Material Safety Data Sheet

Substance name	Tris(2-chloropropyl) Phosphate, TCPP (Flame Retardant)	**Doc. No.**	MSDS-ISGN78-79-244
CAS No.	13674-84-5	**Initial Issue Date**	20-06-1996
UN No.	Not applicable	**Revision Date**	10-08-2020

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: TCPP

Identification of the product: EC#: 911-815-4.

Index Number: Not available

REACH registration No.: 01-2119486772-26-xxxx

Relevant identified uses of the substance and uses advised against:
Identified uses:

Formulation
Rigid foam - Industry applications Rigid foam - Service life
Rigid foam – Professional applications

Restriction on use: Not available

Supplier Name: EVERCHEM SPECIALTY CHEMICALS

Address: 1400 N. Providence Rd, Suite 302, Media PA 19063

Phone: 484-234-5030

Website: www.everchem.com

Emergency Phone: CHEMTREC 1-800-424-9300 Customer #8709

2. HAZARDS IDENTIFICATION

Classification of the substance/mixture
Classification:
The substance is classified as following according to REGULATION (EC) No 1272/2008:

CLP / GHS	
Hazard classes/Hazard categories	Hazard statement
Acute Tox. 4	H302

For full text of H- phrases: see section 2.2.
Label elements
Hazard Pictograms:

Signal words
Warning

Hazard Statement:
H302: Harmful if swallowed

Precautionary statement
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink, or smoke when using this product.
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330 Rinse mouth.
P501 Dispose of contents/container to local regulations.

Other hazards
Not available

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Constituent	Registration No.	CAS NO:	Typical concentration	Concentration range
tris(2-chloro-1-methylethyl) Phosphate	01-2119486772-26-xxxx	13674-84-5	75.2254 % (w/w)	50.0 — 85.0 % (w/w)
bis(2-chloropropyl)-1-chloro-2-propyl phosphate	01-2119486772-26-xxxx	76649-15-5	2.1517 % (w/w)	< 15.0 % (w/w)
bis(1-chloro-2-propyl)-2-chloropropyl phosphate	01-2119486772-26-xxxx	76025-08-6	20.8427 % (w/w)	15.0 — 40.0 % (w/w)
Unknown impurities	N/A	N/A	1.7801 % (w/w)	0.1 — 4.5 % (w/w)

4. FIRST AID MEASURES

Description of first aid measures:
In all cases of doubt, or when symptoms persist, seek medical attention.

In case of inhalation:
Move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention if irritation develops or persists.

In case of skin contact:
Immediately flush skin with plenty of water for at least 15 minutes and get medical attention if irritation persists.

In case of eyes contact:

Hold eyelids apart and flush immediately with water for at least 15 minutes. Seek medical attention.

In case of ingestion:
Rinse mouth. Give water to drink. Induce vomiting. Never induce vomiting in unconscious or confused persons. Always seek medical advice.

Most important symptoms and effects, both acute and delayed
The product is harmful if swallowed

Indication of any immediate medical attention and special treatment needed
If skin irritation or rash occurs, get medical advice/attention.

5. FIRE FIGHTING MEASURES

Extinguishing media:
Suitable extinguishing media:
Carbon dioxide, appropriate foam or dry chemical, water pray, water mist.
Unsuitable extinguishing media:
Not available

Special hazards arising from the substance or mixture:
When heated to decomposition, may release poisonous and corrosive fumes of Carbon Dioxide, Carbon Monoxide and Phosphorus Oxides.

Advice for firefighters:
Full protective clothing and self-contained breathing apparatus (SCBA).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures
No action shall be taken involving any personal risk or without suitable training.
Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material.
Avoid breathing vapour or mist.
Provide adequate ventilation.
Put on appropriate personal protective equipment.

Environmental precautions
Avoid disposing into drainage/sewer system or directly into the aquatic environment. Keeping away from drains, surface-and groundwater, and soil.

Methods and materials for containment and cleaning up
Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers.

Collect in suitable and properly labelled containers.
Ventilate area and wash spill site after material pick up is complete.

Reference to other sections:
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for information on disposal

7. HANDLING and STORAGE

Precautions for safe handling:
Protective measures:

- Do not breathe dusts/vapor. Avoid contact with skin and eyes Handle in well ventilated areas.
- Eliminate all sources of ignition, and do not generate flames or sparks.
- take precautionary measures against static discharges.

Advice on general occupational hygiene:

- Do not eat, drink and smoke in work areas. Wash hands after use.
- Remove contaminated clothing and protective equipment before entering eating areas.
- Wash thoroughly after handling.
- Do not store above the following temperature: 50°C (122°F). Store in accordance with local regulations.
- TCPP has a melting point of -20°. Pumping normally slows down below 0°C.

Conditions for safe storage, including any incompatibilities:

- Store in a tightly closed container.
- Containers which are opened must be carefully resealed and kept upright to prevent leakage Store in a cool, dry, well-ventilated area away from incompatible substances.

Specific end use(s):
Not applicable.

8. EXPOSURE CONTROLS & PERSONAL PROTECTION

Control parameters:
Occupational exposure limits:
Not applicable

Additional exposure limits under the conditions of use:
Not available

DNEL/DMEL and PNEC-Values:
DN(M)ELs for workers

Exposure Pattern	**Route**	**Descriptor**	DNEL/DMEL	(Corrected) Dose descriptor *)	Most sensitive endpoint	Justification
Systemic effects – long term	Dermal	DNEL (Derived No Effect Level)	8 mg/kg bw/day			DNEL is derived for foam– this is a worst case scenario because in the EU Draft RAR dated May 2008 a total absorption value of 23% is taken forward to risk characterization for scenarios where there's exposure to "neat" TCPP and 40% dermal absorption is taken forward for those scenarios where there is exposure due to handling of foam containing TCPP".
Acute systemic effects	Inhalation	DNEL (Derived No Effect Level)	22.4 mg/m³			

Acute – local effects	Dermal					
Long-term systemic effects	Inhalation					
Long-term systemic effects	Dermal	DNEL (Derived No Effect Level)	2.08 mg/kg bw/day			DNEL is derived for foam– this is a worst case scenario because in the EU Draft RAR dated May 2008 a total absorption value of 23% is
						taken forward risk characterization for scenarios where there is exposure to "neat" TCPP and 40% dermal absorption is taken forward for those scenarios where there is exposure due to handling of foam containing TCPP".
Long-term – local effects	Inhalation	DNEL (Derived No Effect Level)	5.82 mg/m³			
Long-term – local effects	Dermal					
Long-term – local effects	**Inhalation**					
*) The (corrected) dose descriptor starting points have been automatically calculated by multiplying the values of the fields "D(N)MEL" and "Assessment factor" provided in the Endpoint summary of IUCLID section 7. Toxicological information. It reflects the value after any corrections, e.g. route-to-route extrapolation. See column "Justification" for the rationale behind such modifications and the use of assessment factors.						

DN(M)ELs for the general population

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Long-term –	**Inhalation**					
local effects						
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PNEC

PNEC	Value	Assessment factor	Remarks/Justification
PNEC aqua - freshwater (mg/L)	0.64	50	According to the Guidance Document R.10 (ECHA, 2008) an assessment factor of 50 applies to the lowest of two long-term results covering two trophic levels as the results have been generated covering that level showing the lowest effective concentrations in the short-term tests. The PNECaqua(freshwater) is based on the 21-d NOEC of 32 mg/L as the reproduction of Daphnia magna was shown to be the most sensitive endpoint.
PNEC aqua -marine water (mg /L)	0.64	500	In the absence of any data on saltwater species, the PNECaqua(marine) was derived on the basis of effects towards freshwater species. According to the Guidance Document R.10 (ECHA, 2008), an assessment factor of 500 applies to the lowest of two long-term results covering two trophic levels as the results have been generated covering those trophic levels showing the lowest effective concentrations in the short-term tests with these species.
PNEC aqua - intermittent releases (mg /L)	0.51	100	According to the Guidance Document R.10, an assessment factor of 100 applies to the most sensitive short-term test of three trophic levels. The calculation of PNEC aqua(intermittent releases) is based on the EC50 (96 h) of 51 mg/L, as the toxicity to Fish (Pimephales promelas) was shown to be the most sensitive endpoint.

PNEC fresh water sediment (mg/kg sediment dw)	13.4		extrapolation method In the absence of any ecotoxicological data for sediment dwelling organisms, a provisional PNEC sediment is derived by calculations based on the equilibrium partitioning method in accordance to the Guidance Document R.10. A Koc of 174, a Henrys Law constant of 0.00042 Pa m³/mole, and the PNEC fresh water of 0.64 mg/l were used for calculation. A PNECsediment of 2.9 mg/kg ww is obtained. This value is converted from wet-weight to dry weight using a conversion factor for sediment concentrations of 4.6.
PNEC marine-sediment (mg/kg sediment dw)	1.34		extrapolation method In the absence of any ecotoxicological data for sediment dwelling organisms, a provisional PNECsediment is derived in accordance to the Guidance Document R.10, by calculation with the equilibrium partitioning method (EPM) on the basis of the outcome of the aquatic toxicity data. In the absence of any data on saltwater species, the PNECaqua(marine) was derived on the basis of effects towards freshwater species. A Koc of 174, a Henrys Law constant of 0.00042 Pa m³/mole, and the PNEC marine water of 0.064 mg/l were used for calculation. A PNECsediment of 0.292 mg/kg ww is obtained. This value is converted from wet-weight to dry weight using a conversion factor for sediment concentrations of 4.6
PNEC soil(mg/kg soil dw)	1.7	10	The availability of a data set that includes acceptable results from three long-term tests with species from at least three trophic levels. An assessment factor of 10 applies to the lowest chronic NOEC to derive a PNECsoil. The PNECsoil is expressed in mg/kg dry weight, equivalent to 1.5 mg/kg soil wet weight.

PNEC stp(mg/L)	7.84	100	According to the Guidance Document R.10, an assessment factor of 100 applies if data on the respiration rate towards activated sludge is available. The derivation of PNEC STP is thus based on the 3-hour EC50 of 784 mg/L.
PNEC oral(mg/kg food)	< 11.6	90	The converted NOEC of <1040 mg/kg food, obtained from the most relevant mammalian data, a 13-week study in rat, is used for PNEC derivation for secondary poisoning for TCPP tris(2-chloro-1-methylethyl) phosphate multiconstituent substance are from a 13-week study in the rat. According to the Guidance document on information requirements and chemical safety assessment, Chapter R.10 an assessment factor of 90 is appropriate for the results of a study of this

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance :	Liquid
Melting / freezing point	< - 20°C
Boiling point	288°C (at 1014.2 hPa) with decomposition.
Flash point (°C):	TCPP has been determined not to have a flash point below its decomposition temperature at 245°C (Tremain & Bartlett, 1994)
Self-ignition temperature:	>400°C
Vapour pressure (25°C):	0.000014 hPa at 25°C
Relative density	1.29(20°C)
Water solubility (g/l):	1.08 g/L at 20°C at pH 5.5.
n-Octanol/Water (log Po/w):	A log Pow of 2.68 at 30°C at pH 7.1
Viscosity:	68.5 cP at 20°C
Surface tension	Not available
Dissociation constant in water(pKa):	The structure of the main constituent tris(2-chloro-1-methylethyl) phosphate does not contain ionization centers calculated by current version of ACD/pKa, v. 7.00 (Currenta, 2009a).
Explosive properties:	Nonexplosive
Oxidizing properties	Non oxidizing
Flammability:	Nonflammable
Granulometry:	Not available
Stability in organic solvents and identity of relevant degradation products:	Not available

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions
Under normal conditions, not hazardous reactions will occur.

Conditions to avoid
Keep away from heat.

Incompatible materials
strong oxidizers,

Hazardous decomposition products
Carbon dioxide and carbon monoxide, Phosphorus oxides.

11. TOXICOLOGICAL INFORMATION

Toxicokinetic, metabolism and distribution

Hazards identified by Draft EU Risk Assessment in May 2008:

"After oral administration, there were indications of <100% absorption, when oral and i. v. dosing were compared. It is quite difficult to estimate the percent oral absorption. However, it appears from the available information that oral absorption is at least 75% and may be slightly higher (based on the Minegishi data, and supported by the Stauffer data). Therefore, 80% oral absorption will be taken forward to risk characterisation.

After oral administration, Cmax in plasma was reached in 0.5 to 2 hours and 5.7 hours in tissues. Tissue radioactivity concentrations were dose and administration route-dependent (oral and intravenous). Although tissue/ blood ratios over 7 days were > 1 for liver, kidney, lung and adipose tissue, absolute concentrations were low and the bioaccumulation potential was considered minimal. TCPP is extensively metabolised and accounted for 2% of urinary or faecal radioactivity after oral administration. Metabolites identified in urine and faeces, in order of abundance, were 0,0-[Bis(1-chloro-2-propyl)]-0-(2-propionic acid) phosphate, bis(1-chloro-2-propyl) monophosphoric acid and 1-chloro-2-propanol. Elimination of TCPP from plasma and tissues was biphasic. The average terminal plasma t½ was 48.7 hours. The longest tissue t½ was recorded in adipose tissue (up to 103.4 hours). Urinary and faecal excretion of radioactivity was dose and administration route-dependent (oral and intravenous), and occurred quite rapidly. The observed biliary/faecal excretion ratio is indicative of enterohepatic recirculation. In a separate in vitro comparative metabolism study with 14C-TCPP, TCEP and TDCP, TCPP was metabolised to 89 and 61% respectively in rat liver S9 mix and liver slices. An in vitro percutaneous absorption study using human skin membranes was conducted to determine the absorption following topical application of [14C]-TCPP. The skin membranes were exposed to TCPP for 8 hours, mimicking a normal working day. The mean total absorption was 22.7 %, 13.6 % and 3.7 %, for doses 0.002, 0.1 and 1 mg/cm2, respectively. The total absorption value of 23% is taken forward to risk characterisation for scenarios where there is exposure to "neat" TCPP. A second in vitro study was conducted to determine the percentage of TCPP absorbed across the skin resulting from manual handling of flexible PUR foam containing TCPP. The skin membranes were exposed to the target concentrations of TCPP in artificial sweat for a period of 8 hours, mimicking a normal working day. It was determined that the total mean absorptions were 33.3% and 38.1% for the low and high doses of TCPP, respectively. Therefore, with respect to risk characterisation, 40% dermal absorption will be taken forward for those scenarios where there is exposure due to handling of foam containing TCPP, i. e. Scenario 3 "Cutting of flexible PUR foam", Scenario 4 "Production of rebound PUR foam and Scenario 8 Use of rigid PUR foam". No toxicokinetic data is available for the inhalation routes at present. For this route, and in line with the TGD, 100% absorption is assumed. "

Updated relevant information: None

Information on toxicological effects
Acute toxicity:

LD50(Oral, rat):	500< LD50<2000 mg/kg bw (male)
LD50(Dermal, rat):	>2000 mg/kg bw
LC50(Inhalation, rat):	> 7 mg/L air (male/female)
Skin corrosion/Irritation:	Not classified
Serious eye damage/irritation:	Not classified
Respiratory or Skin sensitization:	Not classified
Germ cell mutagenicity:	Negative
Carcinogenicity:	Not classified
Reproductive toxicity:	Not classified
STOT- single exposure:	Not classified
STOT-repeated exposure:	Not classified
Aspiration hazard:	Not classified

12. ECOLOGICAL INFORMATION

Acute toxicity		Time	Species	Method	Remarks
LC50	51 mg/L (WAF)	96h	Fish	Static bioassay: method not specified	2 (reliable with restrictions) key study
LC50	131mg/l	48h	Daphnia	Static bioassay: method not specified	2 (reliable with restrictions) key study experimental result Test material (EC name): 911-815-4
EC50	82 mg/L	72h	Algae	OECD Guideline 201	1 (reliable without restriction) key study experimental result Test material (EC name): 911-815-4

Persistence and degradability
TCPP is considered as inherently biodegradable but does not meet the criteria for inherent biodegradability.

Bioaccumulative potential
TCPP has no potential on bioaccumulation in both aquatic and terrestrial organisms.

Mobility in soil
no data available

PBT and vPvB assessment
The substance is not considered a PBT/vPvB.

Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing use or contamination of this product may change the waste management options. According to local regulations. Federal and official regulations.

14. TRANSPORT INFORMATION

	Land transport (ADR/RID)	Sea transport (IMDG)	Air transport (ICAO/IATA)
UN-Number:	Not regulated	Not regulated	Not regulated
UN Proper shipping name:	Not regulated	Not regulated	Not regulated
Transport hazard Class:	Not regulated	Not regulated	Not regulated
Packaging group:	Not regulated	Not regulated	Not regulated
Environmental hazards:	No	No	No
Special precautions for user:	See section 2.2	See section 2.2	See section 2.2
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not regulated	Not regulated	Not regulated

15. REGULATORY INFORMATION

Safety, health, and environmental regulations/legislation specific for the substance or mixture
Relevant information regarding authorization:
Not applicable.

Relevant information regarding restriction:
Not applicable.

Other EU regulations:
Employment restrictions concerning young person must be observed. For use only by technically qualified individuals.

Other National regulations:
Not applicable

Product name: TCPP

Chemical Safety Assessment has been carried out? YES

16. OTHER INFORMATION

Indication of changes
Version 1.0 Amended by (EU) 2015/830

Training instructions:
Not applicable.
Further information:
Not applicable.
Further information:
Employers should use this information only as a supplement to other information gathered by them and should make independent judgment of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.