Industrial Safety & Hazard Analysis

Hazards Classification

- Physical Hazard
- Chemical Hazard
- Biological Hazard
- Psychosocial Hazard

Chemical Hazards classification

Chemical hazards are substances that are dangerous to people, wildlife and the environment at any stage from production to use to disposal.

1. Explosives

OSHA laboratory standard defines an explosive as a chemical that causes a sudden release of pressure,gas and heat when subjected to sudden shock ,pressure or high temperature.In Department of transportation ,this is rated as a hazard class1 .

Nitro cellulose , DNT etc.,

2. Flammable and combustible materials

OSHA laboratory standard defines an flammable as a any material which has a flash point below 100 F or 37.8 C

e.g. Acetone, Benzene

Flash point is the minimum temperature at which a liquid gives enough vapor to ignite in the presence of an ignition source.

3.Combustible OSHA laboratory standard defines an Combustible as a any material which has a flash point above 100 F or 37.8 C

Eg diesel, kerosene etc.,

4. Poison

Are substances which cause harm to any organism when sufficient quantities are absorbed , inhaled or digested.

e.g. ammonia, bleaching powder.

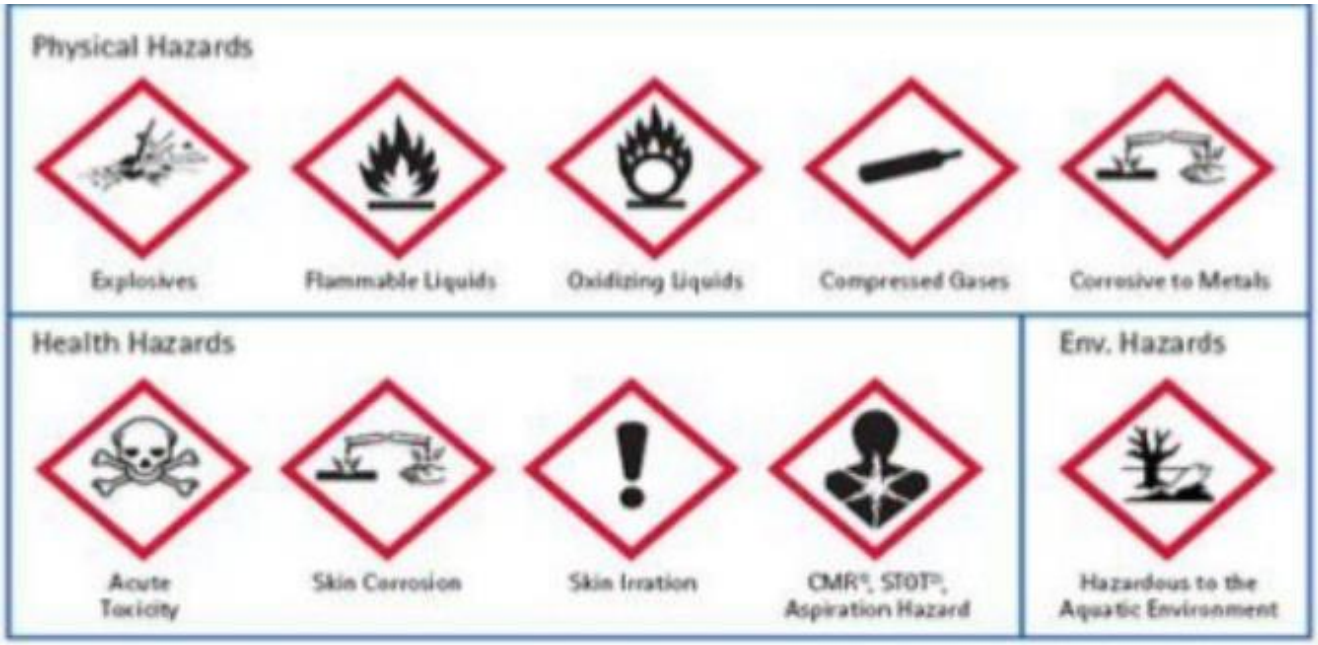
5. Radiation hazard

The danger to health arising from exposure to ionizing radiation ,either due to external irradiation or internal irradiation.

somatic effects- harmful to the person

Genetic effects- harmful to the offspring

E.g. Radium, plutonium



Routes of Entry

Inhalation

Inhalation of chemicals occurs by absorption of chemicals via the respiratory tract once chemicals have entered into the tract, the chemicals will then be absorbed by the blood stream for distribution to body parts.Chemicals can be inhaled in the form of vapors, fumes ,mists, aerosols and fine dust.

Absorption

Some chemicals are absorbed through eyes or skin

Ingestion

Chemical exposure occurs by absorption of chemicals through the digestive tract.

Chemical Safety Data Sheet / Material Safety Data Sheet (MSDS)

• CSDS is a form with data regarding the properties of a particular substance

• Also known as material safety data sheet (MSDS)

• Must be supplied by the supplier of materials

• Can also be obtained from many sources including over the internet

Example for MSDS is given below

Product Data Sheet – Arexons Motorsil D

Product Description

A high temperature silicone RTV Sealant cures in the presence of moisture to form a reliable seal in flanges.

Properties
Acetic elastomer component type. Cures at room temperature. Good resistance to temperature, water, moisture. Excellent oil resistance. Good dielectric properties. Excellent tear resistance. High degree of vibration absorption. Good resistance to mechanical stress. Temperature range: -70 ° C to +300 °C. Does not harm catalytic converters.

The product, after curing, resists water, fuels, mineral oils and synthetic fluids for radiators.

Technical Characteristics (before curing):
Appearance : Paste
Colour : Red
Odour: Typical
Density: 1.120g/ml
Viscosity: 250000 cPs
Volatile %: 3% approx

Technical Characteristics (after curing):
Shore Hardness A : 50
Elongation 200%
Tensile Strength : 4.5 mpa
Modulus of Elasticity : 1.8 MPa
Skin Formation Time: 10 minutes approx..
Curing Time: 4.5mm/ 24 hours
Temperature Resistance : from -70 deg C to + 300 deg C

How to use:
Apply on clean, degreased surfaces. Assemble after 20 minutes. Curing can be accelerated with heat.

Storage Life
In unopened and stored at room temperature environment and protected from direct sunlight: 2 years

Country of Origin: Italy

OBJECTIVE OF MSDS/CSDS

CSDS assists the user in

- understanding recommended safety measures and its rationale
- understanding the effect of noncompliance to recommended safety measures
- identifying the effect of over exposure
- formulation of strategies for safe utilisation of chemicals

Fire hazards

An object, building etc that could easily catch fire or cause a fire and thereby endanger life

electrical hazards

housekeeping hazards

friction hazards

process or operation-related hazards

storage hazards

smoking hazards

include all types of live flames, causes of sparks, hot objects, and chemicals that are potential for ignition, or that can aggravate a fire to become large and uncontrolled.

Potential hazard

The likelihood that a specific chemical or toxic material will cause an ill effect at a given dose.

e.g. experiments with acids

Risk

Risk is the correlation between likelihood and consequence.

An org chart for the acceptability of risk when certain levels of risk have been met, e.g:

- Risk Level Risk Authority
- Low risk = Supervisor
- Medium risk = Superintendent
- Significant risk = Manager
- High risk = Unacceptable without mitigation.

Workplace hazard identification and an assessment of those hazards should be performed before every job.

Job safety analysis

A Job Safety Analysis (JSA) is one of the risk assessment tools used to identify and control workplace hazards.

JSAs are usually developed when directed to by a supervisor, when indicated by the use of a first tier risk assessment and whenever a hazard associated with a task has a likelihood rating of 'possible' or greater.

A JSA is a documented risk assessment developed when company policy directs people to do so.

Generally, high consequence, high likelihood tasks are addressed by way of a JSA.

High consequence, high likelihood tasks include, but are not limited to, those with:

A history of, or potential for, injury, harm or damage such as those involving:

1. Fire, chemicals or a toxic or oxygen deficient atmosphere.
2. Tasks carried out in new environments.
3. Rarely performed tasks.
4. Tasks that may impact on the integrity or output of a processing system.

The JSA or JHA should be created by the work group performing the task. Sometimes it is expedient to review a JSA that has been prepared when the same task has been performed before but the work group must take special care to review all of the steps thoroughly to ensure that they are controlling all of the hazards for this job this time. The JSA is usually completed on a form. The most common form is a table with three columns (although each company has a variation with many having five or six columns). The headings of the three columns are (1) Job Step (2) Hazard (3) Controls. A Hazard is any factor that can cause damage to personnel,property or the environment (some companies include loss of production or downtime in the definition as well). A Control is any process for controlling a hazard. The work group firstly breaks down the entire job into its component steps. Then, for each step, hazards are identified. Finally, for each hazard identified, controls are recorded in the 3rd column.

When the task is complete it is often of benefit to have a close-out or "tailgate" meeting, to discuss any lessons learned so that they may be incorporated into the JSA the next time the task is undertaken.

Four basic stages in conducting a JSA are:

- selecting the job to be analyzed
- breaking the job down into a sequence of steps
- identifying potential hazards
- determining preventive measures to overcome these hazards

Example of JSA form is given below

Sequence of Events	Potential Accidents or Hazards	Preventive Measures