

GHS Classification

ID305

Lead dioxide

CAS 1309-60-0

Date Classified: Jul. 24, 2006 (Environmental Hazards: Mar. 31, 2006)

Physical Hazards

Reference Manual: GHS Classification Manual (Feb. 10, 2006)

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
1 Explosives	Not applicable	—	—	—	Containing no chemical groups with explosive properties
2 Flammable gases	Not applicable	—	—	—	Classified as "solid" according to GHS definition
3 Flammable aerosols	Not applicable	—	—	—	Not aerosol products
4 Oxidizing gases	Not applicable	—	—	—	Classified as "solid" according to GHS definition
5 Gases under pressure	Not applicable	—	—	—	Classified as "solid" according to GHS definition
6 Flammable liquids	Not applicable	—	—	—	Classified as "solid" according to GHS definition
7 Flammable solids	Not classified	—	—	—	Non-flammable (ICSC, 2004)
8 Self-reactive substances and mixtures	Not applicable	—	—	—	Containing no chemical groups with explosive or self-reactive properties
9 Pyrophoric liquids	Not applicable	—	—	—	Classified as "solid" according to GHS definition
10 Pyrophoric solids	Not classified	—	—	—	Non-combustible (ICSC, 2004)
11 Self-heating substances and mixtures	Not classified	—	—	—	Non-combustible (ICSC, 2004)
12 Substances and mixtures, which in contact with water, emit flammable gases	Not classified	—	—	—	Stable to water (insoluble, ICSC (2004)).
13 Oxidizing liquids	Not applicable	—	—	—	Classified as "solid" according to GHS definition
14 Oxidizing solids	Category 3	Flame over circle	Warning	May intensify fire; oxidizer	Inorganic compounds containing oxygen which "intensifies combustion of other materials" according to ICSC (2004). Classified into Division 5.1, Packing Group III (UN#1872) (UN Recommendations on the Transport of Dangerous Goods).
15 Organic peroxides	Not applicable	—	—	—	Not organic compounds
16 Corrosive to metals	Classification not possible	—	—	—	Test methods applicable to solid substances are not available

Health Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
1 Acute toxicity (oral)	Classification not possible	—	—	—	No data available
1 Acute toxicity (dermal)	Classification not possible	—	—	—	No data available
1 Acute toxicity (inhalation: gas)	Not applicable	—	—	—	Due to the fact that the substance is "solid" according to the GHS definition and inhalation of its gas is not expected.
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	—	—	—	No data available
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	—	—	—	No data available
2 Skin corrosion / irritation	Category 2	Exclamation mark	Warning	Causes skin irritation	Based on the description in HSDB (2006): "Probably a severe eye, skin, and mucous membrane irritant." The substance is thus considered severely irritating to the skin.
3 Serious eye damage / eye irritation	Category 2A	Exclamation mark	Warning	Causes serious eye irritation	Based on the description in HSDB (2006): "Probably a severe eye, skin, and mucous membrane irritant." The substance is thus considered severely irritating to the eye.
4 Respiratory/skin sensitization	Respiratory sensitization: Classification not possible Skin sensitization: Classification not possible	(Respiratory sensitization) — (Skin sensitization) —	(Respiratory sensitization) — (Skin sensitization) —	(Respiratory sensitization) — (Skin sensitization) —	Respiratory sensitization: No data available Skin sensitization: No data available
5 Germ cell mutagenicity	Classification not possible	—	—	—	Based on the absence of data on multi-generation mutagenicity tests, germ/somatic cell mutagenicity tests in vivo and germ/somatic cell genotoxicity tests in vivo, and no positive data on mutagenicity tests in vitro (several indices), described in NTP DB (Access on February 2006).
6 Carcinogenicity	Category 2	Health hazard	Warning	Suspected of causing cancer	Due to the fact that the substance is classified as Category R by NTP (2005), Group 2B by IARC (1987), Category A3 by ACGIH (2001) and Category 2B by Japan Society for Occupational Health.
7 Toxic to reproduction	Category 1A	Health hazard	Danger	May damage fertility or the unborn child	Based on expert judgment, given the fact that lead has been known to possess developmental neurotoxic and reproductive toxic potentials in humans. As for the health hazards, refer to "ID168, Lead, CAS: 7439-92-1," "ID48, Lead Oxide (II); Litharge, CAS: 1317-36-8," and "ID47, Lead Acetate (II), CAS: 301-04-2."

8	Specific target organs/systemic toxicity following single exposure	Category 1 (blood system, kidneys, nervous system)	Health hazard	Danger	Causes damage to organs (blood system, kidneys, nervous system)	Based on toxicity of inorganic lead compounds. Based on the human evidence: "The effects observed in acute and chronic studies are very similar for inorganic lead compounds. Inhalation or oral ingestion of inorganic lead has been reported to induce oral contraction and thirst, along with nausea, vomiting, upper abdominal discomfort, loss of appetite, abdominal pain and constipation suggesting gastrointestinal toxicity. The effects on hematopoietic function such as hemoglobin synthesis inhibition due to delta-aminolevulinic acid/heme synthetic enzyme inhibition and anemia caused by shortened survival of red blood cells are considered representative of toxic actions of inorganic lead. Kidney effects are evidenced by interstitial nephropathy and decreased urinary output along with proximal renal tubular damage showing Fanconi's syndrome represented by proteinuria, hematuria, urinary cast, glycosuria and aminoaciduria. Inorganic lead adversely affects the central and peripheral nervous systems, displaying in particular weakening of the muscle of the limbs, pain and spasm. There have been rare reports of adults exhibiting ataxia, headache, paresthesia, depression and coma indicative of toxic effects on the central nervous system when exposing to extremely high doses (details not shown). However, children are most sensitive to toxicity of lead, and neurodevelopmental toxicity manifested as restlessness, aggression, concentration difficulties and memory lapse has become serious problem in the
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (blood system, kidneys, nervous system)	Health hazard	Danger	Causes damage to organs through prolonged or repeated exposure (blood system, kidneys, nervous system)	Based on toxicity of inorganic lead compounds. Based on the human evidence: "The effects observed in acute and chronic studies are very similar for inorganic lead compounds. Inhalation or oral ingestion of inorganic lead has been reported to induce oral contraction and thirst, along with nausea, vomiting, upper abdominal discomfort, loss of appetite, abdominal pain and constipation suggesting gastrointestinal toxicity. The effects on hematopoietic function such as hemoglobin synthesis inhibition due to delta-aminolevulinic acid/heme synthetic enzyme inhibition and anemia caused by shortened survival of red blood cells are considered representative of toxic actions of inorganic lead. Kidney effects are evidenced by interstitial nephropathy and decreased urinary output along with proximal renal tubular damage showing Fanconi's syndrome represented by proteinuria, hematuria, urinary cast, glycosuria and aminoaciduria. Inorganic lead adversely affects the central and peripheral nervous systems, displaying in particular weakening of the muscle of the limbs, pain and spasm. There have been rare reports of adults exhibiting ataxia, headache, paresthesia, depression and coma indicative of toxic effects on the central nervous system when exposing to extremely high doses (details not shown). However, children are most sensitive to toxicity of lead, and neurodevelopmental toxicity manifested as restlessness, aggression, concentration difficulties and memory lapse has become serious problem in the
10	Aspiration hazard	Classification not possible	-	-	-	No data available

Environmental Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
11 Hazardous to the aquatic environment (acute)	Classification not possible	-	-	-	No data available
11 Hazardous to the aquatic environment (chronic)	Classification not possible	-	-	-	No data available