

# Safety data sheet

according to Regulation 2018/830



**PYLONTECH**

Trade name:LFP Lithium Ion Battery  
Version 1.0

Print date: 20190212  
Issue Date:20190212

## SECTION 1. Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifier

Product name : LFP Lithium Ion Battery  
Specifications : PF25 / US2000 / US2000 PLUS / PHANTOM-S / EXTRA2000 /  
FB500 / H48050

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture : Energy storage / telecommunication backup power supply / electric car

### 1.3 Details of the supplier of the safety data sheet

Company : Pylon Technologies Co., Ltd.  
Address : No. 73, Lane 887, Zu Chongzhi Road, Zhangjiang Hi-Tech Park Pudong,  
Shanghai 201203, China  
Telephone : +86 21-51317697  
Telefax : +86 21-51317698  
E-mail address : stella.mao@pylontech.com.cn

### 1.4 Emergency telephone number

Emergency telephone number : +86 21-51317697

## SECTION 2. Hazards identification

### 2.1 Classification of the substance or mixture

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

Skin Irrit. 2	H315
Eye Dam. 1	H318
STOT RE 2	H373
Flam. Liq. 3	H226

#### 2.1.2 Additional information:

For full text of Hazard- and EU Hazard-statements: see SECTION 16.

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## 2.2 Label elements

*Labelling according to Regulation (EC) No 1272/2008 [CLP]*

*Hazard pictograms*



*Signal word:* Danger

*Hazard statements:*

H315	Causes skin irritation
H318	Causes serious eye damage
H373	May cause damage to organs through prolonged or repeated exposure
H226	Flammable liquid and vapour

*Precautionary statements:*

P264	Wash exposed skin thoroughly after handling.
P280	Wear protective gloves / protective clothing / eye protection / face protection.
P260	Do not breathe dust/fume/gas/mist/ vapours/spray.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof [electrical/ventilating/lighting] equipment.
P242	Use non-sparking tools.
P243	Take action to prevent static discharges.
P302 + P352	IF ON SKIN: Wash with plenty water
P321	Specific treatment (see section 4 on this SDS)
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P362	Take off contaminated clothing and wash before reuse.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor.
P314	Get medical advice/attention if you feel unwell.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P370 + P378	In case of fire: Use dry chemical fire extinguishers,carbon dioxide fire extinguishers,foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.

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P501 Dispose of contents/container in accordance with local/regional/national/international regulations

*Supplemental Hazard information (EU): Not applicable.*

## 2.3 Other hazards

no information available.

## SECTION 3. Composition/information on ingredients

### 3.1 Substances

Not applicable

### 3.2 Mixtures

Registration number	Classification according to Regulation (EU) 1272/2008 (CLP)	Concentration (% w/w)
	Lithium iron phosphate(CAS No:15365-14-7)(EC No:604-917-2 )	40-50%
	Graphite (CAS No:7782-42-5)(EC No:231-955-3)	15-25%
	Copper (CAS No:7440-50-8)(EC No:231-159-6 )	5-10%
	aluminium(CAS No:7429-90-5)(EC No:231-072-3)	5-10%
	Poly(vinylidene fluoride)(CAS No:24937-79-9)(EC No:607-458-6 )	5-10%
	Carbon black (CAS No:1333-86-4)(EC No:215-609-9 )	1-10%
	(PAA)/2-PROPENOIC ACID, HOMOPOLYMER(CAS No:9003-01-4)(EC No:618-347-7 )	1-5%
	Lithium hexafluorophosphate(1-) (CAS No:21324-40-3)(EC No:244-334-7)	1-5%
	Acute Tox. 3,H301 Skin Corr. 1A,H314 Eye Dam. 1,H318 STOT RE 1,H372 (Tooth, Bone)	1-5%

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nickel(CAS No:7440-02-0)(EC No:231-111-4 )		
		0.1-1.0%
Carboxymethyl cellulose sodium salt(CAS No:9004-32-4)(EC No:618-378-6)		
		0.1-1.0%
Ethylene carbonate(CAS No:96-49-1)(EC No:202-510-0)		
	Eye Irrit. 2,H319	0.1-1.0%
dimethyl carbonate (CAS No:616-38-6)(EC No:210-478-4)		
	Flam. Liq. 2,H225	0.1-1.0%
Carbonic acid, ethyl methyl ester (CAS No:623-53-0)(EC No:613-014-2)		
	Flam. Liq. 3,H226 Skin Irrit. 2,H315 Eye Irrit. 2,H319 STOT SE 3,H335	0.1-1.0%

## SECTION 4. First aid measures

### 4.1 Description of first aid measures

- General advice : If potential for exposure exists refer to Section 8 for specific personal protective equipment.
- If inhaled : Move person to fresh air; If symptoms persist, consult a physician.
- On skin contact : Take off contaminated clothing and shoes immediately. Flush contact area with lukewarm water.If irritation persists, consult a physician.
- On contact with eyes : If you use contact lenses, remove the lenses first.Wash affected eyes for at least 15 minutes under running water with eyelids held open. If symptoms occur, consult a physician, preferably an ophthalmologist.
- On ingestion : Rinse mouth immediately and then drink plenty of water, seek medical attention.

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

- Symptoms : Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

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

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Treatment : Treatment of exposure should be directed at the the clinical condition of the patient.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Dry chemical fire extinguishers.Carbon dioxide fire extinguishers.Foam.

### 5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting : During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating.Combustion generates toxic fumes of the following: Carbon oxides.

### 5.3 Advice for firefighters

Special protective equipment : Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves).If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Further information : No information available.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Avoid breathing vapor.Avoid skin contact.Ensure adequate ventilation.Remove all sources of ignition. Use personal protective equipment.

### 6.2 Environmental precautions

Environmental precautions : Prevent from entering into soil, ditches, sewers, waterways and/or groundwater.

### 6.3 Methods and materials for containment and cleaning up

Methods for cleaning up : Contain spilled material if possible.Collect in suitable and properly labeled containers.Then store and dispose of according to local regulations.

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## 6.4 Reference to other sections

References to other sections, if applicable, have been provided in the previous sub-sections.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Advice on safe handling : Avoid breathing vapors.Avoid contact with the skin, eyes and clothing.Wear safety glasses with side shields.

Advice on protection against fire and explosion : Sources of ignition should be kept well clear.

### 7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep container tightly closed in a cool, well-ventilated place.Keep away from heat, sparks and flames.

### 7.3 Specific end use(s)

no data available

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

Chemical name	Occupational Exposure Limits		Regulation
Graphite	TWA	2 mg/m <sup>3</sup>	Belgium
Graphite	TWA	2 mg/m <sup>3</sup> ,5 mg/m <sup>3</sup> respirable aerosol	Denmark
Graphite	STEL	5 mg/m <sup>3</sup> respirable aerosol	Denmark
Graphite	TWA	2 mg/m <sup>3</sup>	Finland
Graphite	TWA	2 mg/m <sup>3</sup> respirable aerosol	France
Graphite	TWA	4 mg/m <sup>3</sup> inhalable aerosol, 1 mg/m <sup>3</sup> ,5 mg/m <sup>3</sup> respirable aerosol	Germany (DFG)

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Graphite	TWA	10 mg/m3,4 mg/m3	Ireland
Graphite	TWA	2 mg/m3 (1	Latvia
Graphite	TWA	2 mg/m3 inhalable aerosol	Spain
Graphite	TWA	5 mg/m3 inhalable aerosol	Sweden
Graphite	TWA	5 mg/m3 inhalable aerosol,2 mg/m3,5 mg/m3 respirable aerosol	Switzerland
Graphite	TWA	10 mg/m3 inhalable aerosol,4 mg/m3 respirable aerosol	United Kingdom
Aluminium metal	TWA	5 mg/m3 inhalable aerosol,2 mg/m3 respirable aerosol	Denmark
Aluminium metal	STEL	10 mg/m3 inhalable aerosol,4 mg/m3 respirable aerosol	Denmark
Aluminium metal	TWA	10 mg/m3 inhalable aerosol,5 mg/m3 respirable aerosol	France
Aluminium metal	TWA	4 mg/m3 inhalable aerosol,1 mg/m3,5 mg/m3 respirable aerosol	Germany (DFG)
Aluminium metal	TWA	6 mg/m3 respirable aerosol	Hungary
Aluminium metal	TWA	1 mg/m3	Ireland
Aluminium metal	TWA	2 mg/m3	Latvia
Aluminium metal	TWA	10 mg/m3	New Zealand
Aluminium metal	TWA	10 mg/m3 inhalable aerosol,5 mg/m3 respirable aerosol	Spain
Aluminium metal	TWA	3 mg/m3 respirable aerosol	Switzerland
Aluminium metal	TWA	10 mg/m3 inhalable aerosol,4 mg/m3 respirable aerosol	United Kingdom
Carbon black	TWA	3 mg/m3,5 mg/m3	Belgium
Carbon black	TWA	3 mg/m3,5 mg/m3	Denmark
Carbon black	STEL	7 mg/m3,0 mg/m3	Denmark
Carbon black	TWA	3 mg/m3,5 mg/m3	Finland
Carbon black	STEL	7 mg/m3	Finland
Carbon black	TWA	3 mg/m3,5 mg/m3	France
Carbon black	TWA	3 mg/m3,5 mg/m3	Ireland
Carbon black	STEL	7 mg/m3	Ireland
Carbon black	TWA	3 mg/m3,5 mg/m3	Spain

## 8.2 Exposure controls

- Eye protection : Not required under normal conditions. If battery case is damaged, wear chemical goggles or face shield.
- Hand protection : None required under normal conditions. Wear safety glasses if handling a damaged battery.
- Body and skin protection : Where there is potential for skin contact, have available and wear as appropriate, impervious gloves, apron, pants, jacket, hood and boots.

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General safety and hygiene measures : Wash hands before breaks and after handling the product.

Respiratory protection : None required under normal conditions.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Appearance: : Solid

Odour : no data available

Odour threshold : no data available

pH : no data available

Melting point : not applicable

Boiling point : not applicable

Flash point : 33 °C

Evaporation rate : no data available

Flammability (solid, gas) : not applicable

Upper/lower flammability or explosive limits : no data available

Vapour pressure : no data available

Vapour density : no data available

Relative density : no data available

Water solubility : insoluble

Partition coefficient: n-octanol/water : no data available

Auto-ignition temperature : no data available

Decomposition temperature : no data available



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Viscosity, dynamic : no data available

Explosive properties : none

Oxidising properties : none

**9.2 Other information** :  
no data available

## SECTION 10: Stability and Reactivity

**10.1 Reactivity** : No hazardous reactions if stored and handled as prescribed/indicated.

**10.2 Chemical stability** : Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions** : This product is considered stable.However, avoid contact with ignition sources (e.g. sparks, open flame, heated surfaces).

**10.4 Conditions to avoid** : Avoid all sources of ignition: heat, sparks, open flame.

**10.5 Incompatible materials** : Strong oxidizers.

**10.6 Hazardous decomposition products** : No hazardous decomposition products if stored and handled as prescribed/indicated.

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

#### Information on toxicological effects

#### Acute toxicity

#### Acute Toxicity: oral

Nickel

LD50/rat:> 9 000 mg/kg bw

Lithium hexafluorophosphate(1-)

LD50/rat:50 - 300 mg/kg bw

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Graphite

LD50/rat:> 2 000 mg/kg bw

Ethylene carbonate

LD50/rat:10 400 mg/kg bw

Dimethyl carbonate

LD50/rat:> 5 000 mg/kg bw

Copper

LD50/rat:300 - 500 mg/kg bw

Carbon black

LD50/rat:> 8 000 mg/kg bw

Aluminium

LD50/rat:> 15 900 mg/kg bw

## **Acute Toxicity: inhalation**

Nickel

NOAEC/66 min/rat:>= 10.2 mg/L air

Graphite

LC50/4 h/rat:> 2 000 mg/m<sup>3</sup>; air

Ethylene carbonate

LC0/8 h/rat:730 mg/m<sup>3</sup>; air

Dimethyl carbonate

LC50/4 h/rat:> 5.36 mg/L air (analytical)

Copper

LC50/4 h/rat:> 5.11 mg/L air

Aluminium

LC0/4 h/rat:0.888 mg/L air (analytical)

## **Acute Toxicity: dermal**

Ethylene carbonate

LD50/rat:> 2 000 mg/kg bw

Dimethyl carbonate

LD50/rabbit:> 2 000 mg/kg bw

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Copper

LD50/rat:> 2 000 mg/kg bw

## **Skin irritation/corrosion**

Nickel

rabbit

not irritating

Lithium hexafluorophosphate(1-)

human

corrosive

Graphite

rabbit

not irritating

Ethylene

carbonate rabbit

not irritating

Dimethyl

carbonate rabbit

not irritating

Copper

rabbit

not irritating

Aluminium

rabbit

not irritating

## **Serious eye damage/irritation**

Nickel

rabbit

not irritating

Lithium hexafluorophosphate(1-)

Fresh, fertilised brown leghorn chicken eggs

severe irritant

Graphite

rabbit

not irritating

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Ethylene carbonate  
rabbit  
Category 2 (irritating to eyes) based on GHS criteria

Dimethyl carbonate  
rabbit  
not irritating

Copper  
rabbit  
slightly irritating

Carbon black  
rabbit  
not irritating

Aluminium  
rabbit  
not irritating

## **Respiratory or skin sensitisation**

Lithium hexafluorophosphate(1-)  
mouse  
not sensitising

Graphite  
mouse  
not sensitising

Ethylene carbonate  
guinea pig non-  
sensitizer

Dimethyl carbonate  
guinea pig  
not sensitising

Copper  
guinea pig not  
sensitising

Carbon black  
guinea pig not  
sensitising

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Aluminium  
guinea pig not  
sensitising

## **Germ cell mutagenicity: in vitro**

Lithium hexafluorophosphate(1-)  
negative

Graphite  
negative

Ethylene carbonate  
negative

Dimethyl carbonate  
negative

Copper  
negative

Carbon black  
negative

Aluminium  
negative

## **Germ cell mutagenicity: in vivo**

Lithium hexafluorophosphate(1-)  
negative

Dimethyl carbonate  
negative

Copper  
negative

Carbon black  
negative

Aluminium  
negative

## **Carcinogenicity**

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Nickel

Suspected of causing cancer.

Ethylene carbonate

No evidence of carcinogenicity in the study animals was observed.

Carbon black

No evidence of carcinogenicity in the study animals was observed.

Aluminium

No evidence of carcinogenicity in the study animals was observed.

## **Reproductive toxicity**

Lithium hexafluorophosphate(1-)

Animal tests showed no developmental toxicity

Graphite

Animal tests showed no developmental toxicity

Ethylene carbonate

Animal tests showed no developmental toxicity

Dimethyl carbonate

Animal tests showed no developmental toxicity

Copper

Animal tests showed no developmental toxicity

Carbon black

Animal tests showed no developmental toxicity

Aluminium

Animal tests showed no developmental toxicity

## **STOT-single exposure**

No information available

## **STOT-repeated exposure**

No information available

## **Aspiration hazard**

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No information available

## SECTION 12: Ecological information

### 12.1 Toxicity

Short-term toxicity to fish

Nickel

LC50/96 h/Oncorhynchus mykiss (previous name: Salmo gairdneri):15.3 mg/L

Lithium hexafluorophosphate(1-)

EC50/96 h/other: Oncorhynchus mykiss, Salmo Trutta:51 mg/L

Graphite

LC50/96 h/Danio rerio (previous name: Brachydanio rerio):> 100 mg/L

Carbon black

LC0/96 h/Danio rerio (previous name: Brachydanio rerio):1 000 mg/L

Aluminium

LC50/96 h/Pimephales promelas:1.16 mg/L

Long-term toxicity to fish

Nickel

NOEC/32 d/Pimephales promelas:0.057 mg/L

Lithium hexafluorophosphate(1-)

LC50/20 d/other: Rainbow trout (Neuhold and Sigler, 1960). Rainbow and brown trout (Camargo, 1966)

Aluminium

NOEC/7 d/Pimephales promelas:0.4 mg/L

Short-term toxicity to aquatic invertebrates

Nickel

LC50/48 h/Ceriodaphnia dubia:276 &micro;g/L

Lithium hexafluorophosphate(1-)

LC50/48 h/Daphnia magna:> 100 mg/L

Graphite

NOEC/48 h/Daphnia magna:>= 100 mg/L

Carbon black

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EC100/24 h/Daphnia magna:10 000 mg/L

Aluminium  
LC50/48 h/Ceriodaphnia dubia:0.72 mg/L

Long-term toxicity to aquatic invertebrates

Nickel  
EC10/10 d/other: Chironomus tentans (now known as Chironomus dilutus):404.3 µg/L

Lithium hexafluorophosphate(1-)  
NOEC/21 d/Daphnia magna:3.7 mg/L

Aluminium  
NOEC/6 d/Ceriodaphnia dubia:1.02 mg/L

Toxicity to microorganisms

Nickel  
EC50/30 min/activated sludge:33 mg/L

Lithium hexafluorophosphate(1-)  
EC50/3 h/activated sludge of a predominantly domestic sewage:> 1 000 mg/L

Graphite  
EC20/3 h/activated sludge of a predominantly domestic sewage:> 1 012.5 mg/L

Carbon black  
EC10/3 h/activated sludge, domestic:ca. 800 mg/L

## 12.2 Persistence and degradability

Lithium hexafluorophosphate(1-)  
Rapid reaction with water releases HF and LiF, leading to production of dissolved F<sup>-</sup> ions; subsequently, release of Li<sup>+</sup> and PO<sub>4</sub>(3<sup>-</sup>) ions will follow.

## 12.3 Bioaccumulative potential

No data available

## 12.4 Mobility in soil

No data available

## 12.5 Results of PBT and vPvB assessment



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No data available

## 12.6 Other adverse effects

No data available

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

**Product** : Observe national and local legal requirements.

**Contaminated packaging** : Uncontaminated packaging can be re-used.

## SECTION 14: Transport Information

### Land transport

ADR

14.1. UN number : 3480  
14.2. UN proper shipping : LITHIUM ION BATTERIES  
name:  
14.3. Transport hazard : 9  
class(es):  
14.4. Packing group : II  
14.5. Environmental : Yes  
hazards  
14.6. Special : none  
precautions for user

### Sea transport

IMDG

14.1. UN number : 3480  
14.2. UN proper shipping : LITHIUM ION BATTERIES  
name:  
14.3. Transport hazard : 9  
class(es):  
14.4. Packing group : II  
14.5. Environmental : Yes  
hazards

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14.6. Special : none  
precautions for user

## Air transport

IATA/ICAO

14.1. UN number: : 3480  
14.2.UN proper shipping : LITHIUM ION BATTERIES  
name:  
14.3. Transport hazard : 9  
class(es):  
14.4. Packing group: : II  
14.5. Environmental : Yes  
hazards:  
14.6. Special : none  
precautions for user

## 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

## SECTION 15: Regulatory information

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

Other regulations : Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

### 15.2 Chemical Safety Assessment

A Chemical Safety Assessment/Chemical Safety Report may not be required because: substance(s) are exempted from being registered under REACH, are not yet registered under REACH, are registered under another regulatory process (biocide uses, plant protection products), the volume is below the 10 tons/year threshold specified under Art.14(1) of REACH, the concentration of substance(s) in a mixture is/are below the limits specified under Art. 14(2) of REACH.

## SECTION 16: Other information

### Full text of H-Statements referred to under section 3.

H301 Toxic if swallowed  
H314 Causes severe skin burns and eye damage  
H315 Causes skin irritation

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H318	Causes serious eye damage
H319	Causes serious eye irritation
H225	Highly flammable liquid and vapour
H226	Flammable liquid and vapour
H335	May cause respiratory irritation
H372	Causes damage to organs through prolonged or repeated exposure

## Abbreviations and acronyms

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute toxicity estimate
CAS-No.	Chemical Abstracts Service number
CLP	Classification, Labelling and Packaging
EbC50	Concentration at which 50% reduction of biomass is observed
EC50	Median effective concentration
EN	European Norm
EPA	Environmental Protection Agency
ErC50	Concentration at which a 50% inhibition of growth rate is observed
EyC50	Concentration at which 50 % inhibition of yield is observed
IATA_C	International Air Transport Association (Cargo)
IBC	International Bulk Chemical Code
ICAO	International Civil Aviation Organization
ISO	International Standard Organization
IMDG	International Maritime Dangerous Goods
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
LOEC	Lowest Observed Effect Concentration
LOEL	Lowest observed effect level
MARPOL	International Convention for the Prevention of Marine Pollution from
n.o.s.	Not Otherwise Specified
NOAEC	No Observed Adverse Effect Concentration
NOAEL	No observed adverse effect level
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
OECD	Organisation for Economic Co-operation and Development
OPPTS	Office of Prevention, Pesticides and Toxic Substances
PBT	Persistent, Bioaccumulative and Toxic
STEL	Short term exposure limit
TWA	Time Weighted Average (TWA)
vPvB	very Persistent and very Bioaccumulative

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