prolonged or repeated exposure	R48/25/24/23
H373 May cause damage to organs through prolonged or repeated exposure	R48/20/21/22
H400 Very toxic to aquatic life	R50
H410 Very toxic to aquatic life with long-lasting effects	R50-53
H411 Toxic to aquatic life with long-lasting effects	R51-53
H412 Harmful to aquatic life with long-lasting effects	R52-53
H413 May cause long-lasting harmful effects to aquatic life	R53
EUH059 Hazardous to the ozone layer	R59
EUH029 Contact with water liberates toxic gas	R29
EUH031 Contact with acids liberates toxic gas	R31
EUH032 Contact with acids liberates very toxic gas	R32
EUH070 Toxic by eye contact	R39-41

Concentration limits for substances or mixtures which may be or have been assigned the hazard statements or risk phrase listed in the Table above, meeting the criteria for classification in the hazard classes or categories, and for substances meeting the criteria set out in points (a), (b) or (c) of Article 57 of Regulation (EC) No 1907/2006, shall not exceed the generic or specific concentration limits determined in accordance with the Article 10 of Regulation (EC) No 1272/2008. Where specific concentration limits are determined they shall prevail over the generic ones.

Concentration limits for substances meeting criteria set out in points (d), (e) or (f) of Article 57 of Regulation (EC) No 1907/2006 shall not exceed 0.1% weight by weight. The final product shall not be labelled with hazard statements.

For flushing toilet equipment and urinal equipment, the substances/components in Table below are exempted from the obligation in Article 6(6) of Regulation (EC) No 66/2010 following application of Article 6(7) of the same Regulation: Derogated substance/components:

Substance/component	Hazard statements and risk phrases
Articles with weight below 25 g	All hazard statements and risk phrases
Homogeneous parts of complex articles with weight below 25 g	All hazard statements and risk phrases
Nickel in stainless steel of all types	H351, H372 and R40/48/23
Electronic components of flushing toilets and urinals, which fulfil the requirements of Article 4 set out in Directive 2011/65/EU of the European Parliament and of the Council ⁽¹⁹⁾	All hazard statements and risk phrases

Proposed assessment and verification

For the product or any article or homogenous part of it, the applicant shall provide a declaration of compliance with criterion 3 (a), together with related documentation, such as declarations of compliance signed by their suppliers, on the non-classification of the substances or materials with any of the hazard classes associated to the hazard statements referred to in the above Table in accordance with Regulation (EC) No 1272/2008, as far as this can be determined, as a minimum, from the information meeting the requirements listed in Annex VII of Regulation (EC) 1907/2006. This declaration shall be supported by summarized information on the relevant characteristics associated to the hazard statements referred to in the above Table, to the level of detail specified in section 10, 11 and 12 of Annex II of Regulation (EC) No 1907/2006. Information on intrinsic properties of substances may be generated by means other than tests, for instance through the use of alternative methods such as in vitro methods, by quantitative structure activity models or by the use of grouping or read-across in accordance with Annex XI of Regulation (EC) No 1907/2006. The sharing of relevant data across the supply chain is strongly encouraged.

The information provided shall relate to the forms or physical states of the substance or mixtures as used in the final product.

For substances listed in Annexes IV and V to Regulation (EC) No 1907/2006, which are exempted from registration obligations under point (a) and (b) of Article 2(7) of that Regulation, a declaration by the applicant shall suffice to comply with criterion 3 (a).

⁽¹⁹⁾ OJ L 174, 1.7.2011, p. 88.

Rationale

During the criteria development it was agreed that limitations on hazardous substances and mixtures (as introduced in all new EU Ecolabel criteria decisions developed or revised after the implementation of the new EU Ecolabel Regulation²⁰) need to be included in the criteria set. Indeed, the new EU Ecolabel Regulation obliges to include such requirements.

Article 6(6) of EU Ecolabel Regulation requires that certain types of substances are not allowed in ecolabelled products: "The EU Ecolabel may not be awarded to goods containing substances or preparations/mixtures meeting the criteria for classification as toxic, hazardous to the environment, carcinogenic, mutagenic or toxic for reproduction (CMR), in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures nor to goods containing substances referred to in Article 57 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency".

Nevertheless, the EU Ecolabel Regulation recognises also that in certain circumstances restriction of some substances may not be technically or economically viable. Therefore, Article 6(7) of the Regulation states that: "For specific categories of goods containing substances referred to in paragraph 6, and only in the event that it is not technically feasible to substitute them as such, or via the use of alternative materials or designs, or in the case of products which have a significantly higher overall environment performance compared with other goods of the same category, the Commission may adopt measures to grant derogations from paragraph 6".

Consequently, stakeholders' consultation was conducted to identify substances, which might need to be derogated for this product group. In particular, the industry was invited to submit derogations (motivated and accompanied by information on the function of the respective substance, content in the product and the additional rationale substantiating the request – reasons) for substances, which are classified as hazardous substances but cannot be substituted or eliminated, and do fulfil the conditions set in Article 6(7).

Several derogation requests were submitted to JRC-IPTS during the stakeholders' consultation phase and were carefully evaluated. For each potential derogation (nickel in stainless steel, electronic components, and articles and homogeneous parts below 25 g) the information received and the conclusions drawn from its analysis are presented below.

²⁰ See Footnote 10.

Nickel in stainless steel

A derogation request for nickel in stainless steel has been sent to the JRC-IPTS. The attached supporting information and rationale are presented below²¹.

Nickel improves general corrosion resistance and prompts the formation of austenite (i.e. it is an austenite stabiliser). Stainless steels with 8-9% nickel have a fully austenitic structure and exhibit superior welding and working characteristics to ferritic stainless steels. Increasing nickel content beyond 9% further improves both corrosion resistance (especially in acids) and workability.

From a regulatory perspective, nickel in stainless steel is the main substance of concern. Nickel (metal) has the following CLP harmonized classifications:

- Carc. 2 H351 (R45)
- Skin Sens. 1 H317 (R43)
- STOT RE 1 H372

In accordance with the CLP, mixtures containing 1% or more of nickel are classified with the same hazards as nickel metal. While stainless steels containing 10% or more nickel must be classified STOT RE 1 (H372) and stainless steels containing 1-10% nickel must be classified STOT RE2.

Many stainless steels contain nickel as a deliberate alloying addition. The most commonly used stainless steels contain ~10% nickel. However, the range covers 0 – 38% nickel and even many of the so-called nickel-free stainless steels contain up to 1% nickel as an impurity.

REACH recognizes that, amongst other materials, alloys are special preparations and Annex 1, 0.11 states that “When assessing the risk of the use of one or more substances incorporated into a special preparation (for instance alloys), the way the constituent substances are bonded in the chemical matrix shall be taken into account.”

Stainless steels are a well-known example of special preparations and that the hazard properties of nickel are not expressed by stainless steels. This recognized in the following EU legislation:

- CLP Regulation (1272/2008) Annex I, 1.1.3.2, Note 7: Alloys containing nickel are classified for skin sensitization when the release rate of 0,5 µg Ni/cm²/week, as measured by the European Standard reference test method EN 1811, is exceeded.
- Directive 2004/96/EC amending Council Directive 76/769/EEC as regards restrictions on the marketing and use of nickel for piercing post assemblies specifies a maximum

release rate of 0.2 µg Ni/cm²/week (i.e. replacing a concentration limit of 0.5% Ni max).

- Directive 94/27/EC amending Council Directive 76/769/EEC as regards restrictions on the marketing and use of nickel-containing articles in close and prolonged contact with the skin, which specifies a maximum release rate of 0.5 µg Ni/cm²/week.
- Directive 2009/48/EC on the safety of toys. Recital 21 indicates the need to ensure a high level of protection of children against risks caused by chemical substances in toys, especially CMR substances and allergenic substances and certain metals. In this regard, it states “Nickel in stainless steel has proven to be safe, and consequently it is appropriate that it can be used in toys”. A further reference to nickel in stainless steel is made in Annex II (Particular Safety Requirements), III Chemical Properties, 6. Points 3, 4 and 5 shall not apply to nickel in stainless steel.

These legislative outcomes are supported by an extensive body of evidence²² which demonstrates that, for stainless steels, the release of metals in biological fluids is not proportional to the chemical composition. In particular, the release of metals from stainless steel has been studied in artificial body fluids to mimic dermal, inhalation or gastrointestinal exposure scenarios. When the releases of different metal constituents of stainless steel are compared, iron is usually released at higher amounts than chromium and nickel. However, in all cases the release of metal ions is very low. In general, the less alloyed ferritic stainless steel grades release more metals. However, the increase is attributed to the release of iron. The differences in release rates between different stainless steel grades or surface finishes are usually small (e.g. 2-fold).

Significant differences were seen when metal released from stainless steel was compared with that released from pure metals. Thousand-fold differences in iron and nickel release were seen in a study in which the release from stainless steel grade 316 sheets was compared to the release from nickel metal and iron in artificial lysosomal fluid. The releases of chromium were on the same level both from stainless steel and from pure chromium metal. These in vitro studies suggest that while chromium bioaccessibility from stainless steel is similar to that from metallic chromium, the iron and nickel bioaccessibility from stainless steel is significantly lower than from metallic iron and nickel. These results strongly support the conclusion that the health effects of stainless steel cannot be estimated solely on the basis of its bulk contents of iron and nickel. This can be explained by the chromium oxide passivation layer enveloping the stainless steel surface. It has been shown that chromium oxide enrichment in the surface occurs during in vitro incubation in artificial biological fluids,

²¹ Direct quote of stakeholders' feedback is given in this section *in italic*.

²² Extensive list of references supporting the feedback sent have been submitted to the project team.

and decreases release rates to a very low level that is sustained over time. Although few in number, in vivo studies indicate metal release in animals is similarly low.

Furthermore, an independent assessment of this body of evidence by the Finnish Institute of Occupational Health (FIOH) entitled "Review on toxicity of stainless steel" concludes that "in vitro release tests show that nickel release from stainless steel in artificial lung fluids is substantially (hundred or even 1000-fold) lower than from nickel particles, due to the chromium-(III) oxide enrichment at the surface of stainless steel. The existence of low inhalation toxicity, compared to nickel powder, is supported by a recent 28 days stainless steel inhalation toxicity study. Therefore, no classification for target organ toxicity in repeated exposure to stainless steel is proposed. Also no classification for mutagenicity or carcinogenicity is proposed. Although some grades of stainless steel show somewhat higher release of nickel than grade AISI 316L (which is the grade mostly used in toxicity tests), the differences between grades are low when compared to the differences seen in the release of nickel from pure nickel and stainless steel. Thus, these conclusions can be regarded to apply for all common grades of stainless steel including grade 303 with the highest nickel release." FIOH's conclusions concerning stainless steel and carcinogenicity are supported by IARC's conclusion that stainless steel implants are not classifiable as to their carcinogenicity to humans (Group 3).

Based on the analysis of the feedback submitted, it is proposed to derogate the use of nickel in stainless steel for the product group of flushing toilets and urinals. The reason for the derogation is that nickel when incorporated into stainless steel does not behave like nor have the same hazard profile as the substance nickel. Stainless steel is an alloy (special mixture) and should be evaluated based on the properties of the alloy. This is in line with Article 8 (6) of CLP (Regulation (EC) No 1272/2008) that states that: "Tests that are carried out for the purposes of this Regulation shall be carried out on the substance or on the mixture in the form(s) or physical state(s) in which the substance or mixture is placed on the market and in which it can reasonably be expected to be used."

Tests on stainless steel containing nickel show that stainless steel does not exhibit the same hazard properties as nickel and should not be classified accordingly (as concluded e.g. in the report "Review on Toxicity on Stainless Steel" by the Finnish Institute of Occupational Health in 2010).

Derogation for nickel in stainless steel was also investigated in other product groups (e.g. sanitary tapware²³ and imaging equipment²⁴) and these analyses arrived at the same

²³ For more details, see the report on derogations for hazardous substances in sanitary tapware available at: <http://susproc.jrc.ec.europa.eu/ecotapware/docs/Derogation%20requests.pdf>

conclusions. Nickel in stainless steel appears to be an issue only when used in stainless steel of high-sulphur grades ($S > 0.1\%$) and in case of direct skin contact. Nevertheless, as there is no prolonged contact with the product in the normal use of flushing toilets and urinals (the relevant steel grades are commonly used for screws, mechanical or electrical parts which would be concealed), the risk of skin sensitisation would be negligible and additional restrictions are not proposed in this respect.

Electronic components

Stakeholders highlighted that it is very difficult to obtain information on the substance content of the electronic parts, which are not produced by the final product manufacturers but purchased from other producers. Information on the composition of the electronic components is not made available to final product manufacturers. In this situation, a proposal to set the minimum requirements for electronics in flushing toilets and urinals according to new Directive 2011/65/EU²⁵ (RoHS 2) was made by industry. In accordance with information received, the electronic components of flushing toilets and urinals (e.g. sensors and batteries of flushing systems) are covered by the scope of the RoHS 2 as of 3rd of January 2013.²⁶ Nevertheless, in accordance with Article 2(2) of RoHS 2, a transition period applies to flushing toilets and urinals with electronic components, as they were not covered in previous RoHS legislation (Directive 2002/95/EC²⁷), and no compliance with the requirements of Article 4 of the Directive is requested till 22nd of July 2019.

For the purpose of the EU Ecolabel, all electronic parts of flushing toilets and urinals are proposed to fulfil already the RoHS 2 Article 4 requirements in terms of hazardous substances (see in particular EN 50581 on how to demonstrate the compliance with RoHS 2), and only those fulfilling these RoHS 2 requirements can then be derogated from Criterion 3(a) requirements. Otherwise, electronic parts which do not already fulfil the RoHS 2 Article 4 requirements (as it is still on a voluntary basis until 2019) shall fully comply with the Criterion 3(a) requirements (which are somehow more restrictive). Note that the same approach has been adopted for electronic components of sanitary tapware.

Articles and homogeneous parts below 25 g

Flushing toilets and urinals are in general heavy products. For instance, a toilet suite typically weighs between 25 and 35 kg and a urinal suite can be between 20 and 30 kg for. In order to

²⁴ For more details, see the report on derogations for hazardous substances in imaging equipment available at: <http://susproc.jrc.ec.europa.eu/imaging-equipment/docs/Ecolabel%20Criterion%20Derogations%20Hazardous%20Substances.pdf>.

²⁵ Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

²⁶ The change is due to the new definition of "dependent" on electricity.

²⁷ Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

avoid any unnecessary burden for applicants and assessing competent bodies, it is proposed to derogate articles and homogeneous parts of complex articles with weight below 25 g like in other product groups covering heavy products (e.g. imaging equipment and hydronic heaters). The proposed threshold (25 g) has been set so that it represents approximately 0.1% of the total weight of the functioning unit.

The main reason to derogate very small parts and articles is that no significant environmental improvement can be expected in absolute terms with applying fully the Criterion 3(a) requirements, while the burden may increase exponentially for both applicants and assessing competent bodies.

4.3.2 Criterion 3(b) – Substances listed in accordance with article 59(1) of Regulation (EC) No 1907/2006

Proposed criterion

No derogation from the exclusion in Article 6(6) of Regulation (EC) No 66/2010 shall be given concerning substances identified as substances of very high concern and included in the list provided for in Article 59(1) of Regulation (EC) No 1907/2006²⁸, present in mixtures, in an article or in any homogeneous part of a complex article in concentrations > 0.1%. Specific concentration limits determined in accordance with Article 10 of Regulation (EC) No 1272/2008 shall apply in cases where the concentration is lower than 0.1%.

Proposed assessment and verification

Reference to the list of substances identified as substances of very high concern shall be made on the date of application. The applicant shall provide a declaration of compliance with criterion 3(b), together with related documentation, including declarations of compliance signed by the material suppliers and copies of relevant Safety Data Sheets for substances or mixtures in accordance with Annex II to Regulation (EC) No 1907/2006 for substances or mixtures. Concentration limits shall be specified in the safety data sheets in accordance with Article 31 of Regulation (EC) No 1907/2006 for substances and mixtures.

Rationale

This criterion completes the previous criterion (Criterion 3(a)) based on the EU Ecolabel Regulation itself which states in its Article 6(7): "No derogation shall be given concerning substances that meet the criteria of Article 57 of Regulation (EC) No 1907/2006 and that are identified according to the procedure described in Article 59(1) of that Regulation, present in mixtures, in an article or in any homogeneous part of a complex article in concentrations higher than 0,1 % (weight by weight). Those measures, designed to amend non-essential

elements of this Regulation, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 16(2)".

As such, some specific substances are strictly and without exception excluded from the ecolabelled products and there are no room to derogate from that, thus the obligation of having Criterion 3(b) requirements.

4.4 Criterion 4 – Sustainably managed wood as raw materials

Proposed criterion

All virgin wood must originate from forests that are managed so as to implement the principles and measures aimed at certifying sustainable forest management.

When wood is used in the product placed on the market, the producer shall have a policy for sustainable wood procurement and a system to trace and verify the origin of wood and tracking it from forest to the first reception point.

The origin of all wood shall be documented. The producer shall ensure that all wood originate from legal sources in line with Regulation (EU) No 995/2010. The wood shall not come from protected areas or areas in the official process of designation for protection, old growth forests and high conservation value forests specified in national stakeholder processes unless the purchases comply with the national conservation regulations.

At least 70% of any solid wood and 40% wood-based materials shall originate either from sustainably managed forests which have been certified by independent third party schemes respecting the criteria listed in point 15 of Council Resolution of 15 December 1998 on a forestry strategy for the European Union ⁽²⁹⁾ and further development thereof, or from recycled materials.

Proposed assessment and verification

The applicant shall declare that the product complies with these requirements. When wood is used in the product placed on the market, the applicant shall provide appropriate documentation from the wood supplier indicating the types, quantities and precise origins of wood used. The applicant shall provide appropriate certificate(s) showing that the certification scheme respects the criteria listed in point 15 of Council Resolution of 15 December 1998 on a forestry strategy for the European Union.

²⁸ http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

⁽²⁹⁾ OJ C 56, 26.2.1999, p. 1.

Rationale

From a strict LCA point of view, the need for requiring sustainable wood as raw materials is not supported because wood materials do not play a significant role in terms of environmental impacts of flushing toilets and urinals. However, at MS request, the introduction of sustainable sourcing of wood in the criteria has been added to ensure illegal and unsustainable sourcing of wood is not allowed in EU ecolabelled products in general and toilet seats and covers in particular. Introduction of Criterion 4 is additionally supported by Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market – also known as the Timber Regulation that prohibits introduction into the EU market of illegally harvested timber and products derived from such timber, requiring EU traders who place timber products on the EU market to exercise 'due diligence' specified by Commission Implementing Regulation (EU) No 607/2012 of 6 of July 2012.

All in all, even if Criterion 4 requirement is not expected to bring significant benefits at the product group level (flushing toilets and urinals) compared to other product groups (like wooden furniture), it does not harm on the other side and will help protecting the credibility of the EU Ecolabel.

4.5 Criterion 5 – Product longevity

4.5.1 Criterion 5(a) – Reparability and availability of spare parts

Proposed criterion

The product shall be designed in such a way that its exchangeable components can be replaced easily by the end-user or a professional service engineer, as appropriate. Information about which elements can be replaced shall be clearly indicated in the information sheet provided in print or in electronic format, or both. The applicant shall also provide clear instructions to enable the end-user or trained experts, as appropriate, to undertake basic repairs.

The applicant shall further ensure that original spare parts or their equivalent are available for at least ten years from the date of purchase.

Proposed assessment and verification

The applicant shall declare that the product complies with these requirements and provide a sample or samples of the product information sheet provided in print or in electronic format, or both.

Rationale

Lifetime extension is an important issue for saving raw materials and reducing emissions and other environmental impacts related to the production phase. To ensure longevity of the products, they shall be designed in a way which allows end-user/installer to replace the elements which may have a shorter lifetime (e.g. washers) and repair them easily with use of simple tools. This aspect shall be taken into account in the design phase.

With this regard, it is further required that spare parts are available for purchase to end-users, even several years after the production of a given product model is stopped. Based on stakeholders' feedback a period of ten years after product's date of purchase seems achievable for spare part availability. It should be noted that in practice, at the time of application, the assessing competent body has no means to control this specific requirement (spare part availability in time), which then fully relies on the engagement of the applicant, formalised by a self-declaration.

4.5.2 Criterion 5(b) – Warranty

Proposed criterion

The product shall be covered by a warranty for repair or replacement of minimum five years.

Proposed assessment and verification

The applicant shall declare that the product complies with those requirements and provide a sample of warranty terms.

Rationale

Stakeholders indicated that by law manufacturers shall ensure warranty conditions valid at least for two years. Given that all products of this product group have long lifetime and 5-year warranty is already proposed on the market for some flushing toilets and urinals, it is proposed to extend the warranty up to five years (i.e. three additional years compared to the legal requirement). In general, leak tightness is a key point as leakage would result in significant water wastage. However, as leak tightness is normally covered by the warranty terms (under some conditions), special emphasis on leak tightness was finally not included in the criterion.

4.6 Criterion 6 – Reduced end-of-life impacts

Proposed criterion

Plastic parts with a weight above or equal to 25 g shall be marked in accordance with the requirements of Standard EN ISO 11469 so that materials can be identified for recycling, recovery or disposal during the end-of-life phase.

Flush-free urinals shall either use a ready biodegradable fluid or operate completely without fluid.

Assessment and verification

The applicant shall declare that the product complies with those requirements. Additionally, for flush-free urinals, the applicant shall provide documentation describing the technology used and, when a fluid is used, a test report demonstrating the ready biodegradability of the fluid following the definition and test methods provided for in the “Guidance on the Application of the CLP Criteria”³⁰ according to Regulation (EC) No 1272/2008.

Rationale

The issue on reduced end-of-life impacts is consistent with the EU Ecolabel Regulation requirement of considering the product aspects which allow reducing environmental impacts due to reusability of products.

At the end-of-life of flushing toilets and urinals, it is understood that when managed by professionals (plumbers or builders), any product is sent to the appropriate facility for further dismantling and recovering and/or recycling and/or disposal of. When handled by consumers (households) while performing a do-it-yourself job in their homes, it is believed again that a large share of products are sent to the appropriate facility due to the ever increasing pressure of public authorities to recycle household waste and thus providing facilities where these products can be disposed of.

Stakeholders emphasised that there is no market for reusing flushing toilets and urinals and that these products can be dismantled easily for further material recycling and recovering. Thus there is no need for a specific criterion asking for product ability to be dismantled with simple tools in order to recycle or recover most of the materials.

As clearly mentioned by some stakeholders, if a criterion on recycling were needed, it should focus first on materials in high shares, i.e. ceramics. As a matter of fact, ceramics is the main component of flushing toilets and urinals in general (obviously, this might not be verified for a given product like a stainless steel trough urinal or a plastic flush-free urinal, but this holds at

⁽³⁰⁾: http://echa.europa.eu/documents/10162/13562/clp_en.pdf

the European market level). At the end-of-life, the ceramic part of the product is usually recovered after milling and used for several purposes as aggregate in the same way as inert/construction and demolition waste. Stakeholders mentioned that there are also some moves to recycle the ceramics of the product into new ceramic flushing toilets and urinals (e.g. in the USA) and research on recycling of sanitary and technical ceramics is ongoing (e.g. in Germany) but until now it is only downcycling (products with lower performance). As a consequence, ceramic recycling requirements cannot be asked for in the Ecolabel criteria for now and there is no further need for improving ceramic recovery, which is already in place.

In the same way, there is no need for improving metal scrap (metal components, stainless steel products) recycling. Indeed, there are good developed systems and markets for metal recycling, though significant differences are expected between MS with advanced technologies and good developed systems of waste management and MS where such systems are still under development (however this goes beyond the scope of the EU Ecolabel scheme).

Regarding the plastic parts of the product (e.g. waterless urinals, plastic cisterns, fittings), stakeholders reported that most of them are commonly land-filled or incinerated. To foster potential recycling or recovery of plastic parts or ensure their adequate incineration, it is important that these materials are marked correctly for a better identification and consequently an appropriate treatment. However, to avoid any unneeded burden, plastic parts with weight below 25 g shall be exempted of marking, since marking of small parts will not bring any significant benefit whereas it might jeopardise the functionality of very small parts.

As regards flush-free urinals, it is important that when the seal (which avoids bad odour from air and water backflow) is ensured by a fluid, it shall be ready biodegradable. The reason for that is that, by principle, each time a liquid sealant-based flush-free urinal is used, an infinitesimal part of the sealant fluid is actually 'flushed away' with urine and by repetition, a significant part of the sealant fluid simply ends up in the drainage system, which also obliges the replacement of the cartridge on a regular basis. As the liquid sealant will sooner or later ends up in the wastewater, requiring ready biodegradability of the liquid sealant will prevent any further pollution of the environment.

Note that take-back schemes for flush-free urinal replaceable cartridges were also discussed with stakeholders. Indeed, some flush-free urinals are equipped with a replaceable cartridge which requires to be changed on a regular basis and then represents a specific issue to be tackled. Like for other products (e.g. ink toner of printers), the most appropriate way to ensure a proper recycling or recovery of the replaceable cartridge would be the

implementation of a take-back scheme. However, such a requirement might be difficult in practice and environmental benefits would also be limited, all the more than liquid sealant are required to be ready biodegradable. As a result, requirement for replaceable cartridge take-back scheme was abandoned.

4.7 Criterion 7 – Installation instructions and user information

Proposed criterion

The product shall be accompanied by relevant installation and user information, which gives all the technical details needed for a proper installation and provides advice on the product's proper and environmentally friendly use as well as its maintenance. As a minimum, the installation instructions and user information shall include instruction and information on the following points on the packaging or on documentation accompanying the product in print or in electronic format:

(a) proper installation instructions, including:

- in the case of toilet receptacles, urinals and flushing systems placed on the market independently, information on which products they shall be combined with to make a full functioning unit that is water efficient;
- information on which class(es) or type(s), or both the product has been tested for;
- information on the specific operating pressures that the product is suitable for;
- information on which drainage system types according to Standard EN 12056 the product can work with;
- information describing how to adjust the flush volumes as well as the consequences in terms of residual water level, and filling level;
- a note mentioning the need to consult the national and local regulations before installation of the product.

(b) information communicating that the main environmental impact is related to consumption of water, and advice on how rational use can minimise the environmental impact, in particular information on proper product's use to minimise consumption of water;

(c) information communicating that the product has been awarded the EU Ecolabel, together with a brief, specific explanation as to what this means in addition to the general information provided alongside the EU Ecolabel logo;

(d) the full flush volume in l/flush (tested as indicated in Criterion 1(a));

- (e) in the case of flushing toilet equipment equipped with or allowing the use of a water saving device, the reduced and average flush volumes in l/flush (tested as indicated in Criterion 1(b) and 1(c), respectively);
- (f) in the case of toilet receptacles and urinals placed on the market independently, information communicating that the product has to be combined with a suitable flushing system which has an ecolabel, in order to make a full functioning unit that is water efficient, in particular the full flush volume and, if relevant, the reduced and average flush volumes of the flushing system to be combined with shall be indicated;
- (g) in the case of flushing systems placed on the market independently, information communicating that the product has to be combined with a suitable toilet receptacle and/or urinal, which has an ecolabel, in order to make a full functioning unit that is water efficient, in particular the full flush volume and, if relevant, the reduced and average flush volumes of the toilet receptacle and/or urinal to be combined with shall be indicated;
- (h) recommendations on the proper use and maintenance of the product, mentioning all relevant instructions, particularly:
 - advice on maintenance and use of products,
 - information about which spare parts can be replaced,
 - instructions concerning the replacement of washers and other fittings if the product leaks,
 - advice on product cleaning with appropriate tools and cleaning agents in order to prevent damage to product surface;
- (i) for flush-free urinals, instructions on the maintenance regime including, if relevant, information on how to preserve and maintain the replaceable cartridge and how to change it and when, and a list of service providers for the regular maintenance.
- (j) for flush-free urinals, appropriate recommendations for the disposal of the replaceable cartridges shall be provided, in particular with detailing any take-back scheme(s) in place;
- (k) recommendations on appropriate disposal at product's end-of-life.

Proposed assessment and verification

The applicant shall declare that the product complies with those requirements and provide a sample or samples of the user information or a link to a manufacturer's website containing this information, or both.

Rationale

Appropriate user information is of high importance since the key factor in the area of sustainable water consumption with regard to the use of flushing toilets and urinals is the end-user behaviour. Thus, beyond needed installation and maintenance instructions (as detailed in the criterion requirements), information on the product water consumption (flush volumes) and recommendations concerning rational water consumption and potential water saving shall be attached to the product. This information shall also contain reference to the other environmental impacts which can be reduced due to rational water consumption.

For stand-alone items (i.e. toilets receptacles, urinals, flushing systems), it is of the upmost importance to make clear to prospective purchasers and installers the need to combine them with appropriate low flush counterpart items. Otherwise, any potential water saving would be simply lost.

In terms of installation instructions, information concerning the suitability of product for a given pressure system shall also be highlighted (if appropriate), consequences of installing improper appliances to the existing drainage system shall be pointed out and the options for flush volume adjustment shall be described.

Furthermore, importance of exchanging worn parts (e.g. washers) and preventing water leakage from the product shall be emphasised as leakage may contribute to high water wastage, which can however easily be avoided.

Flush-free urinals, which work on a different basis (compared to flushing urinal and toilet equipment), require additional and dedicated information, in particular for maintenance and replaceable cartridge take-back schemes.

Lastly, the appropriate disposal of the product shall be remained, which will help in a more general way developing right consumer behaviour for product's end-of-life.

4.8 Criterion 8 – Information appearing on the EU Ecolabel

Proposed criterion

The optional label with text box shall contain the following text:

- ‘– high water efficiency and reducing wastewater
- with this ecolabelled product you save water and money
- reduced end-of-life impacts’

The guidelines for the use of the optional label with the text box can be found in the “Guidelines for the use of the EU Ecolabel logo” on the website:

Proposed assessment and verification

The applicant shall declare that the product complies with these requirements and provide a sample of the label.

Rationale

The EU Ecolabel logo placed on the packaging shall contain clear message indicating the advantages related to the purchase and use of ecolabelled products. It shall constitute an incentive to choose the product due to its preferable environmental performance in comparison with other products. The information which appears on the Ecolabel shall refer to:

- "high water efficiency and reducing wastewater" since the flush volumes of the product are limited to be high water efficient (threshold limits on full flush volume and, if applicable, on reduced and average flush volumes), which also leads in wastewater reduction; at the end, less drinking water is used and less wastewater needs to be treated;
- "with this ecolabelled product you save water and money" since the product is designed to save additional water (water saving devices, individual flush control), which should also lead to save money on water bills;
- "reduced end-of-life impacts" since the product is designed to extend its lifetime (product longevity and warranty requirement), facilitate recycling at its end-of-life (plastic part marking) and limit the impact of liquid sealant chemicals from flush-free urinals (ready biodegradability).

4.9 Further considerations

4.9.1 Manufacturing processes

In the preliminary discussions on the criteria development, potential criteria on manufacturing processes, in particular for the ceramic production, were considered. However, it appeared that these issues are already partly covered by European legislation through e.g. Directive 2010/75/EU (Industrial Emissions Directive), for which Reference Documents on Best Available Techniques (BREFs) are produced and applied to manufacturers in a binding way. For instance, a BREF on Ceramic Manufacturing Industry details the best practices for ceramic production that European manufacturers have to follow.

One stakeholder mentioned the possibility to award 6/3 l dual flush toilets (more than 40% flushing toilets) while achieving selectivity with additional criteria on the ceramic production.

From this stakeholder's point of view, all production facilities in Europe are covered by the BREF meaning that this shall be the foundation of their environmental permit. But local authorities can deviate from the values in the BREF when local considerations are taken into account. So the BREF is not a guaranty that all production facilities are in compliance with the limit values stated in the BREF. In addition, production sites outside EU are not covered by the BREF and here setting criteria would even be more relevant to ensure that the production fulfils at least the same requirement as the EU producers.

In terms of facts, the LCA shows that the production phase (including energy during production) is a small impact and improvement potential will still remain limited in absolute terms. For instance, entering into protracted discussion with manufacturers to negotiate a value in the wide range of energy consumption allowed in the BREF document³¹ might exclude unnecessarily certain production facilities while addressing a small impact. Regarding non-EU productions, it is true that they are not covered by the BREF requirements but the following points need also to be kept in mind:

- 1) According to manufacturers, 80% of flushing toilets and urinals for the EU market are produced within the EU. The vast majority of products are then covered by the BREF.
- 2) Setting a maximum energy consumption value between 4,200 kJ/kg and 12,000 kJ/kg may result in excluding major EU manufacturing, which is not looked for in this product group.
- 3) Verification of provenance (i.e. traceability to the product) is particularly weak/difficult to do, thus the real impact of setting maximum energy consumption especially for non-EU production is likely to be much lower than it could be expected.

Taking into consideration all the elements above, it was finally decided not to set any requirements for the ceramic production in particular and the manufacturing processes in general. Most stakeholders agreed that for this product group the EU Ecolabel is not an appropriate policy tool to stimulate development in this area.

4.9.2 Impacts of low-flush products on the drainage system/sewage network

During the stakeholders discussion, the question of the impact of water-saving products in general and low-flush toilets in particular on the drainage system of the building and further on the sewage network was raised many times. Low-flush toilets were often blamed by industry for blockage problems and rising up costs of wastewater treatment. However, these types of statement have never been supported by any solid proof. Low-flush toilets are

³¹ In the BREF on Ceramic Manufacturing Industry, energy consumption of a conventional and a modern tunnel kiln for sanitaryware production is listed, ranging from 4,200 kJ/kg to 12,000 kJ/kg. For more information, see (p129): http://eippcb.jrc.es/reference/BREF/cer_bref_0807.pdf

already implemented in some parts of Europe and, where installed, do not seem to cause specific problems to the functioning of the sewage. In that perspective, there is no evidence that the proposed Ecolabelled flushing toilets and urinals would cause a problem with sewers.

Nevertheless, the relation between water-saving products and the impact on the drainage system/sewage network/wastewater treatment plants will be further explored when the criteria on flushing toilets and urinals are revised.

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5. LIST OF STANDARDS

EN 997:2012, WC pans and WC suites with integral trap, European standard, European Committee for Standardization (CEN), Brussels.

EN 12541:2002, Sanitary tapware – Pressure flushing valves and automatic closing urinal valves PN 10, European standard, European Committee for Standardization (CEN), Brussels.

EN 13407:2006, Wall-hung urinals – Functional requirements and test methods, European standard, European Committee for Standardization (CEN), Brussels.

EN 14055:2010, WC and urinal flushing cisterns, European standard, European Committee for Standardization (CEN), Brussels.

EN 15091:2006, Sanitary tapware. Electronic opening and closing sanitary tapware, European standard, European Committee for Standardization (CEN), Brussels.

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6. APPENDIX 1: METHODOLOGY TO MEASURE AND CALCULATE THE AVERAGE FLUSH VOLUME

6.1 Test methods

Mount the flushing toilet or equipment following the assembling instructions delivered by the manufacturer. In the case of toilet receptacles, the equipment shall be mounted with a test flushing system as described in relevant EN standards.

Install the mounted equipment on a firm flat horizontal or vertical surface as appropriate.

Connect the inlet valve to the water supply having a static water pressure of $(0,2 \pm 0,01)$ MPa $((2 \pm 0,1)$ bar) and open the water supply valve. Leave the water supply open during all the tests.

Operate the full flush mechanism control, collect the water delivered and discard it.

6.1.1 Evaluation of the full flush volume

Operate the full flush mechanism control and collect the water delivered.

Measure the volume using a calibrated container.

Record the measured volume.

Perform the test three times.

If there are differences in the volumes delivered, calculate the full flush volume (V_f) as the arithmetic mean for the three recorded volumes.

6.1.2 Evaluation of the reduced flush volume

Operate the reduced flush mechanism control and collect the water delivered.

Measure the volume using a calibrated container.

Record the measured volume.

Perform the test three times.

If there are differences in the volumes delivered, calculate the reduced flush volume (V_r) as the arithmetic mean for the three recorded volumes.

6.2 Calculation of the average flush volume

Calculate the average flush volume (V_a) as follows:

$$V_a = (V_f + (3 \times V_r)) / 4$$

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7. APPENDIX 2: REQUIREMENTS TO BE MET BY FLUSH-FREE URINALS AND TEST METHODS

7.1 Flush-free urinal requirements

Flush-free urinals shall pass all the following tests:

- load resistance test,
- draining test,
- leak tightness test, and
- backflow prevention of foul air and water test.

7.2 Flush-free urinal test methods

7.2.1 Load resistance test

Flush-free urinals shall be deemed to comply with load resistance test if they meet the requirements on load resistance with passing a static load test similar to those defined in EN 13407. Any equivalent method shall be accepted.

7.2.2 Draining test

Flush-free urinals shall be deemed to comply with draining test if they meet the requirements on draining of water with passing draining of water test similar to those defined in EN 14688. Given that the test in EN 14688 is defined for wash basins, any test adaptation to fit the purpose of testing flush-free urinals shall be accepted. Any equivalent method shall be accepted.

7.2.3 Leak tightness test

Flush-free urinals shall be deemed to comply with leak tightness test if they ensure that all fluid poured into them is evacuated only through the outlet connection. Coloured water shall be used for this test to help detecting any potential leakage. Any equivalent method shall be accepted.

Alternately, flush-free urinals shall be deemed to comply with leak tightness test if they meet the requirements on water absorption with passing determination of water absorption test similar to those defined in EN 13407. Any equivalent method shall be accepted.

7.2.4 Backflow prevention of foul air and water test

Flush-free urinals shall be deemed to comply with backflow prevention of foul air and water test if they meet the requirements on odour tightness and resistance of water seal to pressure similar to those defined in EN 1253-1 with passing, respectively, odour tightness test and resistance of water seal to pressure test similar to those defined in EN 1253-2. Any equivalent method shall be accepted.

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