CPDW project

Review of high-level disinfection practices in drinking water distribution systems in the EU member states

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\textsuperscript{7} European Commission, DG JRC
Review of high-level disinfection practices in drinking water distribution systems in the EU member states

Development of a harmonised test to be used in the European Acceptance Scheme concerning CPDW

European Commission

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SUMMARY

This report is related to the WP4 «Disinfection by-products» as a part of the European Project “Development of harmonised tests to be used in the European Approval Scheme (EAS) concerning Construction Products in Contact with Drinking Water (CPDW), under contract no BVK1-CT2000-00052.

The objectives of this research were first to complete a review of the use of high levels of disinfectants applied to water distribution systems in Europe, then to obtain experimental data concerning the migration rate under different disinfection conditions for a range of the representative CPDW commonly used in Europe and finally to give guidance to the regulators about the need to include a simulation of high levels of disinfection in the European Acceptance Scheme (EAS).

In the majority of Member States (MS), high levels of chlorine are applied to CPDW in the water distribution systems, in order to prevent or to remove microbial contamination. Hydrogen peroxide is also used in response to environmental issues. Potassium permanganate is used inside buildings in some MS.

Regulations or practical guidelines for disinfection procedures are available in most of the MS, mainly in public networks. Few MS have regulations for application inside building and in case of Legionella contamination. Nevertheless, the implementation of the European Directive DWD 98/83/EC including microbial requirements at the consumer tap, will lead the MS to develop guidance for disinfection inside buildings.

The experimental part of the WP4 included a testing programme: a range of organic products were preliminarily exposed to different disinfection procedures (chlorine and hydrogen peroxide under several contact times and concentrations) and the migration rate was compared with the same materials not exposed to disinfectants.

The products to be studied were chosen taking into account their main uses in European water distribution systems application (PVC-U, HDPE, EPDM, epoxy and polyester resins, cement with organic additive). The choice of significant parameters was based on the experience of the participants and on existing national requirements (odour, flavour, TOC, haloforms and other organic micro-pollutants). Supporting standards or draft standards produced by CEN/TC164/WG3 “Materials in Contact with Drinking Water” were used for this work in order to produce migration water.

Six European Institutes have participated in WP4. All were involved in water analysis and four of them were national laboratories for testing materials in contact with drinking water. The test results showed clearly that there was no significant difference attributable to the different disinfectant solutions and contact times, and no difference when the products were not in contact with disinfectants. The research permitted a good transfer of experience between these laboratories, and also permitted to make proposals for the next EAS assessment. These proposals to RG-CPDW are:

• not to include high levels of disinfection in the general test procedure applied to CPDW for EAS logo, except for new products,
• to include in EAS a list of significant chemical parameters (odour, flavour, TOC, GC-MS technique analysis),
• to include inter-laboratories exercises in the future in order to increase the inter-laboratory comparability of the results. Some parameters showed a low reproducibility between laboratories.
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INTRODUCTION

In most of the fifteen European Member States (MS), the use of Construction Products intended for contact with Drinking Water (CPDW) is regulated by National Acceptance Schemes (NAS) in order to protect the consumer against the potential adverse effects of these products on drinking water quality.

The MS differ significantly in their approach and in their organisation for NAS. The existence and the role of National Regulatory Bodies (NRB), and of Toxicity Committees are different, and the acceptance procedure (use of positive lists, migration tests, acceptance criteria, etc.) is not the same in the MSs. Thus, these NAS constitute a barrier to trade for the products in the European Community. A product can be approved in one Member State and disapproved in another Member State. There is no real open market and free circulation of the products. A manufacturer wishing to sell his products all over Europe needs to submit them to the different existing NAS. Moreover, it is costly and difficult to understand each national regulatory approach.

In 1989, CEN/TC164/WG3 “Water Supply – Effects of materials in contact with drinking water” was created and European test procedures are currently under development. Some ENs are already available, but the progress has been very slow due to the relation between test conditions (test methodology) and acceptance criteria (regulatory aspects). These acceptance criteria include parameters to be assessed and acceptance levels for each parameter. They are closely related to the implementation of the Drinking Water Directive (DWD 98/83/EC).

The use of CPDWs must meet the requirements of DWD, but is also related to the Construction Products Directive (CPD 89/106/EC).

In order to resolve these issues, the MS requested DG Enterprise to create a new European structure able to produce European Regulations for CPDW. After a preliminary “Feasibility Study” carried out by four MS, presentation of the report to Standing Committee of Construction (SCC), and with the agreement of the fifteen MS, the SCC decided in 1999 to create the Regulators Group on Construction Products in contact with Drinking Water (RG-CPDW). This body is composed of members from the Standing Committee for Drinking Water (SCDW) and the Standing Committee of Construction (SCC), CEN, national regulators and their experts and observers from European Industry. The task of RG-CPDW is to produce a prototype European Acceptance Scheme (EAS) that will permit the free circulation of construction products for use with drinking water throughout Europe, without any barrier to trade and provide a comparative level of customer protection.

Soon after its creation in 1999, RG-CPDW accepted the tests developed by CEN (some EN or prEN Standards) but also identified the need for a research on other complementary or fundamental aspects of testing of these products in order to complete the EAS. This research project was accepted and funded (50%) by the Commission (DG Research), with the other 50% being funded by the MS (materials manufacturers, water distributors, ministries, etc.). The research project started on 1st March 2001 and consisted of four work packages, microbial growth, cytotoxicity, unsuspected substances detected by GC-MS analysis and disinfectant by-products.
OBJECTIVES OF WP4 “DISINFECTANTS BY PRODUCTS”

The Drinking Water Directive 98/83/EC intends to protect the water quality at the consumer’s tap, so, beyond the effect on water quality of public water distribution systems, the effect of domestic installations also needs to be considered.

The following new aspects of the DWD have consequences for CPDW:
• more stringent requirements on lead, nickel and copper,
• introduction of parameters related to organic materials such as vinyl chloride monomer, epichlorohydrin and acrylamide,
• new products, such as copolymers, composites are now used to replace domestic or service lead pipes,
• greater consideration for microbial parameters at the consumer tap.
• risk of contamination by Legionella in hot water distribution systems inside buildings.

The need for regular disinfection of the water networks clearly appeared. Indeed, in many cases, the poor microbial quality of drinking water is caused by inadequate maintenance of drinking water distribution systems. The consequence is that treatment with high levels of disinfectants may be applied in order to remove microbial contamination, even in countries whose culture and tradition is to avoid the use of chlorine. Such treatments may be used both after installation and/or after renovation or repair of distribution systems. As a result the materials used in the distribution systems are exposed to disinfection procedures. Therefore it is very important to know how materials may react when exposed to high levels of disinfectants and to predict their potential to form disinfectant by-products due to the chemical reactions or even degradation.

Some Member States including France already have national regulations or approval procedures for CPDW test conditions, which simulate high level of disinfection (HLD). This means that all the materials approved in France for contact with Drinking Water have been submitted to a 24 hours contact time with 100 mg/l chlorine, without leaching significant by-products. This is not the case for other Member States that may not consider the performance of materials with HLD.

After discussion within CEN/TC164/WG3, a consensus was achieved to include an optional simulation of disinfection procedure in the standards or draft standards:
• “Organoleptic Assessment of organic materials in piping systems”: EN 1420/1, EN13052/1,
• “Organoleptic Assessment in organic materials in storage systems”: prEN14395/1
• “Migration assessment prEN12873/1 and prEN12873/2

At the moment, this procedure (HLD) is included in these test procedures (contact with 50 mg/l chlorine for 24h) as a possible preliminary stage of testing, but to be applied according to the product standards and/or national regulations.

The results of WP4 research will allow the RG-CPDW to make a decision about the need to include this procedure in the tests required to obtain the EAS “logo”.

The task of this WP4 is not only to compare the performance of different types of materials after contact with one high level of chlorine, but also to submit these materials to different disinfection conditions including chlorine and hydrogen peroxide. The results will lead to improve knowledge on potential disinfection by-products, and to the optimisation of the disinfection procedure in order to avoid possible adverse interactions with the materials.
degradation. Note that WP4 has not considered the effects of low concentrations of disinfectant (for example 1 mg/l of chlorine) used to treat drinking water.

The WP4 research program was carried out over two years in four stages:
Stage 1: review of disinfection practices in Europe
Stage 2: testing disinfection procedures on CPDW,
Stage 3: validation and statistic interpretation of the results,
Stage 4: scheme to include in EN standards and proposals for EAS to RG-CPDW

Six European Institutes have participated in this WP4. All were involved in water analysis and four of them were national laboratories for testing materials in contact with drinking water. They all participated in stage 1 and stage 2. The co-ordinating Institute (CRECEP) mainly performed stages 3 and 4.

This review of disinfection practices relates to the results of Stage 1. It consists of an enquiry carried out by each of the six participants in their country and in other Member States and will improve the knowledge about existing national regulations, guidelines and recommendations applied in European MS for public and private installations or the usual practices of Water Companies.
DISINFECTION PROCEDURES IN EUROPE

It was already known that high chlorine concentrations were used after installation or repair of piping systems but these were not necessarily applied under the same way. A questionnaire was prepared and sent to each MS (regulators, water companies, etc.) to ask them for information on their disinfection practices (See Annex I). The questionnaire contained questions about the type of procedures they used, in which cases, and if appropriate, the specific stringent disinfection conditions they used in case of microbial contamination, e.g. Legionella. He participants divided the work according to the Table below.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Member State</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRECEP (France)</td>
<td>FRANCE</td>
</tr>
<tr>
<td></td>
<td>BELGIUM</td>
</tr>
<tr>
<td></td>
<td>LUXEMBURG</td>
</tr>
<tr>
<td>ISS (Italy)</td>
<td>GREECE</td>
</tr>
<tr>
<td></td>
<td>ITALY</td>
</tr>
<tr>
<td>TWUL (United Kingdom)</td>
<td>UK</td>
</tr>
<tr>
<td></td>
<td>IRELAND</td>
</tr>
<tr>
<td>TZW (Germany)</td>
<td>GERMANY</td>
</tr>
<tr>
<td></td>
<td>AUSTRIA</td>
</tr>
<tr>
<td></td>
<td>FINLAND</td>
</tr>
<tr>
<td>KIWA (Netherlands)</td>
<td>NETHERLANDS</td>
</tr>
<tr>
<td></td>
<td>SWEDEN</td>
</tr>
<tr>
<td></td>
<td>DENMARK</td>
</tr>
<tr>
<td>EPAL (Portugal)</td>
<td>PORTUGAL</td>
</tr>
<tr>
<td></td>
<td>SPAIN</td>
</tr>
</tbody>
</table>

Due to the complexity of the data about disinfection procedures (DP) in the different MS, it was decided to include a global European approach in this report and not to give detailed procedures for each MS. Annex III gives levels of disinfectants used in MS.

General approach

Principles of Water Supply Hygiene

The general rules are based on the principle that the most effective means of avoiding or controlling contamination is to focus on prevention through cleanliness rather than through the use of high levels of disinfectants. Water Suppliers need to be vigilant and identify all the possible ways in which contamination could enter water distribution systems.

Beyond accidental microbial contamination of drinking water (breaks in piping systems, introduction of contaminated water, etc.), operating regimes need to be controlled in order to avoid excessive retention times, low turnover of stored water in storage systems, and dead-ends. Where dead-ends are unavoidable, flushing facilities should be provided. In case of new mains, caution is necessary to store and lay the new pipes, as hygienically as
possible, and to assemble them in satisfactory conditions. The same rules must also be applied in case of repairs.

**Preliminary cleaning procedures**

Several methods are available for cleaning pipelines such as scraping, air scouring, and the use of foam pigs. All these procedures are completed with high water flow (flushing) to eliminate suspended matter, deposits and possibly associated microbial contamination. The decision to disinfect will depend on national regulations, or water supply guidelines. Washing and rinsing operations are not always followed by disinfection procedures.

Several MS do not apply a disinfection procedure, but limit their procedures to efficient cleaning. Nevertheless, the basic principle is in every case “Water networks are always disinfected after thorough cleaning”. In many cases, after the cleaning step, water quality is assessed (turbidity, pH, ..) and if a disinfection procedure is not applied after cleaning, bacterial control is then performed before commissioning.

**Disinfection procedures**

When disinfection procedures are applied, operating conditions may be quite different in Europe from one MS to another or for the different parts of the water distribution systems. Water mains, service pipes, internal building pipes, storage systems are not necessarily disinfected according with the same procedure.

Most of the disinfection procedures are related either to official regulations, water supply guidelines, codes of practice or applied case-by-case when severe microbial contamination occurs in any part of the water distribution system. In some MSs which do not have a disinfection before commissioning policy, disinfection is sometimes unavoidable for safety and hygienic reasons.

**DP applied to piping and storage systems**

**Public networks**

Main pipes

Regulations exist for new pipes in a few MSs (Germany, Austria, UK, France). In other MSs, water companies’ guidelines or codes of practice outline what DP are to be applied. Water suppliers apply high levels of chlorine in the form of a NaClO solution, pellets of Ca(ClO)_2 or chloroisocyanurate for a significant contact time, typically 5 to 150 mg/l of free chlorine for 1 to 24 hours. The most common conditions are 50 mg/l for 24 hours. In some MSs (e.g. Spain), no disinfection is applied for pipes with a diameter of less than 300 mm.

For repairs or assemblies, higher levels of chlorine (200 mg/l up to several g/l) are applied for shorter contact times (few minutes to 30 min) or flushed into/on the valves, pumps, fittings or end pipes.

Service pipes

Due to the new European regulation on the lead concentration in drinking water (EC Directive 98/83), the Water Supplier may need to *urgently* remove and replace a great number of lead service pipes with new lead-free materials. In this case, a disinfection procedure may be carried out differently, in order to minimise disruption in the water supply to the customer, i.e. by flushing for a very short time with high levels of disinfectant.
Storage Systems
Most of the MS recommend that tanks and reservoirs are inspected and cleaned once a year. The available guidelines or regulations are mainly concerned with public storage systems. Information was obtained from Germany, France, Spain, Portugal and the United Kingdom. Usually, DP consists of spraying high levels of chlorine on walls and floor (150 to 5000 mg/l free chlorine for a contact period 20 minutes to 6 hours). Filling with chlorinated water with lower content (10 mg/l for 6 hours) may be performed. H₂O₂ is used more and more frequently (10 to 300 mg/l for 30 minutes to 6 hours).

Inside buildings

General
Despite few existing MS regulations, some guidelines or codes of practice describe the DP to be used by installers in cases of:
• construction of new buildings,
• renovation of buildings,
• replacement of internal lead pipes,
• emergency procedures in case of accidental microbial contamination.

Usually, MSs require an obligation for satisfactory results for microbial quality of drinking water at the consumer tap without giving any guidance on commissioning procedures. When disinfection is carried out (France, Germany, The Netherlands) the disinfectant may be chlorine (10 to 200 mg/l for 1 to 24 hours) or hydrogen peroxide H₂O₂ (100-150 mg/l for 12 hours) or potassium permanganate K₂MnO₄ (15 mg/l for 12 to 24 hours). The United Kingdom also gives guidance on the protection of storage systems inside buildings.

Specific cases of contamination by Legionella
Legionella analysis is performed more frequently in high risks buildings (hospitals, other health establishments, hotels, etc.). Contamination by Legionella can be associated with hot water distribution systems, especially when the water temperature is not maintained sufficiently high or when there is stagnation in the system.

Stringent procedures using alternatively stagnation or flushing with very hot water temperature (70-80 °C) and high levels of chlorine can be applied. Denmark, The Netherlands and United Kingdom (Health and Safety Commission, HMSO. ISBN O-7176-1766-6), give guidance on these procedures. France (Circular 2002/243), Germany (W552) and Italy (Gazzetta Ufficiale della Repubblica Italiana 05/05/2000) published regulations for the prevention and control of Legionella.

Post disinfection operating conditions and control

Most of the guidelines give information about the post disinfection procedure including rinsing procedures and neutralisation of chlorine by sodium thiosulfate (Na₂S₂O₃) before releasing the water into the environment. The absence of disinfectant in rinsing water is checked in order to ensure that the disinfection water is completely removed. Stagnation with fresh water for a few hours is followed with a microbial assessment of water quality.

Microbial control is performed in order to improve the reliability of the data for control purposes. VEWIN Guidelines (NL) specifies two microbial sampling periods of one hour and twenty four hours. Local French codes of practices for main pipes specify two samples
at ten minutes intervals performed at several sampling points of the pipe. Other countries have their own procedure.

The intention is to deliver drinking water as soon as possible to consumers. In case of breaks in the main pipes, and repairs of service or domestic pipes, the choice of a disinfection procedure will be a compromise between the emergency and best hygienic practices.

Relation of the DP with materials

Generally, no specific guidance about incompatibility of material with disinfectants is given. Nevertheless, in order to avoid corrosion or possible degradation of materials, recommendations and/or restrictions are given in some guidelines, e.g. W55 from Austria and French Circular 2002/243. In some cases, very high concentrations of disinfectants are applied (500 to 5000 mg/l chlorine) when repair of valves, pumps, fittings or end pipes are undertaken. These concentrations could affect the properties of the materials.
DISINFECTION PROCEDURES IN EUROPEAN STANDARDS

European standards deal with disinfectants applied in water distribution systems, e.g.:

- EN 805 (Water Supply – Requirements for systems and components outside buildings) describes the disinfection procedures and gives a list of disinfectants to be used (chlorine, 50 mg/l; KMnO₄, 50 mg/l; hydrogen peroxide, 150 mg/l; ClO₂: 50 mg/l)

- EN 1420/1, EN 13052, prEN 14395/1, prENs 12873 (1 and 2). These drafts or standards cover the assessment of the migration of organic materials into water. They all include in the test procedure the description of a simulation of high level of disinfectant (50 mg/l of chlorine).
CONCLUSION

Despite the lack of answers from three MS and the low level of information from some others, it is clearly apparent that high levels of chlorine are used in the majority of MS with different contact times and concentrations.

Hydrogen peroxide is also used in response to environmental issues in order to reduce the formation of haloforms in water distribution systems.

Potassium permanganate is predominantly used inside buildings but is not as efficient as chlorine and may lead to corrosion of metallic materials. For users it is easy to check its complete elimination due to the pink colour of this disinfectant.

For Stage 2 of the work program, a range of organic materials were exposed to different disinfection conditions (chlorine and H₂O₂) and the migration of organic substances and odour/flavour effects associated with materials was compared with the same materials not exposed to the disinfectants.

Some MS do not have regulation or practical guidelines for DP, but they still have to meet microbial requirements. In other MS, regulations are quite precise and detailed and most of the water companies apply the same procedures. Few MS have regulations or recommendations on disinfection for use inside building distribution systems and in case of Legionella contamination. Probably, the implementation of DWD 98/83/EC, with controls applicable to the quality of water at the consumers tap will lead these MS to develop guidance for disinfection inside buildings in order to avoid microbial contamination.

When detailed procedures are given, they include:

- description of rinsing, cleaning, washing before disinfection,
- the general approaches of DP, but also the specific procedures applied to the different parts of the water networks (main pipes, service pipes, reservoirs, …)
- in some MS, the specific DP related to the type of materials,
- the rinsing procedure after disinfection, and description of the neutralization procedure,
- microbial control and sometimes additional chemical controls,
- additional procedures when microbial results are not satisfactory.

It is clearly stated in the different approaches of MS, that the preliminary cleaning and rinsing steps are very important to obtain good microbial results after the disinfection procedure.
ANNEX I  LETTER TO MEMBER STATES

OBJECT: European Co-normative Research project EVKI-CT2000-00052 – WP4 Effects of Disinfectants on Materials

Dear Sir, Madam,

Referring to our participation in the EU project EVKI-CT2000-00052 for the development of harmonised tests to be used in the next European Acceptance Scheme (EAS) concerning Construction Products in contact with Drinking Water (CPDW), we request you to help us in getting actual information about the use of chlorine in drinking water in European countries.

If so, we are very interested in your procedures to use high levels of disinfectants in order to avoid further microbial proliferation in cases of repairing, or contamination of distribution systems, before restarting the distribution to the consumers.

Please send us, if available information about the range of disinfection conditions and trend to use alternatives for high levels of chlorine or hydrogen peroxide. If appropriate, please send us information concerning some microbial contamination episodes in drinking water distribution systems, and if appropriate, specific disinfection procedures to be applied, the existing practices, guidelines and regulations applied for public and private installations participants in your country;

To your information the objectives of this research are the following:
- to complete the review of respectively the use of high levels of disinfectants applied to the water distribution systems after repair or contamination. The disinfection procedures used to treat drinking water (lower disinfectant concentrations) will not be taken into account,
- to determine if CPDW may cause water quality problems if high levels of disinfectants are used,
- to validate the results statistically,
- to optimise the disinfection procedure in order to avoid water quality problems,
- to propose a validated procedure for the simulation of disinfection.

Do not hesitate to contact us if you need more information. Please give us names of people or institutes we can contact in your country, if you can’t help us.
We appreciate your help in this project and thank you in advance.

With kindest regards.

Coordinator Conormative Research WP4
EU project EVKI-CT2000-00052
Tel - Fax:
Email
### ANNEX II DISINFECTANTS USED IN WATER SYSTEMS

#### CHLORINE

<table>
<thead>
<tr>
<th>Member State</th>
<th>Concentration</th>
<th>Contact Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>20 – 40 mg/l</td>
<td>At least 12 h</td>
</tr>
<tr>
<td></td>
<td>50 – 100 mg/l</td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>No information</td>
<td>No information</td>
</tr>
<tr>
<td>Denmark</td>
<td>30 mg/l</td>
<td>36 – 48 h</td>
</tr>
<tr>
<td></td>
<td>Flushing 15 mg/l</td>
<td>20 min</td>
</tr>
<tr>
<td>Finland</td>
<td>50 mg/l</td>
<td>24 – 36 h</td>
</tr>
<tr>
<td>France</td>
<td>15 – 150 mg/l</td>
<td>2 – 24 h *</td>
</tr>
<tr>
<td>Germany</td>
<td>50 mg/l</td>
<td>At least 12 h</td>
</tr>
<tr>
<td></td>
<td>50 mg/l</td>
<td>Regular 36 – 48 h</td>
</tr>
<tr>
<td></td>
<td>5 g/l</td>
<td>Seconds- several min</td>
</tr>
<tr>
<td>Greece</td>
<td>No information</td>
<td>No information</td>
</tr>
<tr>
<td>Italy</td>
<td>20 – 30 mg/l</td>
<td>12 h</td>
</tr>
<tr>
<td></td>
<td>10 mg</td>
<td>24 h</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>5 mg/l</td>
<td>24 – 48 h</td>
</tr>
<tr>
<td>Portugal</td>
<td>15 – 150 mg/l</td>
<td>1 – 24 h</td>
</tr>
<tr>
<td>Spain</td>
<td>3000 mg/l</td>
<td>20 min</td>
</tr>
<tr>
<td></td>
<td>45 mg/l</td>
<td>12h</td>
</tr>
<tr>
<td>Sweden</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>20 – 75 mg/l</td>
<td>36 – 48 h</td>
</tr>
<tr>
<td>United Kingdom and Ireland</td>
<td>20 mg/l</td>
<td>24 h</td>
</tr>
<tr>
<td></td>
<td>50 mg/l</td>
<td>30 min – 16 h</td>
</tr>
<tr>
<td></td>
<td>1000 mg/l</td>
<td>Few sec to 5 min</td>
</tr>
</tbody>
</table>

*TC = 300 (contact time in hours x mg/l Cl2)
### HYDROGEN PEROXIDE

<table>
<thead>
<tr>
<th>Member State</th>
<th>Concentration</th>
<th>Contact Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>100 mg/l</td>
<td>No information</td>
</tr>
<tr>
<td>Belgium</td>
<td>No information</td>
<td>No information</td>
</tr>
<tr>
<td>Denmark</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>Finland</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>France</td>
<td>150 – 300 mg/l</td>
<td>30 min</td>
</tr>
<tr>
<td>Germany</td>
<td>150 mg/l</td>
<td>At least 12 h</td>
</tr>
<tr>
<td></td>
<td>1.5 % H₂O₂ (spraying for reservoirs)</td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td>No information</td>
<td>No information</td>
</tr>
<tr>
<td>Italy</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>Portugal</td>
<td>Hydrogen peroxide at 50% in acidic medium (for tanks)</td>
<td>20 min</td>
</tr>
<tr>
<td>Spain</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>Sweden</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>100 mg/l</td>
<td>24 h</td>
</tr>
<tr>
<td>United Kingdom and Ireland</td>
<td>Not used</td>
<td>-</td>
</tr>
</tbody>
</table>

### POTASSIUM PERMANGANATE

<table>
<thead>
<tr>
<th>Member State</th>
<th>Concentration</th>
<th>Contact time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>NaClO + KMnO₄</td>
<td>No information</td>
</tr>
<tr>
<td>Belgium</td>
<td>No information</td>
<td>No information</td>
</tr>
<tr>
<td>Denmark</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>Finland</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>France</td>
<td>15 mg/l</td>
<td>24 h</td>
</tr>
<tr>
<td>Germany</td>
<td>15 mg/l</td>
<td>12 h</td>
</tr>
<tr>
<td>Greece</td>
<td>No information</td>
<td>No information</td>
</tr>
<tr>
<td>Italy</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>Portugal</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>Spain</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>Sweden</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>Not used</td>
<td>-</td>
</tr>
<tr>
<td>United Kingdom and Ireland</td>
<td>Not used</td>
<td>-</td>
</tr>
</tbody>
</table>

24
ANNEX III LIST OF GUIDELINES AND REGULATIONS ON CLEANING AND DISINFECTION

Austria

Summary ÖVGW-W 55
Hygienic maintenance of pipeline networks (January 1977)

W 55 is available in German language only. W 55 describes the hygienic maintenance of pipeline networks. Household installations are not regarded. Main points of the documents are preventive measures such as storing of pipes, pipe trench and used aids which have to be taken into account during the installation of new pipes and repairs respectively. The hygienic maintenance is divided up in the parts flushing and disinfection with free chlorine. Other disinfectants are not mentioned. Furthermore, the whole disinfection procedure is described in detail and chlorine concentrations for different pipe materials (plastics, cement, cast iron) are recommended. In principle the disinfection process comprises flushing before disinfection, disinfection and control of the disinfectant content, flushing, water quality control.
Belgium

IGR –3-6-001 from CIBE (Water Company Guideline) - Forms F0 103
French version

Denmark *

• Technical paper CEN work document CEN/JWG/164-3-AHG1/155-WG2 “Disinfection of Water Supply Plants”
• other publications in “Water Supply Technigie” and “Water Technique”

English version

CEN/JWG/164-3-AH1/155-WG2 N101

DISINFECTION OF WATER SUPPLY PLANTS
SUBMITTED BY MR. KJØLHEDE (DK)
Disinfection of Water Supply Plants

by H. P. Jeppsen, Fritz Christensen and E. Kirkegaard

During the establishing phase, under repair work or when working, the water supply plant may by accident or due to unfortunate circumstances be infected in many different ways, e.g.:

Bad protection of wells and borings,
Unhygienic conditions in or around filtering plants and clean water tanks,
Insufficient precautions when laying new pipes or when doing repair work on the supply system.

Pollution of drinking water is signified by the presence of color bacillus, increased bacterial count, mudiness, or deterioration of quality through bad smell or taste. Furthermore, a chemical analysis can usually demonstrate an increased quantity of nitrate, phosphate and ammonia, and at times even a too high potassium permanganate count.

When pollution of a water supply plant is found, the object is first and foremost to find the source of pollution and change the conditions causing the pollution to occur.

The cause of pollution must be removed, as it is otherwise necessary to start flushing all over again and possibly disinfect if the source of pollution has again infected the water.

When the source of pollution is removed, it is very often only necessary to rinse through the polluted part of the water supply plant. Rinsing through with lots of water is most efficient and usually performed rather easily, and therefore in many cases this procedure is fully satisfactory.

In cases where flushing through and other mechanical precautions are not sufficient, it is necessary to disinfect using appropriate remedies which will kill or at least impede the growth of damaging or unwanted microorganism.

Thus nothing prevents harmless organisms to survive a disinfection, contrary to a sterilization process which aims at killing everything alive.

A sterilization or a disinfection should be performed whenever possible without doing any damage to the plant being treated, or allowing any disadvantage to occur by continually using the plant.

When a disinfection occurs it is usually a chlorination, as this method has very many advantages, but as the objective is to neutralize all bacteria, any bactericide could in theory be applied. In practice, as a rule only silver salt is found besides compounds of chlorine.
France

French Decree 2001-1220 relative to waters intended for human consumption

The European DWD 98/83/EC relating quality of waters intended was implemented in a French Decree 2001-1220. This Decree mentions in Article 38 Sub section 3 “Hygienic rules applicable to public distribution networks” that water networks and installations have to be cleaned, rinsed and disinfected before commissioning. Moreover, a legal obligation exists for storage systems: they must be emptied, cleaned, rinsed once a year.
H. - Au deuxième alinéa, après le mot : « grade », il est ajouté les mots : « ou emploi ».

Il est fait un premier alinéa ainsi rédigé :

« Ces qui prennent des tierces empruntées, diffère six mois au plus au moment de leur nomination, ne traitement supérieur à celui étendu à des fonctions du même emploi occupé conservent, à leur propre risque, le traitement affecté à l'indice découlant des leurs nominations. »

Art. 3. - La ministre de l'économie, des finances et de l'industrie, le ministre de l'agriculture et de la solidarité, le ministre de la foncière publique et de la réforme de l'Eau et le secrétaire d'État en budget sont chargés, en ce qui concerne de l'exécution du présent décret, qui sera publié au Journal officiel de la République française.

Fall à Paris, le 19 décembre 2001.

Le Premier ministre,

La ministre de l'emploi et de la solidarité,

La ministre de la foncière publique et de la réforme de l'Eau,

Le secrétaire d'État en budget,

Cartes de France.

Décret n° 2001-1220 du 23 décembre 2001 relatif aux mesures à prendre en application de la convention internationale, à l'exclusion des eaux minérales naturelles.

Selon la convention internationale, le Président de la République,

Sur le rapport du Premier ministre et de la ministre de l'agriculture et de la solidarité,

Vu la directive 79/402/CEE du Conseil du 16 juin 1979 modifiée concernant la qualité requise des eaux superficielles destinées à la production d'alimentation dans les Baux minéraux ;

Vu la directive 79/876/CEE du Conseil du 22 octobre 1979 modifiée relative aux méthodes de mesure et à la fréquence des échantillonnages et de l'analyse des eaux superficielles destinées à la production d'alimentation dans les Baux minéraux ;

Vu la directive 90/64/CEE du Conseil du 22 février 1990 modifiée relative à la qualité des eaux destinées à la consommation humaine ;

Vu la directive 93/13/CEE du Conseil du 7 juillet 1990 concernant la libération d'eau à l'endommagement du milieu et de l'environnement ;

Vu la directive 96/63/CE du Parlement européen et du Conseil du 28 octobre 1996 modifiant la directive 90/64/CEE du Conseil relative au rapprochement des législations des États membres concernant l'exploitation et la mise dans le commerce des eaux minérales naturelles ;

Vu la directive 98/89/CE du Conseil du 22 décembre 1998 relative à la qualité des eaux destinées à la consommation humaine ;

Vu le décret n° 2000/372/CE du Parlement européen et du Conseil du 23 octobre 2000 édictant un cadre pour une politique communautaire dans le domaine de l'eau ;

Vu la loi n° 2000-120 du 30 mars 2000 relative à l'organisation des eaux destinées à la consommation humaine et à l'organisation des eaux destinées à la consommation humaine ;

Vu la loi n° 2000-341 du 14 avril 2000 relative aux droits des consommateurs dans leurs relations avec les eaux minérales naturelles.

Vu les décrets n° 75-138 du 12 février 1975 modifiés portant application de la loi n° 73-605 du 3 août 1973 sur les fraudes alimentaires en ce qui concerne les produits et les matériaux utilisés pour le coupage des matériels et objet destinés à être en contact avec des denrées, produits et boissons pour l'alimentation de l'homme et des bétails ;

Vu le décret n° 75-933 du 3 janvier 1975 modifiant les eaux destinées à la consommation humaine, à l'exploitation des eaux minérales naturelles ;

Vu le décret n° 89-169 du 6 juin 1989 modifiant celles aux eaux minérales naturelles et aux eaux pétillantes prélevables ;

Vu le décret n° 90-604 du 1er juillet 1990 modifiant celui de la dénomination ;

Vu le décret n° 92-631 du 8 juillet 1992 modifiant aux eaux minérales et objets destinés à être en contact avec des denrées, produits et boissons pour l'alimentation de l'homme et des bétails ;

Vu le décret n° 93-742 du 29 mars 1993 modifié réfère aux procédures d'admissibilité et de déclaration prévues par l'article 10 de la loi n° 93-3 du 3 janvier 1992 sur l'eau ;

Vu le décret n° 94-153 du 29 novembre 1994 modifié réfère aux conditions d'application de la loi n° 92-43 du 3 janvier 1992 sur l'eau aux opérations, travaux ou activités consistant en des modifications des installations en des secteurs relevés de la convention ou assujettis à des règles de protection du secteur de l'eau nationales ;

Vu le décret n° 95-455 du 6 août 1995 relatif aux droits prévus sur les yachts, les pétroles ou des biens publics de l'eau et de l'air ;

Vu le décret n° 97-34 du 15 janvier 1997 relatif à la dénomination des eaux minérales naturelles ;

Vu le décret n° 97-125 du 19 décembre 1997 relatif à l'application à l'agriculture et de la solidarité ;

Vu l'article 2 du décret du 15 janvier 1997 relatif à la dénomination des eaux minérales naturelles ;

Vu l'article 3 de la convention internationale des eaux en date du 23 novembre 2001 ;

Vu l'arrêt de l'Agence française de sécurité sanitaire des aliments en date du 1er décembre 2001 ;

Vu l'article 5 du décret du 1er décembre 2001 ;

Vu l'article 1er de la convention internationale des eaux en date du 23 novembre 2001 ;

Le Conseil d'État (seconde secure) ;

Vu le projet de loi de finances pour la consommation.


Vu la loi n° 2001-220 du 23 décembre 2001 relative aux eaux destinées à la consommation humaine, à l'exploitation des eaux minérales naturelles.

Vu l'article 1er de la déclaration du 1er juillet 2001 ;


Vu les décrets n° 2000-471 du 1er juillet 2000.

Vu la loi n° 2000-1145 du 1er juillet 2000.

Vu la loi n° 2000-203 du 1er juillet 2000.


Vu la loi n° 2000-203 du 1er juillet 2000.


Vu la loi n° 2000-203 du 1er juillet 2000.


Vu la loi n° 2000-203 du 1er juillet 2000.


Vu la loi n° 2000-203 du 1er juillet 2000.


Vu la loi n° 2000-203 du 1er juillet 2000.


Vu la loi n° 2000-203 du 1er juillet 2000.

L'événement des eaux méditerranéennes, pour le maintien et la main-

gage des installations ainsi que l'élévation des produits livrés dépendent de l'entretien à la santé des personnes et à l'entourage, de con-
ditioner à une source d'irrégularités.

**Sous-section 2**

**Régles pratiquées pour le plomb**

**dans l'agencement de distribution.**

Art. 25. — Les règles imposées des dispositions prises en application

de l'article 22, la mise en place de compléments au plomb

certains zones sanitaires de l'agencement de distribution

de l'issue à commander dans l'entourage humide est interdite.

Art. 26. — Le propriétaire public des eaux méditerranéennes, source dédiée

ou sociale, doit prévoir une source de pollution de distribution

de l'eau au maximum de la nuit et de la journée et de la situation

certains zones sanitaires de l'agencement de distribution.

Art. 27. — Le plomb des eaux méditerranéennes doit être supprimé et

certains zones sanitaires de l'agencement de distribution.

**Sous-section 3**

**Règles pratiquées d'agencement appliquées aux eaux publiques**

**dans l'agencement de distribution**

et les installations non-résiduelles de réseaux publics.

Art. 28. — Les eaux méditerranéennes dédiées aux 1° et 2° de

l'article 29 doivent être conduites par les réseaux publics, l'eau dans certaines

certains zones sanitaires de distribution et de la situation

certains zones sanitaires de l'agencement de distribution.

Art. 29. — Les eaux méditerranéennes dédiées aux 1° et 2° de

l'article 29 doivent être conduites par les réseaux publics, l'eau dans certaines

certains zones sanitaires de distribution et de la situation

certains zones sanitaires de l'agencement de distribution.

**Sous-section 4**

**Règles pratiquées d'agencement appliquées aux eaux publiques**

**dans l'agencement de distribution**

et les installations non-résiduelles de réseaux publics.

Art. 30. — Les eaux méditerranéennes dédiées aux 1° et 2° de

l'article 29 doivent être conduites par les réseaux publics, l'eau dans certaines

certains zones sanitaires de distribution et de la situation

certains zones sanitaires de l'agencement de distribution.

Art. 31. — Les eaux méditerranéennes dédiées aux 1° et 2° de

l'article 29 doivent être conduites par les réseaux publics, l'eau dans certaines

certains zones sanitaires de distribution et de la situation

certains zones sanitaires de l'agencement de distribution.

Art. 32. — Les eaux méditerranéennes dédiées aux 1° et 2° de

l'article 29 doivent être conduites par les réseaux publics, l'eau dans certaines

certains zones sanitaires de distribution et de la situation

certains zones sanitaires de l'agencement de distribution.

Art. 33. — Les eaux méditerranéennes dédiées aux 1° et 2° de

l'article 29 doivent être conduites par les réseaux publics, l'eau dans certaines

certains zones sanitaires de distribution et de la situation

certains zones sanitaires de l'agencement de distribution.

This guideline was prepared in 1998 by Health Ministry with the participation of some water companies, local health authorities and water institutes, including comments from WRc (UK), Zurich City water supplier (CH), and Canadian water companies. It has not yet been officially published but is commonly used by water companies. Several chapters in this guideline are:

- General approach for public water distribution systems
  - General principle: importance of the cleaning,
  - Main objectives,
  - Why and when disinfection needs to be applied?

The basic approach is “Water networks disinfection procedure is only efficient after thorough cleaning”

- Cleaning and disinfection procedures for piping systems
  - Preliminary recommendation during works
  - Procedures are described for diameters < 300 mm and for diam > 300mm
  - Specific cases of service pipes and diameters < 40 mm
  - Removal of disinfectants: recommendations
  - Microbial assessment of water after disinfection

- Cleaning and disinfection procedure for storage systems
  Same framework as for piping systems with additive specific recommendations

- Simplified procedures in specific cases

- Management of non conform results
  Information from health authorities to the customers
MINISTERE CHARGE DE LA SANTE
Direction Générale de la Santé
Sous Direction de la Veille Sanitaire
8, avenue de Ségur - 75350 PARIS 07 SP

NETTOYAGE ET DESINFECTION DES RESERVOIRS ET CANALISATIONS D’EAU DESTINEE A LA CONSOMMATION HUMAINE

GUIDE TECHNIQUE

Note Publique
Version : Février 1989
# Sommaire

## Nettoyage et désinfection des réservoirs et canalisations d'eau destinée à la consommation humaine

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VI.4.1. Paramètres physico-chimiques
Circular DGS/SD7A/SD5-DHOS/E4 N° 2002/243 relating the prevention of risks linked to Legionella in Health Buildings

This circular describes, in nine technical sheets, recommendations to avoid the presence and proliferation of Legionella in hot water distribution systems. It is mainly concerned with hospitals and health building piping systems.

Cleaning and disinfection conditions (contact time, type of cleaning product and disinfectant, temperature, ...) are described in relation to their compatibility with each type of material inside the building. Sheet II is of a particular interest "Cleaning and disinfection of inside building hot water distribution systems (see table 1 and table 2).
Resumé : La présente circulaire précise les mesures de prévention et des modalités de surveillance à mettre en œuvre pour lutter contre les léprellogènes dans les établissements de santé.


Textes de référence :

Texte abrogé : Circulaire n°538 TO 3 du 3 juillet 1974 relative à la prévention des accidents de brûlures par l'eau chaude sanitaire.
**Tableau n°2 : Désinfectants utilisables dans les réseaux d'eau chaude sanitaire**

<table>
<thead>
<tr>
<th>PRODUITS</th>
<th>UTILISÉS EN TRAITEMENT CONTINU</th>
<th>UTILISÉS EN TRAITEMENT DISCONTINU</th>
<th>UTILISÉS EN TRAITEMENT CHOC CURATIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorures gazeux générés par l'hypochlorite (hypochlorite de sodium NaOCl, Chlorure monochlorure de sodium ClO⁻, Chlorate de sodium ClO₃)</td>
<td>1 mg/l de chlorure libre</td>
<td>10 mg/l de chlorure libre pendant 8 h</td>
<td>- 100 mg/l de chlorure libre pendant 1 h  ou 15 mg/l de chlorure libre pendant 24 h  ou 50 mg/l de chlorure libre pendant 12 h</td>
</tr>
<tr>
<td>Bleuroxygénateurs (de sodium ou de sodium hydraté)</td>
<td>NON</td>
<td>10 mg/l en équivalent chlorure libre pendant 8 h</td>
<td>- 100 mg/l en équivalent chlorure libre pendant 1 h  ou 15 mg/l en équivalent chlorure libre pendant 24 h  ou 50 mg/l en équivalent chlorure libre pendant 12 h</td>
</tr>
<tr>
<td>Bisulfate de sodium</td>
<td>1 mg/l de SO₃²⁻</td>
<td>NON</td>
<td>NON</td>
</tr>
<tr>
<td>Peroxyde d'hydrogène saturé avec argent</td>
<td>NON</td>
<td>100 à 1000 mg/l de peroxyde d'hydrogène pour un temps de contact forcé de la concentration en désinfectant et pouvant aller jusqu'à 12 heures.</td>
<td></td>
</tr>
<tr>
<td>Acide perchlorique en ébullition avec H₂O₂</td>
<td>NON</td>
<td>NON</td>
<td>1000 ppm en équivalent HClO₄ pendant 2 h</td>
</tr>
<tr>
<td>Soude</td>
<td>NON</td>
<td>pH &gt;12 au moins une heure. Cependant :  - ces précautions doivent être prises pour le teint des pansements,  - cette solution doit être utilisée en dernier recours et avec de grandes précautions en égard au risque encrassé par le personnel.</td>
<td></td>
</tr>
</tbody>
</table>

**PROCEDES**

- Choix du traitement
- Convient de température en mélange
- 70°C pendant au moins 30 minutes
- Efficacité minimale en point de température de 0,2μm

* Les modalités de désinfection préconisées pour les traitements discontenus n'ont été validées que pour de petits réseaux, et les retours d'expériences ne permettent pas de les valider actuellement pour les réseaux de taille plus importante.

**LIRE IMPORTANT :**

Il est important de noter que la désinfection des produits chimiques dans ces listes, n'implique pas la garantie de sécurité du produit. Les utilisateurs de ces produits doivent :  - respecter les conditions d'emploi (dilution, composition de la préparation commercialisée, mélanges de différents constituants de cette liste),  - respecter les précautions de l'eau,  - observer les limites d'usage dans les réseaux d'eau destinés à la consommation humaine que la conservation horaire doit être assurée par la Direction Générale de la Santé. Si une souche soumise à l'International Committee of the Red Cross en mélanges de folaté de l'eau de l'eau, pour une consommation humaine doit être assurée par l'Institut de la Santé. Il est indispensable de respecter les limites de qualité de l'eau destinée à la consommation humaine dans les eaux à être traitées pour l'eau, à l'Institut de la Santé. Il est nécessaire d'assurer les normes de qualité de l'eau destinée à la consommation humaine dans les eaux et être assuré pour l'eau, à l'Institut de la Santé. Il est nécessaire d'assurer les normes de qualité de l'eau destinée à la consommation humaine dans les eaux à être traitées pour l'eau, à l'Institut de la Santé.
Germany

Summary DVGW-W 291
Cleaning and disinfection of water distribution systems (March 2000)

W 291 is available in German language only.
This document is valid for all parts of the distribution network, which are installed between the drinking water production site and the exchange point to household installations. Different cleaning and disinfection procedures are described in detail. The document is split up in 10 main chapters which are: preventive measures, cleaning, disinfectants, apparatus used for the work with disinfectants, cleaning and disinfection of reservoirs, cleaning and disinfection of pipelines, cleaning and disinfection of valves and fittings, control of the water quality, commissioning, removal of waters which contain disinfectants. Concerning the disinfectants which may be used for the disinfection of parts of the distribution network an overview over well known chemicals such as H$_2$O$_2$, KMnO$_4$, NaOCl, Ca(OCl)$_2$ and ClO$_2$ as well as recommendations concerning their use and applied concentrations is given.

Summary DVGW-W318
Water reservoirs – control and cleaning (February 1983)

W 318 is available in German language only.
W 318 is a guideline especially for the regular control of drinking water reservoirs. Therefore, it is listed in detail how many controls and which kind of control are recommended. Regular controls during operation are distinguished between controls in filled up and empty water chambers. Furthermore, it is listed which points have to be checked before drinking water storage in new constructed reservoirs is realised. Another chapter is dealing with cleaning and disinfection of water reservoirs. Again, it is distinguished between cleaning and disinfection after construction of the reservoir and during regular operation. It is mentioned that cleaning has to be done only if necessary. Furthermore, it is open whether or not cleaning agents/disinfectants are used. But if cleaning agents are used they have to be in accordance with W 319. Finally the whole cleaning process is described in detail.

Summary DVGW-W552
Drinking water heating systems and conduits; technical measures to decrease legionella growth; rehabilitation and operation (April 1996)

W 552 is available in German language only.
W 552 describes the technical and hygienic-microbiological examination as well as measures which have to be undertaken if drinking water heating systems and belonging distribution pipes indicate a legionella contamination. The necessary measures have to be done in dependence of the microbiological results. Therefore, tables are given in which different legionella results are assessed and whether or not further measures have to be initiated. Sanitation measures are divided up in so called working and process measures. Under process measures e.g. thermal and chemical disinfection as well as UV radiation are described. Hereby, chemical disinfection is referring to DVGW W 291 but higher chlorine concentrations (10 mg/L) with shorter contact times (2 hours) are given.
Reinigung und Desinfektion von Wasserverteilungsanlagen

In the present annual report, cases of Legionellosis diagnosed in Italy during 2001 and notified to the National Surveillance System are analysed. In particular, a statistical regional distribution of 325 cases notified in this period (289 cases were confirmed) is shown. From this study it emerges that the situation is similar to that recorded in the previous years in terms of male/female ratio, age-specific distribution and occupation. Moreover, examining the notified cases (except for nosocomial cases) an increase in disease rate is noticed during summer and autumn.

The authors also report a statistical distribution on the exposure to the infection, which was mainly contracted in hospitals (15% of cases) and accommodation (23% of cases). In most cases the etiologic agent was *Legionella Pneumophila* (81.2%), against which antibiotics, such as macrolides, fluoroquinolones and betalactams, were given. In diagnostic terms, the most utilised method was the detection of soluble urinary antigen followed by serology.

In this article, data on infections contracted during a journey are reported. In 2001, their number was doubled in comparison with the previous year. In particular, 130 cases concerning Italian and foreign tourists were notified to ISS by the National Surveillance System, while 56 cases were notified by EWGLI (European Working Group for *Legionella* Infections).
The present document represents an official collection of guidelines for prevention and control of Legionellosis in Italy. It is the result of an agreement between Ministry of Health and local organs (regions and autonomous provinces).

In the first part, epidemiological information about Legionellosis, such as epidemic places, infection risks, transmission conditions and disease frequency, is given. A detailed description of clinical picture, diagnostic methods and therapies is followed by a list of surveillance, prevention and control measures. In the document a National Surveillance System is defined; on the ground of this system the doctor who formulates the diagnosis must fill in a form and send it to the Hygiene Institute of Azienda Sanitaria Locale (a local institution for health care and control) and to the Bacteriology and Medical Mycology Laboratory of Istituto Superiore di Sanità in good time. This system is a part of an international surveillance program that gathers information about infectious contracted by citizens of 30 participating European countries during a journey.

In the second part, there is a description of intervention strategies (thermal treatment, chlorination, copper-silver ionisation, disinfection with ultraviolet light or chlorine dioxide) in order to contrast Legionellosis propagation and diffusion in water distribution systems.
CONFERENZA PERMANENTE PER I RAPPORTI TRA LO STATO
LE REGIONI E LE PROVINCIE AUTONOME DI TRENTO E BOLZANO

DOCUMENTO n. 4 del 2000

LA CONFERENZA PERMANENTE PER I RAPPORTI TRA LO STATO
LE REGIONI E LE PROVINCIE AUTONOME DI TRENTO E BOLZANO

Visita Part. 2, comma 1, lettera b), del decreto-legge 28 agosto 1997, n. 281, che attribuisce a questa Conferenza il compito di promuovere e assicurare accurati, secondo quanto disposto dall'art. 4 del medesimo decreto-legge.

Visita Part. 4, comma 1, del decreto-legge 28 agosto 1997, che provvede che in questo Convenzione Governo, regioni e province autonome, in attuazione del principio di forte collaborazione, possono conclaudere accordi di tipo di coordinazione struttura delle rispettive competenze per svolgere attività di interesse comune.

Visita il documento di linee-guida in argomento trasmesso dal Ministero della sanità il 13 marzo 2000;

Concordati alcuni non sostanziali modifiche al documento stessa;

Accertato l'assenza dei Governi e dei presidenti delle regioni e delle province autonome, espresse in quarta seduta, ai sensi dell'art. 4, comma 2, del medesimo decreto-legge.

Sedute

Il segretario annovera i seguenti assistenti:

Governo, regioni e province autonome,
concorrono alla necessità di attuare sui territori nazionali la misura di prevenzione e controllo delle leggerezioni, individuate dalle linee guida, che sorretto complessivamente ad un obiettivo di salute pubblica,

svolgendo che per il perseguimento del medesimo obiettivo il Ministero della sanità stessa gli indicati criteri generali contenuti nel documento di linee guida per la previsione e il controllo della leggerezioni, in più interessato al presente tema, se estendono parte maggiore, in una relativa normativa di legge, e alla relativa normativa delle regioni e delle province autonome nell'organizzazione dei vari organismi che ad essi in relazione alle azioni delle proprie programmi nazione.

Roma, 4 agosto 2000

H. segretario: CAMPAGLIA

H. presidente: RIBELLI

I Socio: LIUUM

INTRODUZIONE

La leggerrezza è una malattia che preoccupa la comunità nazionale.

La condivisione di un'ampia rete di supporto è necessaria per una effettiva prevenzione e controllo della leggerrezza. È necessario creare un'organizzazione struttura per svolgere attività di interesse comune.

Calcolo linee guida per la previsione e il controllo della leggerrezza, adotta una normativa appropriata e sottopone al consenso, ai criteri generali contenuti nel documento di linee guida per la previsione e il controllo della leggerrezza.

La presente normativa viene anche rivisitata in vista della direttiva n. 1999/271 del 29 dicembre 1999, che regolamenta la Leggerrezza per il perseguimento della salute del commemorato.

12. PANDEMIOLOGIA

La pandemia di malattia da leggerrezza deve essere gestita in modo coordinato con la gestione pubblica.

La pandemia deve essere gestita in modo coordinato con la gestione pubblica.

Il salvataggio di un'organizzazione struttura per svolgere attività di interesse comune e in più interessato al presente tema, se estendono parte maggiore, in una relativa normativa di legge, e alla relativa normativa delle regioni e delle province autonome nell'organizzazione dei vari organismi che ad essi in relazione alla previsione e il controllo della leggerrezza.

Pubblico: LIUUM
Luxembourg

General and limited information in a EUREAU document.

The Netherlands


"Hygienic Code Drinking Water, Storage, Transport and Distribution"
In the present annual report a set of rules is presented covering the prevention of contamination of drinking water during maintenance and renewal work on water distribution system and drinking water reservoirs. These rules are meant to replace the VEWIN guidelines of 1964. These rules are based on the belief that the most effective means of controlling contamination is to focus on prevention through cleanliness, rather than through use of disinfectants to reduce it. It is appreciated that in practise this approach may not always be feasible. A number of methods are available for cleaning of pipelines such as flushing, water and air scouring and the use of foampigs. These methods can be used alone or with disinfectants, like sodiumhypochlorite or calciumhypochlorite, like sodiumhypochlorite or calciumhypochlorite (tables or granulates). If a disinfectant is applied continously or daily registration of the disinfectant concetration is obligatory.
PO-MN-008 Work Procedure “Cleaning and disinfection of tanks”

Aim    Establish the methodology for cleaning and disinfection of tanks, either new or in exploration, and control the efficiency of these procedures.
Scope  The present work procedure is applicable to all tanks of the distribution system of EPAL.
Procedures Selection of cleaning and disinfectant products. The cleaning and disinfectant products must be effective for the aim they are used for. As cleaning products may be used mixtures of: Organic acids, inorganic acids, corrosion inhibitors and tensioactive agents. As disinfectant agents solutions of hydrogen peroxide, chlorine and its derivatives may be used.

<table>
<thead>
<tr>
<th>PROCEDIMENTO OPERATIVO</th>
<th>PO-MN-008</th>
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</thead>
<tbody>
<tr>
<td>LAVAGEM E DESINFECÇÃO DE RESERVATÓRIOS</td>
<td>Edição nº 2</td>
</tr>
</tbody>
</table>

1. **OBJECTIVO**
Estabelecer a metodologia para lavagem e desinfecção de reservatórios novos ou em exploração e para o controlo da eficácia destes processos.

2. **ÂMBITO**
O presente Procedimento Operativo (PO) aplica-se a todos os reservatórios do Sistema de Abastecimento da EPAL.

3. **DEFINIÇÕES**
“Listas positivas” - Listas de substâncias comprovadamente inocuas utilizadas na composição de meiofáís aplicados a sistemas de abastecimento de água para consumo humano.

4. **DOCUMENTOS RELACIONADOS**
NF EN ISO 14001
Manual Ambiental - Capítulo 4.4.6
Decreto-Lei n.º 238/80, de 2 de Agosto
Decreto-Lei n.º 243/2001, de 6 de Setembro.

5. **PROCEDIMENTOS**
A lavagem e desinfecção de todos os reservatórios em exploração, é até à programação anual por parte das áreas de negócio responsável pelos mesmos.

As operações de lavagem e desinfecção são executadas por prestadores de serviço habilitados pela EPAL, em função da capacidade de resposta às exigências de Directivos de Encargos específicos e de preferência, Certificadas para a actividade.

5.1 Seleção de Produtos para Lavagem e Desinfecção

5.1.1 - Os produtos desinfectantes e desinfectantes deverão ser comprovadamente inocuos para as operações a que se destinam e deverão respeitar todos os requisitos definidos no ponto 5.1.2. Como produtos desinfectantes poderão ser utilizadas misturas de: ácidos orgânicos, ácidos inorgânicos, inibidores de corrosão e agentes tensioativos. Como agentes desinfectantes podendo ser usadas soluções à base de partículas de hidrogênio, cloro ou seus derivados.

5.1.2 - Todos os produtos a empregar nas operações de lavagem e desinfecção de reservatórios devem ser acompanhados dos certificados de origem e, pelo menos, dos seguintes documentos de controlo de qualidade essenciais para a aprovação técnico desse produto:

<table>
<thead>
<tr>
<th>Elaboração: ADIAP/LAB</th>
<th>Verificação: SG</th>
<th>Aprovação: CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Signatures]</td>
<td>Report 0000-00-00</td>
<td>[Signatures]</td>
</tr>
</tbody>
</table>

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PO-MN-009 Work Procedure “Cleaning and disinfection of pipes”

Aim
Establish the methodology for cleaning and disinfection of pipes, either new or in exploration, and control the efficiency of these procedures.

Scope
The present procedure is applicable to all pipes of the distribution system of EPAL, when the necessity of cleaning and disinfection is identified: new pipes, pipes needing renovation and when there is a risk of contamination.

Procedures
Selection of cleaning and disinfectant products. The disinfectant products must be effective for the aim they are used for. As disinfectant agents solutions of hydrogen peroxide, chlorine and its derivatives may be used.

<table>
<thead>
<tr>
<th>PROCEAMIENTO OPERATIVO</th>
<th>PO-MN-009</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAVAGEM E DESINFECÇÃO DE CONDUITAS</td>
<td>Edição nº 2</td>
</tr>
</tbody>
</table>

1. **OBJETIVO**
Estabelecer a metodologia para lavagem e desinfeção de condutas novas ou em exploração, e para o controlo da eficácia destes processos.

2. **ÂMBITO**
Este Procedimento aplica-se a todas as condutas do Sistema de Abastecimento da EPAL, quando for identificada a necessidade de lavagem e desinfeção: condutas novas, condutas sujeitas à reparação e em situações de contaminação.

3. **DEFINIÇÕES**

- **Listas positivas** – Listas de substâncias comprovadamente inócuas utilizadas na composição de materiais aplicados em sistemas de abastecimento de água para consumo humano.
- **Condutas novas** – Conduitas para renovação ou ampliação programadas, da rede ou dos edifícios.

4. **DOCUMENTOS RELACIONADOS**

- NPEN ISO 14001
- Manual Ambiental – Capítulo 4.4.6
- Decreto-Lei n.º 238/98, de 1 de Agosto
- Decreto-Lei n.º 243/2001, de 5 de Setembro

5. **PROCEDIMENTOS**

5.1. **Seleção de Produtos para Lavagem e Desinfecção**

5.1.1 - Os produtos desinfetantes devem ser comparativamente eficazes para as operações a que se destinam e devem respeitar todas as regras definidas no ponto 5.1.2. Como agentes desinfetantes pode-se usar soluções a base de peróxido de hidrogênio, cloro ou seus derivados.

5.1.2 - Todos os produtos a empregar nas operações de lavagem e desinfecção de condutas devem ser acompanhados dos certificados de origem e, pelo menos, dos seguintes documentos de controlo de qualidade essenciais para a apreciação técnica das propostas:

- Documento de certificação de empresa fabricante, segundo as normas das séries ISO 9000 ou homologações, quando aplicável;
- Ficha técnica do produto a aplicar;
- Listagem dos sistemas de abastecimento de água nacionais e europeus, onde o produto foi utilizado;

Elaboração: ADS/APT/LAB
Verificação: SG
Aprovação: CA
Spain

Technical procedures (Water Company AGBAR)
PT- AD05 “Cleaning and disinfection of pipes”
PT CC 03 “Cleaning and disinfection of tanks”
Catalan version

United Kingdom

Principles of water supply hygiene and technical guidance notes.

This is a series of principles developed by the water industry to be used as a framework in which to apply their own good practice.


Part 1 is the Approved Code of Practice includes reference to the relevant regulations, followed by the ACoP material and lastly guidance, with the text of each clearly differentiated. The guidance given in this part is largely generic to all water systems from which there is a risk from legionella.

Part 2 of the document then provides guidance specific to particular systems, namely wet cooling systems (systems incorporating cooling towers and evaporative condensers), hot and cold water systems, spa/whirlpool baths and humidifiers/air washers. In addition, a table at Appendix 1 provides a useful list of most other systems known to pose a risk, along with a summary of the main recommended control measures and the frequency of their application.
Madame, Monsieur,

Avec que je vous l'avais annoncé en Avril dernier, je vous adresse une synthèse sur les procédures de désinfection des canalisations utilisées en Europe, complétée par les informations que j'ai reçues de divers pays.

En espérant que ces documents pourront vous aider pour votre prochaine réunion du CEN, début juin, je vous prie d'agréer, Madame, Monsieur, l'assurance de ma considération distinguée.

M. RAPINAT
INTÉRÊT ET OBJECTIF D’UNE DÉSINFECTION DES CANALISATIONS ET DES OUVRAGES

UNE DÉSINFECTION DES OUVRAGES UTILISÉES POUR LA DISTRIBUTION DE L’EAU PEUT INTERVENIR À DIFFÉRENTES PÉRIODES DE LA VIE DES OUVRAGES (MISE EN SERVICE, DURÉE DE TRAVAIL, SUITE À LA DÉTECTION D’UNE CONTAMINATION, DANS LE CADRE D’UN PROGRAMME D’ENRÈVEMENT SYSTÉMATIQUE...) ET VISE À ÉLIMINER DES RISQUES DE CONTAMINATION.

DONNÉES GÉNÉRALES SUR LES PROCÉDURES DE DÉSINFECTION.

EN GÉNÉRAL, ON FAIT APPEL À UNE SOLUTION DE CHLORÉ POUR LA DÉSINFECTION.

POUR GARANTIR L’OBTENTION D’UN RÉSULTAT SATISFAISANT, IL EST NÉCESSAIRE, PROBALEMENT À L’OPÉRATION DE DÉSINFECTION PRÉVUEMENT DITE, DE S’ENTOURER D’UN MINIMUM DE PRÉCAUTIONS LORS DES INTERVENTIONS ET D’EFFETUER UN RINÇAGE PRÉLIMINAIRE.

CE PRÉALABLE Étant POSÉ, LES MODALITÉS DE L’OPÉRATION DE DÉSINFECTION DÉPENDENT À LA FOIS DU TEMPS DE CONTACT QUI PEUT ÊTRE ENVISAGÉ ET DU PH DE L’EAU DISTRIBUTÉE QU’INFLUENCE LA PLUS OU LA PLUS GRANDE EFFICACITÉ DU CHLORÉ SUR LES GERMS :

LES DOSES SONT BEAUCAUP PLUS ÉLEVÉES LORSQUE LE PH PASSÉE DE 7 À 8 (UN FACTEUR DE L’ORDRE DE 20 À ÉVOLUÉ),

LORSQUE LE TEMPS DE CONTACT PEUT ATTENDRE OU DÉPASSER 24 H DES CHLORÉS DE 5 À 15 mg/l SEMBLENT SUFFISANTS,

LORSQUE L’ON N’PARE QUE D’UNE À DEUX HEURES DE TEMPS DE CONTACT, LA DOSE PEUT ATTENDRE 30 mg/l,

ENFIN LORSQUE L’ON NE PEUT METTRE EN ŒUVRE UN TEL TEMPS DE CONTACT, DES SOLUTIONS À 1000 mg/l SONT UTILISÉES (Cf. LA SITUATION EN ANGLETERRE).

IL N’EXISTE DONC PAS DE PROCÉDURE UNIFORME DE DÉSINFECTION DANS TOUTES L’EUROPE, LES DISTRIBUTEURS D’EAU AYANT OPTIMISÉ LES MODALITÉS EN FONCTION DE L’EXPÉRIENCE ACQUISE SUR LES RÉSEAUX QU’ILS EXPLOITENT. DES DOSES DE 150 mg/l NE SONT PAS IMPRÉVABLES, MAIS CERTAINS DISTRIBUTEURS PEUVENT SE CONTENIR DE VALEURS PLUS FAIBLES.

DES CONTRÔLES DE LA QUALITÉ PHYTOSANITAIRE ET BACTÉRIOLOGIQUE SONT EFFECTUÉS APRÈS L’OPÉRATION DE DÉSINFECTION POUR S’ASSURER DE L’EFFICACITÉ DE CETTE PROCÉDURE.

POUR DES INFORMATIONS PLUS DÉTAILLÉES, ON PEUT SE RÉFÉRER AUX DOCUMENTS SUIVANTS CONCERNANT LE PRINCIPE DE DÉSINFECTION MIS EN ŒUVRE À ÉCHELON NATIONAL :

- ANNEXE 1 ALLEMAGNE
- ANNEXE 2 ANGLETERRE
- ANNEXE 3 FRANCE
- ANNEXE 4 ITALIE
- ANNEXE 5 LUXEMBOURG

NOTA : SI LA MISE EN ŒUVRE AVEC DES DOSES ÉLEVÉES DE CHLORÉ POUSVAIENT ÊTRE À L’ORIGINE DE PROBLÈMES POUR CERTAINS MATERIAUX, ON POURRAI ENVISAGER DE CRÉER PLUSIEURS DOSES DE PRODUITS AFIN DE NE PAS IMPOSER UN RECOURS ARBITRAIRE À DES SOLUTIONS TECHNIQUES PLUS ONGREUSES. BIEN ÉVIDEMMENT, IL SERA NÉCESSAIRE À CHAQUE FOIS DE S’ASSURER QUE LES MODALITÉS LOCALISÉES DE DÉSINFECTION PERMETTENT L’USAGE DE CETTE CATÉGORIE DE MATERIAUX.
Mission of the JRC

The mission of the JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.