SECTION 1: Identification of the substance and of the company / undertaking

1.1. Product identifier

1.1.1. Chemical name: **Trimorpholinophosphine oxide**

EC No: 224-662-7
CAS No: 4441-12-7
REACH-Registration No: none
The annual volume produced by the Chemische Fabrik Wülfel is below the REACH registration limit of one ton (Article 6 (1) of Regulation (EC) No 1907/2006 (REACH regulation)).

1.1.2. Trade name Phosphoric acid trimorpholide (PTM)
ACS quality

1.2. Relevant identified uses of the substance and uses advised against

1.2.1. Relevant identified uses

Use descriptor category:

Life cycle stage (LCS)	M: Manufacture - Pharmaceutical industry (increasing storage stability of diagnostic strips)
Sector of use	SU24: Scientific research and development
Technical function	fine chemical

1.2.2. Uses advised against

not known

1.3. Details of the supplier of the safety data sheet

Chemische Fabrik Wülfel GmbH & Co. KG
Hildesheimer Straße 305, 30519 Hannover
Tel.: 0049 511 98496-0, Fax: 0049 511 98406-40
Safety Data Sheet: cfw@wuelfel.de
Web: www.wuelfel.de

1.4. Emergency telephone number

00 49 511 98496-0 (Office hours:
Monday - Thursday 8 o´clock a.m. to 4 o´clock p.m.)
or
Poison control centre north (Bremen, Hamburg, Lower Saxony, Schleswig-Holstein)
Tel.: 00 49 551-19 24 0 (24h emergency call)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

2.1.1. Classification according to Regulation (EC) No 1272/2008 (CLP Regulation)

Not a hazardous substance.

2.2. Label elements

none

2.3. Other hazards

The substance does not meet the criteria for classification as PBT or vPvB substance.
See also the subsection 15.1.2.

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical name	CAS No.	EC No	REACH Registration No	% w/w	Classification according to Regulation (EC) No 1272/2008
Common name: Phosphoric acid trimorpholide (PTM) CA name: Trimorpholino phosphin oxide IUPAC nomenclature: 4-[bis(morpholin-4-yl) phosphoroso] morpholine or 4,4', 4''-Phosphinylidyne-tris-morpholine or 4, 4´, 4´´- Phosphoryltri-morpholine Molecular formula: $C_{12}H_{24}N_3O_4P$	4441-12-7	224-662-7	none	≥ 99,0	not classified as hazardous Note: In the C & L ECHA directory 4 Notifier classified the substance as hazardous with: Skin Irrit. 2; H315 (Causes skin irritation.) Eye Irrit. 2; H319 (Causes serious eye irritation.) STOT SE 3; H335 (May cause respiratory irritation.)

3.2. Mixtures

There is no mixture.

3.3. Additional information

None

SECTION 4: First aid measures

4.1. Description of first-aid measures

4.1.1. General informations

Bring injured person to fresh air, lie down comfortably, remove contaminated clothing.

4.1.2. In case of eye contact

Rinse widely opened eye for several minutes under running water.
Remove any contact lenses if easy to do. Continue rinsing. Further treatment by an ophthalmologist.

4.1.3. In case of skin contact

Wash with soap and water.

4.1.4. Following ingestion

Rinse mouth with water and seek medical advice immediately.

4.1.5. Following inhalation

Move victim to fresh air.

4.1.6. Self-protection of the First Aider

Avoid contact with substance still present.

4.2. Most important symptoms and effects, both acute and delayed

none

4.3. Indication of any immediate medical attention and special treatment needed

none

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Water spray, foam, carbon dioxide, dry powder

Unsuitable extinguishing media: not known

5.2. Special hazards arising from the substance

In case of fire may be released: carbon dioxide, carbon monoxide, nitrogen oxides, phosphorus oxides

5.3. Advice for fire-fighters

In case of fire, if necessary, wears self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Wear personal protective clothes. Skin and eye contact must be prevented by protective eye glasses and gloves.

Avoid formation of dust.

6.2. Environmental precautions

PTM should not be discharged into drains or waterways.

6.3. Methods and material for containment and cleaning up

Collect mechanically. Avoid creating dust clouds.

The product is supplied in suitable containers for disposal.

Clean up the affected area thoroughly.

6.4. Reference to other sections

See Sections 4 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid inhalation, avoid contact with eyes, skin and clothing.

Avoid prolonged exposure.

In case of dust formation proper ventilation must be ensured.

7.2. Conditions for safe storage, including any incompatibilities

The product has to be stored dryly and only in original packaging apart from apartments in well-ventilated rooms, separate from food, beverages and animal feed.

Recommended storage temperature: +10 °C to +25 °C

It is recommended to follow the instructions in the TRGS 510. "Storage of hazardous substances in non-stationary containers".

7.3. Specific end uses

Stabilizer for the shelf life of diagnostic strips.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

none

8.2. Exposure controls

8.2.1. Personal protective equipment

8.2.1.1. Eye / Face protection

Protective glasses required.

8.2.1.2. Respiratory protection:

Required when dust forms (particle filter P2 according to DIN 3181).

8.2.1.3. Skin protection

Chemical protective gloves, e.g. consisting of nitrile rubber (Check for damage before use), Penetration time (value for permeation: Level 6, > 480 min, EN 374)

8.2.2. General health and safety measures

Avoid unnecessary contact with the product.

Wash hands after work, change contaminated clothing.
While using do not eat, drink or smoke.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Some of the information is taken from the REACH registration dossier on trimorpholinophosphine oxide.

Property	Value / Description
Appearance	colorless to pale yellow crystals
Odour	odourless
Odour threshold	not applicable
pH (20 °C)	6.5 -7.0 (50 g / L), according to OECD Test Guideline 122
Melting point or melting range	190-193 ° C (at 1013 hPa), according to OECD Test Guideline 102
Initial boiling point and boiling range	The substance has no boiling point under normal atmospheric conditions (at 1013 hPa) according to OECD Test Guideline 103.
Flash point	not applicable, since solid
Evaporation rate	not determined because vapor pressure too low
Flammability (solid)	Substance melts on contact with a flame and does not ignite according to EC test method A.10.
Upper/lower flammability or explosive limits	see the comments on flammability
Vapour pressure	$8.8 \cdot 10^{-7}$ Pa, according to OECD Test Guideline 104
Vapour density	not determined because vapor pressure too low
Density (20 °C)	1.336 g / cm³, according to OECD Test Guideline 109
Solubilities Solubility in water (20 ° C) Ethanol (20 ° C): Chloroform (20 ° C) Benzene (20 ° C) Petroleum ether (20 ° C)	 125 g / L, according to OECD Test Guideline 105 125 g / L 500 g / L 165 g / L slightly soluble
Partition coefficient: n-octanol/water (log K_{OW})	<- 0.98, according to OECD Test Guideline 117
Auto-ignition temperature	No auto-ignition until reaching the maximum test temperature of 400 ° C (EC test method A.16)
Decomposition temperature	No decomposition when used as intended, signs of decomposition occur above 340 ° C
Viscosity	not relevant, since solid
Explosive properties	not applicable, since stable organic solid (insensitive to heat, impact or friction, contains no chemically unstable or high energetic groups)
Oxidising properties	not applicable, the substance contains no oxidizing acting molecule groups

9.2. Other information
None

SECTION 10: Stability and reactivity

10.1. Reactivity
Substance is not reactive.

10.2. Chemical stability
No decomposition if used according to specifications.
Above 200 °C a slow decomposition occurs.

10.3. Possibility of hazardous reactions
Not known

10.4. Conditions to avoid
Temperatures above 200 °C.

10.5. Incompatible materials
Alkalis

10.6. Hazardous decomposition products
At very high temperatures (decomposition) carbon monoxide, carbon dioxide, oxides of nitrogen and phosphorus oxides are formed (see subsection 5.2.).

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Some of the information is taken from the REACH registration dossier on trimorpholinophosphine oxide.

11.1.1. Acute toxicity
LD_{50}(oral, rat): > 2000 mg/kg bw (OECD Test Guideline 423 (Acute Oral toxicity - Acute Toxic Class Method)

11.1.2. Skin corrosion/irritation
No irritation of rabbit skin (OECD Test Guideline 404 (Acute Dermal Irritation / Corrosion).

11.1.3. Eye damage/irritation
No irritation of the rabbit eye (OECD Guideline 405 (Acute Eye Irritation / Corrosion)).

11.1.4. Sensitisation to the respiratory tract and the skin
Guinea pig tests did not indicate sensitization (OECD Test Procedure 406 (Skin Sensitization)).

11.1.5. Germ cell mutagenicity
The substance has no mutagenic properties (OECD Guideline 471 (Bacterial Reverse Mutation Assay)).

11.1.6. Carcinogenicity
Up to this time there are no indications to this effect.

11.1.7. Reproductive toxicity
Up to this time there are no indications to this effect.

11.1.8. Specific target organ toxicity (single exposure)
Up to this time there are no indications to this effect.

11.1.9. Specific target organ toxicity (repeated exposure)
Up to this time there are no indications to this effect.

11.1.10. Aspiration hazard
Up to this time there are no indications to this effect.

SECTION 12: Ecological information

12.1. Toxicity
No data available

12.2. Persistence and degradability
Some of the information is taken from the REACH registration dossier on trimorpholinophosphine oxide.

According to the calculated log POW of -0.56 the substance does not belong to the persistent substances.
The substance is not readily biodegradable according to the criteria of the OECD guideline 301 D (Ready Biodegradability: Closed Bottle Test).

12.3. Bioaccumulative potential

No data available

12.4. Mobility in soil

Due to the high water solubility, PTM has a high mobility.

12.5. Results of PBT and vPvB assessment

The substance does not belong to this class.

12.6. Other adverse effects

The substance, for reasons of environmental safety should not be discharged into the sewers.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

The product must be supplied in accordance with the hazardous waste regulations to an approved hazardous waste landfill.
Do not dispose of into the sewage system!
Waste disposal code: 160309

SECTION 14 : Transport information

Not hazardous substance according to the national and international dangerous goods regulations.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU regulations

Safety Data Sheet:
Regulation (EC) No 1907/2006 (REACH), Annex II (SDS) is amended by Annex of Regulation (EU) 2015/830.
Classification and labelling:
Regulation (EC) No 1272/2008 (CLP (EU-GHS)

15.1.2. Basic national regulations (Germany)

Act for the protection of young people at work (JArbSchG)
Observe employment restrictions according to § 22 for teens.
Act for the protection of mothers at work, in education and in study (MuSchG)
Inadmissible activities and working conditions according to §§ 11 and 12 MuSchG for expectant and nursing mothers.
Act on protection against hazardous substances (Chemicals Act (ChemG))
Regulation on protection against hazardous substances (Hazardous Substances Regulation (GefStoffV))
Regulation on bans and restrictions on the marketing and delivery of certain substances, mixtures and products pursuant to the Chemicals Act (ChemVerbotsV)
Ordinance on facilities for handling substances that are hazardous to water (AwSV) of 18 April 2017.
Water hazard class (WGK): 1 (slightly hazardous to water),
Self-classification on the basis of the phosphoric acid and morpholine resulting from a hydrolysis of the substance (identification numbers of phosphoric acid: 392, WGK = 1, and morpholine: 158, WGK = 1), taken from the Rigoletto database).

15.2. Chemical Safety Assessment

Not required (Total tonnage band: 0 to < 1 ton per annum)

SECTION 16: Other information

16.1 Indication of changes

Complete revision of the entire SDS on the basis of the data contained in the substance's REACH dossier.

16.2. Literature and sources

Regulations

REACH-Verordnung (EG) Nr. 1907/2006, zuletzt geändert durch Verordnung (EU) 2018/1881 der Kommission

CLP (EU-GHS)-Verordnung (EG) Nr. 1272/2008, zuletzt geändert durch die Verordnung (EU) 2018/1480

REACH registration dossiers

Trimorpholinophosphine oxide (REACH Registration No 01-2120765009-52-0000)

Registrant: Company Merck KGaA, Darmstadt, Germany

16.3. Abbreviations used

ACS	American Chemical Society (Specification of Reagent chemicals)
bw	body weight
CAS	Chemical Abstracts Service
CLP	Classification, Labelling, Packaging
DIN	German Institute for Standardization Incorporated Society - Deutsches Institut für Normung e. V.
EC	European Community
EN	European Standards
EU	European Union
GHS	Globally Harmonized System of Classification, Labelling and Packaging of Chemicals
IUPAC	International Union of Pure and Applied Chemistry
LD	Lethal dosis
OECD	Organisation for Economic Co-operation and Development
PBT	Persistent, Bioaccumulative, Toxic
REACH	Registration, Evaluation, Authorisation of Chemicals
TRGS	Technical Rules for Hazardous Substances
UN	United Nations
vPvB	very persistent and very bioaccumulative

16.4. Further information

This informations are based on our present knowledge. They do not constitute an assurance of product properties and establishes no contract legal rights.