



STORAGE AND HANDLING OF HAZARDOUS CHEMICALS

The safe storage of chemicals is essential to provide for the most effective management of chemicals, decrease workplace risks and prevent accidental chemical mixing in emergencies.

Minimising exposure of personnel to corrosive and toxic chemicals remains paramount in our operations.

Safe storage of chemicals begins with identification of the chemicals to be stored according to their intrinsic hazardous properties. Chemicals that react to produce heat, pressure, fire, explosion, or another type of violent reaction are deemed to be incompatible and are stored carefully and correctly.

Our storage facilities shelter the chemicals: they protect the personnel and the environment from the effects of a spill, fume or gas emission. Our unrivalled facilities ensure correct segregation of chemical families and safe storage for effective order picking.

A leaked chemical, **especially when it is volatile or a gas at room temperature** can cause intoxication. The risk of intoxication is particularly insidious, when the spilt chemical on its own does not have any severe toxicological property but releases a toxic substance when it reacts with the surrounding environment or other chemicals stored in the same room.

For example, chlorine gas forms when liquid bleach comes into contact with an acidic solution

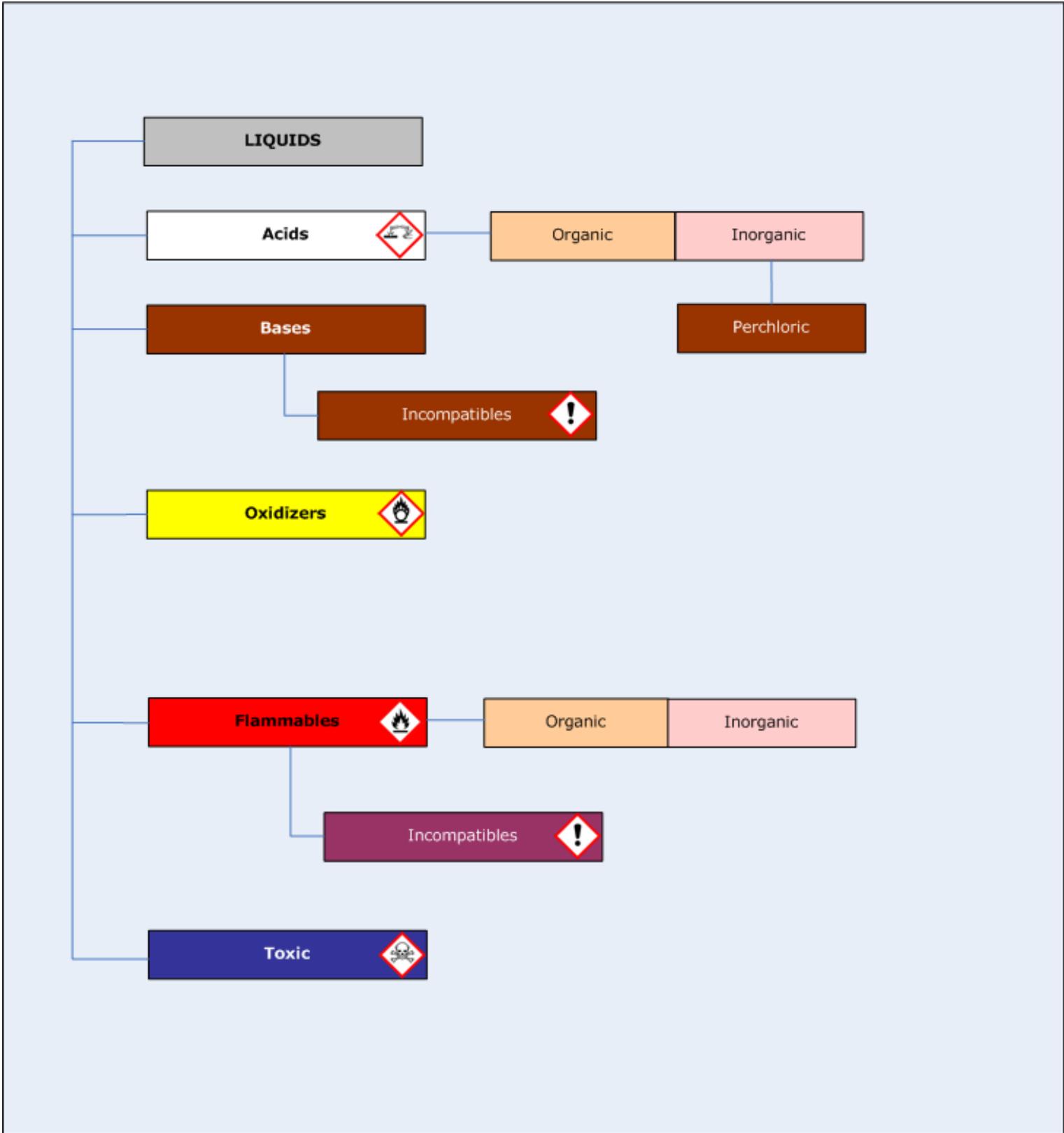
We commit every day to ensure compliance with the relevant regulations, and that all personnel on site remain in a safe environment.

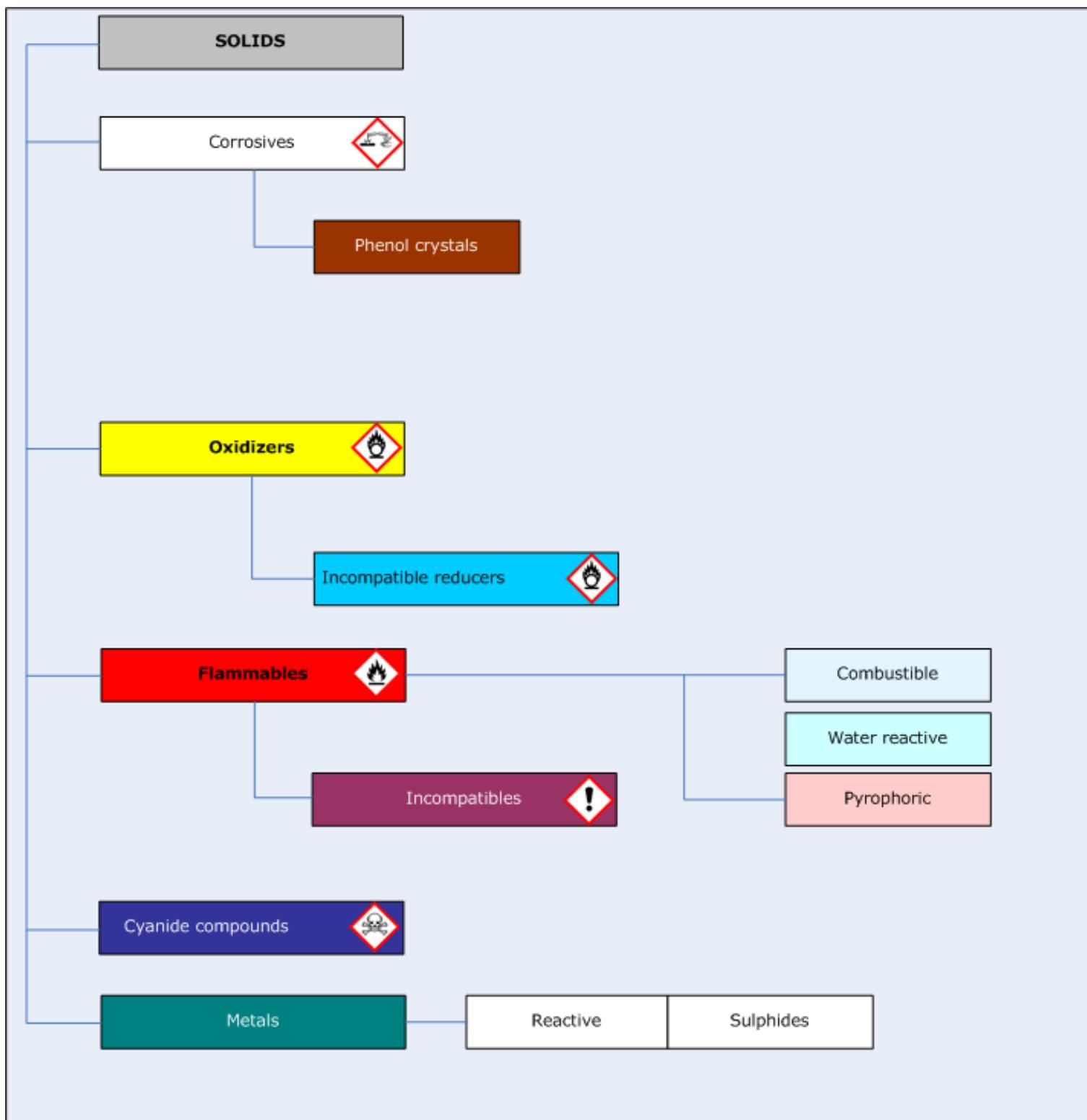
STORAGE CODES & COLOURS

CODE	COLOUR	TYPE
1	ORANGE	INORGANIC ACIDS
2	YELLOW	ORGANIC ACIDS
3	DARK GREEN	BASES
4	BLUE	OXIDIZING/SPECIAL HANDLING INORGANIC ACIDS
5	LIGHT GREEN	OXIDIZERS
6	PURPLE	TOXICS
7	RED	FLAMMABLES
8	WHITE	GENERAL CHEMICALS



CHEMICAL STORAGE SEGREGATION





N.B. Safety Data Sheets should always be consulted for specific storage information codes

Purple Brown Light blue

General storage – no notable incompatibilities Orange Pink Green

DIFFERENCES BETWEEN HAZARDOUS CHEMICALS AND DANGEROUS GOODS

DEFINITION OF HAZARDOUS CHEMICALS

There is no global regulatory definition of hazardous chemicals. Hazardous chemicals refer to any substances or mixtures that may pose harm to facilities, human health and the environment. The UN GHS purple book definition is: Any substances or mixtures meeting GHS classification criteria for physical hazards, health hazards and environmental hazards will be regarded as hazardous chemicals.

DEFINITION OF DANGEROUS GOODS

Dangerous goods are solids, liquids or gases that can harm people, other living organisms, property or the environment. In some countries dangerous goods are more commonly known as hazardous materials. Any goods listed in the dangerous goods list or meeting dangerous goods classification criteria for the 9 classes in the table below will be regarded as dangerous goods.

UN HAZARD CLASSIFICATION

Class 1	Explosive
Class 2	Gases
Class 3	Flammable Liquids
Class 4.1	Flammable Solids/self-reactive solid or liquid
Class 4.2	Spontaneously Combustible/ self- heating
Class 4.3	Dangerous When Wet/ water reactive
Class 5.1	Oxidising Agent
Class 5.2	Organic Peroxides
Class 6.1	Poisonous/ toxic/inorganic
Class 7	Radioactive
Class 8	Corrosive
Class 9	Miscellaneous Dangerous Substance

Dangerous goods are subject to stringent transport regulations. No person may offer or accept dangerous goods for transport unless those goods are properly classified, packaged, marked, labelled, placarded, described and certified on a transport document. Dangerous goods are usually assigned with UN number and proper shipping name.

To find out if a hazardous chemical belongs to dangerous goods, one shall refer to Section 14 of the Safety Data Sheet (SDS) to see if there is a UN number listed. If yes, the chemical product belongs to dangerous goods.

DIFFERENCES BETWEEN HAZARDOUS CHEMICALS AND DANGEROUS GOODS

Not all hazardous chemicals belong to dangerous goods. There are only 9 classes of dangerous goods and they only consider toxicity hazards. Even CMR (carcinogenic, mutagenic or reproductive toxicant) substances which are considered as of the greatest health concern under GHS are not covered by the 9 DG classes.

Not all dangerous goods are hazardous chemicals. This is because dangerous goods not only include hazardous chemicals, but also include articles. For example, air bags and lithium batteries belong to dangerous goods. However, they are not regarded as hazardous chemicals.

Chemicals that belong to dangerous goods are usually hazardous chemicals. The only exceptions are infectious substances/mixtures and radioactive substances/mixtures. They are covered by GHS classification criteria.



Incompatible Chemicals



Chemicals will remain harmless if stored correctly and segregated. In some cases, if incompatible chemicals come into direct contact of one another they may pose a severe fire, explosive or toxic threat.

Examples of incompatible chemicals include:



Sodium Metal



Water



Cyanides



Acids



Glycerol



**Potassium
Permanganate**



Alcohols



Nitric Acid

Oxidising Agents



Oxidizing materials are liquids or solids that readily give off oxygen or other oxidizing substances (such as bromine, chlorine, or fluorine). They are capable of generating oxygen by heat, decomposition or interaction with incompatible materials. Oxidizing liquids and solids can be severe fire and explosion hazards.

These goods will worsen a fire even without the presence of atmospheric air or oxygen. Examples include Peroxides, Persulphates, Perchlorates, Permanganates, Dichromates, and Nitrates to name a few.

What happens when an oxidizing agent comes into contact with a combustible substance mainly depends on the chemical stability of the oxidizing agent.

The less stable an oxidizing product is, the greater the chance that it will react dangerously.

Flammable solvents should always be stored away from oxidizing agents.

Common Oxidizing Materials Include:



Ammonium Dichromate



Potassium Permanganate



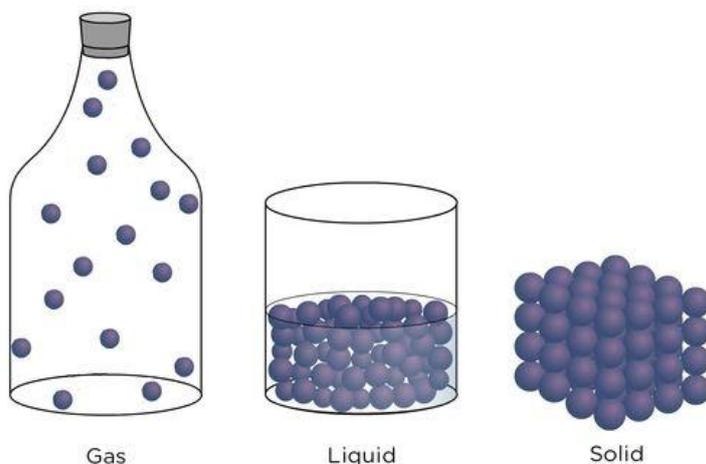
Sodium Peroxide

Flammable Chemicals



Three types of combustible material groups exist (namely solids, liquids and gases), although their respective ignition points or rates of fire propagation are different.

ACE's 80,000 litre flammable store was constructed against environmental regulations and the most stringent safety measures for the most effective storage.



Flammables are most commonly used in the laboratory as solvents.

Never use any type of open flame or any source of ignition around flammable chemicals.

When a bottle of flammable liquid is opened, the first thing to leave the bottle is the vapour. It is the vapours from flammable liquids that are flammable.

Examples of flammable liquids include ethanol, ethyl acetate, acetone, xylene, hexane, methanol and petroleum ether to name a few.

Toxic Chemicals



Toxic chemicals can be both organic or inorganic, and like flammables - can appear in solid, liquid or gaseous form.

All chemicals (even water) result in some toxic effect if an amount high enough comes into contact with a living organism. The most important factor that determines whether a substance is toxic to an individual is the relationship between the amount of the chemical reaching the target organ, and the toxic effect it produces.

The Occupational Safety & Health Administration (OSHA) classifies many toxic chemicals as posing one or more of the following harmful effects upon exposure:



Acute toxicity



Reproductive toxicity



Eye damage or eye irritation



Skin corrosion or irritation



Respiratory or skin sensitization

Corrosive Chemicals



Corrosive materials can attack and chemically destroy external exposed body tissues, and damage or even destroy metal. Corrosive products cause damage as soon as they come into contact with metal, skin, eyes, the respiratory tract (inhalation) or the digestive tract. They pose other hazards too, depending on the particular corrosive material.

Many corrosives are incompatible with other chemicals. If mixed, dangerous chemical reactions can release toxic or explosive products.

Most corrosives are either **Acids** or **Bases**.

Common **acids** include hydrochloric acid, sulfuric acid, nitric acid, acetic acid and hydrofluoric acid.

Common **bases** include sodium hydroxide, potassium hydroxide and ammonium hydroxide.

Some corrosives are also flammable or combustible. If improperly handled, they can easily ignite and burn or even explode.



Environmental Hazards



Apart from the hazards they represent for workers' health, stored chemicals may induce hazards for facilities, fauna and flora, and the general public as well.

If spilled, certain chemicals can irreversibly alter soils, streams and ground waters, thus affecting surrounding communities.

The nature of the environmental damage caused by a chemical spill depends on its toxicological, physical and chemical properties and those of the polluted site, but pollution risk increases with the amount of stored chemicals.

Holding ISO accreditations in all three disciplines places a well maintained responsibility on ACE in this case.

ACE has a legal responsibility to protect the health and safety of our staff and the environment. We have thus assessed the risks associated with the chemical storage facility, implemented the appropriate preventive measures, and control their effectiveness on a regular basis and ensure their maintenance.

**ENVIRONMENTAL MANAGEMENT SERVICES SABS
ISO 14000 ACCREDITED**



Waste Disposal Methods



At ACE, we strive to manage and ensure chemicals and waste management policies and legislation are implemented and enforced in compliance with chemicals and waste management authorizations, directives and agreements.

Safe and lawful hazardous waste disposal methods are ensured through ACE's ISO 14001 accreditation – managing systems in line with environmental policies and regulations.

