BS EN 15363:2014

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Chemicals used for treatment of swimming pool water — Chlorine

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National foreword

This British Standard is the UK implementation of EN 15363:2014. It supersedes BS EN 15363:2007 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CII/59, Chemicals for drinking water treatment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Chemicals used for treatment of swimming pool water - Chlorine

Produits chimiques utilisés pour le traitement de l'eau des piscines - Chlore

Produkte zur Aufbereitung von Schwimm- und Badebeckenwasser - Chlor

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Foreword

This document (EN 15363:2014) has been prepared by Technical Committee CEN/TC 164 “Water supply”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2014 and conflicting national standards shall be withdrawn at the latest by November 2014.

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This document supersedes EN 15363:2007.

The significant technical difference between this edition and EN 15363:2007 is as follows:

— updating of 6.2 in line with current legislation.

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Introduction

In respect of the potential adverse effects on the quality of swimming pool water caused by the product covered by this document:

a) this document provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;

b) it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

NOTE 1 Conformity with this document does not confer or imply acceptance or approval of the product in any of the Member States of the EU or EFTA. The use of the product covered by this document is subject to regulation or control by National Authorities.

NOTE 2 This product which is a biocide will comply with the relevant legislation in force. In the European Union, at the time of publication, this legislation is Directive 98/8/EC [1].

1 Scope

This European Standard is applicable to chlorine used for the treatment of swimming pool water. It describes the characteristics of chlorine and specifies the requirements and the corresponding test methods for chlorine. It provides information on its use in swimming pool water treatment and determines the rules relating to safe handling and use of chlorine (see Annex B).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 937, *Chemicals used for treatment of water intended for human consumption — Chlorine*

3 Description

3.1 Identification

3.1.1 Chemical name

Chlorine.

3.1.2 Synonym or common name

Liquid chlorine.

3.1.3 Relative molecular mass

70,91.

3.1.4 Empirical formula

Cl_2.

3.1.5 Chemical formula

Cl_2.

3.1.6 CAS Registry Number[1)]

7782-50-5.

3.1.7 EINECS reference[2)]

231-959-5.

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1) Chemical Abstracts Service Registry Number.

2) European Inventory of Existing Commercial Chemical Substances.

3.1.8 Commercial form

Liquefied gas.

3.2 Physical properties

3.2.1 Appearance

Liquid chlorine is a clear, amber coloured liquid. Chlorine gas is greenish yellow, 2,5 times heavier than air. It has a suffocating and characteristic odour.

3.2.2 Density

a) Liquid: 1,409 g/ml at 20 °C.

b) Gas:

1) 3,169 kg/m^3 at 100 kPa at 0 °C;

2) 2,945 kg/m^3 at 100 kPa at 20 °C.

3.2.3 Solubility (in water)

7,26 g/l at 20 °C and 100 kPa.

3.2.4 Vapour pressure

669 kPa at 20 °C.

3.2.5 Boiling point at 100 kPa[3)]

- 34 °C.

3.2.6 Liquefaction point

- 101 °C at 100 kPa.

3.2.7 Specific heat

a) Liquid: 920 J/(kg.K) at - 34 °C.

b) Gas: 475 J/(kg.K) at 0 °C.

3.2.8 Viscosity (dynamic)

a) Gas: 1 333 x 10^{-8} Pa.s at 20 °C.

b) Liquid: 4,78 x 10^{-4} Pa.s at - 34 °C.

3) 100 kPa = 1 bar.

3.2.9 Critical temperature

144 °C.

3.2.10 Critical pressure

7 710,83 kPa.

3.2.11 Physical hardness

Not applicable.

3.3 Chemical properties

Chlorine is a very strong oxidizing agent and can react violently with some gases such as hydrogen. Almost all metals form chlorides in the presence of chlorine. Organic compounds including mineral oils and greases react very quickly with chlorine.

Redox potential of chlorine at 25 °C:

$$Cl_2 \text{ (gas)} + 2e^- = 2\ Cl^- + 1{,}36\ V \quad (1)$$

4 Purity criteria

4.1 General

Limits have been given for impurities and toxic substances where these are likely to be present in significant quantities from the current production process and raw materials. If a change in the production process or raw materials leads to significant quantities of other impurities or by-products being present, this shall be notified to the user.

4.2 Composition of commercial product

The product shall contain at least 99,5 %(*m/m*) chlorine.

4.3 Impurities and main by-products

The product shall conform to the requirements specified in Table 1.

Table 1 — Impurities

Impurities	Limit in mg/kg of product
Moisture (H_20)	20
Nitrogen trichloride (NCl_3)	20

4.4 Toxic substances

NOTE For the purpose of this standard, "toxic substances" are those defined in the EU Directive 80/778/EEC of July 15, 1980 [3].

The mercury content shall not exceed the limits specified in Table 2.

Table 2 — Toxic substances

Parameter		Limit in mg/kg of product	
		Type 1	Type 2
Mercury (Hg)	max.	0,1	1
NOTE Except mercury, the inorganic toxic substances (in accordance with EU Directive 80/778/EEC [3]) are not found in the gaseous phase. Pesticides and polycyclic aromatic hydrocarbons and cyanides are not by-products of the manufacturing process.			

5 Test methods

The methods for sampling and analysis are those specified in EN 937.

6 Labelling - Transportation - Storage

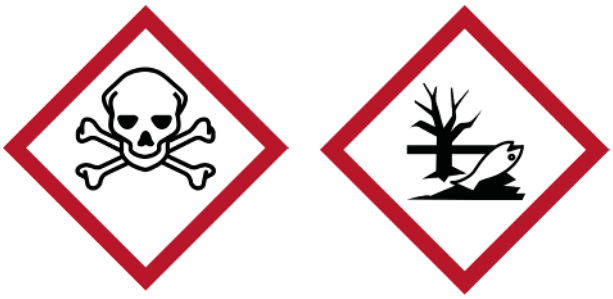
6.1 Means of delivery

Chlorine shall be delivered in transportable pressure equipment (cylinders, pressure drums, tanks, portable tanks).

In order that the purity of the product is not affected, the means of delivery shall not have been previously used for any different product or it shall have been specially cleaned and prepared before use.

6.2 Labelling according to the EU legislation[4)]

The following labelling requirements apply to chlorine at the date of the publication of this document.



a) GHS 06 **b) GHS 09**

- Signal word:

Danger.

- Hazard statement:

H 315 Causes skin irritation.

H 319 Causes serious eye irritation.

H 331 Toxic if inhaled.

H 335 May cause respiratory irritation.

H 400 Very toxic to aquatic life.

Figure 1 — Hazard Pictograms

The legislation [2], and its amendments for the purposes of its adaptation to technical and scientific progress, contains a list of substances classified by the EU. Substances not listed in this regulation should be classified on the basis of their intrinsic properties according to the criteria in the regulation by the person responsible for the marketing of the substance.

4) See [2].

6.3 Transportation regulations and labelling

Chlorine is listed as UN Number[5] 1017 for gaseous phase.

RID[6] ADR[7]: class 2, classification code 2TC.

IMDG[8]: class 2.

IATA[9]: Not permitted unless special authority agreement.

6.4 Marking

The marking shall include the following:

— the name "chlorine" and trade name;

— the net mass;

— the name and address of supplier and/or manufacturer;

— the labelling as a biocidal product pursuant to Article 20 of the Directive 98/8/EC [1] concerning the placing of biocidal products on the market;

— the statement: "This product conforms to EN 15363"; and the type.

6.5 Storage

6.5.1 General

Dry chlorine shall be stored under pressure in mild steel. The dew point of the gas shall be at least - 40 °C.

The filling ratio of a container shall not exceed 1,25 kg/dm^3. Storage tanks shall be protected from direct sunlight, the temperature of the container not exceeding 50 °C. For more details about use, see Annex A.

6.5.2 Long term stability

Stable.

6.5.3 Storage incompatibilities

Refer to EN 937.

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5) United Nations Number.

6) Regulation concerning the International Carriage of Dangerous Goods by Rail.

7) European Agreement concerning the International Carriage of Dangerous Goods by Road.

8) International Maritime Dangerous Goods Code.

9) International Air Transport Association.

Annex A
(informative)

General information on chlorine

A.1 Origin

A.1.1 Raw materials

Chlorine is manufactured from a sodium chloride solution.

A.1.2 Manufacturing process

Electrolysis of alkaline metal chlorides (generally in the form of a solution).

A.2 Use

A.2.1 Function

Disinfectant, oxidizing polluting matter introduced to the pool water by bathers.

A.2.2 Form in which the product is used

It is used as delivered (see A.2.4).

A.2.3 Treatment dose

The treatment dose depends on the composition of swimming pool water, subject to national regulations and depending on the required free chlorine concentration in the swimming pool water.

A.2.4 Means of application

Only vacuum chlorinators should be used and a separate chlorine-gas room having special fittings will always have to be provided for safety reasons.

An automatic chlorine cylinder switchover system should be provided to prevent any interruption in the chlorination (in particular due to chlorine cylinders becoming empty).

As a result of adding chlorine gas, hydrochloric acid is formed in the water and the resulting acidity causes a drop in the pH value. To avoid any undesirable drop in this value if the acidity is low, the chlorine solution may be fed through a reaction vessel filled with calcium carbonate (e.g. high-purity marble or Jurassic limestone).

A.2.5 Secondary effects

The secondary effects include the following:

— decrease in pH due to generation of hydrochloric acid;

— formation of chloramines (combined chlorine) and organo-chlorinated by-products such as trihalomethanes, depending on swimming pool water quality.

A.2.6 Removal of excess product

The most practical method is the use of a reducing agent such as an aqueous solution of a sulfite compound. Other methods use activated carbon or hydrogen peroxide.

Annex B
(normative)

General rules relating to safety

B.1 Rules for safe handling and use

The supplier shall provide current safety instructions.

B.2 Emergency procedures

B.2.1 General

To ensure that chlorine is handled safely, all manufacturers of chlorine possess an emergency instructions file which includes safety.

WARNING — The user should request the safety instructions from the supplier and read them before using chlorine.

The user will inform the local health authorities and fire brigade of its storage capacities. The following information is only a very brief summary of actions to be taken in case of emergency.

B.2.2 First aid

In case of contact with skin, wash immediately with plenty of water. Seek medical advice.

In case of inhalation of gas, allow the victim to rest in fresh air. Other medical care can be necessary. Seek medical attention immediately.

B.2.3 Spillage

Put on breathing apparatus. Isolate contaminated area by means of water curtains. Call local fire brigade.

B.2.4 Fire

Chlorine is not flammable. Storage cylinders or chlorine containing pipes can burst when exposed to a fire, causing toxic emanations.

Bibliography

[1] Directive 98/8/EC of the European Parliament and of the Council on the placing on the market of biocidal products

[2] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (REACH)

[3] Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption

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