1.1 GENERAL SUBSTANCE INFORMATION

A. Type of Substance

element [ ]; inorganic[ ]; natural substanc [ ]; organic[**X**]; organometallic [ ]; petroleum product [ ]

B. Physical State *(at 20°C and 1.013 hPa)*

gaseous [ ]; liquid [ ]; solid [**X**]

C. Purity 99.7 %

1.2 SYNONYMS

sym-Triazine-2,4,6-triol; sym-Triazinetriol; normal Cyanuric acid; 2,4,6-Trihydroxy-1,3,5-triazine; Trihydroxycyanidine; Tricyanic acid; Pseudocyanuric acid; 1,3,5-Triazine-2,4,6(1H,3H,5H)-trione; 1,3,5-Triazine-2,4,6-triol; 1,3,5-Triazinetriol; 1,3,5-Triazinetrione; Tricarbimide; Trihydroxy-1,3,5-triazine

1.3 IMPURITIES

None

1.4 ADDITIVES

None

*1.5 QUANTITY

Remarks: 20,000 tonnes/year
Reference: MITI, Japan

1.6 LABELLING AND CLASSIFICATION

None

*1.7 USE PATTERN

A. General

Type of Use:	**Category:**
main	Intermediate
industrial	Intermediate in closed system
use	Intermediate for various chemicals

Remarks: None
Reference: MITI, Japan

1.8 OCCUPATIONAL EXPOSURE LIMIT

None

* 1.9 SOURCES OF EXPOSURE

In Japan, isocyanuric acid is produced in 2 companies.

Source:	Media of release:	River
	Quantities per media:	407.7 tonnes/year
Remarks:		
Reference:	MITI, Japan	

2. PHYSICAL-CHEMICAL DATA

*2.1 MELTING POINT

Value:	330 °C
Decomposition:	Yes [X] No [ ] Ambiguous [ ]
Sublimation:	Yes [ ] No [X] Ambiguous [ ]
Method:	
GLP:	Yes [ ] No [X] ? [ ]
Remarks:	
Reference:	Organic Chemical Dictionary

*2.2 BOILING POINT

Value:	not measurable
Pressure:	
Decomposition:	Yes [ ] No [X] Ambiguous [ ]
Method:	
GLP:	Yes [ ] No [X] ? [ ]
Remarks:	
Reference:	MITI, Japan

*2.4 VAPOUR PRESSURE

Value:	$< 5.0 \times 10^{-3}$ Pa
Temperature:	25 °C
Method:	calculated [ ]; measured [X] OECD TG 104
GLP:	Yes [X] No [ ] ? [ ]
Test substance:	purity: 99.9 %
Remarks:	
Reference:	MITI, Japan

*2.5 PARTITION COEFFICIENT $\log_{10} P_{ow}$

Log Pow:	< 0.3
Temperature:	25 °C

Method:	calculated [ ]; measured [X] OECD TG 107 HPLC method
GLP:	Yes [X] No [ ] ? [ ]
Test substance:	purity: 99.9 %
Remarks:	
Reference:	MITI, Japan

***2.6 WATER SOLUBILITY**

A. Solubility

Value:	2.7 g/l
Temperature:	25 °C
Description:	Miscible [ ]; Of very high solubility [X]; Soluble [ ]; Slightly soluble [ ]; Of low solubility [ ]; Of very low solubility [ ]; Not soluble [ ]
Method:	OECD TG 105
GLP:	Yes [X] No [ ] ? [ ]
Test substance:	purity: 99.9 %
Remarks:	
Reference:	MITI, Japan

B. pH Value, pKa Value

Value:	$pK_1 = 6.88$ $pK_2 = 11.40$ $pK_3 = 13.50$
Reference:	Merck Index

3. ENVIRONMENTAL FATE AND PATHWAYS

3.1 STABILITY

***3.1.2 STABILITY IN WATER**

Type:	Abiotic (hydrolysis) [X]; biotic (sediment)[ ]
Half life:	Stable in pH 4, 7, 9 at 25 °C
Method:	OECD TG 111
GLP:	Yes [X] No [ ] ? [ ]
Test substance:	purity: 99.9 %
Remarks:	
Reference:	MITI, Japan

***3.2 MONITORING DATA (ENVIRONMENTAL)**

(a)

Type of Measurement:	Background [ ]; At contaminated site [ ]; Other [X]
Media:	Surface water (lake)
Results:	ND (Detection limits: 0.002 mg/l) in 3 areas in Japan as of 1983

Remarks: ND: Not detected
Reference: Chemicals in the environment, EA, Japan (1984)

(b)
Type of Measurement: Background [ ]; At contaminated site [ ]; Other [X]
Media: Surface water (estuary)
Results: ND (Detection limits: 0.004 mg/l) in 1 area in Japan as of 1983
Remarks: ND: Not detected
Reference: Chemicals in the environment, EA, Japan (1984)

(c)
Type of Measurement: Background [ ]; At contaminated site [ ]; Other [X]
Media: Surface water (sea)
Results: ND (Detection limits: 0.002 - 0.004 mg/l) in 6 areas in Japan as of 1983
Remarks: ND: Not detected
Reference: Chemicals in the environment, EA, Japan (1984)

(d)
Type of Measurement: Background [ ]; At contaminated site [ ]; Other [X]
Media: Sediment (lake)
Results: ND (Detection limits: 0.12 - 0.24 mg/kg-dry) in 3 areas in Japan as of 1983
Remarks: ND: Not detected
Reference: Chemicals in the environment, EA, Japan (1984)

(e)
Type of Measurement: Background [ ]; At contaminated site [ ]; Other [X]
Media: Sediment (estuary)
Results: ND (Detection limit: 0.09 mg/kg-dry) in 1 area in Japan as of 1983
Remarks: ND: Not detected
Reference: Chemicals in the environment, EA, Japan (1984)

(f)
Type of Measurement: Background [ ]; At contaminated site [ ]; Other [X]
Media: Sediment (sea)
Results: ND (Detection limit: 0.025 - 0.15 mg/kg-dry) in 6 areas in Japan as of 1983
Remarks: ND: Not detected
Reference: Chemicals in the environment, EA, Japan (1984)

3.3 TRANSPORT AND DISTRIBUTION BETWEEN ENVIRONMENTAL COMPARTMENTS INCLUDING ESTIMATED ENVIRONMENTAL CONCENTRATIONS AND DISTRIBUTION

*3.3.2 THEORETICAL DISTRIBUTION (FUGACITY CALCULATION)

Media: Air-biota [ ]; Air-biota-sediment-soil-water [X]; Soil-biota [ ]; Water-air [ ]; Water-biota [ ]; Water-soil [ ]; Other [ ]

Method: Fugacity level I [ ]; Fugacity level II [ ]; Fugacity level III **[X]**; Fugacity level IV [ ]; Other (calculation) [ ]; Other (measurement)[ ]

Results:

Compartment	Release 100% to air	Release 100% to water	Release 100% to soil
Air	0.1 %	0.0 %	0.0 %
Water	46.5 %	99.6 %	40.5 %
Soil	53.3 %	0.0 %	59.3 %
Sediment	0.2 %	0.4 %	0.2 %

Remarks: Appendix 1
Reference: MITI. Japan

*3.5 BIODEGRADATION

Type: aerobic **[X]**; anaerobic [ ]
Inoculum: adapted [ ]; non-adapted **[X]**;
Concentration of the chemical: related to COD [ ]; DOC [ ]; test substance **[X]**
Medium: water **[X]**; water-sediment [ ]; soil [ ]; sewage treatment [ ]
Degradation: 0 % by BOD after 14 days
7.8 % by TOC after 14 days
5.3 % by HPLC after 14 days
Results: readily biodeg. [ ]; inherently biodeg. [ ]; under test condition no biodegradation observed **[X]**, other [ ]
Method: OECD TG 301C
GLP: Yes **[X]** No [ ] ? [ ]
Test substance: purity: 99.9 %
Reference: MITI, Japan

3.7 BIOACCUMULATION

Species: Carp (*Cyprinus carpio*)
Exposure period: 6 weeks
Temperature: 25 °C
Concentration: (1) 10 mg/L
(2) 1 mg/L
BCF: (1) < 0.1
(2) < 0.5
Method: OECD TG 305C
Type of test: calculated [ ]; measured **[X]**
static[ ]; semi-static[ ]; flow-through**[X]**; other*(e.g. field test)*[ ]
GLP: Yes **[X]** No [ ] ? [ ]
Test substance: purity: 99.9 %
Remarks:
Reference: MITI, Japan

4. ECOTOXICITY

*4.1 ACUTE/PROLONGED TOXICITY TO FISH

(a)

Type of test:	static [ ]; semi-static [X]; flow-through [ ]; other *(e.g. field test)* [ ] open-system [X]; closed-system [ ]
Species:	*Oryzias latipes* (Himedaka)
Exposure period:	96 h
Results:	LC_{50} (96h) > 100 mg/l
Analytical monitoring:	Yes [X] No [ ] ? [ ]
Method:	OECD TG 203 (1992)
GLP:	Yes [X] No [ ] ? [ ]
Test substance:	As prescribed by 1.1 - 1.4, purity: 99.7 %
Remarks:	Groups of 10 Himedaka were exposed to the nominal concentrations of 6.25, 12.5, 25, 50 and 100 mg/l and laboratory water control. Solubilizer was not used. Concentrations of the test substance were kept close to the nominal concentrations (99.5 to 103 %).
Reference:	Environment Agency of Japan (1996)

(b)

Type of test:	static [ ]; semi-static[ ]; flow-through [X]; other *(e.g. field test)* [ ] open-system [X]; closed-system [ ]
Species:	*Oryzias latipes* (Himedaka)
Exposure period:	14 d
Results:	LC_{50} (14d) > 100 mg/l
Analytical monitoring:	Yes [X] No [ ] ? [ ]
Method:	OECD TG 203 (1992)
GLP:	Yes [X] No [ ] ? [ ]
Test substance:	As prescribed by 1.1 - 1.4, purity: 99.7 %
Remarks:	Groups of 10 Himedaka were exposed to the nominal concentrations of 10, 32 and 100 mg/l and laboratory water control. Solubilizer was not used. Concentrations of the test substance were kept close to the nominal concentrations throughout the 14-d test (99 to 102 %).
Reference:	Environment Agency of Japan (1996)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

*A. Daphnia

Type of test:	static [X]; semi-static [ ]; flow-through [ ]; other*(e.g. field test)*[ ]; open-system [X]; closed-system [ ]
Species:	*Daphnia magna.*
Exposure period:	48 h
Results:	EC_{50} (48h) = 1000 mg/l
Analytical monitoring:	Yes [X] No [ ] ? [ ]
Method:	OECD TG 202
GLP:	Yes [X] No [ ] ? [ ]
Test substance:	As prescribed by 1.1 - 1.4, purity: 99.7 %

Remarks:	20 daphnids (4 replicates; 5 organisms per replicate) were exposed to measured concentrations of 100, 180, 320, 580 and 1000 mg/l and laboratory water control. Solubilizer was not used. Concentrations of the test substance were kept close to the nominal concentrations throughout the 48-h test (99.2 to 103.0 %).
Reference:	Environment Agency of Japan (1996)

*4.3 TOXICITY TO AQUATIC PLANTS, e.g. algae

Species:	*Selenastrum capricornutum* ATCC 22662
Endpoint:	Biomass [X]; Growth rate [ ]; Other [ ]
Exposure period:	72 h
Results:	Biomass $EC_{50\ (72h)}$ = 620 mg/l *(Endpoint)* NOEC = 62.5 mg/l
Analytical monitoring:	Yes [X] No [ ] ? [ ]
Method:	OECD TG 201 (1984) open-system [ ]; closed-system [X]
GLP:	Yes [X] No [ ] ? [ ]
Test substance:	As prescribed by 1.1 - 1.4, purity: 99.7 %
Remarks:	Static test. The EC_{50} value for biomass was calculated based on the measured concentrations of the nominal concentrations 62.5, 125, 250, 500 and 1000 mg/l. No solubilizer was used. Concentrations of the test substance were kept close to the nominal concentrations throughout the 72-h test (98 to 105 %).
Reference:	Environment Agency of Japan (1996)

4.4 TOXICITY TO BACTERIA

No data

4.5 CHRONIC TOXICITY TO AQUATIC ORGANISMS

4.5.1 CHRONIC TOXICITY TO FISH

(*)4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

Type of test:	static [ ]; semi-static [X]; flow-through [ ]; other *(e.g. field test)* [ ]; open-system [X]; closed-system [ ]
Species:	*Daphnia magna*
Endpoint:	Mortality [ ]; Reproduction rate [X]; Other [X]
Exposure period:	21 d
Results:	Reproduction rate: $EC_{50\ (21\ d)}$ = 65.9 mg/l *(Endpoint)* NOEC = 32.0 mg/l
Analytical monitoring:	Yes [X] No [ ] ? [ ]
Method:	OECD TG 202(1984)
GLP:	Yes [X] No [ ] ? [ ]
Test substance:	As prescribed by 1.1 - 1.4, purity: 99.7 %
Remarks:	40 daphnids (4 replicate; 10 daphnids per replicate) were exposed to the nominal concentrations of 1.0, 3.2, 10, 32 and 100 mg/l and laboratory water control (dechlorinated tap water).

Concentrations of the test substance were kept close to the nominal concentrations throughout the 21-d test (95 to 103 %). The test water was renewaled every 2 or 3 days.

Reference: Environment Agency of Japan (1996)

4.6 TOXICITY TO TERRESTRIAL ORGANISMS

4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

No data

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

No data

4.6.3 TOXICITY TO OTHER NON MAMMALIAN TERRESTRIAL SPECIES (INCLUDING AVIAN)

No data

4.7 BIOLOGICAL EFFECTS MONITORING (INCLUDING BIOMAGNIFICATION)

No data

4.8 BIOTRANSFORMATION AND KINETICS

No data

4.9 ADDITIONAL REMARKS

None

5. TOXICITY

*5.1 ACUTE TOXICITY

5.1.1 ACUTE ORAL TOXICITY

(a)	Type:	LD_0 [ ]; LD_{100} [ ]; LD_{50} [X]; LDL_0 [ ]; Other [ ]
	Species/strain:	Rats/albino
	Value:	7,700 mg/kg b.w.
	Method:	Other
	GLP:	Yes [ ] No [X] ? [ ]
	Test substance:	purity: unknown
	Remarks:	
	Reference:	Babayan & Aleksandryan: 1985
(b)	Type:	LD_0 [ ]; LD_{100} [ ]; LD_{50} [X]; LDL_0 [ ]; Other [ ]
	Species/strain:	Rats
	Value:	> 7,500 mg/kg b.w.

Method: Other
GLP: Yes [ ] No [X] ? [ ]
Test substance: Sodium isocyanurate, purity: unknown
Remarks:
Reference: *Gigiena i Sanitariya*: 1962

(c) Type: LD_0 [ ]; LD_{100} [ ]; LD_{50} [X]; LDL_0 [ ]; Other [ ]
Species/strain: Mice
Value: 3,400 mg/kg b.w.
Method: Other
GLP: Yes [ ] No [X] ? [ ]
Test substance: purity: unknown
Remarks:
Reference: Babayan & Aleksandryan: 1985

(d) Type: LD_0 [ ]; LD_{100} [ ]; LD_{50} [ ]; LDL_0 [X]; Other [ ]
Species/strain: Rabbits
Value: > 10 g/kg b.w.
Method: Other
GLP: Yes [ ] No [X] ? [ ]
Test substance: purity: unknown
Remarks:
Reference: Toxicity Information: 1972

5.1.2 ACUTE INHALATION TOXICITY

Type: LC_0 [ ]; LC_{100} [ ]; LC_{50} [ ]; LCL_0 [ ]; Other [X]
Species/strain: Rats
Exposure time: not indicated
Value: 612 mg/m^3
Method: Other
GLP: Yes [ ] No [X] ? [ ]
Test substance: As an aerosol, purity: unknown
Remarks: Minimum toxic concentration
Reference: Babayan & Aleksandryan: 1985

5.1.3 ACUTE DERMAL TOXICITY

Type: LD_0 [ ]; LD_{100} [ ]; LD_{50} [X]; LDL_0 [ ]; Other [ ]
Species/strain: Rabbits
Value: > 7,940 mg/kg b.w.
Method: Other
GLP: Yes [ ] No [X] ? [ ]
Test substance: purity: unknown
Remarks:
Reference: Toxikologische Bewertung: 1993

5.1.4 ACUTE TOXICITY, OTHER ROUTES OF ADMINISTRATION

Type: LD_0 [ ]; LD_{100} [ ]; LD_{50} [X]; LDL_0 [ ]; Other [ ]
Species/strain: Rats

Route of Administration:	i.m. [ ]; i.p. [ ]; i.v. [X]; infusion [ ]; s.c. [ ]; other [ ]
Exposure time:	
Value:	> 100 mg/kg b.w.
Method:	Other
GLP:	Yes [ ] No [X] ? [ ]
Test substance:	purity: unknown
Remarks:	
Reference:	*Gigiena i Sanitariya*: 1962

Type:	LD_0 [ ]; LD_{100} [ ]; LD_{50} [X]; LDL_0 [ ]; Other [ ]
Species/strain:	Mice
Route of Administration:	i.m. [ ]; i.p. [ ]; i.v. [X]; infusion [ ]; s.c. [ ]; other [ ]
Exposure time:	
Value:	> 500 mg/kg b.w.
Method:	Other
GLP:	Yes [ ] No [X] ? [ ]
Test substance:	purity: unknown
Remarks:	
Reference:	*Gigiena i Sanitariya*: 1962

Type:	LD_0 [ ]; LD_{100} [ ]; LD_{50} [X]; LDL_0 [ ]; Other [ ]
Species/strain:	Cats
Route of Administration:	i.m. [ ]; i.p. [ ]; i.v. [X]; infusion [ ]; s.c. [ ]; other [ ]
Exposure time:	
Value:	2,144 mg/kg b.w.
Method:	Other
GLP:	Yes [ ] No [X] ? [ ]
Test substance:	Sodium isocyanurate, purity: unknown
Remarks:	
Reference:	*J. Pharmacol. Exp. Ther.*: 1951

5.2 CORROSIVENESS/IRRITATION

5.2.1 SKIN IRRITATION/CORROSION

Species/strain:	Rabbits
Results:	Highly corrosive [ ]; Corrosive [ ]; Highly irritating [ ]; Irritating [ ]; Moderate irritating [ ]; Slightly irritating [ ]; Not irritating [X]
Classification:	Highly corrosive (causes severe burns) [ ]; Corrosive (causes burns)[ ]; Irritating [ ]; Not irritating [ ]
Method:	Federal Hazardous Substances Act (FHSA) tests
GLP:	Yes [ ] No [X] ? [ ]
Test substance:	purity: unknown
Remarks:	
Reference:	Hammond *et al.*: 1986

5.2.2 EYE IRRITATION/CORROSION

(a) Species/strain: Rabbits

	Results:	Highly corrosive [ ]; Corrosive [ ]; Highly irritating [ ]; Irritating [ ]; Moderate irritating [ ]; Slightly irritating [X]; Not irritating [ ]
	Classification:	Irritating [ ]; Not irritating [ ]; Risk of serious damage to eyes [ ]
	Method:	Federal Hazardous Substances Act (FHSA) tests
	GLP:	Yes [ ] No [X] ? [ ]
	Test substance:	purity: unknown
	Remarks:	
	Reference:	Hammond *et al.*: 1986
(b)	Species/strain:	Rabbits
	Results:	Highly corrosive [ ]; Corrosive [ ]; Highly irritating [ ]; Irritating [ ]; Moderate irritating [X]; Slightly irritating [ ]; Not irritating [ ]
	Classification:	Irritating [ ]; Not irritating [ ]; Risk of serious damage to eyes [ ]
	Method:	Rinsed with water
	GLP:	Yes [ ] No [X] ? [ ]
	Test substance:	purity: unknown
	Remarks:	Administration into the eye at 20 mg/24 hr
	Reference:	Toxicity Information: 1972
(c)	Species/strain:	Rabbits
	Results:	Highly corrosive [ ]; Corrosive [ ]; Highly irritating [ ]; Irritating [ ]; Moderate irritating [X]; Slightly irritating [ ]; Not irritating [ ]
	Classification:	Irritating [ ]; Not irritating [ ]; Risk of serious damage to eyes [ ]
	Method:	Standard Draize test
	GLP:	Yes [ ] No [X] ? [ ]
	Test substance:	purity: unknown
	Remarks:	Administration into the eye at 500 mg/24 hr
	Reference:	Marhold: 1972

5.3 SKIN SENSITISATION

No data

*5.4 REPEATED DOSE TOXICITY

(a)	Species/strain:	Rats/Crj: CD (SD)
	Sex:	Female [ ]; Male [ ]; Male/Female [X]; No data [ ]
	Route of Administration:	Oral (by gavage)
	Exposure period:	Male: 44 days Female: From 14 days before mating to day 3 of lactation
	Frequency of treatment:	Daily
	Post exposure observation period:	
	Dose:	0, 10, 40, 150, 600 mg/kg/day
	Control group:	Yes [X]; No [ ]; No data [ ]; Sesame oil Concurrent no treatment[ ]; Concurrent vehicle[X];Historical[ ]
	NOAEL:	150 mg/kg/day
	LOAEL:	600 mg/kg/day

	Results:	Isocyanuric acid indicated toxic effects at 600 mg/kg in both sexes. Excretion of reddish urine was evident. In addition, depression of body weight gain was observed in males. Urinalyses of males revealed appearance of crystals, which is considered this chemical precipitated from urine, and increases of erythrocytes and leukocytes. In hematological examination of males, significant decreases in erythrocyte counts, hemoglobin concentrations and hematocrit values were observed. In blood chemical examination of males, increases in urea nitrogen and creatinine, and a decrease of sodium were revealed. In histopathological examination, dilatation of the renal tubules, necrosis or hyperplasia of the tubular epithelium, increased basophilic tubules, neutrophilic infiltration, mineralization and fibrosis in the kidney, hyperplasia of the mucosal epithelium in the urinary bladder and vacuolization of the zona fasciculata in the adrenals were observed in both sexes. In addition, the incidence of atrophic thymus also showed a tendency for increase in females. Absolute and relative kidney weights and relative adrenal weights were increased in both sexes.
	Method:	OECD Combined Repeat Dose and Reproductive/ Developmental Toxicity Screening Test
	GLP:	Yes [X] No [ ] ? [ ]
	Test substance:	purity: 99.8 %
	Reference:	MHW, Japan: 1997
(b)	Species/strain:	Rats/Rochester strain (Wistar-derived)
	Sex:	Female [ ]; Male [ ]; Male/Female [X]; No data [ ]
	Route of Administration:	Oral (in diet)
	Exposure period:	20 weeks
	Frequency of treatment:	Daily
	Post exposure observation period:	
	Dose:	0, 0.8, 8 % (calculated daily dose: 0, 56, 560 mg/kg)
	Control group:	Yes [X]; No [ ]; No data [ ]; Concurrent no treatment[ ];Concurrent vehicle[X]; Historical[ ]
	NOAEL:	0.8 % (56 mg/kg/day)
	LOAEL:	8 % (560 mg/kg/day)
	Results:	14/20 males and 4/20 females died at 8 %, but no died at 0.8 %. Considerable decrease in body weight gain was observed at 8 %. Urine samples taken prior to the start of feeding and again near termination of the study showed normal concentrations of protein and sugar. In hematological examination no change was observed. There were no changes in organ weights (thyroid, liver, brain, lungs, heart, etc.), expect for kidney weight, which increased at 8 % in females. In histologic study, dilatation of distal collecting tubules and dusts of Bellini, with focal areas of epithelial proliferation were observed at 8 % in both sexes.
	Method:	Other
	GLP:	Yes [ ] No [X] ? [ ]
	Test substance:	Sodium isocyanurate, purity: unknown
	Reference:	Hodge *et al.*: 1965