

HYDROGEN PEROXIDE

BRIGHTEN YOUR FUTURE WITH US



 **ALBONE[®]**

 **PEROXAL[®]**

 **VALSTERANE[®]**





Introduction

Hydrogen peroxide was discovered in 1818 by the French chemist Louis-Jacques Thenard. He coined the famous term "eau oxygenée" to express his belief that it was oxygen diluted into water!

Hydrogen peroxide - H_2O_2 - was rapidly commercially available thereafter, and was primarily used for bleaching straw hats! Since that time, production has grown to currently over 3 million metric tons per year worldwide with a yearly growth of about 3%.

Its main applications are pulp bleaching (50% of demand), chemical synthesis, and textile bleaching.

Arkema is among the top three worldwide leading H_2O_2 producers, with a capacity of 350 ktpa and plants in Asia, Europe and North America.

Our strategic goal is to develop further our leading worldwide position to follow our customers' requests wherever they are, through expanding our capacities and improving our performance.

Hydrogen peroxide



Our flagship, **Jarrie** (France) is among the largest plants currently existing in Europe. Started in 1960 with a 5 ktpa capacity, the plant reaches today 105 ktpa. Apart from Jarrie, we have plants in:

- **Leuna** (Germany) 40 ktpa capacity,
- **Bécancour** (Canada) 73 ktpa capacity,
- **Memphis** (US) 70 ktpa.

Not to forget is our last-born **Shanghai** (China) facility which started up in 2000 with a capacity of 40 kt, and which makes us one of the few real worldwide H₂O₂ suppliers.

This activity has within Arkema a significant upstream (like hydrogen from sodium chlorate, ...) and downstream integration (organic peroxides, hydrazine hydrate, epoxidized soyabean oil, ...) which supports our competitiveness.

Through its worldwide presence Arkema offers one of the most comprehensive service range, which includes reliable logistics, personalized information sessions (safety measures, product applications, ...) and technical assistance: process optimisation, notably in pulp, storage policy and added value management tools (Vendor Management Inventory, VMI).

With two research centers, in Lyon (France) and in King of Prussia (US), Arkema is leading the development of new applications for H₂O₂: our R&D teams support your process towards better quality and improved profitability.

Our R&D fields of expertise are dedicated to:

- pulp and paper bleaching
- bleaching of textile fibres
- waste water and gas treatment
- chemical synthesis
- passivation of metal surfaces
- food, beverage, health and personal care industries
- home cleaning formulations

Arkema offers a wide range of products to fit your various applications:

- **ALBONE**[®] - H₂O₂ grade 18, 30, 35, 50, 60, and 70%: technical quality (standard grade).
- **PEROXAL**[®] - H₂O₂ grade 3, 30, 35, 50, 60, 70%: distilled and pure quality (specialty grade).
- **VALSTERANE**[®] - H₂O₂ grade 35, 50, 70%: designed for food applications only (specialty grade).



Applications

Hydrogen peroxide is normally used as a powerful oxidizing agent. It can however act as a reducing agent for strong oxidants. When it decomposes, it forms water and releases oxygen, which makes it an attractive “environmental friendly” product. It is “a clean oxidant”.



Its oxidizing action is used for:

- bleaching paper pulp,
- bleaching textile and plant fibres,
- manufacturing chemical compounds and preparing other oxidants,
- destroying pollutants and toxic substances,
- metal surface treatment, mineralurgy, and uranium hydrometallurgy.

It also features outstanding disinfectant and antiseptic properties which are exploited in many applications.

Arkema’s technical and R&D departments offer their expertise in this area as well as assistance in developing new applications for hydrogen peroxide.





● Paper pulp bleaching



Hydrogen peroxide is used to bleach all types of pulp including chemical, high-yield or mechanical pulps. It enhances whiteness without dissolving lignin.

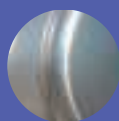
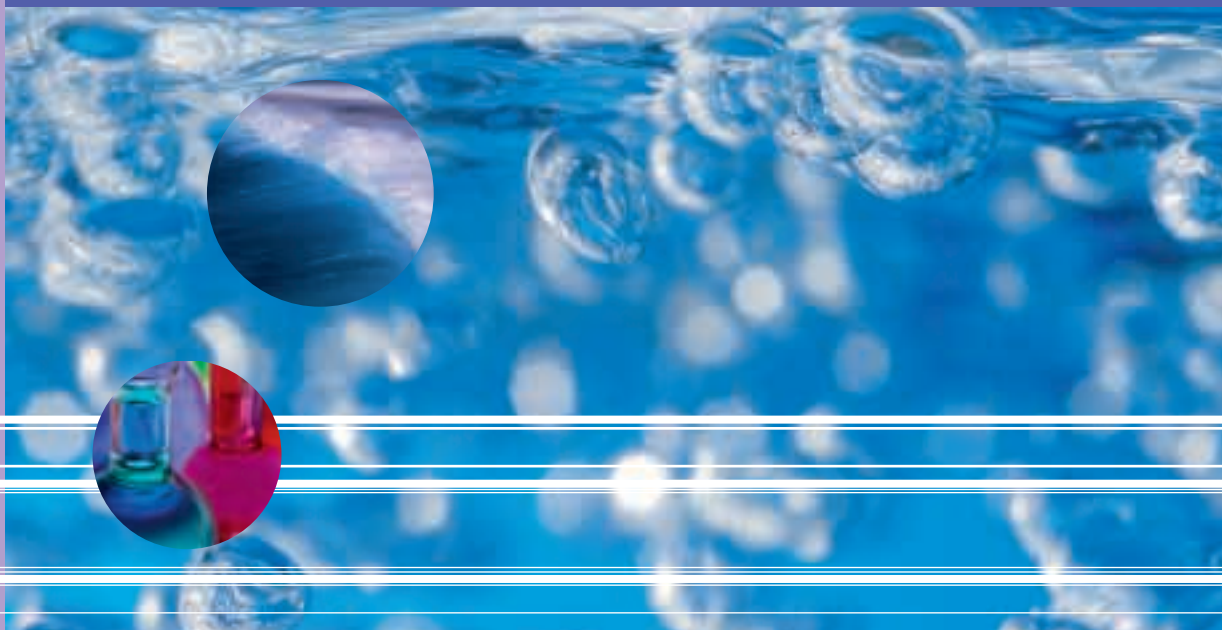
In chemical pulp bleaching processes, hydrogen peroxide plays a vital role throughout the so-called ECF (Elemental Chlorine Free) and TCF (Total Chlorine Free) bleaching. Combined with chlorine dioxide (ECF sequence), hydrogen peroxide ensures optimum whiteness in chemical pulp bleaching whilst minimising the impact of effluents on the environment.



● Textile fibre bleaching

Hydrogen peroxide is used to give a stable chemical whiteness to natural (cotton, wool, silk, linen) and some synthetic fibres (rayon), without damaging the fibres themselves.

Like pulp bleaching, this treatment takes place in an alkaline medium. The solutions should be stabilised with respect to traces of metals such as copper, iron and manganese which can often be found in the fibres or in the water.



● Chemical manufacture

Hydrogen peroxide is used in inorganic chemistry to produce persalts (perborate, percarbonate, persulphates, metal peroxides, etc.) as well as sodium chlorite and chlorine dioxide.

Applications in organic chemistry are numerous, e.g. the manufacture of hydrazine hydrate and hydroxyl-amines (Arkema processes), hydroquinone, epoxy products (oils, latex), organic peroxides, peracetic acid, sulphur derivatives, etc.

● Metal surface treatment

Hydrogen peroxide can be used mixed with sulphuric acid to pickle copper (in micro-electronics). Stainless steel, zirconium, titanium, etc., can also be treated with hydrogen peroxide and hydrofluoric acid blends instead of the environmentally harmful fluonitric blends.

● Waste treatment-environment

- As a clean oxidising agent, hydrogen peroxide is particularly suitable for desulphiding and deodorising urban wastewater. It curbs corrosion and odour pollution caused by hydrogen sulphide.
 - Hydrogen peroxide is also used to remove pollution from industrial effluents containing cyanides, phenols, sulphides and other compounds.
 - In chemical industry, it can support existing system like Claus Claus-Pol, thus avoiding maintenance period and getting a short return on investments.
 - In refineries when treating low concentration H_2S and mercaptans, the H_2O_2 solution can support or replace strippers.
 - Hydrogen peroxide also offers a convenient source of oxygen for aerobic biological treatment (e.g. for removing pollution from hydrocarbon-contaminated sites).
- Finally, combined with appropriate elements, it is an excellent bactericide-algicide for water decontamination (e.g. in the treatment of swimming pool water).



● **Food industry**

Hydrogen peroxide is used to clean and disinfect packages in contact with food products. Its aseptic properties are also invaluable in the sterilisation of drink packs (milk, fruit juice, etc.).



● **Pharmaceuticals**

Hydrogen peroxide is widely used in pharmaceutical applications for its disinfectant properties. Further healthcare applications include the disinfection of dental and surgical instruments as well as contact lenses.



● **Cosmetics**

Hydrogen peroxide is used both in hair bleaching and in colouring lotions, teeth bleaching lotions, pastes and mouthwash.

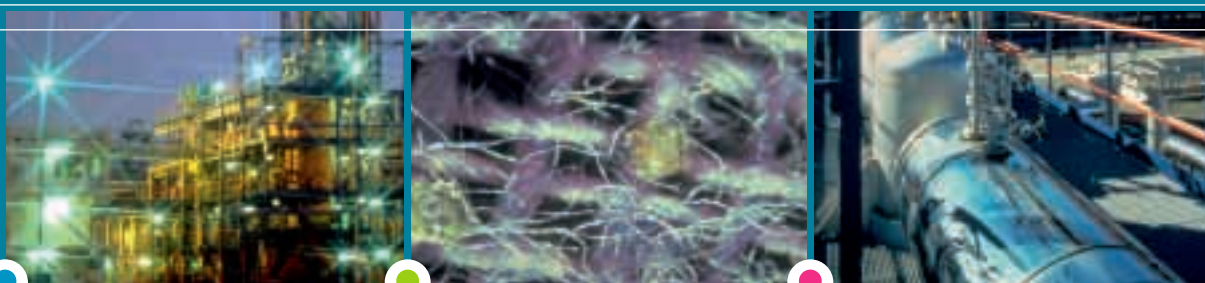
● **Detergence and cleaning**

Hydrogen peroxide is used in detergents and in cleaning agents for home and personal textile.



- Physico-chemical properties
- Chemical properties

Physico-chemical properties



The physico-chemical properties of hydrogen peroxide solutions are given in the following tables.

Although these diagrams relate to aqueous solutions of hydrogen peroxide in its pure state, the data represented by the curves are applicable to commercial solutions.

Physico-chemical characteristics					
PROPERTY	70%	60%	50%	35%	30%
H ₂ O ₂ , g/l	902	745	597	395	334
Litres of O ₂ at 0°C/760 mm Hg released by litre of H ₂ O ₂ at 20°C	298	246	197	130	110
Active O ₂ content, %	32.8	28.2	23.5	16.4	14.1
Freezing point, °C	-37	-55	-51	-32	-26
Boiling point at 760 mm Hg, °C	125	119	114	108	106
Viscosity, centipoises					
- at 0°C	1.93	1.89	1.87	1.81	1.78
- at 20°C	1.24	1.20	1.17	1.10	1.08

Chemical properties



Hydrogen peroxide is best known for its use as an **oxidising agent**.

Its strong oxidising potential allows it to oxidise a large number of organic and inorganic compounds.

It can however also act as a **reducing agent** for strong oxidants.

This ability to act both as reductant and oxidant allows hydrogen peroxide to react in a wide range of applications. With water as its only by-product, hydrogen peroxide is ideal for chemical reactions or syntheses where by-products would be undesirable.

The chemical reactions of hydrogen peroxide are as follows:

Decomposition

Hydrogen peroxide decomposes, particularly under the influence of metal catalysts or in basic medium, into water and gaseous oxygen in an exothermic reaction:



Oxidation

In this type of reaction, hydrogen peroxide can oxidise organic or inorganic compounds by:

• oxygen transfer example:



• electrons transfer example:

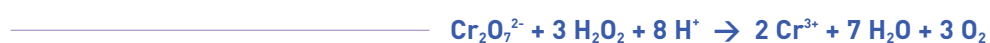




Reduction

Hydrogen peroxide acts as a reducing agent for powerful oxidising agents, in a reaction yielding gaseous oxygen.

Examples:



Transfer of peroxide group

The peroxide group in hydrogen peroxide is transferred to another molecule, for example in the case of the preparation of peracids:



Formation of addition products

Hydrogen peroxide can graft onto other molecules to form addition products which are similar to hydrates.



Stability of commercial hydrogen peroxide solutions

The hydrogen peroxide marketed by Arkema is an aqueous hydrogen peroxide solution to which small amounts of stabilisers have been added.

The purity of this hydrogen peroxide and the presence of stabilisers mean that commercial solutions are extremely stable.

If all necessary precautions are taken during handling and storage, loss of active oxygen from these hydrogen peroxide solutions is negligible. The concentration may drop by less than 1% after 12 month storage at about 20°C.

The main factors affecting the stability of hydrogen peroxide solutions are as follows.

Temperature

A rise in temperature increases the decomposition rate of hydrogen peroxide. It is generally agreed that the rate of decomposition of hydrogen peroxide doubles every time the temperature rises by 10°C (Arrhenius equation). In addition, because of the exothermic nature of the reaction, the rate of decomposition of H₂O₂ self-accelerates.

pH

Hydrogen peroxide solutions are very stable in acid medium, which is why commercial solutions are generally stabilised at a pH of less than 3. The pH should therefore never be allowed to rise accidentally during handling and storage, as this would result in a rapid decomposition of hydrogen peroxide.



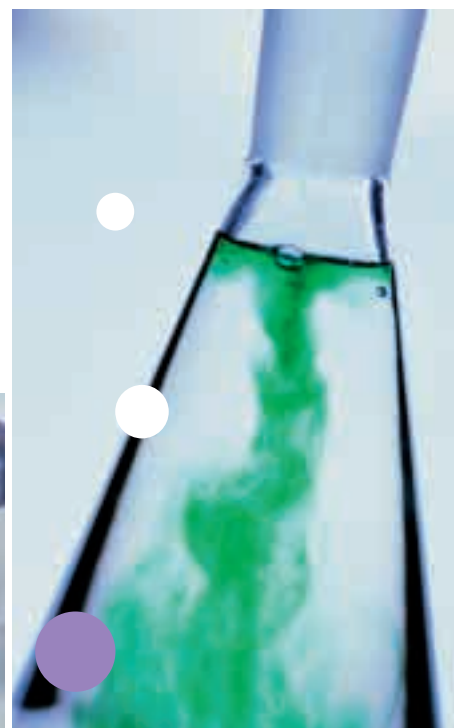
Decomposition catalyst

The majority of metals, in particular iron, chromium, manganese, copper, nickel and zinc catalyse the decomposition of hydrogen peroxide. Hydrogen peroxide solutions should therefore never be allowed to come into contact with these materials, and impurities. This does not apply to stainless steels containing these elements as alloys, as we shall see that they are compatible with hydrogen peroxide if previously passivated. Some organic substances can, at trace levels, bring on the decomposition of hydrogen peroxide, quite apart from the hazard they may cause by secondary reactions.

Some enzymes also tend to cause hydrogen peroxide to decompose, especially in diluted solutions, in a biological catalytic reaction.

Light

Light and solar radiations increase the decomposition rate of hydrogen peroxide solutions.





H₂O₂

- Packaging & transport
- Legislation
- Handling
- Storage
- Compatible materials



Packaging and transport



The hydrogen peroxide solutions marketed by Arkema are available in the following container types:

	Type	Characteristics	Capacity	Optimum net loaded weights
Bulk material	Road tankers	Stainless steel single tank (discharge from the top by dip tube or from the bottom, depending on type) Single tank with breakwater for loadings of 15 t and under	21,000 liters to 24,000 liters	24 t for H ₂ O ₂ 35% 25 t for H ₂ O ₂ 50% 26 t for more than H ₂ O ₂ 50%
	Road tankers	Stainless steel compartmented tanks 3 to 4 tanks	22,500 liters to 31,000 liters	
	20' Isocontainers	Stainless steel (discharge from the top by dip tube)	17,500 liters to 21,000 liters	18.8 t to 22.5 t for H ₂ O ₂ 35% 19.9 t to 23.9 t for H ₂ O ₂ 50% 20.45 t to 24.5 t for H ₂ O ₂ 60% 21 t to 25.8 t for H ₂ O ₂ 70%
	Rail tankers	Stainless steel (discharge from the top by dip tube)	Boggies: 50 to 60m ³ Axles: 28 to 35m ³	
Packed material	IBC	Polyethylene	1,000 liters	1,000 kg and 1,080 kg
	Jerrycans	Polyethylene	30 and 60 liters	30 kg, 60 kg and 65 kg
	Drums	Polyethylene	220 liters	200 kg to 235 kg

Legislation



Arkema is a member of the Peroxygens CEFIC subgroup. This subgroup is intended to coordinate European H₂O₂ producers efforts in the implementation of regulation (usage, storage, transport, ...)

All users of hydrogen peroxide are responsible for complying with the regulations in force in their own countries.

Storage

The European Commission Directive 2004/73/EC (29th ATP of the Council Directive 67/548/EEC) classifies hydrogen peroxide as:

- irritant: 5% to 8% concentrations,
- harmful: 8% to 50% concentrations.

For concentrations exceeding or equal to 50%, hydrogen peroxide is classified as a corrosive and oxidising material.

Hydrogen peroxide in concentration $\geq 50\%$ is an oxidiser, so its storage is subject to the Council Directive 96/82/EC "SEVESO".

- low threshold is 50 tons,
- high threshold is 200 tons.

The tonnage should be based on the weight of pure hydrogen peroxide.

Labelling of storage areas

The Directive 67/548/EEC governs the regulatory labelling and storage. Both discharge and storage areas should therefore display the same orange plate as road tankers to provide instant identification for hauliers and emergency services.

Transport

The transport of hydrogen peroxide, in concentrations of 8% and above, is subject to the major regulatory provisions governing the transport of hazardous materials.

UN: United Nations recommendations,
 RID/ADR: European rail and road transport regulations,
 RTMD: French regulations,
 IMDG: International maritime transport regulations,
 IATA: International air transport regulations.

Concentration (%)	8≤C<20	20≤C≤40	40<C≤60	>60
Danger N°	50	58	58	559
Material Identification N°	2984	2014	2014	2015
Labels	5.1	5.1 + 8	5.1 + 8	
Classification	Oxidizing	Oxidizing and corrosive	Oxidizing and corrosive	
Land / Sea transport		Class 5.1	Class 5.1	

5.1



8



ALL TRANSPORT MUST BE CARRIED OUT IN DEGREASED PASSIVATED PICKLED TANKERS (Stainless steel, aluminium) RINSED WITH DEMINERALIZED WATER

Handling



Hydrogen peroxide was risk-assessed at European Community level.

Report is available at: ecb.jrc.it

All our bulk containers, railcars and road tankers are dedicated to hydrogen peroxide only.

How to unload bulk equipment

- By gravity: in certain countries and for concentrations below 70%.
- By pumping: using a suitable centrifugal self-priming pump, fitted with ceramic or PTFE mechanical mountings. Membrane pumps are suitable for metering.
- By air pressure: this should only be used if none of the above methods is available. The maximum working pressure should be the lowest possible pressure compatible with the transfer conditions, and should in no way exceed the working pressure of the equipment (e.g. lorry tank: 1.5 bar).

The air should be carefully filtered and oil-free, although dry nitrogen is preferable.

Isotanks, rail tankers and road tankers should be resealed carefully after unloading, but not washed inside. All traces of hydrogen peroxide on the outside of the containers shall be removed with plenty of water.

For safety reasons, containers of whatever type allocated to hydrogen peroxide shall not be used for other purposes; in particular, storing other products, blending or diluting operations are forbidden.

Packaging

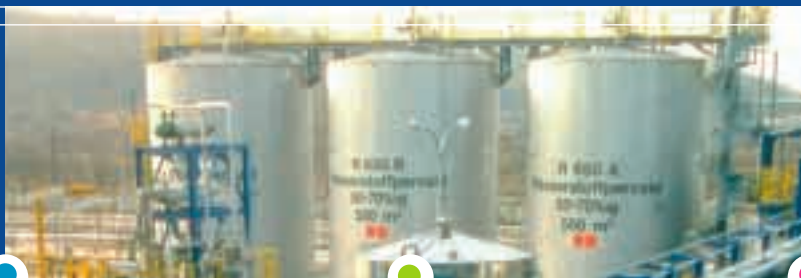
- **Small packages:** jerrycans, drums

Various methods may be used, although we recommend a siphon primed by a water pump. A clean polyethylene siphon is preferable. The use of compressed air is prohibited. These containers should not be unloaded by pouring because of the risk of splashes, unless they are fitted with a suitable spout.

- **One way IBC:** they are equipped with a bottom valve allowing to safely unload the hydrogen peroxide.

All our packaging comply to the Directive 94/62/CE as well as, in France, Decree n°94-609 of 13.7.94 and Decree n°98-638 of 20.7.98.

Storage



Bulk storage tanks are highly recommended when product consumption justifies the expenditure.

As a rule, storage capacity should be at least equal to 1.5 times the volume of any delivery if operations are to run smoothly.

Storage tanks should preferably be located outside buildings, away from combustible materials as well as heat sources.

For safety reasons, all hydrogen peroxide transfer pipes should be set up outdoors, in readily accessible areas, and with unrestricted flow at both ends. Because of possible gas formation, no hydrogen peroxide should remain trapped in a section of pipe or in a closed vessel if there is no possibility for expansion. The pipes should also be designed so that no liquid may be allowed to flow from the storage tanks back to the supply containers.



Compatible materials



The choice of materials that can be in contact with hydrogen peroxide is of the utmost importance for the construction of storage installations and ancillary facilities. Most metals are in fact incompatible with hydrogen peroxide and can act as decomposition catalysts.

Metals

We recommend using Z2 CN18-10 (304L) stainless steel, or preferably Z2 CND 17-12 (316L). The whole installation can be made from these materials and should include appropriate welding and surface treatment.

In particular, all traces of carbon steel or rust shall be eliminated.

High purity grade 1080A aluminium may be used; however, the preparation of this kind of (any surface) is more delicate than for stainless steel, and parts which will not be in constant contact with H_2O_2 are liable to be corroded.

Plastics

We recommend certain plastics such as polyvinyl chloride (PVC), polyethylene, polypropylene, and polytetrafluoroethylene (PTFE). Particular care should be taken when using these materials as they are liable to decay with time, although this can be controlled to some extent; regular monitoring is therefore essential. Joints and seals must be made of PTFE or flexible PVC.

Passivating metal equipment

Oxygen compatible grade.

Any equipment for use in installations which will be in contact with hydrogen peroxide shall be of an oxygen compatible grade, i.e. free of all traces of flammable products (hydrocarbon, oil, grease, etc.) and of any product incompatible with hydrogen peroxide; it also has to be cleaned, pickled and passivated so as to be free of all impurities, welding scrap, slag and rust.

Various products and methods are available from a number of companies to ensure that metal surfaces are suitably clean.

Recommendations

••• For aluminium:

a) Pickling

Brush internal surfaces of containers when cold with a stiff haired or nylon brush impregnated with a solution containing for example:

- 10 g/l of sodium pyrophosphate,
- 0.5 g/l of alkylaryl sulphonate.

When pickling pipes, use a pump to circulate the solution before rinsing carefully.

b) Passivation

Fill the tanks with acidified water, prepared as 10 litres of 36° Bé nitric acid per cubic metre of cold water. Leave to stand, cold, for 48 hours. Empty the tank, and carefully rinse with demineralised water to remove all traces of acidity.

••• For stainless steel:

The inside of installations shall be treated after the equipment has been tested for strength and found to be leak-proof, and before any functional ancillary equipment is fitted.

The following products are prohibited for this treatment:

- chlorinated and halogenated solvents,
- halogen ions, except for pickling operations,
- caustic soda and potash.

The treatment consists of the following stages:

- degreasing with phosphoric acid solution,
- rinsing,
- pickling with fluonitric solution,
- rinsing,
- passivating with nitric acid solution,
- final rinsing with demineralised water.

The treatment will be carried out by spray, immersion, or, exceptionally, by applying the products in the form of a paste, depending on the size and the amount of surfaces to be treated.

- N.B.:
- every major step shall be followed by a check,
 - the resulting solutions shall be destroyed in an officially approved centre,
 - any equipment thus treated shall be maintained in that condition until first use.

For complete storage description, please refer to the H₂O₂ storage guideline set up by the CEFIC Peroxygens subgroup. Do not hesitate to contact us to receive a copy or visit www.cefic.org



- Preparing solutions
- Analysing solutions



Preparing solutions



For the majority of applications, commercial hydrogen peroxide solutions are too concentrated to be used as such, and should therefore be diluted before use.

Dilution water

Water used for diluting hydrogen peroxide solutions should not contain impurities which could cause the product to decompose. It is therefore advisable to use demineralised or deionised water (the water quality may be checked by conductivity). If the hydrogen peroxide solutions are to be stored, select demineralised water having a conductivity $< 1\mu\text{S}/\text{cm}$.

Stabilisers

Whatever the quality of the water, diluting hydrogen peroxide always tends to affect the stability of the product. It is therefore advisable to add small amounts of stabilisers to avoid the solutions decomposition.

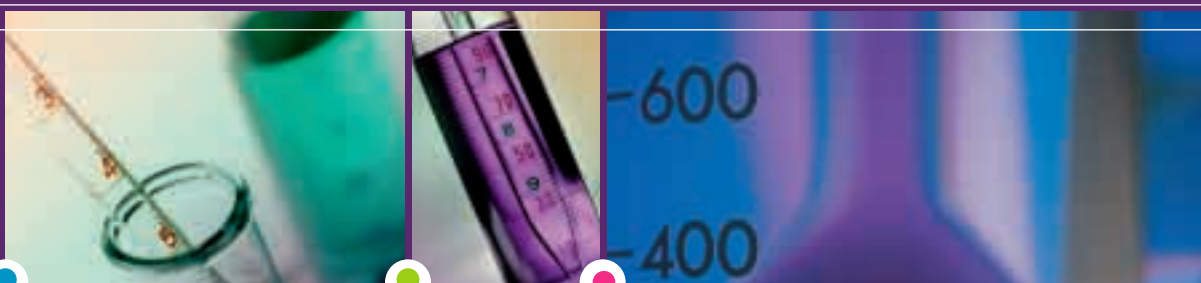
For diluted solutions of hydrogen peroxide at concentrations lower than or equal to 30%, the pH should be adjusted to between 2 and 3 with a solution of orthophosphoric acid, which may be obtained for example by diluting 10 volumes of 85% commercial orthophosphoric acid in 90 volumes of demineralised water.

According to applications, other stabilisers may be added such as ortho-oxyquinoline sulphate, dipicolinic acid, aminomethylene phosphonic acids and derivatives, etc.

If the hydrogen peroxide solutions are to be used in medical or food applications, it is essential to check that the solutions containing those stabilisers do comply with the standards in force in the countries they are intended for.

In all cases, the pH of hydrogen peroxide solutions should be checked after dilution, and should be below 3.

Analysing solutions



It may be necessary to determine the hydrogen peroxide content of both commercial solutions and solutions which are diluted before use.

Both permanganate and iodometric methods may be used to determine the hydrogen peroxide concentration. Permanganate is used for testing concentrated hydrogen peroxide solutions as well as bleaching baths to which no organic material has been added, whereas iodometry is used for testing solutions used in paper pulp processing and in oxygenated heat treatment baths for textiles.

For dosing traces of residual hydrogen peroxide in effluents, colored strips can be used: their blue coloration enables to carry out a semi-quantitative dosage.

A better precision can be obtained for dosage of traces by using titanium chloride reaction. Please contact us for more details on the latter method of analysis.

Permanganate method

Please refer to CEFIC Peroxygens H₂O₂ AM - 7157 method (Determination of hydrogen peroxide content available at www.cefic.org).

Principle

The action of the potassium permanganate on hydrogen peroxide in an acidic medium.

Reaction



1. **Titration** concentrated hydrogen peroxide solutions
(concentration exceeding or equal to 30% H₂O₂ by weight)

Reagents

- sulphuric acid solution of around 490 g/l,
- potassium permanganate solution of 15.8 g/l (normal 0.5 solution).

2. **Titration** diluted hydrogen peroxide solutions
(1 g of H₂O₂/l to 40 g of H₂O₂/l).

Reagents

- sulphuric acid solution of around 300 g/l,
- potassium permanganate solution of 3.16 g/l (normal 0.1 solution).

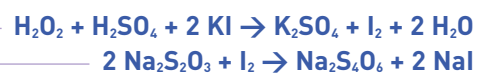


• Iodometric method

Principle

The oxidation of potassium iodide by hydrogen peroxide in an acid medium, and the titration, using a sodium thiosulphate solution, of the iodine so released.

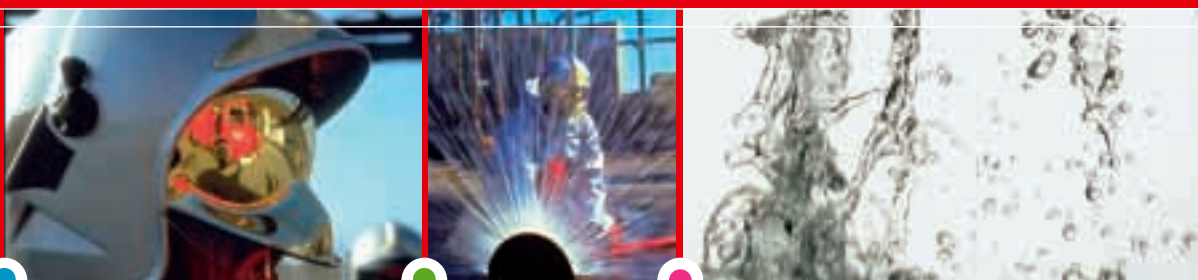
Reaction



Reagents

- sulphuric acid solution of approximately 300 g/l,
- potassium iodide solution of approximately 100 g/l,
- ammonium molybdate solution of approximately 5 g/l,
- sodium thiosulphate solution of 24.8 g of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5 \text{H}_2\text{O}$ /l (normal 0.1 solution),
- starch or thiodene.

Safety & emergency measures



Hydrogen peroxide is a powerful oxidising agent. Its handling features potential risks, which can be prevented by suitably training all staff liable to handle it or to work in installations using it. Supplying personnel with appropriate information is part of any basic prevention policy (CD Rom and information courses are available from Arkema on request).

Please do not hesitate to contact us.

The nature of the hazard remains the same for any concentration of product, although the higher the concentration, the greater the hazard.

Users shall always refer to the safety data sheet before handling the product.

Health and safety

Health risks

Hydrogen peroxide causes burns when in contact with the skin. It is not just an irritant but can also be a corrosive substance for the eyes, the respiratory system, and the skin. Accidental ingestion can cause serious internal damage. Accidental inhalation of high vapor concentration can cause pulmonary oedema.

Personal protection

The following equipment should be worn as appropriate, whenever there may be risks of splashes or spillage, in particular when containers are being connected, discharged or cleaned:

- safety goggles,
- gloves and apron made of a suitable synthetic material (no leather),
- plastic boots,
- face mask,
- positive air pressure mask or self-contained breathing apparatus when cleaning the tanks.

Suitably effective showers should be provided in the vicinity of storage, pumping, injection and handling areas.

First aid

Should an operator or his/her clothing be splashed, wash immediately and abundantly with water for a prolonged period of time.

If the product has been swallowed, do not induce vomiting but give tepid water to drink and encourage burping or belching.

Then seek medical help or hospitalise depending on the seriousness of the incident.

Anyone having inhaled the product should be taken into the open, and, if necessary, given artificial respiration.

Fire - explosion

Physical and chemical hazards

Hydrogen peroxide can trigger the spontaneous ignition of combustible materials, as well as decomposing and releasing gaseous oxygen and/or form radicals when in contact with incompatible materials. This decomposition can cause explosions.

Hydrogen peroxide can induce ignition or explosion of organic materials when mixed with them. Significant temperature rises can also lead to explosions.

Preventive measures

Sprinkler systems should be installed to keep storages at cool temperatures.

It is essential to maintain all hydrogen peroxide storage and handling areas clean and free of combustible materials such as pallets, paper, grease, etc.

Fire-fighting and accidental release measures

Water spray is the only appropriate fire-fighting method. When leakages or other accidental releases occur, all personnel either not required or not equipped with personal protection should be evacuated, the leak sealed off if possible, and all incompatible materials removed from the area. The best method for eliminating risks associated with accidental releases of hydrogen peroxide is to dilute the product with sufficient amounts of water, i.e. in proportion with the scale of the leak.



Environment

Environmental impact

Hydrogen peroxide has toxic oxidising effects on living organisms (please refer to safety data sheet - SDS).

Preventive measures

A catchpit in a bunded area should be provided which is compatible with the storage capacity. Water supplies should be installed near hydrogen peroxide handling and storage areas for diluting spillages if required.

Emergency measures

As a rule, accidentally released product should flow into a catchpit in a bunded area and be subsequently pumped out into an inert tank. It may then be released into the drainage system after being heavily diluted with water.



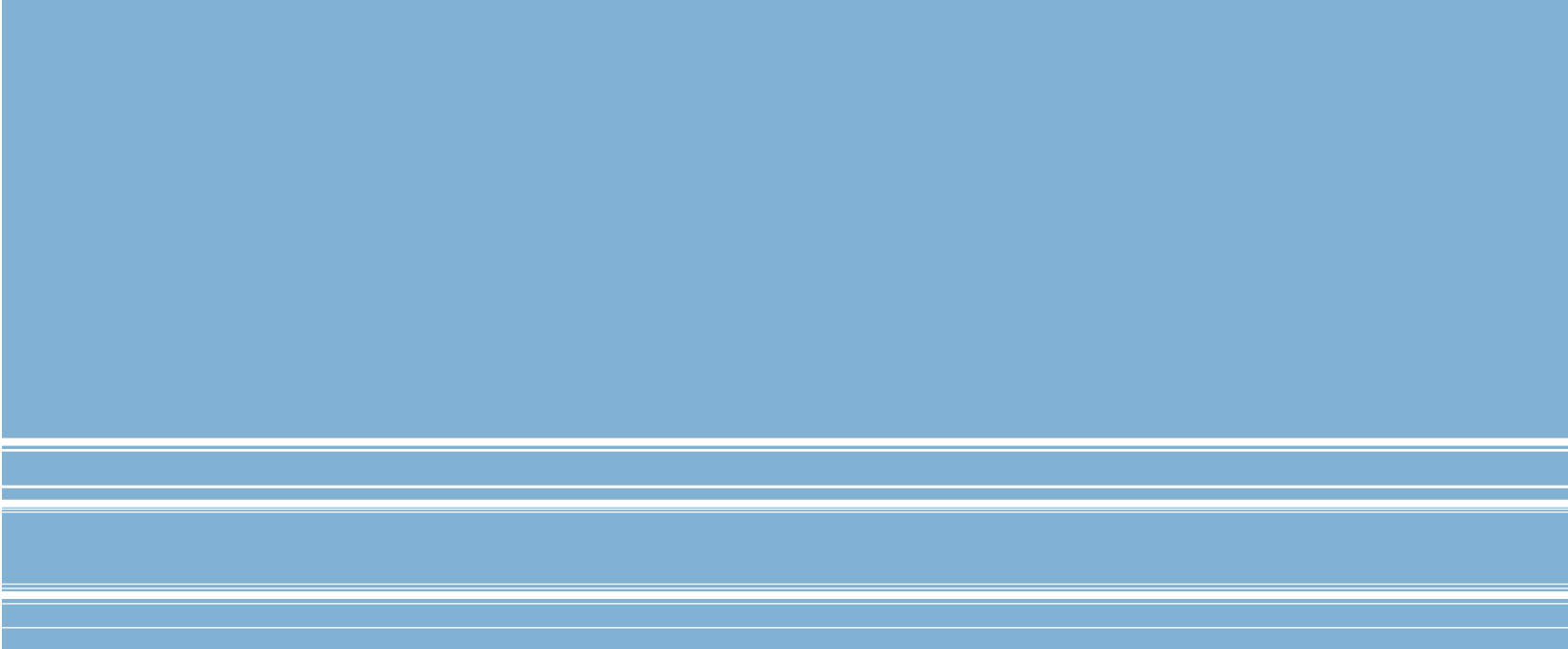
A global chemical player, Arkema consists of 3 coherent and balanced business segments:

- Vinyl Products: Chlorochemicals and PVC, Vinyl Compounds, Pipes and Profiles (Alphacan),
- Industrial Chemicals: Acrylics, PMMA (Altuglas International), Thiochemicals, Fluorochemicals, Hydrogen Peroxide,
- Performance Products: Technical Polymers, Specialty Chemicals (Ceca), Organic Peroxides, Additives, Urea Formaldehyde Resins, Agrochemicals (Cerexagri).

Arkema develops its activities by combining safety and environmental protection, client proximity, industrial reliability, and competitiveness.

Present in over 40 countries with 18,600 employees, Arkema achieves sales of 5.2 billion euros.

With its 6 research centers in France, the United States and Japan, and internationally recognized brands, Arkema holds leadership positions in its principal markets.



Arkema worldwide bleaching & chemicals business

Brighten your future with us



● H₂O₂ production plants
Albone®
Peroxal®
Valsterane®

● Area business Management

● Sales Office

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