

# Cleaning and maintenance products and services: Procura<sup>+</sup> Key Criteria – Extended version

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## 1 Introduction

The cleaning and maintenance product group encompasses a vast range of products ranging from hard surface cleaning products to dishwashing and laundry detergents. The exact product types covered by the Procura<sup>+</sup> Key Criteria are specified in section 2 of this chapter. In addition these guidelines promote more environmental friendly and healthier cleaning practices.

### 1.1. Key environmental/social impacts

Impact	Approach
<ul style="list-style-type: none"> <li>Air pollution, ozone formation (smog), bioaccumulation or food chain exposure and maybe hazardous effect on aquatic organisms due to the use of certain chemicals within cleaning agents.</li> </ul>	Avoidance of unnecessary products → Avoidance of certain substances or ingredients in cleaning products
<ul style="list-style-type: none"> <li>Negative impact on the occupational health of employees due to the use of certain cleaning agents that contain solvents classified as harmful to health</li> </ul>	→ Procurement / use of products without harmful substances

Regular cleaning of public buildings is essential to ensure hygienic and healthy indoor conditions and to maintain the interior. In this way cleaning helps prolong the useful life of interior equipment and floor coverings and contributes to health care.

Besides these obvious necessities and advantages, the use of cleaning agents may cause negative environmental and social impacts. The environment, in particular the aquatic environment, is negatively effected by the existence of harmful chemicals in the products themselves such as chemicals which are not, or poorly biodegradable. Possible social impacts due to the use of cleaning agents are effects on the occupational health of employees: both the staff dealing directly with the substances and the staff working in the environment treated with the agents. They range from skin irritation or allergic reactions, to damage to skin, eyes or materials as well as (chronic) health risk from exposure of skin or lung to the product. By

excluding certain chemicals from the products we use most of these problems can be substantially reduced.

Other approaches to reducing environmental impacts include reviewing cleaning methods, frequencies and dosage, optimising and reducing the product range, participation and training of cleaning staff in addition to reducing dirt.

The amount of packaging also represents a waste problem after use, therefore the procurement of bigger containers, refilling of clearly-marked bottles, purchase of concentrated cleaning agents, etc. should also be considered

## 1.2. Procurement considerations

As with all procurement activities, it is necessary not just to consider what is being bought, but also how efficiently the procured products are being used, and even whether it is necessary to procure at all. This is particularly true in relation to cleaning products and services, where a re-examination of cleaning methods, and the consideration of whether a certain service is really required, can lead to a substantial reduction not only in the quantities of harmful substances used, but also in water consumption and financial costs.

The last decade has seen an increasing trend towards the outsourcing of cleaning work. Outsourcing is mainly motivated by possible cost reductions and the quality assurance of cleaning by professionals. However, in terms of quality, the decisive question is not who carries out the cleaning (internal employees or contractors) but the aspect of training and monitoring of personnel.

The Procura<sup>+</sup> Key Criteria are applicable both for products purchased directly for in-house cleaning, and also when cleaning services are contracted out to private companies. From a legal point of view, it is perfectly acceptable to provide a list of harmful substances which the successful contractor must not use in providing the tendered service as long as the list has not been composed arbitrarily with the purpose of excluding certain bidders. Also, a floor register and a cleaning plan or at least a fairly precise description of cleaning demands have to be established to define precisely the service within the call for tender.

## 1.3. Cost implications

With cleaning products the price difference for purchasing products in compliance with the key criteria above is minimal, and would not lead to a significant increase in expenditure. Between 90% and 95% of the money spent on cleaning is, in any case, spent on staff costs. On the contrary, behavioural changes in the way cleaning is carried out can result in significant savings through a reduced need for cleaning products. Obviously, also a streamlined assortment reduces the efforts for calls for tender, storage and handling and may result in cost savings. The Vienna example presented in Box 1 below clearly demonstrates the potential savings that can be achieved.

Following a material flow analysis carried out on behalf of the Association of Vienna Hospitals in 1996, a number of cleaning products and ingredients were identified as environmentally harmful. To address this problem, environmental criteria were developed to be used when tendering for products or cleaning services. Alongside the application of these criteria, efforts were made to train staff to reduce the amount of chemicals used in cleaning.

As direct result of this approach, the following results were achieved between 1996 and 2000:

- A reduction in the number of products used from about 500 to 42 (20 ecologically benign and 22 ecologically acceptable)

- A 23% reduction in the quantities of cleaning agents used from 386,000 tonnes per year to 297,000 tonnes per year
- A 10% reduction in costs from €647,000 per year to €581,000 per year

Currently, the hospital is shifting towards the use of microfibre cloth for cleaning and is testing magnetic washing disks to prevent the use of chemical agents.

#### **Box 1: Saving costs and reducing environmental impact – the Association of Vienna Hospitals**

### **1.4. Relevant European legislation**

The European market for cleaning products is a very heterogeneous one, indicated by the fact that the International Association for Soaps, Detergents, Maintenance Products (AISE) covers more than 1000 companies in the European Union alone, of which almost 60% are SMEs. In September 2002, the European Commission adopted a proposal for a Regulation on detergents [COM(2002) 485 final]. The proposal aims to increase the protection of the aquatic environment against the harmful effects of surfactants<sup>1</sup>, through stricter testing of biodegradability. The scope was also widened to include all types of detergents, whereas previously the biodegradability of, for example, certain surfactants contained in fabric softeners, was not regulated. Strict labelling requirements for detergents and cleaning products are also to be made binding. This regulation will, for the first time, ensure the uniform application of detailed technical requirements in the member states, and facilitate subsequent amendments that will be required in order to keep up with developing scientific knowledge.

In September 2002, the European Commission adopted a proposal for a regulation on detergents [COM(2002) 485 final]. The proposal aims to increase the protection of the aquatic environment by testing the ultimate rather than the primary biodegradability of detergent surfactants. Cationic and amphoteric surfactants are now also included in the regulation. Surfactants have to be readily biodegradable.

The classifications referred to are those laid out in EC Directive 1999/45/EC and Council Directive 67/548/EEC. EC Directive 1999/45/EC concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations. Council Directive 67/548/EEC on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances.

The tendering of industrial cleaning services falls under the remit of the European Services Directive (Council Directive 92/50/EEC).

## **2 Procura<sup>+</sup> Key Criteria – Direct cleaning product purchases**

The Procura<sup>+</sup> key criteria for direct cleaning products purchases focus on two main aspects:

- **Exclusion of certain substances or ingredients:** For the cleaning agents, the products and ingredients suggested for exclusion are those most hazardous to the local environment and human health, and effective alternatives are available for all. The classifications referred to, are those laid out in EC Directive 1999/45/EC and Council Directive

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<sup>1</sup> Surfactants (surface active agents) are the most important ingredients in cleaning products, due to their capability to wet hydrophobic surfaces, remove dirt and keep it in suspension

67/548/EEC. Further information on the substances excluded is included in section 5 below.

- **Dosage devices and instructions:** In many cases excessive amounts of cleaning products are used because users are not aware of the appropriate dosage or do not have usable measuring devices. A great deal can be saved through the inclusion of dosage devices and instructions

The criteria are valid for institutional cleaning products used for general cleaning and maintenance of buildings: all-purpose and neutral cleaners; cleaners for cleaning plastic or metal surfaces; sanitary and toilet cleaners; restroom and bathroom cleaners; dishwashing detergents (hand and machines dishwashing detergents); laundry detergents; softener, glass and alcohol cleaners; carpet cleaning agents; floor strippers and floor care products.

They are not valid for disinfectants, industrial cleaners and special cleaning applications (spot remover, furniture polish, grill cleaners, drain cleaners or products used in closed systems).

### Direct cleaning product purchases (in-house cleaning)

**Subject matter:** *Purchase of environmentally friendly cleaning products*

**Specifications:** *All procured products must be delivered with clear dosage instructions and devices and must be in compliance with the following criteria:*

- **Are not** classified as sensitising (with R42 and/or R43), or as dangerous for the environment (N) according to the Dangerous Preparations Directive (1999/45/EC).
- **Do not** contain volatile organic compounds in concentrations that exceed 10% of the weight of the product (or 20% in the case of floor care products). The following solvents are allowed up to 30%: ethanol, isopropanol, n-propanol and acetone.
- **Do not** contain preservatives with a bio-accumulative potential  $P(ow) > 3$  or exp.  $BCF > 100$ .
- **Do not** contain surfactants not readily biodegradable (OECD 301A-F)<sup>8</sup>  
Surfactants have to comply with Detergent Regulation 648/2004/EC without application of Article 5 and 6 (exception).
- **Do not** contain the following ingredients:
  - Those classified as carcinogenic, mutagenic, or toxic to reproduction (R45, 46, 49, 60, 61), or very toxic or toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment (R50/53, 51/53) according to the Dangerous Substances Directive (67/548/EEC) in quantities that exceed 0,01 % by weight of the final product. This includes also each ingredient of any preparation used in the formulation that exceeds 0,01 % by weight of the final product.
  - Ethylenediamine tetraacetate (EDTA)
  - Alkylphenolethoxylates (APEO).
  - Chlorine based bleach (active chlorine compounds).
  - Nitro-musk and polycyclic musk compounds
- Added perfume blends are produced in accordance with IFRA norms..
- Dyes: Colouring agents must be included in Cosmetic Directive 2003/15/EEC or permitted for use as colours in foodstuff

**Verification:** *Suppliers must provide clear evidence that the criteria are met. Products carrying the EU Ecolabel or Nordic Swan will be deemed to comply.*

## Implementation notes



**Surfactants:** The criteria relating to the biodegradability of surfactants are the same as those of the proposed EC Regulation on detergents. They remain part of the key criteria as, even if the regulation passes into law it will still be possible for manufacturers to apply for derogation (exemption). Such derogation will only be granted on the basis of a complementary risk assessment and may allow or restrict the use of surfactants not being readily biodegradable, probably mainly for special applications



**Lots:** As contracts for cleaning products tend to cover a wide range of product types - as outlined above - it is a good idea to divide the tender into "lots". This means that a supplier can choose to offer products in some categories but not in others. The tenderer then chooses the best product in each category (or "lot"), even if they come from different suppliers.

## Contracted cleaning services

The Procura+ key criteria for contracting cleaning services focus on the following aspects:

- **Exclusion of certain substances or ingredients:** For the cleaning agents, the products and ingredients suggested for exclusion are those most hazardous to the local environment and human health, and effective alternatives are available for all. The classifications referred to are those laid out in EC Directive 1999/45/EC and Council Directive 67/548/EEC. Further information on the substances excluded is included in section 5 below.
- **Responsible cleaning practices:** Cleaning staff is constantly in touch with substances that contain chemical components that can be irritating, corrosive, etc. Therefore in order to guarantee safety conditions, staff has to be trained and clear procedures must be in place.

### Contracted cleaning services

**Subject matter:** *Contract for environmentally friendly cleaning services.*

**Specifications:**

*Products employed by the cleaning company must meet the following criteria:*

*(insert the criteria from the "Direct cleaning product purchases" section)*

**Verification:** The contractor must supply a list of the products intended to be used, together with information proving that they meet these specifications. At the end of each year a balance must be submitted indicating the name and quantity of the cleaning products used. For any products not mentioned in the initial bid information must again be submitting proving they meet the specifications.

**Selection criteria:**

*The contractor must either:*

- *Have an environmental management system (EMS) for cleaning services (such as EMAS, or ISO 14001) or,*
- *Commit to developing precise work instructions on environmental protection and on health and safety standards in carrying out the service. These instructions shall be presented to the contracting authority during the first weeks after the start of the contract and shall be displayed in the buildings in a way that they can be consulted by each cleaning person at any time. Examples*

*of work instructions include the identification and proper handling of hazardous products, proper procedures for the storage of hazardous materials, precise dosage instructions, waste separation and disposal and skin protection.*

**Contract provisions:**

- a) Staff and Organisation
  - *The cleaning staff must be trained for their various tasks. A record of these training measures (introductory/vocational training) should be kept and presented to the contracting authority.*
  - *A facility manager, foreman/forewoman or co-ordinator should be nominated to organise and supervise the cleaning. The appointed person should stay in contact with the contracting authority and be reachable during working hours. The facility manager, foreman/forewoman or co-ordinator has to be sufficiently trained in the fields of occupational health and safety standards, application techniques and environmental issues.*
- b) Supplies, Materials and Equipment to be provided by the contractor
  - *By request of the contracting authority all cleaning supplies used in the facility have to be balanced according to their quantity. The first balance shall be drawn up six months after the start of the contract. Subsequently, an annual balance shall be settled each year and shall be submitted to the contracting authority according to prior agreement.*

**Implementation notes**



**Selection criteria (EMS):** the presentation of a certified environmental management system (EMS) will be a mean of proof of the technical capacity to provide an environmentally sound cleaning service, as long as the EMS is related to the performance of the service and not to another area not related to the subject matter of the contract.



**Contract clauses (tender documents):** These special contract clauses must be made clear to potential bidders in the tender documents.



**Contract clauses (penalties for non-compliance):** To ensure effectiveness, appropriate penalties must be included in the contract for non-compliance, for example withholding payment until compliance is achieved.

### 3 Further ideas

It is recommended that a working group be set up involving those responsible for co-ordinating cleaning services within a public authority, together with environment and procurement officials, to discuss the following aspects.

#### 3.1. Stricter Standards

Your authority may want to implement higher environmental standards as the ones given. You may then ask for products that are not classified as harmful (Xn), corrosive (C): R34, R35; irritating (Xi, with R41).

You may also wish to exclude products containing ingredients classified as R39 (danger of very serious irreversible effects), or R48 (danger of serious damage to health by prolonged exposure), though it unlikely these would anyway be included in the products offered.

Please be aware however that for the time being only products labelled with the Nordic Swan fully comply with these criteria. The EU Eco-label would not be sufficient evidence of compliance, and additional proof would need to be requested from the supplier.

Furthermore In countries where there is significant waste processing under anaerobic conditions, it could be helpful to include a further criteria: “Products do not contain surfactants that are non-anaerobically biodegradable in accordance with OECD 11734”. This is a requirement of both the EU Ecolabel and the Nordic Swan, which can therefore be used to demonstrate compliance.

### 3.2. Overall environmental burden

The EU Ecolabel criteria also require the product to meet a certain standard in terms of the overall toxicity to the aquatic environment, indicated by the “Critical Dilution Volume” (CDV<sub>TOX</sub>). This is a very effective way of ensuring the best possible product is purchased but would require a substantial degree of calculation on behalf of the contracting authority, or alternative means of measuring the offered products, as this will not be included in the standard information on the product. For more information see the EU Ecolabel criteria document: [http://ec.europa.eu/environment/ecolabel/pdf/all-purpose\\_cleaners/all\\_purpose\\_cleaners\\_en.pdf](http://ec.europa.eu/environment/ecolabel/pdf/all-purpose_cleaners/all_purpose_cleaners_en.pdf)

### 3.3. Packaging

The packaging used for cleaning products, as with all products, is also of environmental relevance. Potential criteria to use in either the specifications or award phase include:

- Delivery in refillable containers.
- Containers and other packaging material are PVC-free.
- Proof of disposal or acceptance of packaging provided or the participation of the tender applicant in an officially recognised collection and recycling system.
- Any outer packaging is taken back by retailer/producer.

### 3.4. Streamlining of product range

In some cases up to 50 and more different types of cleaning products are in use, while public authorities with a streamlined assortment confirm that they manage all cleaning purposes with about 15 types of products. In many cases several products are in use that fulfil the same purpose; in other cases it is possible to renounce certain product types. The range of products should be checked to determine whether all used products are really necessary.

Reconsider especially the need for the following product types:

- **Toilet bowl freshener, cistern additives, deodorising blocks for urinals**  
If toilets are cleaned regularly, these products can be avoided, because they mainly dye and perfume the waste water. Perfumes are of particular concern because of their potential hazard to health, mainly their allergic potential. Especially avoid urinal blocks with paradichlorobenzene.
- **Air freshener**  
If toilets and washrooms are cleaned regularly and windows can be opened for the

purpose of ventilation, these products can be avoided. Perfumes are of particular concern because of their potential hazard to health, mainly their allergic potential.

- **Chemical drain cleaners**

These products contain corrosive chemicals, especially alkaline substances. They can be substituted by the use of sink plungers as a safer and more environmentally friendly alternative.

- **Fabric softener**

These products do not contribute to the cleaning of textiles, but rather make textiles fleecy and give a pleasing odour. Through the use of fabric softeners the absorptive capacity of the textile is reduced and the tissue gets dirty more easily.

- **Floor finish based on water insoluble polymers**

If you decide on a sealing for the floor, use a long lasting and durable sealing, but avoid regular maintenance with floor finish based on water insoluble polymers. This causes films which are costly to remove with stripping.

- **Disinfectants in cleaners**

No cleaners should contain disinfectants. Cleaning and disinfecting processes should be separated. Eliminating disinfectants from all-purpose, bathroom, and floor cleaners etc. will reduce the toxicity of these products and reduce the amount of disinfectant chemicals. The procurement of disinfecting cleaners entails the risk that disinfectants are frequently used for purposes where no disinfecting is necessary. Biocides are principally toxic to water-living organism, some of them seem to be not easily biodegradable and there is the risk that resistance of microorganisms to other antibiotic substances might increase.

- **Aerosol cans and propellants**

No products should be delivered in aerosol cans. All product categories must be available in a non-aerosol formulation such as pump sprays. The avoidance of propellants (mainly propane or butane) helps to save resources. Products with a high content of propellants are classified with the danger symbols and danger phrases F+ Extremely flammable or F Highly flammable.

- **Floor finish strippers**

Hard floor care involves one of the most harmful products used in the cleaning sector – floor finish stripper. These products are used to remove the sealing of resilient floors and contain considerable amounts of harmful chemicals like solvents and highly alkaline ingredients. The avoidance of stripping or the increase of intervals between strippings represents an important contribution to environmental and health protection but helps also saving money. Alternatives are spray cleaning or dry refurbishment. Spray cleaners have a rather high content of solvents, however due to the fact, that considerably smaller amounts of the product are necessary compared to stripping and sealing, harmful effects for the environment are drastically reduced. The intervals between stripping can be increased by improving the resistance of the sealing through the use of speed rotary floor machines.

For the easy maintenance and cleaning of elastic floorings it is advisable to purchase high quality coverings that are delivered in a state where they do not require additional treatment with protective agents. If floors are sealed, polymers containing metal salts should be avoided.

- **Strongly acidic cleaners**

Many toilet bowl and sanitary cleaners contain acids, which can be harmful to health and the environment. Regular cleaning of toilets and sanitary rooms should be performed with mild cleaners, like all-purpose cleaners. Acid cleaners are used to remove lime stains, rust or other stubborn deposits. If cleaning is performed on a regular basis mildly acid cleaners (e.g. based on citric acid) are sufficient for this purpose and, depending on the intensity of use, a weekly cleaning with acid cleaners might be sufficient. However sanitary cleaners based on citric acid might have already rather low pH values (below 2,0) To remove very stubborn lime stains, stronger cleaners might be necessary. These cleaners contain e.g. amidosulphonic acid (middle strength acid cleaners contain about 10-15%) or phosphoric acid. Highly acidic cleaners may contain up to 25% or even more phosphoric acid. As far as it is possible, these highly acidic cleaners should be avoided. At least they should only be used for deep cleaning of stubborn deposits, but not on a regular basis for general cleaning.

Don't mix acid cleaners with products which contain chlorine bleaching agents (e.g. disinfecting bathroom cleaners). This creates a very toxic chlorine gas.

- **Disinfectants**

Disinfectant should only be applied in cases where it is prescribed by law or recommended by hygiene staff, e.g. in hospitals, kitchens, canteens. In other cases e.g. for lavatories and washrooms disinfection is not necessary on a regular basis.

### 3.5. Choice of cleaning methods and techniques

Think about replacing cleaning methods which employ especially harmful products (e.g. floor stripping), by more environmentally sound methods. Using “green cleaning techniques”: The use of modern cleaning techniques and methods (e.g. speed rotary floor machines, mopping systems, the cleaning by cup method (see box 2 below) and cleaning trolleys) facilitates the work of the cleaning staff, supports ergonomic cleaning, increases productivity and may also contribute to a reduction in the use of cleaning agents and water. In recent years a number of innovative products and techniques have appeared on the market (e.g. fibre cloths such as microfibre cloths, synthetic fibre cloths, or cellulose fibre technique cloths), which involve a much lower, or even zero use of chemical cleaning agents, but which are as effective as traditional techniques.

**Material used:**

- a bucket with water and soap
- a cup
- two mops.

With the cup: pour water from the bucket on the floor, then one mop is used to wash the floor (make it wet) and the other mop to wipe the floor.

The mop yarns are changed when dirty and are not in contact with the water in the bucket.

The advantage is that it is not necessary to change the water in the bucket every other minute. This way the consumption of both water and cleaning agent is reduced.

An advantage for the cleaning staff is that they don't have to wring the mop or floor cloth.

**Box 2: “Cleaning by cup” method**

### 3.6. Cleaning frequency

Demand-oriented cleaning: Cleaning should be carried out according to the principle “as little as possible, as much as necessary”. It is often the case that buildings are “over-cleaned”, because psychologically we feel that something is not clean unless it shines and has a pleasant smell. It is also clear that some parts of buildings need less cleaning than others, but often this is not recognised in cleaning practices. A discussion around a few central questions, the drawing up of a register of floor area and the subsequent establishment of a cleaning plan will lead to a far more efficient cleaning approach based on actual needs.

### 3.7. Training of cleaning staff

Training of staff: Employee training is of outstanding importance for the success of green cleaning programmes, occupational health and safety and the appropriate application of modern cleaning techniques. Extensive introductory training for new staff and regular training for permanent staff should be considered. A number of important topics need to be covered, particularly concerning dosage and dosage devices, new techniques and cleaning products, awareness of health risks and usage guidance.

## 4 Relevant product labels



European Eco-label

All-purpose cleaners and sanitary cleaning products (Directive 2002/523/EC)

Detergents for dishwashers (Directive 1999/427/EC)

Hand dishwashing detergent (Directive 2001/607/EC)

Laundry detergents (Directive 1999/476/EC)

[ec.europa.eu/environment/colabel/index\\_en.htm](http://ec.europa.eu/environment/colabel/index_en.htm)



Scandinavian Eco-label (Nordic Swan)

All Purpose cleaners

Sanitary cleaning products

All purpose cleaners

Dishwasher detergents

Hand dishwashing detergents

Floor care products

Shampoo & Soap

Laundry detergents

[www.svanen.nu](http://www.svanen.nu)

UZ 19 Hand dishwashing detergent

UZ 20 Detergent for dishwashers

UZ 21 Textiles laundry detergent

UZ 30 All-purpose cleaners and sanitary cleaning products (identical with EU-Eco-label guideline

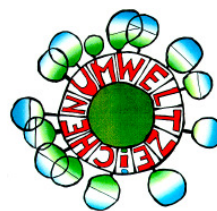
[www.umweltzeichen.at](http://www.umweltzeichen.at)



German Eco-label (Blue Angel)

RAL UZ 70 laundry detergent

[www.blauer-engel.de](http://www.blauer-engel.de)



Austrian Eco-label



General Purpose Cleaners  
Industrial and Commercial  
Cleaners  
[www.terrachoice.ca](http://www.terrachoice.ca)



Hand Cleaners (GS-41)  
Industrial and Institutional  
Cleaners:  
All Purpose Cleaners (GS-  
37)  
Powdered Laundry Bleach  
(GC-11)  
Glass Cleaners (GS-37)  
Floor Care Products (GS-40)  
[www.green Seal.org](http://www.green Seal.org)

## 5 Harmful and hazardous substances – further information

### 5.1. Classification of dangerous substances and preparations

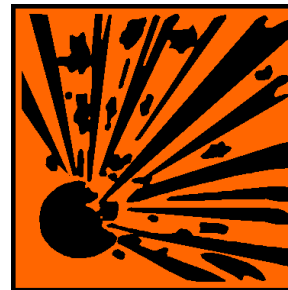
Classification and labelling involves an evaluation of the hazard of a substance or preparation in accordance with Directive 67/548/EEC (substances) and 1999/45/EC (preparations). A evaluation considers their physical-chemical properties and health or environmental effects. The classification of chemicals by risk-phrases given in annex I of the EU-Directive 67/548/EC is thus a useful instrument for the establishment of procurement criteria. However, one has to keep in mind that there are about 100,000 products currently on the market, but so far only a few of them have been officially classified in Directive 67/548/EC.



**N**  
Dangerous for the  
environment



**O**  
Oxidising



**E**  
Explosive



**C**  
Corrosive



<b>F+</b> Extremely flammable	<b>Xn</b> Harmful	<b>T+</b> Very Toxic
<b>F</b> Highly flammable	<b>Xi</b> Irritant	<b>T</b> Toxic

**Fig 1. Danger symbols and indication of danger**

## 5.2. pH

The pH value is a measure for corrosive properties of a substance or solution. Low pH values are caused by strong acids while high pH values are caused by alkaline substances. High acidic or alkaline solutions may cause injuries to the skin or eyes. Industrial and commercial cleaners which apply for the Canadian Ecolabel are not allowed to have a pH lower than 2,0 or greater than 13,0. The final report on the Development of Ecolabel Criteria for All-Purpose and Sanitary Cleaners suggests that the pH-value of household products shall be in the range of more than 2.5 and less than pH 11.5. However, it is not suggested to limit the pH for institutional products, especially because the efficiency in descaling lime and cleaning toilet bowls increases if the pH-value is below 2. No limits have been suggested for pH values in the key criteria because it is assumed that staff handling institutional products are appropriately trained, so, the likelihood of injury is assumed to be lower.

## 5.3. Volatile organic compounds (VOC)

It is a matter of definition if a chemical is regarded as VOC or not. The proposal for a directive on the limitation of emissions of volatile organic compounds due to the use of organic solvents in decorative paints and varnishes and vehicle refinishing products [COM/2002/0750 final] defines a volatile organic compound (VOC) to mean: any organic compound having a boiling point less than or equal to 250°C measured at a standard pressure of 101.3 kPa.

As solvents evaporate relatively quickly into the air they are also assigned to VOCs (volatile organic compounds). Some other ingredients in cleaners such as organic acids, organic alkali or preservatives are volatile too (e. g. formic acid, ammonia or formaldehyde). VOCs are one possible source of indoor pollution. VOCs may also cause headaches, fatigue or irritation to the eyes, nose, throat, lungs or skin. Additionally, some solvents can also be absorbed through the skin (e. g. butylglycol). VOCs undergo chemical reactions in the atmosphere, which cause a number of indirect effects, in particular the formation of photochemical oxidants such as tropospheric ozone. When highly concentrated in the air, ozone can impair human health and can damage forests, vegetation and crops, reducing yields.

## 5.4. Ethylenediamine tetraacetate (EDTA)

EDTA is very strong complexing agent and used in cleaning agents as a builder to improve cleaning efficiency by deactivating water hardness. Complexing agents do not only combine with the calcium and magnesium ions of hard water but may also re-mobilise heavy metals of river sediments when they are discharged into the aquatic environment. While this is true of all complexing agents, EDTA is of particular concern because it is barely biodegradable and it has stronger complexing properties than other substances used as builders (e.g. NTA).

## 5.5. Alkylphenoethoxylates (APEO)

APEOs are transformed in the environment into metabolites that are more toxic than the original surfactant, and both APEOs and metabolites are suspected to have hormone-mimicking, estrogenic effects and have high bioaccumulation factors. Today APEOs have been largely replaced, especially in household detergents and personal care products, as a result of voluntary agreements between the authorities and industry.

## 5.6. Bleaching agents based on active chlorine

Bleaching agents are used in cleaners for hygienic purposes but also to remove stains (urinary salts) and to bleach textiles (laundry detergents). In some cases they may attack sensitive surfaces (e. g. NaOCl may corrode metal surfaces). Halogenated organic compounds may be formed by the reaction of active chlorine with organic substances and thus contributing to the AOX-load of the aquatic environment. Some of these halogenated compounds may be toxic and slowly degradable in the aquatic environment.

## 5.7. Nitro-musk and polycyclic musk compounds

These compounds are suspected of being carcinogenic and show a tendency to accumulate in a mother's milk. Although scientific opinion differs on the banning or limiting of certain musk compounds, for the reason of precaution the exclusion of all nitro musk perfumes is recommended.

## 5.8. Surfactants

Surfactants (surface active agents) are the most important ingredients in cleaning products due to their capability to wet hydrophobic surfaces, remove dirt and keep it in suspension.

Four types of surfactants exist:

- Anionic surfactants are negatively charged in aqueous solutions. Soap is maybe the most well known anionic surfactant. They are mainly used in laundry detergents, cleaning and dishwashing detergents as well as in personal care products.
- Non-ionic surfactants do not ionize in aqueous solutions. They are mostly used in combination with anionic surfactants in laundry detergents, cleaning and dishwashing detergents as well as personal care products and are especially used in institutional and industrial cleaners.
- Cationic surfactants are positively charged in aqueous solution. Quarternary ammonium compounds are typical examples. Cationic surfactants are primarily applied in fabric softeners and hair care products.
- Amphoteric surfactants have both acidic and alkaline properties. They are used in personal care products and all-purpose cleaning agents.

As a result of their surface-active properties, surfactants are relatively toxic to aquatic organisms, and should thus biodegrade quickly. Biodegradation is the biologically catalysed

reduction in complexity of chemicals or organic compounds. In the case of surfactants, two types of biodegradation have to be considered:

- Primary biodegradation: degradation of the chemical structure of a substance by a biological action involving a loss of the specific property of the organic components, this means loss of the surface-active properties.
- Ultimate biodegradation: complete degradation of an organic components by means of micro-organisms, involving the production of carbon dioxide (in aerobic condition), water, mineral salts and new cellular components for the biomass.

Up to 2003, only the primary biodegradation of anionic and nonionic surfactants has been regulated: The 73/404/CEE European directive concerning detergents and banned surfactants which have a primary biodegradability below 90 %.

In September 2002, the European Commission adopted a proposal for a regulation on detergents [COM(2002) 485 final]. The proposal aims to increase the protection of the aquatic environment by testing the ultimate rather than the primary biodegradability of detergent surfactants. Cationic and amphoteric surfactants are now also included in the regulation. Surfactants have to be readily biodegradable according to one of the following tests:

<b>Mineralisation according to test</b>	
OECD 301 B (Modif. Sturm Test) or CO <sub>2</sub> Headspace Test (ISO 14593) or OECD 301 C (Modif. MITI-Test) or OECD 301 D (Closed Bottle Test) or OECD 301 F (Manometric Respirometry) or	$\geq 60\%$
OECD 301 A (DOC Die-Away Test) or OECD 301 E (Modif. OECD Screening Test)	$\geq 70\%$

## 5.9. Preservatives

Preservatives are chemical agents that prevent the growth of microorganisms in the product and are typically used in liquid products that do not have extreme pH or high concentrations of surfactants or solvents. Most substances used as preservatives may also be used as disinfectants. As already argued earlier, cleaning and disinfection should be separated. Some preservatives are bioaccumulative. One means of determining the bioaccumulation of a chemical is to measure their partition between octanol and water. This partition is expressed as Pow. The test is described in OECD guidelines No. 107 and 117. If the solubility of the substance in octanol is at least 1000 times greater than in water ( $\log \text{Pow} > 3$ ), the substance is regarded as bioaccumulative unless the contrary has been established, e.g. by determining experimentally the bioconcentration factor (BCF) in fish in accordance with OECD test methods 305 A-E. If the BCF of the substance is 100 or more, the substance is regarded as bioaccumulating.

## 5.10. Perfumes

Perfume may consist of hundreds of constituents or also single chemical substances or herbal extracts that are added to the product. Perfumes receive attention because of their potential hazard to health and also due to their bioaccumulative potential. The main hazard to health is their allergic potential. Contact allergy to perfume occurs with a relatively high incidence. Unfortunately, data about the environmental fate and inherent properties of perfumes are very incomplete. Moreover, the kind of fragrance is usually not identified in frame formulas.

Most manufacturers who use perfume in their formulations refer to the Code of Practice of IFRA (International Fragrance Association):

<http://www.ifraorg.org/GuideLines.asp>

It is especially necessary to inform people who suffer from allergies about whether a product contains perfume, preservatives or other potentially sensitising substances. The Scientific Committee on Cosmetic Products and Non-Food Products (SSCCNFP) identified 24 substances, that are known to be allergenic perfume ingredients (opinion SCCNFP/0017/98). Cosmetic Directive 2003/15/EC lists 26 substances, which are known to be allergenic perfume ingredients. Until there is a harmonization between the regulation on detergents and the cosmetic directive, it is recommended to refer to the cosmetic directive for the declaration of perfumes.