

GHS Classification

ID55

Diarsenic trioxide

CAS 1327-53-3

Date Classified: Mar. 23, 2006 (Environmental Hazards: Feb. 10, 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 atom 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,1999)
8 Self-reactive substances and mixtures	Not applicable	—	—	—	Containing no atom 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,1999)
11 Self-heating substances and mixtures	Not classified	—	—	—	Non-combustible (ICSC,1999)
12 Substances and mixtures, which in contact with water, emit flammable gases	Not classified	—	—	—	Stable to water – water solubility: 1.2 – 3.7g/100mL (20degC). (ICSC, 1999)
13 Oxidizing liquids	Not applicable	—	—	—	Classified as "solid" according to GHS definition
14 Oxidizing solids	Not classified	—	—	—	No data available, though being inorganic compounds containing oxygen. Classified into Category 6.1 (UN#1561) by 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)	Category 2	Skull and crossbones	Danger	Fatal if swallowed	Based on the LD50 value of 25mg/kg calculated from the testing data of rat LD50 (oral route) of 20mg/kg, 188mg/kg and 385mg/kg (EHC 224, 2001).
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
2 Skin corrosion / irritation	Classification not possible	—	—	—	No data available
3 Serious eye damage / eye irritation	Category 2A-2B	Exclamation mark	Warning	Causes strong eye irritation	Based on the evidence of "eyelid edema and corneal injury and opacity" (CERI Hazard Data 2001-8, 2001) from the rabbit skin irritation test, although the substance should be placed in Category 2A from the viewpoint of safety.
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	Category 2	Health hazard	Warning	Suspected of causing genetic defects	Based on negative data on heritable mutagenicity tests (dominant lethal tests) and germ cell mutagenicity tests in vivo (chromosome aberration tests), positive data on somatic cell mutagenicity tests in vivo (chromosome aberration tests) and the absence of data on germ cell genotoxicity tests in vivo, described in CERI Hazard Data 2001-8 (2002), Recommendations by Japan Society of Occupational Health (2000), and DFGOT Vol. 21 (2005). It should be noted, however, that the positive data on the chromosome aberration tests are based on epidemiological studies, and the substances concerned are not identified.
6 Carcinogenicity	Category 1A	Health hazard	Danger	May cause cancer	Due to the fact that the substance is classified as Category K (as arsenic compounds and inorganics) by NTP (2005), Group 1 (as arsenic and arsenic compounds) by IARC (1987) and Category 1 (as arsenic and arsenic compounds) by the Japan Society of Occupational Health.
7 Toxic to reproduction	Category 1A	Health hazard	Danger	May damage fertility or the unborn child	Based on the correlation between arsenic exposure and adverse effects on reproductive capacity (increased mortality of foetuses, newborns and children, a decrease in birthweights, an increased incidence of natural abortion, stillbirth and congenital malformation) observed in several epidemiological studies, the evidence of malformations in foetuses including cranioschisis and renal defect at dosing levels not toxic to dams in Syrian hamster teratogenicity tests, and the evidence of a decreased number of foetuses and skeletal malformations (although no data are available on toxicity to dams) in rat teratogenicity tests, described in CERI Hazard Data 2001-8 (2002) and EHC 224 (2001). It should be noted, however, that the results of the epidemiological studies do not provide sufficient information on confounding factors.
8 Specific target organs/systemic toxicity following single exposure	Category 1 (alimentary canal, heart, skeletal muscles, respiratory organs)	Health hazard	Danger	Causes damage to organs (gastrointestinal tract, heart, skeletal muscles, respiratory	Based on the human evidence including "severe digestive symptoms associated with vomiting and diarrhea, muscle spasm, cardiac abnormalities", nasal mucous membrane irritation (occasionally developing into nasal septum defect), pharynx and respiratory irritation" (IARC 23, 2004) and the evidence from animal studies including "dry vomiting and intestinal hemorrhage" (EHC 224, 2001).

9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (central/peripheral nervous system, immune system, respiratory organs, liver, kidneys, skin, blood vessels)	Health hazard	Danger	Causes damage to organs (central and peripheral nervous systems, immune system, respiratory organs, liver, kidneys, skin, blood vessels) through prolonged or	Based on the human evidence including "marked decrease in lymphocyte counts", "enlargement of the liver, loss of appetite, upper respiratory symptoms, skin lesion, peripheral neuropathy", "apparent damage to the liver and kidneys" (IARC 23, 2004), "gangrene caused by peripheral vascular disorder, a Taiwan case of black foot disease induced by exposure to 20g of the substance in total over several years, calculated as arsenic" and "irritation to the surface of the body, skin, conjunctiva and nasal mucous membrane reported as effects of diarsenic trioxide" (CERI Hazard Data 2001-8, 2002) and the evidence from animal studies including "dehairing, eczema, squamous hyperplasia in the epidermis, hyperkeratosis, skin ulcer, incrustation" and "metaplasia in alveolar, tract and bronchial epithelia". The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1.
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)	Category 3	—	—	Harmful to aquatic life	It was classified into Category 3 from 96 hours LC50=20.2mg/L of the fish (Rainbow Trout) (CERI Hazard Data, 2002).
11 Hazardous to the aquatic environment (chronic)	Category 3	—	—	Harmful to aquatic life with long lasting effects	Although acute toxicity was Category 5 and bio-accumulation was low (BCF=5 (Existing Chemical Safety Inspections Data)), since it was a metallic compound and the underwater action was unknown, it was classified into Category 3.