

BUREAU OF INDIAN STANDARDS

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भारतीय मानक मसौदा

हाइड्रोजन पेरोक्साइड — सुरक्षा संहिता

(IS 14200 का पहला पुनरीक्षण)

Draft Indian Standard

Hydrogen Peroxide — Code of Safety

(First Revision of IS 14200)

ICS 13.300; 71.060.20

Chemical Hazards Sectional Committee, CHD 7

Last date for Comments: 20.03.2025

FOREWORD

(Formal clause to be added later)

Hydrogen peroxide is used as an oxidising agent in many organic reactions, manufacture of epoxidised oils, organic peroxide, inorganic peroxide, bleaching of textiles, silk, mechanical and chemical pulp, deinking of waste papers, extraction and purification of metals, pickling of copper and copper alloys, etching and cleaning of printed circuits, odour control, detoxification of industrial waste waters, decomposition of heat treatment salts, oxidation of dyes, sterilization and disinfection and related fields.

The elimination of accidents is vital to public interest. Accidents produce economic and social loss and impair individual or group productivity. Realization of this loss has led the authorities to devote a good deal of attention to safety education. In any programme of safety education, preparation of code of safety is an essential part. Apart from general precautions, some typical precautions are required to be taken and this code of safety lays special emphasis on these points.

The properties of hydrogen peroxide listed in Clause 4 have been taken from literature and have been included for information only. Moreover, these properties pertain to hydrogen peroxide. BIS has published a separate standard IS 2080 : 2021 on the requirements and the methods of sampling and test for stabilized hydrogen peroxide.

This standard was originally published in 1994. The Committee felt a need to revise this standard with a view to update the standard based on the experience of last three decades and on the currently available data. In this revision general properties have been incorporated and modifications have been made to update safety measures for controlling hazards and essential information on symptoms of poisoning, first-aid, medical treatment, storage, handling, labelling and employee safety.

There is no ISO standard on this subject.

The various clauses of the standard have been aligned with the format being applied for all Indian Standards on code of safety of chemicals.

1 SCOPE

This standard prescribes a code of safety concerning the hazards related to hydrogen peroxide and properties of aqueous solution hydrogen peroxide, the nature of hazards associated with it and essential information with respect to personal protection, handling & storage, labelling, transport, spillage/leakage (emergency preparedness), fire prevention and firefighting, communication, training, health monitoring, first aid and waste disposal.

2 REFERENCES

The Indian Standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

3 TERMINOLOGIES

For the purpose of this standard the definitions given in IS 4155 and IS 4167 shall apply.

4 PROPERTIES

4.1 General Information
4.1.1 Chemical Name — Hydrogen peroxide.

4.1.2 Common Name & Synonyms — Peroxide, hydrogen peroxide, oxygenated water, hydrogen dioxide.

4.1.3 Uses

Hydrogen peroxide is used as bleaching agent in pulp and paper industry. It is also used in manufacture of sodium per-carbonate and sodium perborate, which are used as mild bleaches in laundry detergents. Hydrogen peroxide is used in certain waste-water treatment processes to remove organic impurities. Hydrogen peroxide may be used for the sterilization of various surfaces, including surgical instruments, and may be deployed as a vapour (VHP) for room sterilization. High concentration of hydrogen peroxide is used as monopropellant or the oxidizer component of a bipropellant rocket.

4.2 Identification

4.2.1 Formula — H_2O_2 .

4.2.2 CAS Number — 7722-84-1.

4.2.3 UN Number

4.2.3.1 for 20 to 60 percent, UN 2014.

4.2.3.2 for more than 60 percent, UN 2015.

4.2.4 UN Class — 5.1.

4.3 Physical Properties

4.3.1 General

Hydrogen peroxide is a clear, colourless syrupy liquid miscible with water in all proportions. It is also soluble in alcohol and ether. It is a powerful oxidising agent. Its solutions of 30 percent and above can very easily cause

blistering of skin. The reaction of hydrogen peroxide with flammable materials is highly hazardous. It may explode at higher concentration if not handled properly, or contaminated with some organics or metal catalysts, exposed to heat, mechanical impact or detonation of blasting cap.

4.3.2 Molecular Mass — 34.016 g/mol.

4.3.3 Physical State — it is clear, colourless syrupy liquid free from suspended impurities and dust.

4.3.4 Colour — it is a clear, colourless liquid.

4.3.5 Odour — it has a slightly sharp odour at ordinary concentration. Above 60 percent (*m/m*) concentration the odour will be pungent.

4.3.6 Boiling Point

Boiling point of hydrogen peroxide at 1 atm at different percent corresponding to different temperature are following:

- a) 107 °C for 35 percent (*m/m*).
- b) 113.9 °C for 50 percent (*m/m*).
- c) 125 °C for 70 percent (*m/m*).
- d) 150 °C for 100 percent (*m/m*).

4.3.7 Melting Point — (-) 0.43°C.

4.3.8 Total Vapour Density — 1 mm at 15.3 °C for 90 percent (*m/m*).

4.3.9 Specific Gravity

- a) 1.111 at 20 °C for 30 percent (*m/m*).
- b) 1.29 at 20 °C for 70 percent (*m/m*).
- c) 1.45 at 20 °C for 90 percent (*m/m*).

4.3.10 Viscosity at 20°C

- a) 1.11 mPa*s for 30 percent (*m/m*).
- b) 1.18 mPa*s for 50 percent (*m/m*).
- c) 1.25 mPa*s for 100 percent (*m/m*).

4.3.11 Vapour Pressure at 30 °C

- a) 3.3 kPa for 30 percent (*m/m*).
- b) 1.4 kPa for 50 percent (*m/m*).
- c) 0.8 kPa for 100 percent (*m/m*).

4.3.12 Heat of Combustion — No information available.

4.3.13 Refractive Index at 25 °C

- a) 1.3325 for 30 percent (*m/m*).
- b) 1.3661 for 50 percent (*m/m*).
- c) 1.4067 for 100 percent (*m/m*).

4.3.14 Solubility in Water

It is miscible in water in all proportion.

4.3.15 Solubility in other solvents

In general, concentrated hydrogen peroxide solutions are completely miscible with most organic liquids (including ethanol, isopropanol, acetone, ethyl cellosolve, pyridine, etc.) that are miscible with water in all proportions. In addition, hydrogen peroxide is more miscible than water in a number of organic materials, such as methyl methacrylate, dimethyl and diethyl phthalate, ethyl acetate, and aniline. Compounds with which hydrogen peroxide is nearly immiscible include petroleum ether, toluene, styrene, carbon tetrachloride, chloroform, kerosene, fuel oil, and gasoline.

4.3.16 Light Sensitivity

Light can cause photochemical decomposition of hydrogen peroxide. The absorption of radiation by hydrogen peroxide solutions occurs over a wide spectrum.

4.4 Chemical Properties

4.4.1 Reactivity

Hydrogen peroxide is acidic in nature and is a powerful oxidising agent. Readily oxidisable materials or alkaline substances containing heavy metals may react violently. Soluble fuels such as acetone, ethanol, and glycerol will detonate on admixture with peroxide of over 30 percent concentration. Under certain circumstances it acts as reducing agent, that is, with potassium permanganate.

4.4.2 Corrosion Properties

It is corrosive in nature.

4.4.3 Stability at High Temperature

Elevated temperatures encourage decomposition, whereby reaction rate increases. The rate of decomposition reaction in solution (homogeneous) will increase 2 times to 3 times for every 10 °C rise of temperature.

4.5 Fire and Explosion Hazard Properties

4.5.1 Ignition Temperature — Not applicable

4.5.2 Auto Ignition Temperature — Not applicable

4.5.3 Flash Point

Hydrogen peroxide is not flammable but hydrogen peroxide continually evolves some oxygen due to decomposition. Normally the decomposition rate is small but if provision is not made for the escape of this gas, the buildup of high pressure will result in possible rupture of equipment.

4.5.4 Explosive Limit

Commercial hydrogen peroxide solutions up to 70 percent by weight are not considered to be explosive of their own. However, explosions may occur under some circumstances when aqueous hydrogen peroxide solutions are mixed with organic compounds to form single phase emulsion or suspension or in presence of powerful reducing agent. Hydrogen peroxide vapour can explode under normal pressure if hydrogen peroxide concentration in vapour phase exceeds 26 percent (40 percent by weight).

4.5.4.1 Fire involving hydrogen peroxide may be of flaring type but not explosive unless confined.

4.5.5 Fire Risk

Hydrogen peroxide solutions themselves are not flammable. However, hydrogen peroxide can cause spontaneous combustion of many organic materials such as, clothes, paper, wood, etc., with above 50 percent (*m/m*) strength combustion may be immediate. Even a dilute commercial solution can concentrate by evaporation and spontaneous combustion may sometimes occur after a period of storage.

5 HEALTH HAZARD & TOXICITY INFORMATION

5.1 General Information

5.2 Route of Entry

Pure hydrogen peroxide is a crystalline solid below (-) 11 °C and a colorless liquid with a bitter taste above (-) 11°C. It is almost always used as an aqueous solution, which is available in dilute form (3 percent to 10 percent) for household use and in concentrated form (greater than 30 percent) for industrial use. Hydrogen peroxide is unstable, decomposing readily to oxygen and water with release of heat. Commercial peroxide products contain a stabilizer (usually acetanilide) to slow the rate of spontaneous decomposition. Hydrogen peroxide is nonflammable, but it is a powerful oxidizing agent that can cause spontaneous combustion when it comes in contact with organic material.

5.2.1 Skin

Hydrogen peroxide cause a spontaneous white discoloration of the upper layers of the skin (10 percent solution upwards), and the mucous membrane (5 percent solution upwards). The short contact of the skin with concentrated solution may cause a whitening accompanied by a tingling sensation. This discoloration of skin is due to tissue swelling due to diffusion of hydrogen peroxide and decomposition forming oxygen bubbles in the skin tissue.

5.2.2 Eyes

The high concentrations of hydrogen peroxide on contact with eyes can lead to severe corneal damage, conjunctivitis (pink eye), and risk of blindness.

5.2.3 Ingestion

Hydrogen peroxide if swallowed can lead to bleeding of the mucous membranes and because of the oxygen which is suddenly released to distension of the esophagus and the stomach, causing severe damage.

5.2.4 Inhalation

The inhalation of concentrated hydrogen peroxide mist or vapour can lead to irritation or itching of the respiratory tract, a longer exposure may cause inflammation of respiratory organs or even lung edema.

5.2.5 Long term effects

It may cause chronic respiratory irritation. Hydrogen peroxide is not known to be an occupational respiratory or skin sensitizer.

5.3 Toxicity information

- a) Threshold Limit Value (TLV) — 1 ppm or (1.4 mg/m³)

NOTES

1 ACGIH (TLV-TWA) the TWA concentration for a conventional 8 h work day and 40 h work week, to which it is believed that nearly all workers may be repeatedly exposed, day after day for lifetime without adverse effect

2 ACGIH (TLV-CL) Ceiling Value, the concentration that should not be exceeded during any part of the working exposure, if instantaneous measurements are not available, sampling should be conducted for the minimum period of the time sufficient to detect exposures at or above the ceiling value.

3 ACGIH (TLV-STEL) indicates Short Term Exposure Limit A 15 minutes TWA exposure that should not be exceeded at any time during a work day, even if the 8 h TWA is within the TLV-TWA Exposures above the TLV-TWA up to the TLV-STEL should be less than four times per day, and there should be at least 60 minutes between successive exposures in this range.

- b) Short Term Exposure Limit (STEL) — 2.8 mg/m³.
c) Immediately Dangerous to Life or Health (IDLH) — 75 ppm (105 mg/m³).
d) Lethal Dose (LD₅₀) (rat male), Oral — 1193 mg/kg.
e) Lethal Dose (LD₅₀) (rat female) Oral — 1270 mg/kg.
f) Inhalation (Rat) Lethal Concentration (LC) — 2000 mg/m³ at 4 h.

5.4 Antidote

There is no antidote for hydrogen peroxide poisoning.

5.5 Health Effects

5.5.1 Signs and Symptoms

Depending on the concentration, inhalation hydrogen peroxide vapor can cause eye and throat irritation, coughing, and breathing difficulty. Serious eye or skin burns and bleaching of the hair may result from contact with hydrogen peroxide solutions.

5.5.2 Acute Toxicity

The acute exposure of hydrogen peroxide may lead to irritation at site of contact. Inhalation of

5.5.2.1 Local effects

Inhalation of hydrogen peroxide when heated or misted, may cause irritation to the nose, throat and respiratory tract. In very severe cases bronchitis or pulmonary oedema may occur, which can potentially be fatal. Acute ingestion of hydrogen peroxide results in gastrointestinal irritation, and possible gas embolism. Concentrations greater than 30 percent to 40 percent cause severe irritation, with signs and symptoms including abdominal pain, foaming at the mouth, vomiting and haematemesis, and gastric distension. Fever, lethargy, shock, unconsciousness, and respiratory arrest may also occur. Concentrated solutions may cause gas embolism, and in severe cases, death may occur within minutes of ingestion. However, most cases of acute ingestion of hydrogen peroxide result only in mild adverse effects. Dermal contact with solutions of 35 percent hydrogen peroxide cause mild skin irritation. Solutions of 50 percent hydrogen peroxide and above cause severe irritation and corrosion, severe burns, blisters, ulcers and permanent scarring. Ocular exposure to hydrogen peroxide solutions of greater

than 35 percent are expected to cause corrosion, corneal burns, lacrimation, photophobia, conjunctivitis, and permanent injury including blindness.

5.5.3 Chronic Toxicity

The hydrogen peroxide does not cause chronic toxicity.

6 PERSONAL PROTECTIVE EQUIPMENT

6.1 Availability and Use

6.1.1 The personal protective equipment is not an adequate substitute for good, safe working conditions, adequate ventilation, and intelligent conduct on the part of employees working with hydrogen peroxide. In many instances, it is the only practical mean of protecting the worker, particularly in emergency situations. The personal protective equipment protects only the worker wearing it, and other unprotected workers in the area maybe exposed to danger.

6.1.2 The correct usage of personal protective equipment requires the education of the workers in proper employment of the equipment available to him. Under conditions which are sufficiently hazardous to require personal protective equipment, its use should be supervised and the type of protective equipment selected should be capable of control over any potential hazards.

6.2 Non-Respiratory Equipment

6.2.1 Eye and face Protection

6.2.1.1 Chemical safety goggles

Plastic Safety goggles which fit snugly around the eyes should always be worn whenever there is danger of severe exposure to phosphoric acid, for example, when cleaning or repairing equipment, taking or handling samples, or cleaning up spills or leaks (*see* IS 8520). Eye and face fountains (*see* IS 10592) or water wash or water sprays should be available in areas where ammonia leaks, spills or splashes may be encountered.

6.2.1.2 Face shields

Plastic shields (full length or 20 cm minimum) with forehead protection may be worn in addition to chemical safety goggles where complete face protection is desirable. Face shields should never be substituted for chemical safety goggles, but both should be worn when a face shield is desirable (*see* IS 8520).

Plastic Safety goggles which fit snugly around the eyes should always be worn whenever there is danger of severe exposure to hydrogen peroxide, for example, when cleaning or repairing equipment, taking or handling samples, or cleaning up spills or leaks (*see* IS 8520).

6.2.2 Head Protection

Where there is no danger from falling objects, safety helmets (*see* IS 2925) or 'hard' hats are considered unnecessary, soft brimmed hat or caps should be worn to give protection against liquid leaks and splashes.

6.2.3 Foot and leg Protection

Chemical resistant shoes with built-in steel toe caps are recommended for workers handling drums and cans of hydrogen peroxide. Rubbers may be worn over leather safety shoes to prevent their contamination. Rubbers should be thoroughly cleaned and ventilated to remove contamination. Do not use contaminated shoes (*see* IS 10667).

6.2.4 Body, Skin and Hand Protection

a) The personnel handling hydrogen peroxide should wear chemical protective gloves and clothing to prevent skin exposure. It is recommended to wear appropriate thermal protective clothing, when necessary (*see* IS).

b) The personnel should wear laboratory coats, appropriately sized for the personnel and buttoned to their full length. The personnel must also wear full length pants, or equivalent, and close-toed shoes. The area of skin between the shoe and ankle must not be exposed.

c) As a precautionary measure, lab members working directly with 70 percent or greater peroxide during test operations should wear the entire body chemical spill protection suits.

7 STORAGE, HANDLING, LABELLING AND TRANSPORTATION

7.1 Storage

7.1.1 General

The material of construction for storage and handling equipment should be compatible with hydrogen peroxide. It is extremely important to note that all of the contact surfaces should be non-porous, smooth, and as free of surface impurities as possible to prevent decomposition of the hydrogen peroxide.

7.1.2 Small Containers

All the hydrogen peroxide storage containers should be atmospheric vessel. The small containers of pure aluminum and high-density polyethylene should be used for storing hydrogen peroxide. These containers should be stored unopened in the upright position and preferably should not be stacked too high. It should be stored on concrete flooring, separated from heat and protected from the sun. The place should be well-ventilated. It must be kept very clean and free from incombustible materials and other compatible chemicals such as alkalis, strong acid, etc. Water hose should be available for flushing away spillages and leaks, etc. A safety shower (*see* IS 10592) and an eye wash fountain should be provided. Pipelines must not pass through storage areas, especially those carrying chemicals. No special electrical regulations are necessary, but mercury vapour lamps are undesirable. Plastic bottles become brittle with prolonged contact with hydrogen peroxide.

7.1.3 Bulk Storage

Pure aluminum is recommended material of construction for hydrogen peroxide storage tanks. Aluminum tanks can be erected both horizontally and upright for static reasons. Storage tanks should be placed on suitable safety trough. Before being filled first time the storage tanks and all parts of hydrogen peroxide storage should undergo suitable cleaning and passivation operations. Storage tanks must be filled with suitable venting device. Hydrogen peroxide in the piping should not remain trapped between two valves. An advice of an expert from manufacturer may be sought wherever necessary on storage and handling problems.

7.1.4 Hydrogen peroxide storage facilities should be located within a diked area to contain any spills that may occur. (Never return spilled hydrogen peroxide to the storage vessel!) This diked area should have a controlled drain, normally closed, to allow dilution and flushing of any spilled hydrogen peroxide solution. The hydrogen peroxide drain should contain no organic material. In the restricted confines of the drain, the gas space above the liquid will be oxygen-enriched. Adding hydrogen peroxide to any organics in this drain may present a significant risk of a vapor-phase explosion. Therefore, segregate the hydrogen peroxide and organic compound drains. A water hose, safety shower and eyewash station should be installed very near the storage area.

7.1.5 Hydrogen peroxide storage tanks and inlet hose connections should be clearly labeled to prevent puffing either the wrong chemical into hydrogen peroxide storage tanks or hydrogen peroxide into the wrong storage tank. The storage area for hydrogen peroxide should have sufficient access for tank truck deliveries.

7.2 Handling

The suitable PPEs such as protective gloves, boots close-fitting safety goggles, if necessary protective suits made of rubber or suitable plastics should be used by the personnel handling hydrogen peroxide. The proper care should be taken to avoid inhalation of hydrogen peroxide vapour or mist. Hydrogen peroxide is preferably siphoned out. The containers should be handled by hand of lift trucks, and should not be rolled or left on the site. Hydrogen peroxide once removed should not be returned to the container due to possible contamination.

7.3 Labelling

Each container (including tankers) shall carry an identifying label or stencil as specified in IS 1260 (Part 1) and Label Model No. 5.1 of Annex B of IS 18149. The storage containers shall be labelled or marked to identify as follows:

- a) Contents of the container;
- b) Name and address of the manufacturer or importer of the hazardous chemical; and
- c) Physical, chemical and toxicological data as per the criteria given in the relevant schedule of the *manufacture, storage and import of Hazardous Chemicals Rules*, 1989. While referring to the statutes, the stipulations given in the subsequent amendments of those statutes shall be taken into account.

7.4 Transport

The Rules and Regulations for transportation of hazardous chemicals shall be strictly adhered to. During shipping in drums the materials may have to be stored in such a way that it should fulfil all instruction of storage given under 7.1.

During the transportation each container shall have identifying label with name 'Hydrogen Peroxide'. Road tanker shall have a placard class label.

7.4.1 Driver

Vehicle driver should be aware of the potential hazards of the load and should know standard procedure (dos and don'ts) in the event of an accident or an emergency.

Driver should carry TREM card when vehicle is on road.

NOTE — If transport of the hazardous chemical is involved it shall be carried out in accordance with the *Central Motor Vehicles Rules, 1989*. While referring to the statutes, the stipulations given in the subsequent amendments of those statutes shall be taken into account.

8 SPILLAGE, LEAKAGES AND WASTE DISPOSAL

8.1 Spillage and Leakages

8.1.1 If spills and leaks occur, wash off all contaminated surface with plenty of water.

8.1.2 Do not absorb in any combustible material.

8.1.3 Do not attempt to recover spilled liquid.

8.1.4 Do not attempt to transfer hydrogen peroxide into other unidentified container.

8.1.5 If the container is leaking through its vent as a result of having been tipped on its side, then only action required will be to restore it in a vertical position and to wash the outside surface of the containers and surrounding area with copious quantities of water.

8.1.6 If a plastic container appears to be bulging, more likely it is the result of excessively high decomposition taking place. The first action should be to take off screw cap and insert carefully to relieve the pressure. If there is any sign of undue decomposition such as bubbles on the surface of the liquid or outside of the container feels warm, then the contents should be diluted and disposed to the drain as soon as possible.

8.1.7 In case of fire wear a fire-suit equipped with independent breathing apparatus before entering contaminated zone. Use water only for extinguishing the fire. Do not use foam or dry chemical extinguishers. Keep adjacent containers cool by spraying with water.

8.1.8 Storage Tank Leaks

If the leak is large and serious and cannot be easily stopped by isolating the valves then copious amount of water should be directed into the bunk and kerbed area, before repair can begin. If leak is in main tank then this will need to be emptied either into small containers or into another suitable container compatible with hydrogen peroxide. If the leak is small and occurs in some section of pipe work that can be isolated, then the local repairs can be carried out.

8.1.9 Small Spills

Spills of hydrogen peroxide should be contained and isolated from waterways, sewer drains, and any flammable or combustible materials. Small spills should be diluted with large amounts of water and disposed of in accordance with applicable local, state or federal regulations. Do not use absorbents or adsorbents to soak up hydrogen peroxide spills. Absorbents and adsorbents may contain organics that can react with hydrogen peroxide. Rinse hydrogen peroxide contaminated cloth or paper towels with water until they are free of residual hydrogen peroxide. Failure to do so may result in a fire once they dry. Personnel attempting to clean up hydrogen peroxide spills should wear proper personal protective equipment.

8.1.10 Large Spills

If the large spill of hydrogen peroxide occurs, spillage should be contained and isolated from waterways, sewer drains, and any flammable or combustible materials by constructing dikes of earth, sand or some other inert material. The dilution of large spills with water will reduce the evolution of steam, oxygen gas, and entrained hydrogen peroxide. Emergency responders should wear suitable proper personal protective equipment and should only approach hydrogen peroxide spills from up wind. Once the spill is contained, the hydrogen peroxide should be allowed to decompose before being collected and disposed of in accordance with applicable local, state, and central regulations. If required, report spills to the appropriate state or central authorities.

8.2 Waste Disposal

All relevant regulations of local and state authorities for prevention and control of pollution should be observed. (Hydrogen peroxide decomposes of its own giving water and oxygen the product universally accepted and not creating an additional pollution).

8.2.1 Dispose off hydrogen peroxide by diluting it with plenty of water.

9 FIRE PROTECTION AND FIRE FIGHTING

9.1 Fire Fighting

Water spray in plenty is most effective for extinguishing fire induced by hydrogen peroxide. Do not use foam or dry chemical extinguishers. Keep adjacent area and containers cool by spraying with water whenever fired. Fires involving hydrogen peroxide should be extinguished with water. Containers of hydrogen peroxide involved in a fire should be cooled with water sprays. If the container begins to discolor or vent violently, emergency responders should evacuate the area.

10 TRAINING

Persons handling or working in plant involving hydrogen peroxide shall have training such that they can be expected to carry out their jobs effectively and safely. They should be familiar with method of handling and be appraised of use of protective equipment for safe handling. During the instructions, stress should be given about the hazards due to eye contacts, skin contacts, inhalations and ingestion. All persons should be familiar with the location of alarm boxes, first aid boxes, fire extinguishers and personal protective equipment.

10.1 Safety in handling hydrogen peroxide depends to a great extent on employee's education, proper safety instructions, intelligent supervision and use of safe equipment.

11 HEALTH MANAGEMENT, FIRST-AID AND MEDICAL TREATMENT

11.1 Health Monitoring

11.1.1 *Personal Hygiene*

11.1.2 *Physical Examination*

Workers should be thoroughly instructed and supervised in proper operating procedures to avoid exposure to hydrogen peroxide. Where exposure is possible, personal protective equipment should be used.

11.1.2.1 *Periodic examination*

Health examination of personnel handling hydrogen peroxide should be carried periodically.

11.1.2.2 *Medical examination*

No special medical examinations other than routine medical check are required.

11.2 First Aid

11.2.1 *General Principles*

The doctor should be consulted for all exposures except minor instances of inhalation or skin contact. All first aid procedures should be periodically reviewed by a doctor familiar with the material and its condition of use in the workplace.

11.2.2 *Contact with Skin*

The first immediate action for skin contact with hydrogen peroxide is repeated rinsing of the affected area with plenty of water. The contaminated clothing, shoes, and leather goods should be removed immediately. If skin irritation occurs or feel unwell, get medical advice/attention. The contaminated clothing should be washed under water and before re-use or discard.

11.2.3 *Contact with Eyes*

In case of hydrogen peroxide (even a small quantity) splashes in the eye the affected eye must be rinsed with clean water initially with eyewash bottle and subsequently with an irrigation device. This must be done immediately and continuously for at least 15 min. Refer promptly to a physician preferably to an eye specialist.

11.2.4 *Ingestion*

In case of accidental ingestion it is recommended that copious amounts of water to be drunk. If available milk or white of egg can be given. Do not induce vomiting. Then medical advice must be sought.

11.2.5 *Inhalation*

In case of accidental inhalation, remove the victim to fresh air. Rescuers should wear suitable air-masks. Medical advice must then be sought.

ANNEX A

(Clause 2)

LIST OF REFERRED STANDARDS

| <i>IS No.</i> | <i>Title</i> |
|-------------------------------------|--|
| IS 1260 (Part 1) : 1973 | Pictorial markings for handling and labelling of goods Part 1 Dangerous goods (<i>first revision</i>) |
| IS 2925 : 1984 | Specification for industrial safety helmets (<i>second revision</i>) |
| IS 4155: 2023 | Glossary of terms relating to chemical and radiation hazards and hazardous chemicals (<i>first revision</i>) |
| IS 4167: 2020 | Glossary of terms relating to air pollution (<i>second revision</i>) |
| IS 8519 : 2024 | Guide for selection of occupational protective clothing — Body protection (selection, care, and maintenance) (<i>first revision</i>) |
| IS 8520 : 2023/ ISO 19734 : 2021 | Eye and face protection — Guidance on selection, use, and maintenance (<i>first revision</i>) |
| IS 10592 : 2018 | Industrial emergency showers, eye and face fountains and combination units — Specification (<i>first revision</i>) |
| IS 10667 : 1983 | Guide for selection of industrial safety equipment for protection of foot and leg |
| IS 18149: 2023 | Transportation of dangerous goods – Guidelines |