GHS Classification

ID33 2,4-Dinitrotoluene

CAS 121-14-2 Date Classified: Apr. 20, 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 classified	-	-	-	Because of a lack of data on the kick-off temperature and decomposition energy (though the substance contains nitro groups, with its oxygen budget calculated at -144). Classified into Divisiton 6.1 (UN#1600 dinitrotoluene (molten)) (UN Recommendations on the Transport of Dangerous Goods). Commercial dinitrotoluene, which contains about 20% of 2,6-dinitrotoluene, starts to decompose at 250degC -- a process that continues at 280degC (Bretherick (J), 5th, 1998). The decomposition energy stands at about 85% of that of TNT (2,4,6-trinitrotoluene) (5.1kJ/g) (Bretherick (J), 5th, 1998), according to some reports.
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	-	-	-	Classified into Division 6.1 (UN#1600 dinitrotoluene (molten)) (UN Recommendations on the Transport of Dangerous Goods)
8	Self-reactive substances and mixtures	Not classified	-	-	-	Classified into Division 6.1 (UN#1600 dinitrotoluene (molten)) (UN Recommendations on the Transport of Dangerous Goods)
9	Pyrophoric liquids	Not applicable	-	-	-	Classified as "solid" according to GHS definition
10	Pyrophoric solids	Not classified	-	-	-	Classified into Division 6.1 (UN#1600 dinitrotoluene (molten)) (UN Recommendations on the Transport of Dangerous Goods)
11	Self-heating substances and mixtures	Classification not possible	-	-	-	Test methods applicable to liquid substances are not available - melting point: 71degC (ICSC, 1999), test temperature: 140degC
12	Substances and mixtures, which in contact with water, emit flammable gases	Not applicable	-	-	-	Containing no metals or metalloids (B, Si, P, Ge, As, Se, Sn, Sb, Te, Bi, Po, At)
13	Oxidizing liquids	Not applicable	-	-	-	Classified as "solid" according to GHS definition
14	Oxidizing solids	Not classified	-	-	-	No data available, though being organic compounds containing oxygen bound to carbon and hydrogen. Classified into Division 6.1 (UN#1600 dinitrotoluene (molten)) (UN Recommendations on the Transport of Dangerous Goods)
15	Organic peroxides	Not applicable	-	-	-	Organic compounds containing no "-O-O-" structure
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 4	Exclamation mark	Warning	Harmful if swallowed	Based on the LD50 value of 324mg/kg calculated from the testing data of rat LD50 (oral route) of 268mg/kg (IUCLID (2000)), 568mg/kg (IUCLID (2000)), 650 mg/kg (IUCLID (2000)), 268 mg/kg (IUCLID (2000)), 270 mg/kg (IUCLID (2000)), 893 mg/kg (IUCLID (2000)), 400 mg/kg (IUCLID (2000))
1	Acute toxicity (dermal)	Classification not possible	-	-	-	Insufficient data available
1	Acute toxicity (inhalation: gas)	Not applicable	-	-	-	Due to the fact that the substance is "solid" according to the GHS definition.
1	Acute toxicity (inhalation:	Classification not possible	-	-	-	No data available
1	Acute toxicity (inhalation: dust, mist)	Classification not possible	-	-	-	No data available
2	Skin corrosion / irritation	Category 3	-	Warning	Causes mild skin irritation	Based on the description in the report on rabbit skin irritation tests (CERI-NITE Hazard Assessment No.51 (2004)): "mild irritation" (though exposure time is unknown).
3	Serious eye damage / eye irritation	Not classified	-	-	-	Based on the description in the report on rabbit skin irritation tests (CERI-NITE Hazard Assessment No.51 (2004)): "mild irritation" (though exposure time is unknown).
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: Insufficient data available
5	Germ cell mutagenicity	Category 2	Health hazard	Warning	Suspected of causing genetic defects	Based on negative data on multi-generation mutagenicity tests (dominant lethal tests), the absence of data on germ cell mutagenicity tests in vivo, positive data on somatic cell mutagenicity tests in vivo (micronucleus tests) and the absence of data on germ cell genotoxicity tests in vivo, described in CERI-NITE Hazard Assessment No.51 (2004).
6	Carcinogenicity	Category 2	Health hazard	Warning	Suspected of causing cancer	Due to the fact that the substance is classified as Group 2B by IARC (1996).
7	Toxic to reproduction	Category 2	Health hazard	Warning	Suspected of damaging fertility or the unborn child	Based on the description in CERI-NITE Hazard Assessment No.51 (2004): The results of rat 3-generation reproduction studies suggest a decrease in the survival rate of newborns at dose levels toxic to parent animals; those of tests on male genital organs suggest atrophy of seminiferous tubules and severe spermatogenic disorder at dose levels causing adverse effects on body weight gain.

8	Specific target organs/systemic toxicity following single exposure	Classification not possible	-	-	-	Classification not possible, because of a lack of data, although specific target organs appear to be the blood and nervous systems, based on the evidence from animal studies including "cyanosis and dystonia, with rats showing higher sensitivity to lethal action than mice" (ATSDR 1998). Refer to GHS classification of "a mixture with dinitrotoluene isomers containing more than 70% of dinitrotoluene" (CAS#25321-14-6) made by the program. Commercial dinitrotoluene contains about 75% of 2,4- dinitrotoluene and 20% of 2,6- dinitrotoluene (CERI-NITE Hazard Assessment No.51
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (liver, blood, nervous system, testes)	Health hazard	Danger	Causes damage to organs through prolonged or repeated exposure (liver, blood, nervous system, testes)	Based on the evidence from animal studies including "hepatocellular degeneration, hyperplasia of the bile duct epithelium, methemoglobinemia, anemia, demyelination of the brain stem and cerebellum, neuropathy, atrophy of testes" (CERI-NITE Hazard Assessment No.51 (2004)). The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1. Refer to GHS classification of "a mixture with dinitrotoluene isomers containing more than 70% of dinitrotoluene" (CAS#25321-14-6) made by the program. Commercial dinitrotoluene contains about 75% of 2,4- dinitrotoluene and 20% of 2,6- dinitrotoluene (CERI-NITE Hazard Assessment No.51 (2004)).
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 1	Environment	Warning	Very toxic to aquatic life	It was classified into Category 1 from 96 hours EC50=0.91mg/L of the algae (Chlorella) (CERI/NITE Hazard Assessment Report, 2004).
11	Hazardous to the aquatic environment (chronic)	Category 1	Environment	Warning	Very toxic to aquatic life with long lasting effects	Although acute toxicity is Category 1 and bio-accumulation is low (log Kow=1.98(PHYSPROP Database, 2005)), since there was no rapidly degrading (the decomposition of dinitrotoluene by BOD: 0%(Existing Chemical Safety Inspections Data)), it was classified into Category 1.