SODIUM HYPOCHLORITE SOLUTION (LIQUID CHLORINE BLEACH) – REQUIREMENTS

CDCRS 43: 202X

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Committee representation

This CARICOM Regional Standard was developed by the Regional Technical Sub-Committee for Sodium Hypochlorite Products under the supervision of the Regional Technical Committee for Chemicals, hosted by the CARICOM Member State, Trinidad and Tobago, which at the time comprised the following members:

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Foreword

This CARICOM Regional Standard CRS 43:202X, Sodium hypochlorite solutions (Liquid chlorine bleaches) – Requirements has been developed under the authority of the CARICOM Regional Organisation for Standards and Quality (CROSQ). It was approved as a CARICOM Regional Standard by the CARICOM Council for Trade and Economic Development (COTED) at its XX Meeting in MM YYYY.

The standard is meant to address the issues related to:

a) Product quality, health and safety in the storage, handling and use of sodium hypochlorite solutions; and

b) Inter-regional market access for sodium hypochlorite solutions by harmonizing product requirements.

Sodium hypochlorite solution is the most available type of bleaching agent and as such, a commonly used product in the CARICOM region. It is widely used in homes, schools, hospitals, swimming pools and drinking water supplies to reduce or destroy microbe populations. It is particularly important when used in hospitals and other health care facilities, for its sanitizing properties on hard surfaces and some equipment against pathogens. The product is also used as a laundry whitener and stain remover for domestic and institutional laundry.

Sodium hypochlorite solution is often referred to as “liquid chlorine bleach”. The name arose because of the use of chlorine in its manufacture, however, this is a misnomer as “chlorine gas” is not present in the product nor is it involved in the product’s mode of action. Since the term liquid chlorine bleach is the common name used by consumers it is, however, considered admissible. The product is manufactured by the reaction of molecular chlorine with sodium hydroxide and water. A small excess of sodium hydroxide is required to maintain the pH between 11 and 13 to minimise decomposition.

Sodium hypochlorite disproportionates spontaneously to chloride and chlorate. This disproportionation is accelerated by ionic strength, sunlight, temperature and concentration of the sodium hypochlorite. Metals such as copper, nickel and cobalt also catalyse the degradation of sodium hypochlorite.

Since sodium hypochlorite solution is highly unstable under conditions of elevated temperature and on exposure to sunlight, solutions that would remain relatively stable under normal conditions of storage and use in a temperate climate, would not do so in a tropical climate. In this regard, it was necessary to establish specifications, to maintain, as far as possible, the stability and strength of the product and to extend the lifespan of the sodium hypochlorite in the tropical environment.

The product is a corrosive compound and provisions are therefore included for adequate labelling for use of such a common, yet potentially dangerous substance.

In formulating this standard considerable assistance was derived from the following publications which were still current when this standard was being developed:

Bureau of Indian Standards
IS 11673:1993, *Sodium hypochlorite solution – Specification*

East African Community

EAS 295:2010, *Sodium hypochlorite solutions – Specifications*

Instituto Ecuatoriano de Normalizacion
NTE INEN 1583:1998*, Sodium hypochlorite solutions – Requirements*

South African Bureau of Standards
SANS 296:2010, *Sodium hypochlorite solutions*

United Nations
Globally Harmonized System for Classification and Labelling of Chemicals (GHS), New York and Geneva, (8th edition)

This standard includes the following normative annexes that are indispensable to the proper application of this standard:

1) Annex A – Requirement for hazard symbol for product and carton labels;
2) Annex B – Requirements for signal word, hazard and precautionary statements; and
3) Annex C – Requirements for and legibility of information provided on labels.

1 Scope

This standard specifies the minimum requirements and test methods for sodium hypochlorite solutions (liquid chlorine bleaches), including scented solutions. This standard also specifies the requirements for labelling and characteristics of containers.

This standard applies to solutions which contain sodium hypochlorite as the only active ingredient.

This standard does not apply to industrial grade sodium hypochlorite solutions.

2 Normative references

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

ASTM International
ASTM D2022, *Standard Test Methods of Sampling and Chemical Analysis of Chlorine Containing Bleaches*
ASTM D891, *Standard Test Methods for Specific Gravity, Apparent, of Liquid Industrial Chemicals*
ASTM B873, *Standard Test Method for Measuring Volume of Apparent Density Cup Used in Test Methods B212, B329, and B417*

CARICOM Regional Organisation for Standards and Quality
CRS 55-1, *Labelling of commodities – Part 1: General requirements*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

3.1
available chlorine
measure of the oxidizing power of the chlorine present as hypochlorite and expressed in terms of chlorine with an atomic mass of 35.45 u

3.2
batch
material from a single mix or in the case of a continuous production process, the material from a single day's production

3.3
best by date
best before date
date after which the manufacturer or packager does not guarantee any property of the goods by reason of the foreseeable deterioration due to age or normal handling and storage before retail sale

3.4 date of manufacture
date at which the sodium hypochlorite solution is batch tested and approved by the manufacturer

3.5
free space
difference between the internal capacity of the container and the filled volume that is occupied by the sodium hypochlorite solution, that is, the space between the cap and the sodium hypochlorite solution.

NOTE to entry Free space may also be referred to as headspace or ullage.

3.6
hazard statement
statement assigned to a hazard class and category that describes the nature of the hazards of a hazardous product, including where appropriate, the degree of hazard

3.7
hazard symbol
hazard pictogram
pictorial representation of the category to which the product is allocated based on the nature of the potential physical, health or environmental harm

3.8
industrial grade
sodium hypochlorite solution of 10 - 15 % by weight available chlorine

3.9
label
any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed, impressed on, accompanying or attached to a container

3.10
main display panel
part of a label normally intended to be presented to the consumer, or intended to be conspicuous to the consumer, at the time when the product to which the label relates is offered or exposed for sale

3.11
nominal
percentage value of a component, quoted by the manufacturer or supplier, which corresponds to the general composition given by the designation, that is, no deviation from the set range

3.12
normal handling, transport and storage conditions
treatment of the containerized products, at handling, transport and storage, in accordance with the instructions provided by the manufacturer or national regulatory requirements or with generally accepted practices where instructions are not provided

3.13
precautionary statement
phrase or pictogram or both which describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposures to, or improper storage or handling of a hazardous chemical

3.14
primary container
package:
a) designed to be in direct contact with the product; and
b) which protects the contents from contamination and other effects of the external environment; and
c) in which the sodium hypochlorite solution is presented for sale

3.15
secondary container
carton
packaging designed to contain one or more primary packaging, together with any protective materials, if present in package, and intended to protect goods during transport and storage, which is not customarily used to store sodium hypochlorite solution when displayed for sale

3.16
secondary display panel
part of the label other than the main display panel which contains product information that is not included in the main display panel

3.17
sodium hypochlorite solution
liquid chlorine bleach
bleach product formed by reacting chlorine with an alkali such as caustic soda in water

4 Product characteristics

4.1 The sodium hypochlorite solution shall be supplied as pale yellow liquid, free from visible sediment or suspended matter.

4.2 The sodium hypochlorite solution shall have a nominal concentration of 5 to 7 % by weight available chlorine, when tested in accordance with method detailed in ASTM D2022.

4.3 The declared nominal concentration shall be maintained up to the best by or best before date of the product.

4.4 Free alkali content shall not be more than 0.6 g/100 ml or less than 0.1 g/100 ml calculated as sodium hydroxide (NaOH) when tested in accordance with ASTM D2022.

4.5 The determination of the specific gravity required for use in the determination of available chlorine shall be in accordance with ASTM B891.

4.5 The volume of sodium hypochlorite solution provided in the container shall not be less than the volume specified on the label, when tested in accordance with ASTM B873.

NOTE 1 The raw materials used should conform to manufacturer's product/material specifications so as to not affect the stability of the sodium hypochlorite. During manufacture every precaution should be taken to avoid contact with metals which may destabilise the sodium hypochlorite solution.

NOTE 2 It is recommended that the sodium hypochlorite solution be protected from sunlight and should not be stored at temperatures above 35 °C (see also 5.1.5).

5 Packaging

5.1 Primary containers and closures

5.1.1 The materials used for making the containers and their closures shall be resistant to interaction with the sodium hypochlorite solution to prevent:

a) degradation of container and closure;

b) decomposition of sodium hypochlorite solution; and

c) formation of harmful or dangerous substances.

5.1.2 Containers and closure systems shall:

a) be designed and manufactured so as to prevent any loss of the contents;

b) be designed and manufactured so as to withstand normal handling, transport and storage conditions; and

c) ensure that the container can be resealed after being opened to prevent leakage.

5.1.4 The container shall be opaque so as to prevent the passage of light to the contents of the container and subsequent reaction with the content.

5.1.5 A free space shall be left above the liquid, within the container to compensate for expansion of the sodium hypochlorite to its vapour form. This shall be:

a) at least 4 % of the total volume of the container; and

b) calculated as a percentage of the total capacity of the container.

5.1.6 Containers shall be able to be packed in an upright position.

5.1.7 Where containers are filled with products, storage shall be in a cool place, away from direct sunlight.

NOTE See Note 2 at 4.5 for guidance.

5.2 Secondary containers or cartons

5.2.1 Cartons shall be designed and manufactured such that during handling, transportation and storage, cartons:

a) withstand normal handling, transport and storage conditions;

b) firmly secure the containers and product; and

c) allow a stacking height such as to prevent damage to the cartons and product and subsequently product spillage.

6 Labelling

6.1 General requirement

6.1.1 The label shall be in the official language or languages of the country in which the product is sold.

6.1.2 The label shall be firmly affixed to the primary container.

6.1.3 The information on the label should be legible and indelible, for the life of the product.

6.1.4 Labelling requirements shall be in accordance with CRS 55-1.

6.2 Product

6.2.1 Main display panel

On the main display panel of the label of the primary container, the following information shall be printed:

a) the brand name or trademark of the product;

b) the common name of the product;

c) the nominal concentration of the available chlorine by weight or the percentage chlorine of the product, which shall be:

1) prominently displayed ;

2) directly below, above or beside the common name or chemical name of the product;

3) the type height being measured in relation to the lower case “o”; and be in accordance with the heights at Annex C.

d) the net contents of the container which shall be expressed in International Systems of Units (SI) of volume. The “avoirdupois” units may also be used but shall be used in brackets alongside the SI units;

EXAMPLE Representing both the SI and avoirdupois systems side by side as 500 mL (16.9 fl oz).

e) general precautionary statements, as follows:

a) “Keep out of reach of children”;

b) “Read instructions before use” or equivalent; and.

c) If medical advice is needed, have product container or label at hand; and

f) hazard symbol or pictogram in accordance with Annex A and Figure A.1.

6.2.2 Secondary display panel

Each container of sodium hypochlorite solution shall also be labelled with the following information:

a) the common or chemical name of the product or of each component which contributes substantially to any related hazard of the product;

NOTE The common name of the chemical can be expessed as “contains sodium hydroxide (caustic soda)”.

b) the date of manufacture;

c) the best before date;

d) the name and address of the manufacturer or distributor;

e) the country of origin;

f) precautionary statements of the risks involved in the use of the substance in accordance with Annex B;

g) directions for use;

h) adequate directions for storage of the sodium hypochlorite solution, including to store in a cool, dark place.

i) instructions against mixing with other chemicals or household cleaning agents;

EXAMPLE Do not mix with acids or other household cleaning agents.

j) instructions against reuse of container;

k) container disposal based on national regulatory requirements; and

l) first aid instructions. See Annex B;

NOTE The label can contain additional information at the manufacturer's discretion.

6.3 Carton

Each carton of sodium hypochlorite solution shall be labelled with the following information printed in bold type and securely affixed thereon:

a) the common name of the product as per the Safety Data Sheet;

EXAMPLE The name "Liquid Chlorine Bleach" or "Sodium Hypochlorite Solution".

b) the trade name or brand name;

c) a prominently displayed hazard symbol in accordance with Annex A and Figure A.2;

d) an indication of the recommended storage conditions for the sodium hypochlorite;

e) storage information shall be provided either through:

— the presence of the Safety Data Sheet (SDS); or

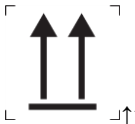
— printed on the carton as, "store in a dry place, at less than 35ºC room temperature",

f) the recommended maximum stack height;

g) the volume of sodium hypochlorite solution per container;

h) the number of containers of sodium hypochlorite in the carton;

i) an appropriate symbol indicating the orientation or the top of the carton;

EXAMPLE  ↑↑ THIS WAY UP ↑↑

j) A statement pertaining to cautionary handling; and

Example “Handle with care” or “Use no hooks”.

k) Batch number, identification code or other identifier.

NOTE 1 The use of bar codes facilitates ease of traceability and recall.

NOTE 2 Additional labelling requirements may be needed for international shipping. The labelling requirements at 6.3 are for the purpose of traceability, product identification and safe handling.

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Annex A
(normative)

Requirement for hazard symbol for product and carton labels

A.1 Application

A.1.1 The label on the primary container shall bear the hazard symbol for corrosive products, as shown in Figure A.1. The symbol shall:

a) be printed in strong contrast to the rest of the label;

b) be prominently displayed on the primary panel;

c) be accompanied by the signal word “DANGER”; and

d) have a minimum diagonal length of 15 mm.

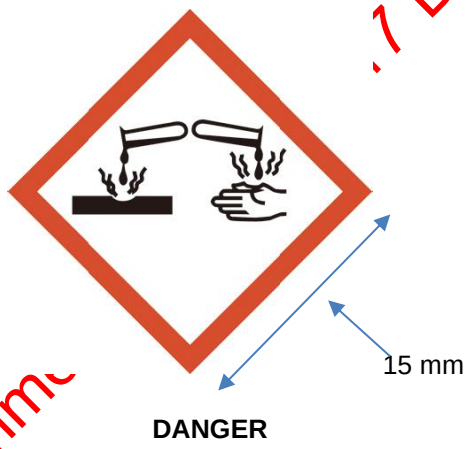

Figure A.1 — Hazard symbol for primary containers[1]

A.1.2 The label of the secondary container or carton, shall include the hazard symbol for corrosive product as shown in Figure A.2. The symbol shall:

a) be printed in black and white and be of strong contrast to the rest of the label;

b) be prominently displayed relative to the size of the carton; and

c) have a minimum diagonal length of 100 mm.

[1] The hazard symbol has been extracted from the United Nations Globally Harmonized System for Classification and Labelling of Chemicals (GHS),

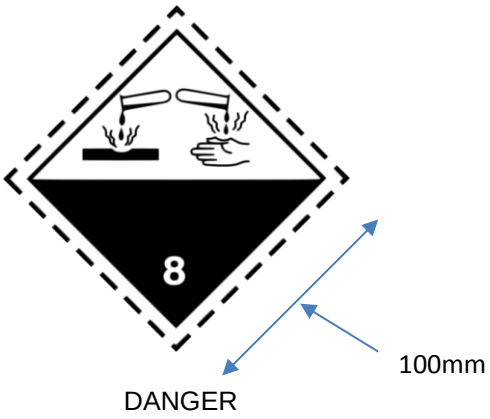

Figure A.2 — Hazard symbol for secondary containers or cartons[2]

A.2 Orientation

A.2.1 The hazard symbol at Figures A.1 and A.2 shall be in the shape of a square set at a point.

A.2.2 The signal word "**DANGER**" shall be placed immediately below the hazard symbol.

A.2.3 Additionally, the use of the word "**CORROSIVE"** shall be optional and should, if used, be placed near to the hazard symbol, however, it should not be used in place of the word 'DANGER"

[2] The hazard symbol has been extracted from the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations, Volume 1.

Annex B
(normative)

Requirements for signal word and hazard and precautionary statements

B.1 Codification of hazard statements

The hazard statement codes are meant for reference purposes and shall not be used as part of or replace the hazard statement text. See Table B.1 for the hazard statements that apply.

NOTE Hazard statements are assigned a unique alphanumerical code which consists of one letter and three numbers, as follows:

a) The letter “H” (for hazard statement);
b) The number designating the type of hazard to which the hazard statement is assigned, according to the numbering of the different parts of the GHS, as follows;
    — “2” for physical hazard;
    — “3” for health hazard; and
    — “4” for environmental hazard
c) Two numbers corresponding to the sequential numbering of hazards arising from the intrinsic properties of the substance or the mixture, such as corrosive to skin (codes from 314 to 317), flammability (codes from 220 to 230).

B.2 Codification of precautionary statements

The precautionary statement codes are meant for reference purposes and shall not be used as part of or replace the precautionary statement text. See Table B.1 for the precautionary statements that apply.

NOTE Precautionary statements are assigned a unique alphanumerical code which consists of one letter and three numbers, as follows:

a) The letter “P” (for precautionary statement);
b) one number designating the type of precautionary statement as follows;
— “1” for general precautionary statements
— “2” for prevention precautionary statements:
— “3” for response precautionary statement;
— “4” for storage precautionary statements; and
— “5” for disposal precautionary statements;
c) Two numbers corresponding to the sequential numbering of the precautionary statements.

B.3 Presentation of label elements

B.3.1 The hazard symbol, signal word and hazard statements shall be located together on the label.

B.3.2 The hazard and precautionary statements that shall be placed on the product label are as outlined in Table B.1.

B.3.3 The statements are to be written on the label in CAPS and BOLD just as represented in the Table B.1.

B.4 Hazard communication

Table B.1 outlines the signal word and hazard and precautionary statements that shall be used on the label.

Table B.1 - Hazard and precautionary statements for the product label

Hazard and precautionary statements for the product label					
Signal Word	**Hazard statements**	**Precautionary statements**			
		Prevention	**Response**	**Storage**	**Disposal**
DANGER	H290	P234	P390	P405	501
	May be corrosive to metals	Keep only in original packaging	Absorb spillage to prevent material damage	Store locked up	Dispose of container in accordance with national regulatory requirements
	H314	P260	P301+P330 +P331		
	Causes severe skin burn and eye damage	Do not breathe mist/ vapours /spray/dust	**IF SWALLOWED : Rinse mouth. Do not induce vomiting**		
		P264	P302+P361+P 354		
		Wash exposed area thoroughly after handling	**IF ON SKIN: Take off immediately all contaminated clothing. Immediately rinse with water for**		

Hazard and precautionary statements for the product label					
Signal Word	**Hazard statements**	**Precautionary statements**			
		Prevention	**Response**	**Storage**	**Disposal**
			several minutes		
		P280 Wear protective gloves/protective clothing/eye protection/ face protection/	P316 Get emergency medical help immediately		
			P363 Wash contaminated clothing before re-use		
			P304+P340 **IF INHALED: Remove person to fresh air and keep comfortable for breathing**		
			P321 Specific treatment (see……on this label). This is based on the SDS.		
			P305+P354+ P338		

Hazard and precautionary statements for the product label					
Signal Word	**Hazard statements**	**Precautionary statements**			
		Prevention	**Response**	**Storage**	**Disposal**
			IF IN EYES: Rinse cautiously with clean water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing		

NOTE The following statements are optional and should be placed on the label by the manufacturer as deemed necessary:

- (H400) Very toxic to aquatic life
- (P404) Storage – Store in a closed container
- (H318) – Causes serious eye damage
- (P332+P313) If skin irritation occurs: Get medical advice/attention.
- (P362+P364) Take off contaminated clothing and wash it before reuse.
- (P337+P313) If eye irritation persists: Get medical advice/attention.
- (EUH206) Warning! Do not use together with other products. May release dangerous gases (chlorine).

Annex C
(normative)

Requirements for conspicuousness and legibility of information provided on labels

F.1 All the information required on labels of sodium hypochlorite as specified in this standard shall be presented on the carton and container labels in accordance with the minimum specifications stated in F.2 to F.4.

F.2 The ratio of height to width of the letter shall not exceed a differential of 3 units to 1 unit (that is, no more than 3 times as high as it is wide).

F.3 When fractions are used, each component numeral shall meet one-half the minimum height requirements.

F.4 The letters and numerals shall be in a type size established in relationship to the area of the main panel and shall comply with the following type specifications:

a) not less than 1.6 mm in height on cartons or primary containers, the main panel of which has an area of not less than 32 cm^2, but not more than 36 cm^2;

b) not less than 2 mm in height on cartons or primary containers, the main panel of which has an area of 36 cm^2 or less;

c) not less than 3 mm in height on cartons or primary containers, the main panel of which has an area of more than 36 cm^2, but not more than 144 cm^2;

d) not less than 5 mm in height on cartons or primary containers, the main panel of which has an area of more than 144 cm^2, but not more than 625 cm^2;

e) not less than 6 mm in height on cartons or primary containers, the main panel of which has an area of more than 625 cm^2, but not more than 1225 cm^2;

f) not less than 10 mm in height on cartons or primary containers, the main panel of which has an area of more than 1225 cm^2, but not more than 2500 cm^2;

g) not less than 13 mm in height on cartons or primary containers, the main panel of which has an area greater than 2500 cm^2; and

h) be measured in relation to lower case “o”.

END OF DOCUMENT

CARICOM REGIONAL ORGANISATION FOR STANDARDS AND QUALITY

The CARICOM Regional Organisation for Standards and Quality (CROSQ) was created as an Inter-Governmental Organisation by the signing of an agreement among fourteen Member States of the Caribbean Community (CARICOM). CROSQ is the regional centre for promoting efficiency and competitive production in goods and services, through the process of standardization and the verification of quality. It is the successor to the Caribbean Common Market Standards Council (CCMSC), and supports the CARICOM mandate in the expansion of intra-regional and extra-regional trade in goods and services.

CROSQ is mandated to represent the interest of the region in international and hemispheric standards work, to promote the harmonization of metrology systems and standards, and to increase the pace of development of regional standards for the sustainable production of goods and services in the CARICOM Single Market and Economy (CSME), and the enhancement of social and economic development.

CROSQ VISION:

The premier CARICOM organisation for the development and promotion of an Internationally Recognised Regional Quality Infrastructure; and for international and regional harmonized CARICOM Metrology, Standards, Inspection, Testing and Quality Infrastructure

CROSQ MISSION:

The promotion and development of standards and standards related activities to facilitate international competitiveness and the sustainable production of goods and services within the CARICOM Single Market and Economy (CSME) for the enhancement of social and economic development

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