TIOXIDE® TR92

Version	Revision Date:	SDS Number:	Date of last issue: 03/07/2019
2.4	03/07/2019	400001000044	Date of first issue: 10/15/2016

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : TIOXIDE® TR92

Manufacturer or supplier's details

Company name of supplier : Venator Americas LLC
Address : 10001 Woodloch Forest Drive
The Woodlands,
TX 77380
United States of America (USA)
Telephone : (001) 844 831 6720
Telefax : (001) 281 465 6731

E-mail address of person responsible for the SDS : msds@venatorcorp.com

Emergency telephone number : USA & Canada: +1-800-424-9300 Other Americas: +1-703-741-5970 [CCN 820025]

Recommended use of the chemical and restrictions on use

Recommended use : Opacifying agent
Pigment

Restrictions on use : Do not use for cosmetics, food additives, drug additives, feed additives or permanent implant applications., Due to lack of related experience or data, the supplier cannot approve this use.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Not a hazardous substance or mixture.

GHS label elements

Not a hazardous substance or mixture.

Other hazards

Handling and/or processing of this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose and throat.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Chemical nature : inorganic

Hazardous components

Chemical name	CAS-No.	Concentration (% w/w)

titanium dioxide	13463-67-7	90 - 100
aluminium oxide	1344-28-1	1 - 5

SECTION 4. FIRST AID MEASURES

General advice	:	Do not leave the victim unattended. Treat symptomatically.
If inhaled	:	Remove person to fresh air. If signs/symptoms continue, get medical attention. If unconscious, place in recovery position and seek medical advice.
In case of skin contact	:	Wash off with soap and water.
In case of eye contact	:	Rinse immediately with plenty of water, also under the eyelids. Remove contact lenses. Protect unharmed eye. If eye irritation persists, consult a specialist.
If swallowed	:	Rinse mouth with water. If conscious, make the victim drink the following: Give small amounts of water to drink. Do not induce vomiting without medical advice. Consult a physician if necessary.
Most important symptoms and effects, both acute and delayed	:	Dust contact with the eyes can lead to mechanical irritation. Inhalation of dust may cause shortness of breath, tightness of the chest, a sore throat and cough. The product is not irritant but as with all fine powders can absorb moisture and natural oils from the surface of the skin during prolonged exposure. Individuals with sensitive skin may experience skin drying on prolonged or repeated exposure.
Protection of first-aiders	:	No action shall be taken involving any personal risk or without suitable training.
Notes to physician	:	No specific measures identified.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Product is compatible with standard fire-fighting agents.
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during firefighting	:	No information available.
Hazardous combustion	:	No hazardous combustion products are known

products

Specific extinguishing methods	:	Cool containers/tanks with water spray.Standard procedure for chemical fires.Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	No action shall be taken involving any personal risk or without suitable training. Prevent unauthorised persons entering the zone. Avoid dust formation. Remove all sources of ignition. Ventilate the area. Avoid breathing dust. Keep people away from and upwind of spill/leak. Only qualified personnel equipped with suitable protective equipment may intervene. Never return spills in original containers for re-use. Treat recovered material as described in the section "Disposal considerations". For disposal considerations see section 13. The danger areas must be delimited and identified using relevant warning and safety signs.
Environmental precautions	:	Try to prevent the material from entering drains or water courses. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Clean-up methods - small spillage Clean up promptly by sweeping or vacuum. Keep in suitable, closed containers for disposal. Clean-up methods - large spillage Approach release from upwind. Clean up promptly by sweeping or vacuum. Avoid creating dusty conditions and prevent wind dispersal. Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Technical measures	:	Ensure that eyewash stations and safety showers are close to the workstation location.
Local/Total ventilation	:	Use only with adequate ventilation.

Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Advice on safe handling	:	For personal protection see section 8. Avoid creating dust. Smoking, eating and drinking should be prohibited in the application area. Manual handling guidelines should be adhered to when handling sacks. In the manufacture of titanium dioxide, product is packaged at temperatures of approximately 100 to 120° C (212 to 248° Fahrenheit). When pigment is shipped shortly after manufacture, it may stay hot for a very long time depending on ambient temperatures and inventory storage practices. Due to the potential of elevated pigment temperature, caution should be used while handling pigment and in solvent applications. Each work environment must be assessed to determine hazards. Emptying of flexible intermediate bulk containers (FIBC's) can generate static electricity. Customers using FIBC's should consult leaflet "Tiotainer® Handling Guidelines". Empty FIBC's by gravity only (do not empty pneumatically). Remove all wrapping prior to emptying FIBC's. In all cases, the protective cover or wrapping should remain in place during storage and only be removed immediately prior to use. Care should be taken to avoid moisture, particularly with a partly used pallet of material. When transferring from one container to another apply earthing measures and use conductive hose material.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Smoking, eating and drinking should be prohibited in the application area. Wash face, hands and any exposed skin thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas. Barrier creams may help to protect the exposed areas of skin, they should however not be applied once exposure has occurred. Wash hands before breaks and at the end of workday.
Conditions for safe storage	:	Store in accordance with the particular national regulations. Keep only in the original container in a cool, well ventilated place away from oxidizing agents. Keep in a dry place. Keep cool. Protect from sunlight. Eliminate all ignition sources if safe to do so. Keep container closed when not in use. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Use appropriate container to avoid environmental contamination.

When using standard pallets, those containing paper or plastics bags can be stacked to a maximum of 2 high.

Materials to avoid : No materials to be especially mentioned.

Storage period : 12 Months

Further information on storage stability : Keep in a dry place.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
titanium dioxide	13463-67-7	LMPE-PPT	10 mg/m3 (Titanium)	MX OEL
		LMPE-CT	20 mg/m3 (Titanium)	MX OEL
		VLE-PPT	10 mg/m3	NOM-010-STPS-2014
		TWA	10 mg/m3 (Titanium dioxide)	ACGIH
aluminium oxide	1344-28-1	LMPE-PPT	10 mg/m3	MX OEL
		VLE-PPT	10 mg/m3	NOM-010-STPS-2014
		TWA (Respirable fraction)	1 mg/m3 (Aluminium)	ACGIH

Engineering measures : Ensure adequate ventilation, especially in confined areas. Use engineering controls to keep exposures below the OEL or DNEL

Personal protective equipment

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines

Filter type : P2 filter

Hand protection
Directive : Use gloves approved to relevant standards e.g. EN 374 (Europe), F739 (US).

Eye protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
Ensure that eyewash stations and safety showers are close

to the workstation location.

Skin and body protection	:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Protective measures	:	Wear suitable protective equipment.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	powder
Colour	:	white
Odour	:	slight
Odour Threshold	:	No data is available on the product itself.
pH	:	6.5 - 9Concentration: 100 g/l
Melting point	:	ca. 1,800 °C
Initial boiling point and boiling range	:	Not applicable
Flash point	:	Not applicable
Evaporation rate	:	No data is available on the product itself.
Flammability (solid, gas)	:	Not expected to form explosive dust-air mixtures.
Flammability (liquids)	:	No data is available on the product itself.
Burning rate	:	Will not burn Not combustible.
Upper explosion limit / Upper flammability limit	:	No data is available on the product itself.
Lower explosion limit / Lower flammability limit	:	No data is available on the product itself.
Vapour pressure	:	No data is available on the product itself.
Relative vapour density	:	No data is available on the product itself.
Relative density	:	4.05 (20 °C)
Density	:	4.05 g/cm3 (20 °C) Skeletal density

Solubility(ies)		
Water solubility	:	Not applicable
Solubility in other solvents	:	Solvent: Methanol Description: insoluble
Partition coefficient: n-octanol/water	:	No data is available on the product itself.
Auto-ignition temperature	:	No data is available on the product itself.
Thermal decomposition	:	No data is available on the product itself.
Self-Accelerating decomposition temperature (SADT)	:	No data is available on the product itself.
Viscosity	:	No data is available on the product itself.
Explosive properties	:	No data is available on the product itself.
Oxidizing properties	:	None.
Impact sensitivity	:	Not impact sensitive.
Particle size	:	No data is available on the product itself.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	No decomposition if stored and applied as directed.
Possibility of hazardous reactions	:	Stable under recommended storage conditions. No hazards to be specially mentioned.
Conditions to avoid	:	No data available
Incompatible materials	:	None known.
Hazardous decomposition products	:	At high temperature, decomposition products could include trace of alpha-ethyl acrolein and formaldehyde.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	:	No data is available on the product itself.

Acute toxicity

Components:

titanium dioxide**:**

Acute oral toxicityComponents	:	LD50 (Rat, female): > 5,000 mg/kg Method: OECD Test Guideline 425 Assessment: The substance or mixture has no acute oral

toxicity

aluminium oxide:
Acute oral toxicityComponents : LD50 (Rat, male and female): > 10,000 mg/kg
Method: OECD Test Guideline 401

Components:

titanium dioxide:
Acute inhalation toxicity : LC50 (Rat, male and female): 3.43 - 5.09 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
Assessment: The substance or mixture has no acute inhalation toxicity

aluminium oxide:
Acute inhalation toxicity : LC50 (Rat, male and female): > 2.3 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity - Product : Acute toxicity estimate : > 5,000 mg/kg
Method: Calculation method

Acute toxicity (other routes of administration) : No data available

Skin corrosion/irritation

Components:

titanium dioxide:
Species: Rabbit
Assessment: No skin irritation
Method: OECD Test Guideline 404
Result: Normally reversible injuries

aluminium oxide:
Species: Rabbit
Assessment: No skin irritation
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation

Components:

titanium dioxide:
Species: Rabbit
Result: Normally reversible injuries

Assessment: No eye irritation
Method: OECD Test Guideline 405

aluminium oxide**:**
Species: Rabbit
Result: No eye irritation
Assessment: No eye irritation
Method: OECD Test Guideline 405

Respiratory or skin sensitisation

Components:

titanium dioxide**:**
Test Type: Local lymph node assay (LLNA)
Exposure routes: Skin
Species: Mouse
Assessment: Does not cause skin sensitisation.
Method: OECD Test Guideline 429
Result: Does not cause skin sensitisation.

Exposure routes: Skin
Species: Guinea pig
Assessment: Does not cause skin sensitisation.
Method: OECD Test Guideline 406
Result: Does not cause skin sensitisation.

aluminium oxide**:**
Exposure routes: Skin
Species: Guinea pig
Result: Does not cause skin sensitisation.

Components:

titanium dioxide**:**

Assessment:	No skin irritation, No eye irritation Does not cause skin sensitisation., Does not cause respiratory sensitisation.

Germ cell mutagenicity

Components:

titanium dioxide**:**

Genotoxicity in vitro	:	Test Type: Ames test Concentration: 100 - 200 ug/plate Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 471 Result: negative Test Type: In vitro mammalian cell gene mutation test Concentration: 31 - 500 µg/L Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 476 Result: negative Test Type: Chromosome aberration test in vitro Concentration: 125 - 2500 µg/L

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Components:

titanium dioxide:

Genotoxicity in vivo : Test Type: Micronucleus test
Species: Mouse (males)
Application Route: Inhalation
Exposure time: 5 consecutive days
Dose: 0.8, 7.2, and 28.5 mg/m³
Method: OECD Test Guideline 474
Result: negative

Test Type: Micronucleus test
Species: Rat (male and female)
Application Route: Oral
Exposure time: once
Dose: 500, 1000, and 2000 mg/kg bw
Method: OECD Test Guideline 474
Result: negative

Components:

titanium dioxide:

Germ cell mutagenicity-Assessment : Tests on bacterial or mammalian cell cultures did not show mutagenic effects., Animal testing did not show any mutagenic effects.

Germ cell mutagenicity-Assessment : No data available

Carcinogenicity

Components:

titanium dioxide:
Species: Rat, male and female
Application Route: Oral
Exposure time: 103 weeks
Dose: 0, 25000, 50000 ppm
Frequency of Treatment: 7 days/week
NOAEL: > 50.000 ppm

Method: No information available.
Remarks: Titanium Dioxide: based on the results of chronic inhalation studies (with positive results only in a single species - rat), IARC has concluded that: "There is inadequate evidence in humans for the carcinogenicity of titanium dioxide. " but that : "There is sufficient evidence in experimental animals for carcinogenicity of titanium dioxide". IARCs overall evaluation was that "titanium dioxide is possibly carcinogenic to humans (Group 2B)."

Venator has examined all of the available animal carcinogenicity and mechanistic data together with workplace epidemiology data for titanium dioxide and concludes that the weight of scientific evidence indicates that there is no causative link between titanium dioxide exposure and cancer risk in humans and that workplace exposures in compliance with applicable exposure standards will not result in lung cancer or chronic respiratory diseases in humans.

Components:

titanium dioxide:

Carcinogenicity - Assessment : Not classifiable as a human carcinogen.

Reproductive toxicity

Components:

aluminium oxide:

Effects on fertility : Species: Rat, male and female
Application Route: Oral
Dose: 1000 milligram per kilogram
Method: OECD Test Guideline 422
Result: Animal testing did not show any effects on fertility.

Components:

titanium dioxide:

Effects on foetal development : Species: Rat, male and female
Application Route: Oral
Dose: 100, 300, and 1000 mg/kg bw/
Duration of Single Treatment: 20 d
Frequency of Treatment: 7 days/week
General Toxicity Maternal: No observed adverse effect level: 1,000 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: 1,000 mg/kg body weight
Method: OECD Test Guideline 414
Result: No adverse effects

aluminium oxide:

Species: Rat
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: 266 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Components:

titanium dioxide:

Reproductive toxicity - Assessment : No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.

STOT - single exposure

No data available

STOT - repeated exposure

No data available

Repeated dose toxicity

Components:

titanium dioxide**:**
Species: Rat, male and female
: 3500 mg/m3
Application Route: Ingestion
Test atmosphere: dust/mist
Exposure time: 2 yr
Number of exposures: 5 d
Method: Chronic toxicity

Species: Rat, male and female
: 10 - 50 mg/m3
Application Route: Inhalation
Exposure time: 2 yr
Number of exposures: 6 hours/day, 5 days/week
Method: Chronic toxicity

Components:

titanium dioxide**:**

Repeated dose toxicity - Assessment	:	No skin irritation, No eye irritation No adverse effect has been observed in chronic toxicity tests.

Aspiration toxicity

No data available

Experience with human exposure

General Information:	No data available
Inhalation:	No data available
Skin contact:	No data available
Eye contact:	No data available
Ingestion:	No data available

Toxicology, Metabolism, Distribution

No data available

Neurological effects

No data available

Further information

Ingestion:	No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

titanium dioxide:

Toxicity to fish	:	LC50 (Cyprinodon variegatus (sheepshead minnow)): > 10,000 mg/l Exposure time: 96 h Test Type: semi-static test Test substance: Marine water Method: OECD Test Guideline 203

aluminium oxide:

Toxicity to fish	:	LC50 (Fish): > 50 mg/l Exposure time: 96 h Test Type: static test Test substance: Fresh water

Components:

aluminium oxide:

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h

Components:

aluminium oxide:

Toxicity to algae	:	IC50 (Selenastrum capricornutum (green algae)): > 100 mg/l Exposure time: 72 h
M-Factor (Acute aquatic toxicity)	:	No data available
Toxicity to fish (Chronic toxicity)	:	No data available
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	No data available
M-Factor (Chronic aquatic toxicity)	:	No data available
Toxicity to microorganisms	:	No data available
Toxicity to soil dwelling organisms	:	No data available

Components:

titanium dioxide:

Plant toxicity	:	NOEC: 100,000 mg/kg Exposure time: 480 h

Components:

titanium dioxide:

Sediment toxicity : (Gammarus pulex (Amphipod)): > 100000 mg/kgsedimentdw
Study: Acute
Test Type: semi-static test
Water: Fresh water
Exposure duration: 28 d
Method: ASTM Method, other

(Gammarus pulex (Amphipod)): 100000 mg/kgsedimentdw
Study: Chronic
Test Type: semi-static test
Water: Fresh water
Exposure duration: 28 d
Method: ASTM Method, other

(Gammarus pulex (Amphipod)): 14989 mg/kgsedimentdw
Study: Acute
Test Type: semi-static test
Water: Marine water
Exposure duration: 10 d

Components:

titanium dioxide:

Toxicity to terrestrial organisms : NOEC: 10,000 mg/kg
Exposure time: 672 h

Ecotoxicology Assessment

Components:

aluminium oxide:

Acute aquatic toxicity : This product has no known ecotoxicological effects.

Components:

aluminium oxide:

Chronic aquatic toxicity : This product has no known ecotoxicological effects.

Toxicity Data on Soil : No data available

Other organisms relevant to the environment : No data available

Persistence and degradability

Biodegradability - Product : Remarks: The methods for determining biodegradability are not applicable to inorganic substances.

Remarks: The methods for determining biodegradability are not applicable to inorganic substances.

Biochemical Oxygen Demand (BOD) : No data available

Chemical Oxygen Demand (COD)	:	No data available
BOD/COD	:	No data available
ThOD	:	No data available
BOD/ThOD	:	No data available
Dissolved organic carbon (DOC)	:	No data available
Physico-chemical removability	:	No data available
Stability in water	:	No data available
Photodegradation	:	No data available
Impact on Sewage Treatment	:	No data available

Bioaccumulative potential

Components:

titanium dioxide:

Bioaccumulation	:	Species: Oncorhynchus mykiss (rainbow trout) Bioconcentration factor (BCF): 19 - 352 Exposure time: 14 d Test substance: Fresh water Method: semi-static test Remarks: Does not bioaccumulate.
Partition coefficient: n-octanol/water	:	No data available

Mobility in soil

Mobility	:	No data available

Components:

titanium dioxide:

Distribution among environmental compartments	:	Remarks: No data available
Stability in soil	:	No data available

Other adverse effects

Environmental fate and pathways	:	No data available
Results of PBT and vPvB assessment	:	No data available

Endocrine disrupting potential	:	No data available
Adsorbed organic bound halogens (AOX)	:	No data available

Hazardous to the ozone layer

Ozone-Depletion Potential	Not applicable

Additional ecological information - Product	:	No data available
Global warming potential (GWP)	:	No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. This material and its container must be disposed of in a safe way. In accordance with local and national regulations. Dispose of wastes in an approved waste disposal facility. If recycling is not practicable, dispose of in compliance with local regulations.
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA
Not regulated as dangerous goods

IMDG
Not regulated as dangerous goods

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations

NOM-002-SCT
Not regulated as dangerous goods

Special precautions for user

Remarks : Not classified as dangerous in the meaning of transport regulations.

SECTION 15. REGULATORY INFORMATION

The components of this product are reported in the following inventories:

CH INV	:	On the inventory, or in compliance with the inventory
DSL	:	All components of this product are on the Canadian DSL
AICS	:	On the inventory, or in compliance with the inventory
NZIoC	:	On the inventory, or in compliance with the inventory
ENCS	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory
TCSI	:	On the inventory, or in compliance with the inventory
TSCA	:	On the inventory, or in compliance with the inventory

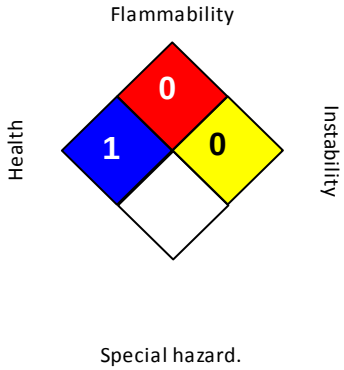
Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

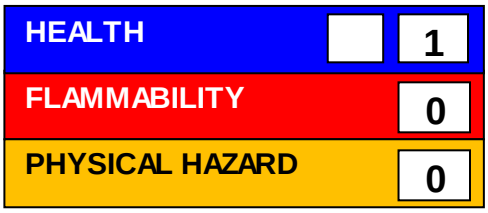
SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



HMIS® IV:



HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Sources of key data used to compile the Safety Data Sheet	:	Information taken from reference works and the literature., Information derived from practical experience.
Revision Date	:	03/07/2019
ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
MX OEL	:	Mexico. Occupational Exposure Limits
NOM-010-STPS-2014	:	Mexico. Norm NOM-010-STPS-2014 on Chemicals Polluting the Work Environment - Identification, Assessment and Control - Appendix 1 Occupational Exposure Limits
ACGIH / TWA	:	8-hour, time-weighted average
MX OEL / LMPE-PPT	:	Time weighted average
MX OEL / LMPE-CT	:	Short term exposure limit
NOM-010-STPS-2014 / VLE-PPT	:	Time weighted average limit value

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