

## **P79 : CLASSIFICATION OF CHEMICAL SUBSTANCES AND ADVERSE EFFECTS OF CHEMICAL SUBSTANCES ON HUMAN HEALTH**

Yüksel Söyleriz1 (Chemical Engineer, MSc)

1the Department of Environmental Health of Public Health Institution for Turkey of the Ministry of Health of the Republic of Turkey, Ankara

### **Purpose**

In this study, classification of chemical substances and adverse effects of chemical substances on human health in European Union and Turkey are assessed.

### **Method**

In this study, national and international legislation and practices in the countries of the European Union are reviewed.

### **Findings**

We are in contact with numerous chemicals and / or chemical products (paints, detergents, cosmetics, pesticides, biocides, etc.) directly or indirectly at every stage of our lives.

Due to the high amount of chemicals used in our lives, new regulations regarding the harmfulness communications for the safe use of this product were needed to be done. These arrangements within the framework "Global Harmonization System" (GHS) have been accepted as standard rules on classification, labeling and packaging of chemical substances and mixtures by member countries of OECD.

The United Nations has created a certain standard after working on classification of chemical substances in recent years. The United Nations together with the OECD and the ILO has created a platform since they worked from 1970s to today's. GHS is a common standard in order to perform classification, labelling, packaging, storage and transport of chemical substances in the same way all over the world. CLP

Regulation is based on 3 main Directives in accordance with "Globally Harmonized System" on United Nations, Classification and Labelling of Chemicals.

These are;

Dangerous Substances Directive (67/548 / EEC)

Dangerous Mixtures Directive (1999/45 / EC)

-REACH Regulation Title XI (Classification & Labelling).

Countries outside the European Union member countries applying GHS system are;

USA, Canada, New Zealand, Brazil, China, the Philippines, Russia, Japan,

Mexico, South Africa and African Countries.

### **Valid legislation on the classification of chemicals in European Countries;**

For substances;

Until 01.06.2015, 67/548/EEC Directive on Dangerous Substances and CLP Regulation 1278/2008 EC. on classification, labelling and packaging of substances and mixtures

After the date of 01/06/2015 CLP Regulation 1278/2008 EC.

For mixtures;

Until 01/06/2015 99/45 /EEC Directive on the Dangerous Preparations and CLP 1278/2008 EC Regulation

After the date of 01/06/2015 EC Regulation 1278/2008.

(For mixtures already on the market before 1 June 2015, a transitional period is granted. Such mixtures do not need to be re-labelled and re-packaged before 1 June 2017)

**Agents Classified By the International Agency for Research on Cancer (the IARC) is an intergovernmental agency forming part of the World Health Organization of the United Nations.**

Group 1	Carcinogenic to humans	117 agents
Group 2A	Probably carcinogenic to humans	
Group 2B	Possibly carcinogenic to humans	287
Group 3	Not classifiable as to its carcinogenicity to humans	503

Group 4

Probably not carcinogenic to humans

1

## **Classification to the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)**

Hazard classes

The classes of dangerous goods according to ADR are the following: Class 1 Explosive substances and articles

Class 2 Gases, including compressed, liquified, and dissolved under pressure gases and vapors

Flammable gases (e.g. butane, propane, acetylene)

Non-flammable and non-toxic, likely to cause asphyxiation (e.g. nitrogen, CO<sub>2</sub>) or oxidisers (e.g. oxygen)

Toxic (e.g. Chlorine, Phosgene) Class 3 Flammable liquids

Class 4.1 Flammable solids, self-reactive substances, and solid desensitized explosives

Class 4.2 Substances liable to spontaneous combustion

Class 4.3 Substances which, in contact with water, emit flammable gases

Class 5.1 Oxidizing substances Class 5.2 Organic peroxides Class 6.1 Toxic substances Class 6.2 Infectious substances

Class 7 Radioactive material Class 8 Corrosive substances

Class 9 Miscellaneous dangerous substances and articles

## **By- Law on Protection Building from Fire (Official Gazette of 19.12.2007 and 26735)**

Article 102, Classification hazardous substances are classified as follows:

- a) Explosive substances,
- b) Flammable and explosive gases,
- c) Flammable liquids,
- d) Flammable solids,
- d) Oxidizing agents,
- e) Toxic and disgusting substances f) Radioactive substances,
- g) Etchant substances,
- h) Other hazardous substances

## **By-Law on health and safety measures related to chemical agents at work (official gazette of 12.08.2013 and numbered 28733)**

Definition of dangerous substances: Substances or mixtures having with one or more of the hazardous properties of explosive, oxidizing, very flammable, flammable, combustible, toxic, very toxic, harmful, corrosive, irritant, allergenic, carcinogenic, mutagenic, toxic for reproduction and dangerous for the environment. Or substances not having above properties but causing risks workers in terms health and safety due to chemical, physico-chemical or toxicological properties, way of using or keeping for chemicals or chemicals, occupational exposure limit values of which are determined.

## **By-Law on the classification, packaging, and labelling of substances and preparations (Official Gazette dated 11st Dec. 2013 and No 28848 first edition)**

### **-16 Physico-chemical Hazards;**

1. Explosives (Unstable explosives, Sections 1.1, 1.2, 1.3, 1.4, 1.5, and 1.6) (ANFO, TNT -trinitro toluene)
  2. Flammable gases (category 1 and 2) (acetylene, butane, propane, ethylene)
  - 3 Flammable aerosols (category 1 and 2) (dispersed in a solid or a liquid gas atmosphere, room deodorants,)
  4. Oxidizing gases (Category 1) (hydrogen peroxide, PR chloric acid, Sodium and Potassium Nitrate)
  5. Gas under pressure (such as acetylene).
  6. Flammable liquids (Category 1, 2 and 3) (petrol)
  7. Flammable solids (Category 1 and 2) (nitrocellulose)
  8. Easy reactant (unreacted) substances and mixtures (Type A, B, C, D, E, F, and G) (acetylene)
  9. Pyrophoric liquids (Category 1)
- Pyrophoric substances are spontaneously flammable liquid at normal temperature.



10. Pyrophoric solids (Category 1) and white phosphorus,
11. Easy to become hot substances and mixtures (Category 1 and 2)
12. In contact with water emit gases that are flammable substances and mixtures (Category 1, 2 and 3)  
Calcium carbide
13. Oxidizing liquids (Category 1, 2 and 3)
14. Oxidizing solids (Category 1, 2 and 3)
15. Organic peroxides (Type A, B, C, D, E, F and G) Benzoyl peroxide
16. Corrosive to metals (Category 1)

#### **-10 Human Health Hazards;**

- 1 Acute toxicity (Category 1, 2, 3 and 4)
- 2 Skin corrosive / irritation, (Category 1A, 1B, 1C and 2)
- 3- Serious eye damage / eye irritation, (Category 1 and 2)
- 4-respiratory or skin sensitization (Category 1)
- 5-Germ cell mutagenicity, (Category 1A, 1B and 2)
- 6-Carcinogenic (Category 1A, 1B and 2) (known, which is evidence, not proof)
- 7-toxic to the reproductive system (Category 1A, 1B and 2) plus additional category for effects on lactation or through
- 8-specific target organ toxicity (Bhote) - single exposure ((Category 1, 2) and only for respiratory tract irritation and narcotic effects Category 3)
- 9-specific target organ toxicity (Bhote) - repeated exposure (Category 1 and 2)
- 10-aspiration harmful (Category 1)

#### **-1 Environmental;**

- 1-harmful to the aquatic environment (Acute Category 1, Chronic Category 1,2, 3, and 4)

#### **-1 Ozone Hazards;**

Classified as harmful to the ozone layer

Much less is known about the human health impacts of hazardous chemicals. "Whether a substance is harmful to human health or not" can be understood by using " the health risk assessment" The World Health Organization states determination of methodology on how to determine the effects of chemical substances on human health as problem formulation, hazard identification, hazard characterization, exposure assessment and risk characterization.

#### **Result**

A clean environment is essential for human health and well-being. However, the interactions between the environment and human health are highly complex and difficult to assess. This makes the use of the precautionary principle particularly useful. A clean environment is essential for human health and well-being. However, the interactions between the environment and human health are highly complex and difficult to assess. The World Health Organization (WHO) estimates that more than 25% of the global burden of disease is linked to environmental factors, including exposures to toxic chemicals. Key subjects of environmental health; air pollution, climate change, chemicals, flooding, water, food safety, urban planning, waste and radiation. Pesticides and harmful chemicals cause more than 900,000 deaths annually. (WECF News & Reports) WHO estimates confirmed that air pollution is the world's largest single environmental health risk, attributable to 7 million premature deaths globally in 2012 as a result of the joint effects of outdoor and household air pollution, with 582 000 of those deaths occurring in the European region. Outdoor air pollution and in particular its fine particulate component has recently been classified as carcinogenic to humans (group 1) in terms of human health by IARC Toxic air pollutants are known to cause or are suspected of causing cancer, birth defects, reproduction problems, and other serious illnesses. Exposure to certain levels of some toxic air pollutants can cause difficulty in breathing, nausea or other illnesses. Exposure to certain toxic pollutants can even cause death. Much less is known about the health impacts of chemicals. There is growing concern about the effects of exposure to mixtures of chemicals at low levels and for long periods over our lifetime, in particular during early childhood and pregnancy. Persistent chemicals with long-term effects, such as polychlorinated biphenyls (PCBs) and chlorofluorocarbons (CFCs), and those used in long-life structures -for example construction materials -may present risks even after their production has been phased out. The production and use of chemicals are increasing worldwide. For example, the global output of chemicals increased approximately 10-fold between 1970 and 2010. In this respect, an important trend is being observed: chemical production continues to grow faster in countries that are not members of the Organization for Economic Co-operation and Development (OECD) than in OECD countries, and this trend is expected to continue and even accelerate. OECD estimates that non-OECD countries, which were responsible for about 17% of the global production of chemicals in 1970, will be producing 31% of an even larger world production in 2020.



TURJOEM

The Turkish Journal of Occupational / Environmental  
Medicine and Safety

# The Turkish Journal of Occupational / Environmental Medicine and Safety

Vol:1, Issue Supplement 2

Web: <http://www.turjoem.com>

ISSN : 2149-4711

Oral Presentation

Taking into consideration the principles on human-centered approach, protecting and improving the health of individual health and combating the risk factors forming for human health, raising the quality of life and taking measures for the subjects threatening public health; necessary activities on effects of chemical substances on human health should be done by working in cooperation with related institutions. and by monitoring closely studies being made in international organizations such as European Union, European Chemicals Agency (ECHA), the World Health Organization (WHO), the Chemical Weapons Convention, etc.

**Keywords:** chemical substance, health risk assessment of chemical substances, biocidal products, production permit