

## GHS Classification

**ID924**

**2-Furaldehyde**

**CAS 98-01-1**

Date Classified: May 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	-	-	-	There are no chemical groups associated with explosive properties present in the molecules.
2 Flammable gases	Not applicable	-	-	-	Liquid (GHS definition)
3 Flammable aerosols	Not applicable	-	-	-	Not aerosol products
4 Oxidizing gases	Not applicable	-	-	-	Liquid (GHS definition)
5 Gases under pressure	Not applicable	-	-	-	Liquid (GHS definition)
6 Flammable liquids	Classification not possible (Category 3 or Category 4)	Flame	Warning	Flammable liquid and vapour; Combustible liquid	There is data of with 60 degC which is a boundary value between Category 3 and 4. Therefore, if the flash point is not measured with a real sample, it cannot be judged. The acceptance criteria are as follows: Category 3: 23 degC<= flash point <=60 degC; Category4: 60 degC< flash point <=93 degC
7 Flammable solids	Not applicable	-	-	-	Liquid (GHS definition)
8 Self-reactive substances and mixtures	Not applicable	-	-	-	There are no chemical groups associated with explosive or self-reactive properties present in the molecule.
9 Pyrophoric liquids	Not classified	-	-	-	Flash point: 315degC (ICSC (J), 1998)
10 Pyrophoric solids	Not applicable	-	-	-	Liquid (GHS definition)
11 Self-heating substances and mixtures	Classification not possible	-	-	-	Test methods applicable to liquid substances are not available
12 Substances and mixtures, which in contact with water, emit flammable gases	Not applicable	-	-	-	The chemical structure of the substance does not contain metals or metalloids(B, Si, P, Ge, As, Se, Sn, Sb, Te, Bi, Po, At).
13 Oxidizing liquids	Not applicable	-	-	-	Organic compounds containing oxygen (but not chlorine and fluorine) chemically bonded only to carbon and hydrogen (but not to other elements).
14 Oxidizing solids	Not applicable	-	-	-	Liquid (GHS definition)
15 Organic peroxides	Not applicable	-	-	-	Containing no -O-O- structure
16 Corrosive to metals	Not classified	-	-	-	UNRTDG Class: 6.1, Subsidiary risks Class: 3

## Health Hazards

Hazard class	Classification	symbol	signal word	hazard statement	Rational for the classification
1 Acute toxicity (oral)	Category 3	Skull and crossbones	Danger	Toxic if swallowed	Calculated based on the following values: Rat LD50 value: 122 to 158mg/kg (CICAD 21, 2000), about 125mg/kg (DFGOT vol.9, 1998), 50 - 149mg/kg (EU-RAR, 2004), and 149mg/kg (PATTY 4th, 1994) and 50 - 100 mg/kg (PATTY 4th, 1994, Advice of Sanei Society, 1993). Since the calculated values was 86.1mg/kg, it was classified to category 3.
1 Acute toxicity (dermal)	Category 3	Skull and crossbones	Danger	Toxic in contact with skin	It was set as Category 3 based on rabbit LD50 value: >310mg/kg (EU-RAR, 2004) and between 500 and 1000mg/kg (PATTY 4th, 1994).
1 Acute toxicity (inhalation: gas)	Not applicable	-	-	-	Liquid (GHS definition)
1 Acute toxicity (inhalation: vapour)	Category 2	Skull and crossbones	Danger	Fatal if inhaled	Calculated ased on rat LC50 (1 hour) : 189ppm (4-hour equivalent: 0.371mg/kg) (CICAD 21, 2000, DFGOT vol.9, 1998), 1037ppm (4-hour equivalent: 2.033mg/L) (CICAD 21, 2000), 995ppm (4-hour equivalent 1.95mg/L) (DFGOT vol.9, 1998), 4.075mg/L (4-hour equivalent: 2.038mg/L) (EU-RAR, 2004); and LC50 (4 hours): 235ppm (equivalent: 0.922mg/L) (CICAD 21, 2000, DFGOT vol.9, 1998, EU-RAR, 2004) and 0.6mg/L (EU-RAR, 2004). The calculated value was 0.8005mg/L (converted value of 204ppm). This is considered to steam with almost no mist from vapor pressure, and it was classified as Category 2 by the ppm concentration standard.
1 Acute toxicity (inhalation: dust, mist)	Classification not possible	-	-	-	No data available
2 Skin corrosion / irritation	Category 2	Exclamation mark	Warning	Causes skin irritation	There is description that irritation was not acknowledged by 12-hour apply on skin of rabbits (CICAD 21 (2000) and EU-RAR (2004)). But from description that irritation was acknowledged by 24-hour apply on the skin of the rabbit (EU-RAR (2004)), and from description that the skin was stimulated as affect of the humans (IARC 63 (1995), Occupational Health Recommendation of Occupational Exposure Limits (1993), and PATTY (4th, 1994)), it was set as Category 2 .
3 Serious eye damage / eye irritation	Category 2A	Exclamation mark	Warning	Causes serious eye irritation	Although stimulativeness, such as corneal opacity, was acknowledged in the eyes of the rabbits, the ocular change recovered nine days after (EU-RAR (2004), CICADS 21 (2000)). So we classified it as Category 2A.
4 Respiratory/skin sensitization	Respiratory sensitization: Classification not possible; Skin sensitization: Not possible	-	-	-	Respiratory organ: No data. Skin : Based on the description that sensitizing was not acknowledged in Buehler test and Maximization test using the guinea pigs of EU-RAR (2004), and the description that sensitizing was not acknowledged in Maximization test for the human of DFGOT (vol.18, 2002), and since it was concluded that there was no skin sensitization property in EU-RAR (2004), we classified it to be Out Of Category.

5	Germ cell mutagenicity	Not classified	-	-	-	There is a negative result (DFGOT vol.9, 1998, EU-RAR, 2004, IARC 63, 1995, NTP TR382, 1990) in the chromosome aberration test using the mouse marrow cells, which are the in vivo mutagenicity tests using a somatic. So it carried out outside of Category.
6	Carcinogenicity	Category 2	Health hazard	Warning	Suspected of causing cancer (state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard)	It was classified into the group 3 (IARC 63, 1995) in IARC. But it was classified into A3 (ACGIH 7th, 2001) in ACGIH, and category 3 (EU-RAR, 2004) in EU in 2003. So it was considered as Category 2 according to EU which is latest assessment document.
7	Toxic to reproduction	Not classified	-	-	-	It was considered as out of category based on the description that specific reproductive toxicity was not observed at the dose in which general toxicity is observed in parental animals in an oral administration study during the pregnancy using the rat (EU-RAR (2004)), and test that the oral administration toxicity in rat and mouse for two years and a carcinogenicity test, and the 13-week inhalation exposure test in a hamster, etc, in any study, effect was not observed in the genital tract of both sex. In addition, the CMR working groups of EU estimates that furfural should not be classified into a Reproductive toxic substances (EU-RAR (2004)).
8	Specific target organs/systemic toxicity following single exposure	Category 1 (respiratory organs, liver)	Health hazard	Danger	Cause damage to organs (respiratory organs, liver)	As in CICAD 21 (2000), ACGIH (7th, 2001), DFGOT (vol.9, 1998), EU-RAR (2004), PATTY (4th, 1994) and Society for Occupational Health Recommendation of Occupational Exposure (1993), description that respiratory irritation was seen in human exposure, description in CICAD 21 (2000) and IARC 63 (1995) that pulmonary edemas was seen in exposure of the guidance value range of Category 1 in the inhalation exposure test using rats, and description in DFGOT (vol.9, 1998) and EU-RAR (2004) that the affects on liver was seen with the given dose of the guidance value range of Category 1 in the oral administration study using rats Category .So it was set as Category 1 (respiratory tracts, liver).
9	Specific target organs/systemic toxicity following repeated exposure	Category 1 (respiratory organs); Category 2 (liver)	Health hazard	Danger; Warning	Causes damage to organs (respiratory organs) through prolonged or repeated exposure; May cause damage to organs (liver) through prolonged or repeated exposure	It was classified into Category 1 (respiratory tracts) based on the descriptions that effects on lungs were observed in the range of guidance value of Category 1 in the inhalation exposure test using the rat (CICAD 21 (2000), DFGOT (vol.9, 1998), and IARC 63 (1995)). Moreover, we categorize it as Category 2 (liver) based on the descriptions that the effects on the liver was observed with the dosage of the guidance value range of Category 2 in the oral study using the rat (CICAD 21 (2000), DFGOT (vol.9, 1998), EU-RAR (2004), IARC 63 (1995), IRIS (2005), NTP TR382 (1990)).
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-hour LC50=16mg/L of fishes (Bluegill) (CICAD21, 2000).
11 Hazardous to the aquatic environment (chronic)	Not classified	-	-	-	Since rapidly degrading (BOD: 93.5% (existing chemical safety inspections data)), and less bio-accumulative (log Kow=0.41 (PHYSPROP Database, 2005)).