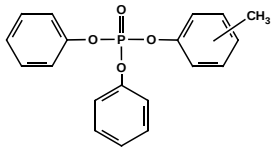
FOREWORD INTRODUCTION

DIPHENYL CRESYL PHOSPHATE

CAS N°: 26444-49-5

SIDS INITIAL ASSESSMENT PROFILE

CAS No.	26444-49-5
Chemical Name	Diphenyl cresyl phosphate
Structural formula	

CONCLUSIONS AND RECOMMENDATIONS

Environment

The chemical is toxic to aquatic organisms and considered not readily biodegradable. However the predicted environmental concentration is lower than the predicted no effect concentration. Therefore, it is considered of low potential risk and low priority for further work.

Health

The chemical is moderately toxic in a repeated dose toxicity study (i.e. liver, kidney, adrenal). This chemical is considered to be non-genotoxic. As margin of safety is very large, it is currently considered of low potential risk and low priority for further work.

SHORT SUMMARY WHICH SUPPORTS THE REASONS FOR THE CONCLUSIONS AND RECOMMENDATIONS

Diphenyl cresyl phosphate is used as an additive for plasticizer and gasoline and as a flame retardant. The production volume in Japan was estimated to be 1,700 tonnes (1990 - 1993) and more than 1,000 tonnes/year with a highest production volume of 5,000 tonnes/year in Germany. The chemical is not produced but imported into Sweden, Denmark and Canada in volumes of 350 kg/year, 3 tonnes/year and 10 - 100 tonnes/year respectively. The chemical is also produced in the United States, however precise production data were not available. This chemical is used as the consumer product at 7 % in a filling foam for insulating air spaces.

The chemical is a stable liquid at pH 4, but is hydrolysed at pH 7 and 9. The half-life at pH 7 is about 47 days. This chemical is considered not readily biodegradable. Modelling of the potential environmental distribution of diphenyl cresyl phosphate (obtained from a Mackay generic level III fugacity model) showed this chemical would be distributed mainly to water and soil. The PEC_{local} was estimated based on Japanese and German production data to be 1.5×10^{-5} and 9×10^{-4} mg/l, respectively

The lowest acute toxicity data to fish, daphnids and algae were: 1.3 mg/l (96 h-LC_{50} of *Oryzias latipes*), 3.7 mg/l (24 h EC_{50} of *Daphnia magna*) and 0.55 mg/l (NOEC of *Selenastrum*

capricornutum), respectively. The lowest chronic toxicity data to daphnid was 0.12 mg/l (21d-NOEC (reproduction) *Daphnia magna*). The lowest acute and chronic toxicity data for each trophic level were considered in calculating the predicted no effect concentration (PNEC). An assessment factor of 100 was used to both acute and chronic toxicity data to determine the PNEC. The PNEC was calculated as 0.0012 mg/l. The chemical is strongly toxic to algae, and moderately toxic to fish and daphnids however the predicted environmental concentration is lower than the predicted no effect concentration. Therefore, the environmental risk is considered to be low.

The chemical is produced in closed systems and therefore only limited occupational exposure is expected in filling it into drums. Inhalation is considered the main route of exposure. An average concentration of 0.3 mg/m^3 was measured at a Japanese production facility. This exposure level is equivalent to 0.005 mg/kg/day. As this chemical is not biodegradable and highly bioaccumulative, the exposure to the general population via the environment would be assumed through drinking water and fish. The concentration in drinking water is estimated to be equal to the calculated PEC (i.e. 9.0×10^{-4} mg/l) to provide a worst case calculation. The daily intake is calculated as 3×10^{-5} mg/kg/day (2 l/day, 60 kg b.w.). Using the maximum bioconcentration factor of 980, the concentration of this chemical in fish can be calculated as 8.82×10^{-4} mg/g-wet. As a daily intake of fish in Japan is estimated to be 90 g for 60 kg body weight person, the daily intake of this chemical will be 1.30×10^{-3} mg/kg/day.

Although the chemical showed no mutagenic effects in bacteria, a positive result was obtained in chromosomal aberration test in vitro. A recent negative micronucleus test confirmed that the chemical is not expected to be genotoxic. In a combined repeat dose and reproductive/developmental toxicity screening test, treatment at the mid dose (60 mg/kg/day), resulted in enlargement and cortical vacuolation of the adrenals in both sexes. In addition, an increase of food consumption and total cholesterol, a decrease of cholinesterase activities, and enlargement of the liver were found in male rats, and suppression of body weight gains, histopathological changes in the liver, kidneys and the thymus were found in female rats. For reproductive effects, only a fertility index and an implantation index decreased in the highest group (300 mg/kg/day). Therefore, NOEL for repeated dose toxicity was 12 mg/kg/day and NOEL for reproductive toxicity was 60 mg/kg/day.

For human health, a margin of safety was estimated to be 2400, based on occupational exposure. However, the frequency of exposure is very limited and the very few workers involved wear personal protective equipment. The human health risks for the public from indirect exposure via the environment and consumer use are also low.

IF FURTHER WORK IS RECOMMENDED, SUMMARISE ITS NATURE

FULL SIDS SUMMARY

CAS NO: 26444-49-5		SPECIES	PROTOCOL	RESULTS
PHYSICAL-CHEMICAL				
2.1	Melting Point		Unknown	< - 10 °C
2.2	Boiling Point		Unknown	245 °C at 0.53 kPa
2.3	Density			
2.4	Vapour Pressure		OECD TG 104	< 1.2 x 10^{-4} Pa at 25 °C
2.5	Partition Coefficient (Log Pow)		OECD TG 117	3.7
2.6 A.	Water Solubility		OECD TG 105	2.4 mg/l
B.	pH			
	pKa			
2.12	Oxidation: Reduction Potential			
ENVIRONMENTAL FATE AND PATHWAY				
3.1.1	Photodegradation		Sunlight, Calculation	In water $T_{1/2}$ = 4.86 years
3.1.2	Stability in Water		OECD TG 111	$T_{1/2}$ = stable at pH 4 $T_{1/2}$ = 47 days at pH 7
3.2	Monitoring Data		Monitoring program in Japan	In air = In surface water = not detected in Japan In soil/sediment = not detected in Japan In biota =
3.3	Transport and Distribution		Calculated Fugacity level III	Release: 100% to Water In Air: 0 % In Water: 97.6 % In Sediment: 2.3 % In Soil: 0.1 %
			Local exposure	1.5 x 10^{-5} mg/l
3.5	Biodegradation		OECD TD 301C	not readily biodegradable
3.7	Bioaccumulation			BCF = 360 or 980
ECOTOXICOLOGY				
4.1	Acute/Prolonged Toxicity to Fish	*Oryzias latipes*	OECD TG 203	LC_{50} (24 hr) = 2.7mg/l, LC_{50} (48hr) = 1.7mg/l, LC_{50} (72 hr) = 1.3mg/l, LC_{50} (96hr) = 1.3mg/l
4.2	Acute Toxicity to Aquatic Invertebrates *Daphnia*	*Daphnia magna*	OECD TG 202	EC_{50} (24 hr) = 3.7 mg/l
4.3	Toxicity to Aquatic Plants e.g. Algae	*Selenastrum capricornutum*	OECD TG 201	EC_{50} (72 hr) = 0.99mg/l NOEC (72 hr) =

4.5.2	Chronic Toxicity to Aquatic Invertebrates (*Daphnia*)	*Daphnia magna*	OECD TG 202	EC_{50}s (14 d) = 0.27 mg/l (Reproduction) EC_{50}s (21 d) = 0.31 mg/l (Reproduction) LC_{50}s (21 d) = 0.35 mg/l (Mortality) NOECs (21 d) = 0.12 mg/l
4.6.1	Toxicity to Soil Dwelling Organisms			No studies located
4.6.2	Toxicity to Terrestrial Plants			No studies located
(4.6.3)	Toxicity to Other Non-Mammalian Terrestrial Species (Including Birds)			
TOXICOLOGY				
5.1.1	Acute Oral Toxicity	Rat		LD_{50} = 6,400 mg/kg
5.1.2	Acute Inhalation Toxicity	Sheep		LC_{50} = > 0.37 mg/m^3/1hr
5.1.3	Acute Dermal Toxicity	Rabbit		LD_{50} = > 5,000 mg/kg
5.4	Repeated Dose Toxicity	Rat	OECD Combined	NOEL = 12 mg/kg/day
5.5	Genetic Toxicity In Vitro			
A.	Bacterial Test (Gene mutation)	*S. typhimurium*	Japanese TG	- (With metabolic activation) - (Without metabolic activation)
B.	Non-Bacterial In Vitro Test (Chromosomal aberrations)	CHL cells	Japanese TG	+ (With metabolic activation) - (Without metabolic activation)
5.6	Genetic Toxicity In Vivo	Mouse	Japanese TG	-
5.8	Toxicity to Reproduction	Rat	OECD Combined	NOEL = mg/Kg (General toxicity) NOEL = 60 mg/kg (Repro. Tox. parental) NOEL = 300 mg/kg (Repro. Tox. F1 generation)
5.9	Developmental Toxicity/ Teratogenicity			
5.11	Experience with Human Exposure			None

[Note] Data beyond SIDS requirements can be added if the items are relevant to the assessment of the chemical, e.g. corrosiveness/irritation, carcinogenicity.

Revised SIDS Initial Assessment Report
for
7th SIAM
(Australia, March 25 - 27, 1998)

Chemical Name:	Diphenyl Cresyl phosphate
CAS No:	26444-49-5
Sponsor Country:	JAPAN

National SIDS Contact Point in Sponsor Country: Kenichi Suganuma
Director, Second International Organization Bureau, Ministry of Foreign Affairs, Japan

HISTORY:

SIDS Dossier and Testing Plan were reviewed at the SIDS Review Meeting on (date), where the following SIDS Testing Plan was agreed. This chemical has been evaluated in SIAM-3, and micronucleus test was requested for confirmation of genetic toxicity endpoint.

no testing ( )
testing (X)

Water Solubility, Vapour pressure, Partition coefficient
Photodegradation, Stability in water, Biodegradation
Acute toxicity to Fish, Acute toxicity to daphnia, Acute toxicity to algae, Chronic toxicity to daphnia
Genotoxicity to bacteria, Chromosomal aberration in vitro, Micronucleus Test
Combined repeat dose and reproductive/developmental toxicity screening test

In March, 1998, we received many exposure information from member countries. Therefore, SIAR of this chemical was revised including these exposure information.

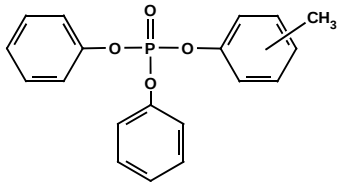
COMMENTS:
Deadline for circulation: March 7, 1997
Date of Circulation: March 28, 1997
Date of Recirculation: May 16, 1997
Date of Circulation: March 16, 1998
(To all National SIDS Contact Points and the OECD Secretariat)

SIDS INITIAL ASSESSMENT REPORT

Diphenyl cresyl phosphate
[26444-49-5]

1. IDENTITY

OECD Name:	Diphenyl cresyl phosphate
Synonym:	Diphenyl tolyl phosphate
CAS Number:	26444-49-5
Empirical Formula:	$C_{19}H_{17}O_4P$
Structural Formula:	



Degree of Purity:	49.1 %
Major Impurities:	Cresol, isomer of tolyl ester
Essential Additives:	No additives

2. GENERAL INFORMATION ON EXPOSURE

The production level of diphenyl cresyl phosphate in Japan was about 1,700 tonnes/year in 1990-1993. The most of this amount was sold and handled in Japan. There is no information about imported volumes of dipheny cresyl phosphate. Diphenyl cresyl phosphate is used in industry as the plasticizer in Japan.

In Germany, the chemical is produced by one company in amounts > 1,000 tonnes/year and highest production volume is 5,000 tonnes/year. Total amount is used as flame retardant or plasticizer in polymer matrics.

In Sweden, no production are reported, and total use volume is 320 kg/year. Use pattern is additives to high temperature oil used in gear boxes, additives to hydraulic oil used in cars, in glue applied on screen tables used in textile printing and softener and flame retardant in polymers. The concentration in end products are between 0.4 - 25%.

In Denmark, there is no production volume, and total use volume is 3 tonnes/year. Main use pattern is softeners, construction materials and paint, laquers and varnishes.

In United States, there are production and usage, but production, import and export volume is confidential. According to the EPA's Office of Pollution Prevention and Toxics Use Cluster Scoring System, this chemical is used as plasticizer; extreme-pressure lubricant; hydraulic fluids; gasoline additive; food packaging. It is also used as plasticizer for polyvinyl plastics, cellulosic plastics and polystyrene, polycarbonates and butadiene rubbers. This chemical is used as an flame-retardant for polyvinyl plastics.

In Canada, the chemical is not produced, but is imported between 10 - 100 tonnes/year. It is used in plastics and in some paints and coatings.

3. ENVIRONMENT

3.1 Environmental Exposure

3.1.1 General Discussion

Monitoring data

In a monitoring program in Japan in 1981, diphenyl cresyl phosphate was not detected in surface water or sediment in 63 areas in Japan. The detection limit was 0.05μg/l for surface water and 0.005mg/l for sediment, respectively.

Environmental distribution

The potential environmental distribution of diphenyl cresyl phosphate obtained from a generic level III Fagacity model is shown in the Table. The results show that if diphenyl cresyl phosphate is released mainly to water and soil, it is unlikely to be transported to other compartment but if diphenyl cresyl phosphate is released mainly to air, it is likely to be transported to soil and water.

Environmental distribution of diphenyl cresyl phosphate
using a generic level III Fugacity model.

Compartment	Release: 100 % to air	Release: 100 % to water	Release: 100 % to soil
Air	14.5 %	0.0 %	0.0 %
Water	8.2 %	97.6 %	0.2 %
Soil	77.1 %	0.1 %	99.8 %
Sediment	0.2 %	2.3 %	0.0 %

abiotic and biotic degradation in air, water, soil;

a) Biodegradability test (OECD TG 301C) of diphenyl cresyl phosphate showed 0 - 5 % gradation after 28 days by BOD, GC and HPLC. Therefore. Diphenyl cresyl phosphate is classified as “not readily biodegradable”.

Degree of degradation after 28 days
0, 0, 0 % after 28 days by BOD
11, 5, 5 % from HPLC analysis
4, 1, 3 % from GC analysis

b) Hydrolysis as a function to pH:

Stable at pH 4 at 25 ^{o}C
Half-life time: 47.0 days at pH 7 at 25 ^{o}C
5.1 days at pH 9 at 25 ^{o}C

c) Photodegradability (estimation)

Diphenyl cresyl phosphate is stable photochemically, and half life for photelysis in water was estimated to be 4.86 years.

bioaccumulation in different environmental compartments:

According to the German company data, bioconcentration factor (BCF) was 360 or 980.
Partition coefficient (log Pow) at 25 ^{o}C was 3.7 (OECD TG 107)

possibility to form degradation products and their environmental fate and pathways.
No data are available.

3.1.2 Predicted Environmental Concentration

Local exposure:

a) According to a Japanese manufacturer, 540 kg/year of diphenyl cresyl phosphate are released into the WWTP. Elimination in the WWTP is 98 % with a flow of 0.7 x 10^6 tonnes/year into the bay. Local predicted environmental concentration (PEC_{local}) is 1.5 x 10^{-5} mg/l, employing the following calculation model. In this case, 1000 is applied as the dilution factor.

$$\frac{\text{Amount of release } (0.54 \times 10^9 \text{ mg/year}) \times (100\text{-}98)}{\text{Volume of effluent } (0.7 \times 10^9 \text{ l/year}) \times \text{Dilution factor } (1000) \times 100} = 1.5 \times 10^{-5}$$

b) According to a German exposure information, German proposed to integrate a generic exposure scenario using the following parameters.

Production volume:	50,000 tonnes/year (maximum production volume given in IUCLID)
Release factor for production:	0.3 % (production and processing at the same site)
number of production days:	300 days/year
Elimination in stp:	91 % (according to the Simpletreat)
Flow-rate of receiving river:	60 m^3/s (according to the TGD)

With this data, a PEC_{local} of about 9 x 10^{-4} mg/l can be calculated.

Regional exposure

An exposure scenario for the use of this chemical as plasticizer and flame retardant shoul be integrated. Germany proposed following scenario. One can assume that 1 % per year of the used this chemical will migrate out of polymer matrix. With the assumption that the total amount if this chemical used in polymer materials was constant within the last 10 years and assuming an average life duration of the products of 10 years a diffuse emission of 500 tonnes/year is resulting. In a region of 200 x 200 km^2 and a number of inhabitants of 20 million 25% of the diffuse emission, that is 125 tonnes/year. takes place. As a worst case it is assumed that the total amount is emitted into durface water. With the model SIMPLEBOX a regional PEC of 1.1 x 10^{-3} mg/l could be calculated. EUSES has calculated a $PEC_{regional}$ of 1.2 x 10^{-3} mg/l .

3.2 Effects on the Environment

3.2.1 Aquatic effects

a) Acute toxicity to fish

SIDS data: *Oryzias latipes*
Test results: LC_{50} (24h) = 2.7 mg/l
LC_{50} (48h) = 1.7 mg/l
LC_{50} (72h) = 1.3 mg/l
LC_{50} (96h) = 1.3 mg/l

b) Acute toxicity to daphnids

SIDS data: *Daphnia magna*
Results: 24-hours: EC_{50} = 3.7 mg/l

c) Results of long-term tests e.g., reproduction

SIDS data: *Daphnia magna*
Results: Reproduction: NOEC = 0.12 mg/l

d) Toxicity to algae

SIDS data: *Selenastrum capricornutum*
Results: 72-hours EC_{50} = 0.99 mg/l
NOEC = 0.55 mg/l

e) Other ecotoxicological data

SIDS data: *Ankistrodesmus falcatus*
Results: 4-hours EC_{50} = 0.7 mg/l

SIDS data: *Scenedemus quadricauda*
Results: 4-hours EC_{50} = 1 mg/l

SIDS data: *Brachydanio rerio*
Results: 96-hours EC_{90} = 11.5 mg/l

f) Hazard assessment for the aquatic organisms

The chemical is strongly toxic to algae, and moderately toxic to fish and daphnids.

3.2.2 Terrestrial effects

No data are available

3.2.3 Other effects

No more data are available.

3.3 Initial Assessment for the Environment

Predicted no effect concentration:

Predicted no effect concentration (PNEC) for aquatic organisms has been calculated for the lowest values for most sensitive species, daphnia (Daphnia magna). Using the NOEC of 0.12 mg/l and assessment factor 100.

PNEC = 0.12/100 = 0.0012 mg/l

Predicted environmental concentration:

Predicted environmental concentration (PEC_{local}) from Japanese local exposure scenario was 1.5×10^{-5} mg/l,

$PEC_{local}/PNEC = 1.5 \times 10^{-5}/0.0012 = 1.25 \times 10^{-2} < 1$

Predicted environmental concentration (PEC_{local}) from German local exposure scenario was 9×10^{-4} mg/l,

$PEC_{local}/PNEC = 9 \times 10^{-4}/0.0012 = 0.75 < 1$

Predicted environmental concentration (PEC_{local}) from German regional exposure scenario was 1.2×10^{-3} mg/l,

$PEC_{local}/PNEC = 1.2 \times 10^{-3}/0.0012 = 1$

This ratio indicates marginal.

4. HUMAN HEALTH

4.1 Human Exposure

4.1.1 Occupational exposure

As dipheny cresyl phosphate is produced in a closed system, exposure during synthesis may be excluded. This chemical is used as antiflammable plasticizer for polymer. The possibility of workplace exposure is when the product is filled into drums, with inhalation uptake considered to be the main exposure route. Skin contact plays a minor role. An average workplace concentration in a production site was 0.3 mg/m^3. At the production site of this chemical, the daily intake through inhalation could be estimated as 0.005 mg/kg/day. However, actual body burden must be low, because workers wear protective equipment during drum filling.

4.1.2 Consumer exposure

This chemical is used as the consumer product named Assil-IF at a concentration of 7 %. Assil-IF is a filling foam for insulating air spaces.

4.1.3 Indirect exposure via the environment

As diphenyl cresyl phosphate is not biodegradable and high bioaccumulative, the exposure to the general population via the environment would be possible through drinking water processed from surface water and through fish which may accumulate this chemical.

Based on the physical chemical properties of this chemical, a significant removal during the purification process of drinking water is not expected. Therefore, the concentration in drinking water should be estimated to be equal to PEC calculated in Section 3.1, i.e. 9×10^{-4} mg/l, as the worst case. The daily intake is calculated as 3×10^{-5} mg/kg/day (2 l/day, 60 kg b.w.).

Using the maximum bioconcentration factor of 980 obtained by tests, the concentration of this chemical in fish can be calculated as follows:

$$PEC_{fish} = (9 \times 10^{-4} \text{ mg/l}) \times 980 = 8.82 \times 10^{-4} \text{ mg/g-wet}$$

As a daily intake of fish in Japan is estimated to be 90 g for 60 kg body weight person, the daily intake of this chemical will be 1.3 x 10^{-3} mg/kg/day.

4.2 Effects on Human Health

a) mode of action of the chemical, toxicokinetics and metabolism

No data are available.

b) acute toxicity;

SIDS data:	Oral/Rat: LD_{50}: 6,400 mg/kg
Inhalation/Sheep:	LC_{50}: > 0.37 mg/l/1h
Dermal/Rabbit:	LD_{50}: > 5,000 mg/kg

c) repeated dose toxicity;

SIDS data:	OECD Combined Repeated Dose and Reproductive/Developmental Screening Toxicity Test
Results:	In the 300 mg/kg group, salivation, a suppression of body weight gain and increase of water intake were found in both sexes, and an increase of food consumption was found in male rats. In the investigation of hematology, changes of parameters indicated anemia, and an increase of leukocytes were found in the 300mg/kg group of male rats. In the investigation of clinical chemistry, increase in total cholesterol and decreases in GOT, albumin, A/G ratio, cholinesterase activity and triglycerides were also found in the 300 mg/kg group of male rats. In urinalysis, decreases in pH and specific gravity, an increase of urine volume were found in the 300 mg/kg of male rats. In the pathological examination, enlargement and cortical vacuolation of the adrenals, enlargement of the liver, and fatty change of the proximal tubular epithelium were found in both sexes. In addition, reduction of fatty change of the hepatocytes, increase in hyaline droplets and basophilic changes in the proximal tubular epithelium, erosion or focal necrosis in mucosa of stomach and atrophy of seminiferous tubular were found in male rats, and clear cell change of hepatocytes, atrophy of thymus, hypertrophy and hyperplasia of the interstitial cells in the ovaries were found in female rats. In the 60 mg/kg group, suppression of body weight gains was found in female rats. Enlargement and cortical vacuolation of the adrenals were found in both sexes. In addition, an increase of total cholesterol, a decrease of cholinesterase activity, and enlargement of the liver were found in male rats, and histopathological changes in the liver, kidneys and the thymus were found in female rats.
NOEL:	12 mg/kg/day

d) reproduction/developmental toxicity;

SIDS data:	OECD Combined Repeated Dose and Reproductive/Developmental Screening Toxicity Test
Results:	A fertility index and an implantation index decreased in the 300 mg/kg group. These were probably caused by dysspermatogenesis. A birth index tended to low. There were

no effects on the reproductive or developmental parameters of copulation, pregnancy, parturition or lactation. In an observation of neonates, no effects were found on the values for live pups, mean pup weights, sex ratio, abnormal pups or loss of offsprings.

These results indicate that the no effect levels for reproduction or development are 60 mg/kg for sires, and 300 mg/kg for dams and offsprings.

NOEL for P generation: 60 mg/kg
NOEL for F1 generation: 300 mg/kg
NOEL for F2 generation: not applicable

e) genetic toxicity

Bacterial test: Negative results in *S. Typhimurium*/ TA100, TA1535, TA98, TA1537 and *E. coli* WP2 uvrA with and without metabolic activation (Japanese TG)

Chromosomal

Aberration in vitro: Marginal positive result in Chinese hamster liver (CHL) cells with metabolic activation (Japanese TG)

Micronucleus Test: Negative result (Japanese TG)

f) any other human health related information that is available.

None

4.3 Initial Assessment for Human Health

Diphenyl cresyl phosphate is produced in closed systems and therefore only limited occupational exposure is expected in filling it into drums. Inhalation is considered the main route of exposure. An average concentration of 0.3 mg/m^3 was measured at a Japanese production facility. This exposure level is equivalent to 0.005 mg/kg/day. As this chemical is not biodegradable and highly bioaccumulative, the exposure to the general population via the environment would be assumed through drinking water and fish. The concentration in drinking water is estimated to be equal to the calculated PEC (i.e. 9.0×10^{-4} mg/l) to provide a worst case calculation. The daily intake is calculated as 3×10^{-5} mg/kg/day (2 l/day, 60 kg b.w.). Using the maximum bioconcentration factor of 980, the concentration of this chemical in fish can be calculated as 8.82×10^{-4} mg/g-wet. As a daily intake of fish in Japan is estimated to be 90 g for 60 kg body weight person, the daily intake of this chemical will be 1.30×10^{-3} mg/kg/day.

Although the chemical showed no mutagenic in bacterial tests and micronucleus test, a marginal positive result was obtained in chromosomal aberration test in vitro. In a combined repeat dose and reproductive/developmental toxicity screening test, NOEL for repeated dose toxicity was 12 mg/kg/day and NOEL for reproductive toxicity was 60 mg/kg/day.

A margin of safety is estimated to be 2400, based on occupational exposure. However, the frequency of exposure is very limited and the workers involved wear personal protective equipment. The margin of safety is 4.0×10^5 for drinking water and 9.2×10^3 for eating fish, based on local exposure scenario. Consumer exposure is also considered to be

low. Therefore human health risks from occupational exposure and indirect exposure are presumably low.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

For environment, diphenyl cresyl phosphate is toxic to aquatic organisms and considered not readily biodegradable. However the predicted environmental concentration is lower than the predicted no effect concentration. Therefore, it is considered of low potential risk and low priority for further work.

For human health, the chemical is moderately toxic in a repeated dose toxicity study (i.e. liver, kidney, adrenal). This chemical is considered to be non-genotoxic. As margin of safety for occupational and indirect exposure is very large, it is currently considered of low potential risk and low priority for further work.

5.2 Recommendations

5.3 REFERENCES

ANNEX: Full SIDS Dossier

REVISED OECD HPV FORM 1

SIDS DOSSIER
ON THE HPV PHASE-2 CHEMICAL

Diphenyl cresyl phosphate

CAS No. 26444-49-5

Sponsor Country: JAPAN
DATE: May 16, 1997

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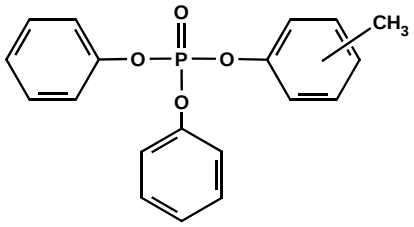
5.2.2 EYE IRRITATION/CORROSION
5.3 SKIN SENSITISATION
5.4 * REPEATED DOSE TOXICITY
5.5 * GENETIC TOXICITY IN VITRO
A. BACTERIAL TEST
B. NON-BACTERIAL IN VITRO TEST
5.6 * GENETIC TOXICITY IN VIVO
5.7 CARCINOGENICITY
5.8 * TOXICITY TO REPRODUCTION
5.9 * DEVELOPMENTAL TOXICITY / TERATOGENICITY
5.10 OTHER RELEVANT INFORMATION
A. SPECIFIC TOXICITIES (NEUROTOXICITY, IMMUNOTOXICITY etc.)
B. TOXICODYNAMICS, TOXICOKINETICS
5.11 * EXPERIENCE WITH HUMAN EXPOSURE

6. REFERENCES

Note: *;Data elements in the SIDS
†;Data elements specially required for inorganic chemicals

S I D S P R O F I L E

DATE: May 16, 1997

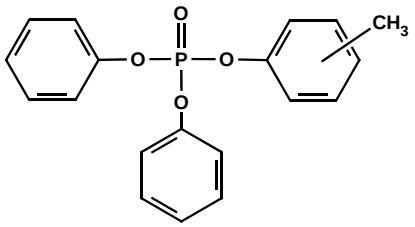
1.01 A.	**CAS No.**	26444-49-5
1.01 C.	**CHEMICAL NAME (OECD Name)**	Diphenyl cresyl phosphate
1.01 D.	**CAS DESCRIPTOR**	
1.01 G.	**STRUCTURAL FORMULA**	
	OTHER CHEMICAL IDENTITY INFORMATION	
1.5	**QUANTITY**	In Japan, 1,700 tonnes/year in 1990 - 1993.
1.7	**USE PATTERN**	Plasticizer
1.9	**SOURCES AND LEVELS OF EXPOSURE**	In Japan, 540 kg/year are released into the WWTP. Elimination in the WWTP is 98 %.
ISSUES FOR DISCUSSION (IDENTIFY, IF ANY)		

SIDS SUMMARY
DATE: May 16, 1997

CAS NO: 26444-49-5		Information	OECD Study	GLP	Other Study	Estimation Method	Acceptable	SIDS Testing Required
STUDY		**Y/N**	**Y/N**	**Y/N**	**Y/N**	**Y/N**	**Y/N**	**Y/N**
PHYSICAL-CHEMICAL DATA								
2.1	Melting Point	Y	N	N	Y	N	Y	N
2.2	Boiling Point	Y	N	N	N	N	Y	N
2.3	Density	N						N
2.4	Vapour Pressure	N						Y
2.5	Partition Coefficient	N						Y
2.6	Water Solubility	N						Y
	pH and pKa values	N						N
2.12	Oxidation: Reduction potential	N						N
	OTHER P/C STUDIES RECEIVED							
ENVIRONMENTAL FATE and PATHWAY								
3.1.1	Photodegradation	N						Y
3.1.2	Stability in water	N						Y
3.2	Monitoring data	Y	N	N	Y	N	Y	N
3.3	Transport and Distribution	N						N
3.5	Biodegradation	N						Y
	OTHER ENV FATE STUDIES RECEIVED							
ECOTOXICITY								
4.1	Acute toxicity to Fish	N						Y
4.2	Acute toxicity to Daphnia	N						Y
4.3	Toxicity to Algae	N						Y
4.5.2	Chronic toxicity to Daphnia	N						Y
4.6.1	Toxicity to Soil dwelling organisms	N						N
4.6.2	Toxicity to Terrestrial plants	N						N
4.6.3	Toxicity to Birds	N						N
	OTHER ECOTOXICITY STUDIES RECEIVED							
TOXICITY								
5.1.1	Acute Oral	Y	N	N	Y	N	Y	N
5.1.2	Acute Inhalation	Y	N	N	Y	N	Y	N
5.1.3	Acute Dermal	Y	N	N	Y	N	Y	N
5.4	Repeated Dose	N						Y
5.5	Genetic Toxicity *in vitro*							
	. Gene mutation	N						Y
	. Chromosomal aberration	N						Y
5.6	Genetic Toxicity *in vivo*	N						N
5.8	Reproduction Toxicity	N						Y
5.9	Development / Teratogenicity	N						N
5.11	Human experience	N						N
	OTHER TOXICITY STUDIES RECEIVED							

1. GENERAL INFORMATION

1.01 SUBSTANCE INFORMATION

***A.**	**Cast number**	26444-49-5
B.	**Name** *(IUPAC name)*	Diphenyl cresyl phosphate
***C.**	**Name** *(OECD name)*	Diphenyl cresyl phosphate
†D.	**CAS Descriptor**	
E.	**EINECS-Number**	247-693-8.
F.	**Molecular Formula**	$C_{19}H_{17}O_4P$
***G.**	**Structural Formula**	
H.	**Substance Group**	Not applicable
I.	**Substance Remark**	
J.	**Molecular Weight**	340.32

1.02 OECD INFORMATION

A.	**Sponsor Country:**	JAPAN
B.	**Lead Organisation:**	Ministry of Health and Welfare (MHW) Ministry of International Trade and Industry (MITI) Environment Agency (EA) Ministry of Labour (MOL)
	Name of Lead Organisation:	Ministry of Foreign Affairs
	Contact person:	Mr. Kenichi Suganuma Director Second International Organization Bureau Ministry of foreign Affairs
	Address:	Street: 2-2-1 Kasumigaseki, Chiyoda-ku Postal code: 100 Town: Tokyo Country: Japan Tel: 81-3-3581-0018 Fax: 81-3-3503-3136

C. Name of responder

Name: Same as above contact person

1.1 GENERAL SUBSTANCE INFORMATION

A. Type of Substance

element [ ]; inorganic [ ]; natural substance[ ]; organic [X]; organometallic[ ]; petroleum product [ ]

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

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

C. Purity

> 99.5 %

1.2 SYNONYMS

Diphenyl tolyl phosphate

1.3 IMPURITIES

Cresol

1.4 ADDITIVES

No additives

***1.5 QUANTITY**

Location	Production	Date			
Japan	1,700 tonnes/year	1990 - 1993			
	Export (tonnes)	1993	1992	1991	1990
	Malaysia	370	251		
	Formosa	230	383	616	416
	Germany	60	177	95	1
	Korea	1	2	8	73

Reference: MITI, Japan

1.6 LABELLING AND CLASSIFICATION

No information are available.

***1.7 USE PATTERN**

A. General

	Type of Use:	Category:
(a)	main industrial use	Additive to plastic (plasticizer)

Reference: MITI, Japan and ECDIN Database

B. Uses in Consumer Products

No consumer use

1.8 OCCUPATIONAL EXPOSURE LIMIT VALUE

Exposure limit value
None

Short term exposure situation

Number of workers:	2
Length of exposure period:	2 hrs per time
Frequency:	one time a day
Remarks:	No emission data
Reference:	Company data

*** 1.9 SOURCES OF EXPOSURE**

Source:	Media of release: Water from a production site
Quantities per media:	10 kg/year
Remarks:	
Reference:	MITI, Japan

1.10 ADDITIONAL REMARKS

A. Options for disposal

Remarks:	Incineration
Reference:	MITI, Japan

B. Other remarks

Remarks:	None
Reference:	

2. PHYSICAL-CHEMICAL DATA

***2.1 MELTING POINT**

Value: < - 10 °C
Decomposition: Yes **[ ]** No **[X]** Ambiguous **[ ]**
Sublimation: Yes **[ ]** No **[X]** Ambiguous **[ ]**
Method:
GLP: Yes **[X]** No **[ ]** ? **[ ]**
Remarks:
Reference: Unpublished company data

***2.2 BOILING POINT**

Value: 245 °C
Pressure:
Decomposition: Yes **[ ]** No **[X]** Ambiguous **[ ]**
Method:
GLP: Yes **[ ]** No **[ ]** ? **[X]**
Reference: Unpublished company data

†2.3 DENSITY (relative density)

No data available

***2.4 VAPOUR PRESSURE**

(a)
Value: < 1.2 x 10^{-4} Pa
Temperature: 25 °C
Method: calculated **[ ]**; measured **[X]**
OECD Test Guideline 104 (Dynamic method)
GLP: Yes **[X]** No **[ ]** ? **[ ]**
Reference: MITI, Japan (Unpublished Report, Test was performed in Chemicals Inspection and Testing Institute, Japan)

(b)
Value: 0.000001 hPa
Temperature: 41 °C
Method: calculated **[ ]**; measured **[X]**
GLP: Yes **[X]** No **[ ]** ? **[ ]**
Reference: Unpublished company data

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

(a)
Log Pow: 3.7
Temperature: 25 °C
Method: calculated **[ ]**; measured **[X]**
OECD Test Guideline 117
GLP Yes **[X]** No **[ ]** ? **[ ]**
Remarks:
Reference: MITI, Japan (1993)

(b)
Log Pow: 5.1

Temperature:
Method: calculated **[X]**; measured **[ ]**
Leo, A.: CLOGP-3.54 MedChem Software 1989
GLP Yes **[ ]** No **[ ]** ? **[ ]**
Remarks:
Reference: Company data

***2.6 WATER SOLUBILITY**

A. Solubility

(a)
Value: 2.4 mg/l
Temperature: 25 °C
Description: Miscible **[ ]**; Of very high solubility **[ ]**; Of high solubility **[ ]**; Soluble **[ ]**; Slightly soluble **[ ]**; Of low solubility **[X]**; Of very low solubility **[ ]**; Not soluble **[ ]**
Method: OECD Test Guideline 105
GLP Yes **[X]** No **[ ]** ? **[ ]**
Remarks:
Reference: MITI, Japan (1993)

(b)
Value: 0.0026 g/l
Temperature: 25 °C
Description: Miscible **[ ]**; Of very high solubility **[ ]**; Of high solubility **[ ]**; Soluble **[ ]**; Slightly soluble **[ ]**; Of low solubility **[X]**; Of very low solubility **[ ]**; Not soluble **[ ]**
Method: Unknown
GLP Yes **[ ]** No **[ ]** ? **[X]**
Remarks:
Reference: Sieger et al. (1979)

B. pH Value, pKa Value

No data available

2.7 FLASH POINT *(liquids)*

(a)
Value: 240 °C
Type of test: Closed cup **[ ]**; Open cup **[X]**; Other **[ ]**
Method: C.O.C. Method
GLP: Yes **[ ]** No **[ ]** ? **[X]**
Remarks:
Reference: Unpublished company data.

(b)
Value: 242 °C
Type of test: Closed cup **[ ]**; Open cup **[X]**; Other **[ ]**
Method:

GLP: Yes **[ ]** No **[ ]** ? **[X]**
Remarks:
Reference: Unpublished company data.

2.8 AUTO FLAMMABILITY *(solid/gases)*

No data available

2.9 FLAMMABILITY

No data available

2.10 EXPLOSIVE PROPERTIES

No data available

2.11 OXIDISING PROPERTIES

No data available

†2.12 OXIDATION: REDUCTION POTENTIAL

No data available

2.13 ADDITIONAL DATA

A. Partition co-efficient between soil/sediment and water (Kd)

No data available

B. Other data

No data available

3. ENVIRONMENTAL FATE AND PATHWAYS

3.1 STABILITY

***3.1.1 PHOTODEGRADATION**

Type: Air **[ ]**; Water **[X]**; Soil **[ ]**; Other **[ ]**
Light source: Sunlight **[X]**; Xenon lamp **[ ]**; Other **[ ]**
Light spectrum:
Relative intensity:
Spectrum of substance: epsilon = 8.17×10^{3} at 300 nm
Concentration of Substance: 5×10^{-5} M.
Temperature:
Direct photolysis:
Half life: 4.86 years
Degradation rate: 2.26×10^{-13} mol/l/s

Quantum yield:	0.01
Indirect Photolysis:	
Type of sensitizer:	
Concentration of sensitizer:	
Rate constant (radical):	cm^3/molecule*sec
Degradation:	
Method:	calculated **[X]**; measured **[ ]**
	Estimated parameter for calculation:
	Concentration 5×10^{-5} M
	Depth of water body 500 cm
	Conversion rate 6.023×10^{20}
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Test substance:	
Remarks:	
Reference:	W. J. Lyman, W. F. Reehl and D. H. Rosenblatt, "Handbook of Chemical Property Estimation Method" McGraw Hill Book Co., 1981

*3.1.2 STABILITY IN WATER

Type:	Abiotic (hydrolysis) **[X]**; biotic (sediment)**[ ]**
Half life:	Stable at pH 4
	47.0 days at pH 7 at 25 °C
	5.10 days at pH 9 at 25 °C
Method:	OECD Test Guideline 111
GLP	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	Diphenyl cresyl phosphate
Remarks:	
Reference:	MITI, Japan (1993)

3.1.3 STABILITY IN SOIL

No data available

*3.2 MONITORING DATA (ENVIRONMENTAL)

(a)

Type of Measurement:	Background [ ]; At contaminated site [ ]; Other [X]
Media:	Surface water
Results:	ND (Detection limits: 0.05 µg /l) in 63 areas in Japan as of 1981
Remarks:	ND: Not detected
Reference:	EA, Japan (1983)

(b)

Type of Measurement:	Background [ ]; At contaminated site [ ]; Other [X]
Media:	Sediment
Results:	ND (Detection limits: 0.005 mg/l) in 63 areas in Japan as of 1981
Remarks:	ND: Not detected
Reference:	EA, Japan (1983)

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

No data available

*3.3.1 TRANSPORT

No data available

*3.3.2 THEORETICAL DISTRIBUTION (FUGACITY CALCULATION)

Global exposure:

The potential environmental distribution of diphenyl cresyl phosphate obtained from a generic level III Fagacity model is shown in the Table. The results show that if diphenyl cresyl phosphate is released mainly to water and soil, it is unlikely to be transported to other compartment but if diphenyl cresyl phosphate is released mainly to air, it is likely to be transported to soil and water.

Environmental distribution of diphenyl cresyl phosphate
using a generic level III Fugacity model.

Compartment	Release: 100 % to air	Release: 100 % to water	Release: 100 % to soil
Air	14.5 %	0.0 %	0.0 %
Water	8.2 %	97.6 %	0.2 %
Soil	77.1 %	0.1 %	99.8 %
Sediment	0.2 %	2.3 %	0.0 %

Local exposure:

According to a Japanese manufacturer, 540 kg/year of diphenyl cresyl phosphate are released into the WWTP. Elimination in the WWTP is 98 % with a flow of 0.7×10^6 tonnes/year into the bay. Local predicted environmental concentration (PEC_{local}) is 1.5×10^{-5} mg/l, employing the following calculation model. In this case, 1000 is applied as the dilution factor.

$$\frac{\text{Amount of release } (0.54 \times 10^9 \text{ mg/year}) \times (100\text{-}98)}{\text{Volume of effluent } (0.7 \times 10^9 \text{ l/year}) \times \text{Dilution factor } (1000) \times 100} = 1.5 \times 10^{-5} \text{ mg/l}$$

3.4 IDENTIFICATION OF MAIN MODE OF DEGRADABILITY IN ACTUAL USE

No data available

*3.5 BIODEGRADATION

(a)
Type: aerobic **[X]**; anaerobic **[ ]**

Inoculum:	adapted **[ ]**; non-adapted **[X]**;
Concentration of the chemical:	100 mg/l
	related to COD **[ ]**; DOC **[ ]**; test substance **[X]**
Medium:	water **[ ];** water-sediment **[ ];** soil **[ ];** sewage treatment **[ ]**
	Other [Japanese standard activated sludge]
Degradation:	0, 0 and 0 % after 28 days from BOD
	11, 5 and 5 % after 28 days from HPLC
Results:	readily biodeg. **[ ];** inherently biodeg. **[ ]**; under test condition no biodegradation observed **[X]**, other **[ ]**
Kinetic Method:	OECD Test Guideline 301 C.
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	Diphenyl cresyl phosphate, purity:
Remarks:	
Reference:	MITI, Japan (1993)

3.6 BOD_5, COD OR RATIO BOD_5/COD

No data available

3.7 BIOACCUMULATION

BCF:	980
Reference:	Boethling R.S. & Cooper, J.C. (1985)

3.8 ADDITIONAL REMARKS

A. Sewage treatment)

None

B. Other information

None

4. ECOTOXICITY

*4.1 ACUTE/PROLONGED TOXICITY TO FISH

(a)

Type of test:	static **[ ]**; semi-static **[X]**; flow-through **[ ]**; other **[ ]**
	open-system **[X]**; closed-system **[ ]**
Species:	*Oryzias latipes.*
Exposure period:	96 hr
Results:	LC_{50} (24h) = 2.7 mg/l
	LC_{50} (48h) = 1.7 mg/l (95% confidence limits: 1.0 - 2.7 mg/l)
	LC_{50} (72h) = 1.3 mg/l
	LC_{50} (96h) = 1.3 mg/l
	NOEC =
	LOEC =
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**

Method:	OECD Test Guideline 203 (1981)
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Test substance:	Diphenyl cresyl phosphate, purity: phenol, m-cresol, p-cresol = 59%, 22%, 12%
Remarks:	A group of 10 fish were exposed to 5 nominal concentrations (0.29 - 3.09 mg/l). Stock solution was prepared with methanol (0.3 mg/l), Controls with and without this vehicle were taken for test.
Reference:	EA, Japan (1991)

(b)

Type of test:	static **[ ]**; semi-static **[ ]**; flow-through **[ ]**; other *(e.g. field test)* **[ ]** open-system **[ ]**; closed-system **[ ]**
Species:	*Brachydanio rerio*
Exposure period:	
Results:	LC_{50} (24h) = LC_{50} (48h) = LC_{50} (72h) = LC_0 (96h) = 8.1 mg/l LC_{90} (96h) = 11.5 mg/l NOEC = LOEC =
Analytical monitoring:	Yes **[ ]** No **[ ]** ? **[X]**
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	Diphenyl cresyl phosphate; Purity: Unknown
Remarks:	None
Reference:	Company data (Bayer AG).

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:	24 hr
Results:	EC_{50} (24h) = 3.7 mg/l (95% confidence limits: 3.0 - 4.3 mg/l) EC_{50} (48h) = NOEC =
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**
Method:	OECD Test Guideline 202 (1984)
GLP:	Yes **[ ]** No **[X]** ? **[ ]**
Test substance:	Diphenyl cresyl phosphate, purity: phenol, m-cresol, p-cresol = 59%, 22%, 12%
Remarks:	20 Daphnids (4 replicates; 5 organisms per replicate) were exposed to 5 nominal concentrations (2.6 - 27 mg/l). Stock solution was prepared with DMSO: HCO-40 = 9:1 (10-100

mg/l). Controls with and without this vehicle were taken for test.

Reference: EA, Japan (1991)

B. Other aquatic organisms

No data available

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

Species:	*Selenastrum capricornutum* ATCC 22662.	
Endpoint:	Biomass **[X]**; Growth rate **[ ]**; Other **[ ]**	
Exposure period:	72 hr	
Results:	Biomass:	EC_{50} (.24 hr) =
	(Endpoint)	EC_{50} (.72 hr) = 0.99 mg/l
		NOEC = 0.55 mg/l ($p < 0.05$)
		LOEC =
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**	
Method:	OECD Test Guideline 201 (1984)	
	open-system **[X]**; closed-system **[ ]**	
GLP:	Yes **[ ]** No **[X]** ? **[ ]**	
Test substance:	Diphenyl cresyl phosphate,	
	purity: phenol, m-cresol, p-cresol = 59%, 22%, 12%	
Remarks:	The EC50 values were calculated based on 5 nominal concentrations (0.31 - 3.24 mg/l). Stock solution was prepared with methanol (3.24 mg/l). Controls with and without this vehicle were taken for test.	
Reference:	EA, Japan (1991).	

4.4 TOXICITY TO BACTERIA

Type:	Aquatic [ ]; Field [ ]; Soil [ ]; Other [ ]
Species:	
Exposure period:	3 hr
Results:	EC_{10} (hr) =
	EC_{50} (3 hr) = > 10000 mg/l
	EC_{100} (hr) =
Analytical monitoring:	Yes **[ ]** No **[ ]** ? **[X]**
Method:	Unknown
	open-system **[ ]**; closed-system **[ ]**
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	Diphenyl cresyl phosphate, purity: Unknown
Remarks:	None
Reference:	Unpublished company data (Bayer AG)

4.5 CHRONIC TOXICITY TO AQUATIC ORGANISMS

4.5.1 CHRONIC TOXICITY TO FISH

No data available

(*)4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

Type of test:	static **[ ]**; semi-static **[X]**; flow-through **[ ]**; other **[ ]**; open-system **[X]**; closed-system **[ ]**	
Species:	*Daphnia magna.*	
Endpoint:	Mortality **[ ]**; Reproduction rate **[X]**; Other **[ ]**	
Exposure period:	21 days	
Results:	Mortality:	LC_{50} (24 hr) = 4.0mg/l (95% confidence limits:3.0-6.4 mg/l) LC_{50} (48 hr) = 1.3mg/l (95% confidence limits:1.0-1.5 mg/l) LC_{50} (96 hr) = 0.44mg/l LC_{50} (7 d) = 0.44mg/l LC_{50} (14 d) = 0.41mg/l (95%confidencelimits:0.33-0.52mg/l) LC_{50} (21 d) = 0.35mg/l (95%confidencelimits:0.27-0.45mg/l) NOEC = LOEC =
	Reproduction:	EC_{50} (14 d) = 0.27 mg/l EC_{50} (21 d) = 0.31mg/l NOEC = 0.12 mg/l ($p < 0.05$) LOEC = 0.38.mg/l ($p < 0.05$)
Analytical monitoring:	Yes **[ ]** No **[X]** ? **[ ]**	
Method:	OECD Test Guideline 202 (1984)	
GLP:	Yes **[ ]** No **[X]** ? **[ ]**	
Test substance:	Diphenyl cresyl phosphate, purity: phenol, m-cresol, p-cresol = 59%, 22%, 12%	
Remarks:	40 Daphnids (4 replicates; 10 organisms per replicate) were exposed to 5 nominal concentrations (0.038 - 3.8 mg/l). Stock solution was prepared with DMSO: HCO-40 = 9:1. Controls with and without this vehicle were taken for test.	
Reference:	EA, Japan (1991)	

4.6 TOXICITY TO TERRESTRIAL ORGANISMS

4.6.1 TOXICITY TO SOIL DWELLING ORGANISMS

No data available

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

No data available

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

No data available

4.7 BIOLOGICAL EFFECTS MONITORING (INCLUDING BIOMAGNIFICATION)

No data available

4.8 BIOTRANSFORMATION AND KINETICS

No data available

4.9 ADDITIONAL REMARKS

None

5. TOXICITY

*5.1 ACUTE TOXICITY

5.1.1 ACUTE ORAL TOXICITY

Type:	LD_0 **[ ]**; LD_{100} **[ ]**; LD_{50} **[X]**; LDL_0 **[ ]**; Other **[ ]**
Species/strain:	Rat
Value:	6,400 mg/kg b.w.:
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	Diphenyl cresyl phosphate
Remarks:	None
Reference:	Unpublished company data

5.1.2 ACUTE INHALATION TOXICITY

Type:	LC_0 **[ ]**; LC_{100} **[ ]**; LC_{50} **[X]**; LCL_0 **[ ]**; Other **[ ]**
Species/strain:	Sheep
Exposure time:	1 hour
Value:	> 0.37 mg/m^3/1hr
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	Diphenyl cressyl phosphate, purity: Unknown
Remarks:	None
Reference:	Kimerie, F. (1964)

5.1.3 ACUTE DERMAL TOXICITY

Type:	LD_0 **[ ]**; LD_{100} **[ ]**; LD_{50} **[X]**; LDL_0 **[ ]**; Other **[ ]**
Species/strain:	Rabbit
Value:	> 5,000 mg/kg b.w.
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	Diphenyl cresyl phosphate, purity: Unknown
Remarks:	None
Reference:	Johannsen, F.R. (1977)

5.1.4 ACUTE TOXICITY, OTHER ROUTES OF ADMINISTRATION

No data available

5.2 CORROSIVENESS/IRRITATION

5.2.1 SKIN IRRITATION/CORROSION

Species/strain:	Rabbit
Results:	Highly corrosive **[ ]**; Corrosive **[ ]**; Highly irritating **[X]**; Irritating **[ ]**; Moderate irritating **[ ]**; Slightly irritating **[ ]**; Not irritating **[X]**
Classification:	Highly corrosive (causes severe burns)**[ ]**; Corrosive (causes burns)**[ ]**; Irritating **[ ]**; Not irritating **[ ]**
Method:	OECD Test Guideline 404 (1982)
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	Commercial, purity: Unknown
Remarks:	
Reference:	Unpublished company data (Bayer AG)

5.2.2 EYE IRRITATION/CORROSION

Species/strain:	Rabbit
Results:	Highly corrosive **[ ]**; Corrosive **[ ]**; Highly irritating **[X]**; Irritating **[ ]**; Moderate irritating **[ ]**; Slightly irritating **[ ]**; Not irritating **[ ]**
Classification:	Irritating **[ ]**; Not irritating **[ ]**; Risk of serious damage to eyes **[ ]**
Method:	OECD Test Guideline 405 (1982)
GLP:	Yes **[X]** No **[ ]** ? **[ ]**
Test substance:	Commercial, purity: Unknown
Remarks:	
Reference:	Unpublished company data (Bayer AG, 1982)

5.3 SKIN SENSITISATION

Type:	Patch Test
Species/strain:	Human, Rat
Results:	Sensitizing **[ ]**; Not sensitizing **[X]**; Ambiguous **[ ]**
Classification:	Sensitizing **[ ]**; Not sensitizing **[ ]**
Method:	Unknown
GLP:	Yes **[ ]** No **[ ]** ? **[X]**
Test substance:	Commercial, purity: Unknown
Remarks:	
Reference:	Mallette, F.S. & von Saam, E. (1952)

*5.4 REPEATED DOSE TOXICITY

Type:	Fertility **[ ]**; One-generation study **[ ]**; Two-generation study **[ ]**; Other **[X]**
Species/strain:	Rat Crj:CD (SD)
Sex:	Female **[ ]**; Male **[ ]**; Male/Female **[X]**; No data **[ ]**
Route of Administration:	Oral (gavage)
Exposure period:	Males: 45 days including 14 days before mating

Female: from 14 days before mating to day 3 of lactation
Frequency of treatment: 7 days/week
Post exposure
observation period:
Premating
exposure period: male: 14 days, female: 14 days
Duration of the test:
Doses: 0, 12, 60, 300 mg/kg (10 animals/group)
Control group: Yes **[X]**; No **[ ]**; No data **[ ]**;
Concurrent no treatment **[ ]**; Concurrent vehicle **[X]**; Historical **[ ]**
NOEL: 12 mg/kg/day
LOEL: 60 mg/kg/day
Results: In the 300 mg/kg group, salivation, a suppression of body weight gain, increase of water intake were found in both sexes, and an increase of food consumption was found in male rats.

In the investigation of hematology, changes of parameters indicated anemia, and an increase of leukocytes were found in the 300 mg/kg group of male rats. In the investigation of clinical chemistry, a decrease in got, alubumin, A/G ratio and triglycerides were also found in the 300 mg/kg group of male rats. In urinalysis, decreases in pH and specific gravity, an increase of urine volume were found in the 300 mg/kg of male rats.

In the pathological examination, enlargement and cortical vacuolation of the adrenals, enlargement of the liver, and fatty change of the proximal tubular epithelium were found in both sexes. In addition, reduction of fatty change of the hepatocytes, hyaline droplets and basophilic changes in the proximal tubular epithelium, erosion or focal necrosis, and atrophy of seminiferous tubular were found in male rats, and clear cell change of hepatocytes, atrophy of thymus, hypertrophy and hyperplasia of the intestinal cell in the ovaries were found in female rats.

In the 60 mg/kg group, enlargement and cortical vacuolation of the adrenals were found in both sexes. In addition, an increase of food consumption and total cholesterol, a decrease of cholinesterase activities, and enlargement of the liver were found in male rats, and suppression of body weight gains, histopathological changes in the liver, kidneys and the thymus were found in female rats.
Method: OECD Combined Repeat Dose and Reproductive/Developmental Screening Toxicity Test (1992)
GLP: Yes **[X]** No **[ ]** ? **[ ]**
Test substance: Commercial, purity: 41.9 %
Remarks:
Reference: MHW, Japan (1993a)

*5.5 GENETIC TOXICITY IN VITRO

A. BACTERIAL TEST

Type: Bacterial reverse mutation assay
System of testing: *S. typhimurium* TA98, TA100, TA1535, TA1537
E. coli WP2 uvrA
Concentration: 0, 312.5, 625, 1250, 2500, 5000 μg/plate
Metabolic activation: With **[ ]**; Without **[ ]**; With and Without **[X]**; No data **[ ]**
Results:
Cytotoxicity conc: With metabolic activation: 5000 μg /plate
Without metabolic activation: 5000 μg /plate
Precipitation conc:
Genotoxic effects: + ? -
With metabolic activation: **[ ] [ ] [X]**
Without metabolic activation: **[ ] [ ] [X]**
Method: Japanese Guideline for Screening Mutagenicity Testing of Chemicals
GLP: Yes **[X]** No **[ ]** ? **[ ]**
Test substance: Commercial, purity: 41.9 %
Remarks: Procedure: Plate method (37°C, 20 min.), Plate/test: 3
Reference: MHW, Japan (1993b)

B. NON-BACTERIAL IN VITRO TEST

Type: Cytogenetic assay
System of testing: Chinese Hamster lung (CHL) cells
Concentration: 0, 0.004, 0.008, 0.016 mg/ml
Metabolic activation: With **[ ]**; Without **[ ]**; With and Without **[X]**; No data **[ ]**
Results:
Cytotoxicity conc: With metabolic activation: 0.05 mg/l
Without metabolic activation: 0.025 mg/l
Precipitation conc:
Genotoxic effects: + ? -
With metabolic activation: **[X] [ ] [ ]**
Without metabolic activation: **[ ] [ ] [X]**
Method: Japanese Guideline for Screening Mutagenicity Testing of Chemicals
GLP: Yes **[X]** No **[ ]** ? **[ ]**
Test substance: Commercial, purity: 41.9 %
Remarks:
Reference: MHW, Japan (1993b)

*** 5.6 GENETIC TOXICITY IN VIVO**

Type: Micronucleus Test
Species/strain: Mice/Crj:BDF1
Sex: Female **[ ]**; Male **[ ]**; Male/Female **[X]**; No data **[ ]**
Route of
Administration: Oral (gavage)
Exposure period:
Doses: 0, 312.5, 625,and 1,250 mg/kg
Mice/group 5 male and female/group
Results: The frequency of micronucleated polychromatic erythrocytes was not significantly increased in male and female mice up to the dose of 1,250 mg/kg 24 hr after the oral gavage treatment. Inhibition of bone marrow cell proliferation was not observed under the test conditions.

Lowest dose producing toxicity: 1,250 mg/kg in male and female mice
Maximum tolerated dose: 1,500 mg/kg in male and 1,250 mg/kg in female mice
Genotoxic effects: + ? -
[ ] [ ] [X]

Method: Guideline for Screening Mutagenicity Testing of Chemicals (Japan) and OECD Test Guideline 474.
Procedure: Bone marrow/Acridine Orange staining
solvent: Olive oil
Positive control: Cyclophosphamide 50 mg/kg
GLP: Yes **[X]** No **[ ]** ? **[ ]**
Test substance: Commercial, purity: 41.9 %
Remarks:
Reference: MHW, Japan (1996)

5.7 CARCINOGENICITY

No data available

*5.8 TOXICITY TO REPRODUCTION

Type: Fertility **[ ]**; One-generation study **[ ]**; Two-generation study **[ ]**; Other **[X]**
Species/strain: Rat Crj:CD (SD)
Sex: Female **[ ]**; Male **[ ]**; Male/Female **[X]**; No data **[ ]**
Route of
Administration: Oral (gavage)
Exposure period: Males: 45 days including 14 days before mating
Female: from 14 days before mating to day 3 of lactation
Frequency of treatment: 7 days/week
Post exposure
observation period:
Premating
exposure period: male: 14 days, female: 14 days
Duration of the test:
Doses: 0, 12, 60, 300 mg/kg (10 animals/sex/group)
Control group: Yes **[X]**; No **[ ]**; No data **[ ]**;
Concurrent no treatment **[ ]**; Concurrent vehicle **[X]**; Historical **[ ]**
NOEL Parental: 300 mg/kg/day
NOEL F1 Offspring: 60 mg/kg/day
NOEL F2 Offspring:
Results: A fertility index and an implantation index decreased in the 300 mg/kg group. These were probably caused by dysspermatogenesis. A birth index was tend to be low. There were no effects on the reproductive or developmental parameters of copulation, pregnancy, parturition or lactation. In an observation of neonated, no effects were found on the values for live pups, mean pup weights, sex ratio, abnormal pups or loss of offsprings. These results indicate that the no effect level for repeat dose toxicity of this substance is 12 mg/kg for both sexes, and that the no effect levels for reproduction or development are 60 mg/kg for sires, and 300 mg/kg for dams and offsprings.
Method: OECD Preliminary reproductive/Developmental Toxicity Test (1992)
GLP: Yes **[X]** No **[ ]** ? **[ ]**

Test substance: Diphenyl cresyl phosphate, purity: 41.9 %
Remarks: None
Reference: MHW, Japan (1993a)

***5.9 DEVELOPMENTAL TOXICITY/ TERATOGENICITY**

See 5.8

5.10 OTHER RELEVANT INFORMATION

No data available

A. Specific toxicities

No data available

B. Toxicodynamics, toxicokinetics

No data available

*** 5.11 EXPERIENCE WITH HUMAN EXPOSURE**

None

6. REFERENCES

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Johannsen, F.R. (1988) Toxicol. Appl. Pharmacol., 41, 291 - 304.

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MHW, Japan (1993b) Unpublished Report on Mutagenicity Tests of Diphenyl cresyl phosphate (HPV/SIDS Test conducted by MHW, Japan).

MHW, Japan (1996) Unpublished Report on Micronucleus Test of Diphenyl cresyl phosphate. (HPV/SIDS Test conducted by MHW, Japan).

Mallette, F.S. & von Saam, E., (1952) Arch. Hyg. Occup. Med., 6, 231 - 236.

MITI, Japan (1993a) Unpublished data.

MITI, Japan (1993b) Unpublished Report (HPV/SIDS Test conducted by MITI, Japan. Test was performed in Chemical Inspection and Testing Institute, Japan).

Sieger et al. (1979) Environ. Sci. Technol., 13, 840 - 844.

EXTRACT FROM IRPTC LEGAL FILES

file: 17.01 LEGAL rn : 523624
!!! WARNING - not original IRPTC record - WARNING !!!
systematic name:Phosphoric acid, methylphenyl diphenyl ester
common name :Cresyl diphenyl phosphate
reported name :Phosphoric acid diphenyl cresyl ester
cas no :26444-49-5 rtecs no :TC5520000
area : DEU type : REG

subject	specification	descriptor
AQ USE	INDST	CLASS RQR

This substance is classified as hazardous to water (Water Hazard Class: WHC 2). (There are 3 water hazard classes: WHC 3 = severely hazardous; WHC 2 = hazardous; WHC 1 = moderately hazardous; and the classification as "not hazardous to water"). The purpose of the classification is to identify the technical requirements of industrial plants which handle substances hazardous to water.
entry date: SEP 2001 effective date: 01JUN1999

title: Administrative Order relating to Substances Hazardous to Water (Verwaltungsvorschrift wassergefaehrdende Stoffe)
original : BUANZ*, Bundesanzeiger, 51 , 98a , 1 , 1999

****

file: 17.01 LEGAL rn : 1301374
systematic name:Phosphoric acid, methylphenyl diphenyl ester
common name :Cresyl diphenyl phosphate
reported name :PHOSPHORIC ACID,METHYLPHENYL DIPHENYL ESTER
cas no :26444-49-5 rtecs no :TC5520000
area : USA type : REG

subject	specification	descriptor
MANUF	REQ	PRMT
USE	OCC	PRMT
SAFTY	OCC	MXL

; Summary - THE FOLLOWING CHEMICAL IS INCLUDED ON A LIST OF CHEMICALS AND MIXTURES FOR WHICH REPORTING IS CURRENTLY REQUIRED UNDER THE TOXIC SUBSTANCES CONTROL ACT SECTION 2607A. THIS TOXIC SUBSTANCE IS SUBJECT TO PRELIMINARY ASSESSMENT INFORMATION RULES ON PRODUCT ION QUANTITIES, USES, EXPOSURES, AND ADVERSE EFFECTS. MANUFACTURERS INCLUDING IMPORTERS MUST SUBMIT A REPORT FOR THIS LISTED CHEMICAL MANUFACTURED AT EACH SITE.
entry date: OCT 1991 effective date: 1982

title: PRELIMINARY ASSESSMENT INFORMATION RULES
original : FEREAC, FEDERAL REGISTER, 47 , , 26998 , 1982
amendment: CFRUS*, CODE OF FEDERAL REGULATIONS, 40 , 712 , 30 , 1990

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file: 17.01 LEGAL rn : 1302143
systematic name:Phosphoric acid, methylphenyl diphenyl ester
common name :Cresyl diphenyl phosphate
reported name :Cresyl diphenyl phosphate

cas no :26444-49-5 rtecs no :TC5520000
area : USA type : REG

subject	specification	descriptor
FOOD	ADDIT	RSTR
TRANS		RSTR
STORE		RSTR
PACK		RSTR

; Summary - THIS SUBSTANCE IS INCLUDED ON A LIST OF SUBSTANCES USED TO PREPARE ADHESIVES WHICH MAY BE SAFELY USED AS COMPONENTS OF ARTICLES INTENDED FOR USE IN PACKAGING, TRANSPORTATION, OR HOLDING FOOD IN ACCORDANCE WITH THE FOLLOWING PRESCRIBED CONDITIONS: SUBSTA NCE MUST BE SEPARATED FROM THE FOOD BY A FUNCTIONAL BARRIER, MUST NOT EXCEED LIMITS OF GOOD MANUFACTURING PRACTICE USED WITH DRY FOODS, OR NOT EXCEED TRACE AMOUNTS AT SEAMS AND EDGE EXPOSURES WHEN USED WITH FATTY AND AQUEOUS FOODS. ALSO REGULATED BY SEA M INTEGRITY, LABELING STANDARDS, AND ANY PROVISION UNDER 21 CFR 175
entry date: NOV 1991 effective date: 1977

title: SUBSTANCES FOR USE ONLY AS COMPONENTS OF ADHESIVES
original : FEREAC, FEDERAL REGISTER, 42 , , 14534 , 1977
amendment: CFRUS*, CODE OF FEDERAL REGULATIONS, 21 , 175 , 105 , 1988

****

file: 17.01 LEGAL rn : 1471162
!!! WARNING - not original IRPTC record - WARNING !!!
systematic name:Phosphoric acid, methylphenyl diphenyl ester
common name :Cresyl diphenyl phosphate
reported name :Diphenyl tolyl phosphate
cas no :26444-49-5 rtecs no :TC5520000
area : EEC type : REG

subject	specification	descriptor
MANUF	INDST	CLASS
IMPRT	INDST	CLASS

The substance is included in a list of existing substances produced or imported within the Community in quantities exceeding 1000 tonnes per year. - A system of data reporting by any manufacturer who has produced or any importer who has imported the substance, as such or in a preparation, in quanities exceeding 10 tonnes per year is established.
entry date: AUG 1999 effective date: 04JUN1993

title: Council Regulation (EEC) No 793/93 of 23 March 1993 on the evaluation and control of the risks of existing substances
original : OJECFC, Official Journal of the European Communities, L84 , , 1 , 1993