

Rotation Ligature Ties (Pletcher Springs, Tie Hooks, Power Pins, Teflon®* Coated Ligature Wires, Preformed Ligature Wires, Mini-Twisted Kobayashi Ligatures)

Section 1. Identification

Product identifier : Rotation Ligature Ties (Pletcher Springs, Tie Hooks, Power Pins, Teflon®* Coated Ligature Wires, Preformed Ligature Wires, Mini-Twisted Kobayashi Ligatures)

Product code : Not available.

Other means of identification : Not available.

Product type : Solid.

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

Product use : Dental product: Orthodontic Appliance
This product, under the normal conditions of use, meets the definition of an "ARTICLE".

Area of application : Professional applications.

Manufacturer : **Ormco Corporation**
1332 S. Lone Hill Avenue
Glendora, CA 91740-5339
Telephone no.: 1-800-854-1741

e-mail address of person responsible for this SDS : OrmcoCustCare@sybrondental.com

Emergency telephone number (with hours of operation) : CHEMTREC® (24 hours) U.S. : 1-800-424-9300 International: +1-703-527-3887

Section 2. Hazard identification

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Supplemental label elements : Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 69.8%

Other hazards which do not result in classification : If dust or fumes are generated during processing (e.g., brazing, cutting, grinding, sawing, and welding) hazardous chemicals could be released.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture
Other means of identification : Not available.

Ingredient name	% (w/w)	CAS number
nickel	<45	7440-02-0
cobalt	>31	7440-48-4
molybdenum	<18	7439-98-7
manganese	<12.5	7439-96-5
tungsten	<6.5	7440-33-7
silicon	<4.5	7440-21-3
Aluminium powder (stabilized)	<3.5	7429-90-5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First-aid measures

Description of necessary first aid measures

Eye contact : No special measures are required. Get medical attention if symptoms occur.
Inhalation : No special measures required. Get medical attention if symptoms occur.
Skin contact : No special measures required. Get medical attention if symptoms occur.
Ingestion : If swallowed then seek immediate medical assistance.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments : No specific treatment.
Protection of first-aiders : In case of major fire and large quantities: No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
metal oxide/oxides
Fluoride compounds
Hydrogen fluoride (HF).

Special protective actions for fire-fighters : In case of major fire and large quantities: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Low release. For professional use only. Handling of product in very small amounts or in situations where release is highly unlikely

For emergency responders : Low release. See also the information in "For non-emergency personnel".

Environmental precautions : No special measures are required.

Methods and materials for containment and cleaning up

Small spill : No special measures required.

Large spill : No special measures required.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : No special measures are required.

Advice on general occupational hygiene : No special measures are required.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Section 8. Exposure controls/personal protection

Ingredient name	Exposure limits
Nickel	<p>CA Saskatchewan Provincial (Canada, 7/2013). STEL: 3 mg/m³ 15 minutes. Form: Inhalable fraction TWA: 1.5 mg/m³ 8 hours. Form: Inhalable fraction</p> <p>CA Ontario Provincial (Canada, 7/2015). TWA: 1 mg/m³ 8 hours. Form: Inhalable fraction.</p> <p>CA Alberta Provincial (Canada, 4/2009). 8 hrs OEL: 1.5 mg/m³ 8 hours.</p> <p>CA British Columbia Provincial (Canada, 5/2015). TWA: 0.05 mg/m³, (as Ni) 8 hours.</p> <p>CA Quebec Provincial (Canada, 1/2014). TWAEV: 1 mg/m³ 8 hours.</p>
cobalt	<p>CA Alberta Provincial (Canada, 4/2009). 8 hrs OEL: 0.02 mg/m³, (as Co) 8 hours.</p> <p>CA British Columbia Provincial (Canada, 5/2015). TWA: 0.02 mg/m³, (as Co) 8 hours.</p> <p>CA Ontario Provincial (Canada, 7/2015). TWA: 0.02 mg/m³, (as Co) 8 hours. Form: Inorganic</p> <p>CA Quebec Provincial (Canada, 1/2014). Skin sensitizer. TWAEV: 0.02 mg/m³, (as Co) 8 hours.</p> <p>CA Saskatchewan Provincial (Canada, 7/2013). STEL: 0.06 mg/m³, (measured as Co) 15 minutes. TWA: 0.02 mg/m³, (measured as Co) 8 hours.</p>
molybdenum	<p>CA British Columbia Provincial (Canada, 5/2015). TWA: 10 mg/m³ 8 hours. Form: Inhalable TWA: 3 mg/m³ 8 hours. Form: Respirable</p> <p>CA Saskatchewan Provincial (Canada, 7/2013). STEL: 20 mg/m³, (measured as Mo) 15 minutes. Form: Inhalable fraction TWA: 10 mg/m³, (measured as Mo) 8 hours. Form: Inhalable fraction STEL: 6 mg/m³, (measured as Mo) 15 minutes. Form: respirable fraction TWA: 3 mg/m³, (measured as Mo) 8 hours. Form: respirable fraction</p> <p>CA Ontario Provincial (Canada, 7/2015). TWA: 10 mg/m³, (as Mo) 8 hours. Form: Inhalable fraction. TWA: 3 mg/m³, (as Mo) 8 hours. Form: Respirable fraction.</p> <p>CA Alberta Provincial (Canada, 4/2009). 8 hrs OEL: 3 mg/m³, (as Mo) 8 hours. Form: Respirable 8 hrs OEL: 10 mg/m³, (as Mo) 8 hours.</p> <p>CA British Columbia Provincial (Canada,</p>
manganese	

Section 8. Exposure controls/personal protection

tungsten

5/2015).

TWA: 0.2 mg/m³, (as Mn) 8 hours.

CA Alberta Provincial (Canada, 4/2009).

8 hrs OEL: 0.2 mg/m³, (as Mn) 8 hours.

CA Ontario Provincial (Canada, 7/2015).

TWA: 0.2 mg/m³, (as Mn) 8 hours.

CA Quebec Provincial (Canada, 1/2014).

TWAEV: 0.2 mg/m³, (as Mn) 8 hours. Form: Total dust.

CA Saskatchewan Provincial (Canada, 7/2013).

STEL: 0.6 mg/m³, (measured as Mn) 15 minutes.

TWA: 0.2 mg/m³, (measured as Mn) 8 hours.

CA Alberta Provincial (Canada, 4/2009).

8 hrs OEL: 5 mg/m³, (as W) 8 hours.

15 min OEL: 10 mg/m³, (as W) 15 minutes.

CA British Columbia Provincial (Canada, 5/2015).

TWA: 5 mg/m³ 8 hours.

STEL: 10 mg/m³ 15 minutes.

CA Saskatchewan Provincial (Canada, 7/2013).

STEL: 10 mg/m³, (measured as W) 15 minutes.

TWA: 5 mg/m³, (measured as W) 8 hours.

CA Ontario Provincial (Canada, 7/2015).

STEL: 10 mg/m³, (as W) 15 minutes.

TWA: 5 mg/m³, (as W) 8 hours.

CA British Columbia Provincial (Canada, 5/2015).

TWA: 3 mg/m³ 8 hours. Form: Respirable dust

TWA: 10 mg/m³ 8 hours. Form: Total dust

CA Quebec Provincial (Canada, 1/2014).

TWAEV: 10 mg/m³ 8 hours. Form: Total dust.

CA Saskatchewan Provincial (Canada, 7/2013).

STEL: 20 mg/m³ 15 minutes.

TWA: 10 mg/m³ 8 hours.

CA Quebec Provincial (Canada, 1/2014).

TWAEV: 10 mg/m³, (as Al) 8 hours.

CA Alberta Provincial (Canada, 4/2009).

Skin sensitizer.

8 hrs OEL: 10 mg/m³ 8 hours. Form: Metal Dust

CA Saskatchewan Provincial (Canada, 7/2013).

STEL: 20 mg/m³, (measured as Al) 15 minutes. Form: Metal dust

TWA: 10 mg/m³, (measured as Al) 8 hours.

Form: Metal dust

STEL: 10 mg/m³, (measured as Al) 15 minutes. Form: Pyro powder

TWA: 5 mg/m³, (measured as Al) 8 hours.

Form: Pyro powder

STEL: 4 mg/m³, (measured as Al) 15

silicon

Aluminium powder (stabilized)

Section 8. Exposure controls/personal protection

minutes.
TWA: 2 mg/m³, (measured as Al) 8 hours.
CA British Columbia Provincial (Canada, 5/2015).
TWA: 1 mg/m³ 8 hours. Form: Respirable
CA Ontario Provincial (Canada, 7/2015).
TWA: 1 mg/m³ 8 hours. Form: Respirable fraction.

Appropriate engineering controls : No special measures are required for small quantities under normal and intended conditions of product use.

Environmental exposure controls : No special measures are required for small quantities under normal and intended conditions of product use.

Individual protection measures

Hygiene measures : No special measures are required for small quantities under normal and intended conditions of product use.

Eye/face protection : No special measures are required for small quantities under normal and intended conditions of product use.

Skin protection

Hand protection : No special protection is required.

Body protection : No special measures are required for small quantities under normal and intended conditions of product use.

Other skin protection : No special measures are required for small quantities under normal and intended conditions of product use.

Respiratory protection : No special measures are required for small quantities under normal and intended conditions of product use.

Section 9. Physical and chemical properties

Appearance

Physical state : Solid. [Formed wire]

Color : Metallic. Gray.

Odor : Odorless.

Odor threshold : Not applicable.

pH : Not applicable.

Melting point : 1371.1°C (2500°F)

Boiling point : 1466.7°C (2672.1°F)

Flash point : Not applicable.

Evaporation rate : Not applicable.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not applicable.

Vapor pressure : Not applicable.

Vapor density : Not applicable.

Relative density : Not applicable.

Solubility : Insoluble in the following materials: cold water and hot water.

Partition coefficient: n-octanol/water : Not applicable.

Auto-ignition temperature : Not applicable.

Decomposition temperature : Not applicable.

Viscosity : Not applicable.

Section 9. Physical and chemical properties

Flow time (ISO 2431) : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.
Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
cobalt	LC50 Inhalation Dusts and mists	Rat - Male, Female	<0.05 mg/l	4 hours
molybdenum	LD50 Oral	Rat	550 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	>5.84 mg/l	4 hours
	LD50 Dermal	Rat	>2000 mg/kg	-
manganese	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	5.14 mg/l	4 hours
silicon	LD50 Oral	Rat	9 g/kg	-
	LD50 Oral	Rat	3160 mg/kg	-

Conclusion/Summary : Not available.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
manganese	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
tungsten	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
silicon	Eyes - Mild irritant	Rabbit	-	3 milligrams	-

Conclusion/Summary

Skin : Not available.

Eyes : Not available.

Respiratory : Not available.

Sensitization

Conclusion/Summary

Section 11. Toxicological information

Skin : Not available.

Respiratory : Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
molybdenum	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Nickel	Category 1	Inhalation	respiratory tract
manganese	Category 2	Not determined	central nervous system (CNS) and lungs
Aluminium powder (stabilized)	Category 2	Not determined	lungs

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Section 11. Toxicological information

Potential delayed effects : Not available.

Potential chronic health effects

Conclusion/Summary : Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Nickel	Acute EC50 2 ppm Marine water	Algae - <i>Macrocystis pyrifera</i> - Young	4 days
	Acute EC50 450 µg/l Fresh water	Aquatic plants - <i>Lemna minor</i>	4 days
	Acute EC50 1000 µg/l Marine water	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute IC50 0.31 mg/l Marine water	Crustaceans - <i>Americamysis bahia</i> - Juvenile (Fledgling, Hatchling, Weanling)	48 hours
	Acute LC50 47.5 ng/L Fresh water	Fish - <i>Heteropneustes fossilis</i>	96 hours
cobalt	Chronic NOEC 100 mg/l Marine water	Algae - <i>Glenodinium halli</i>	72 hours
	Chronic NOEC 3.5 µg/l Fresh water	Fish - <i>Cyprinus carpio</i>	4 weeks
	Acute LC50 4400 µg/l	Daphnia - <i>Daphnia magna</i>	48 hours
molybdenum	Acute LC50 3.4 mg/l Fresh water	Fish - <i>Pimephales promelas</i>	96 hours
	Acute LC50 >200000 µg/l	Daphnia - <i>Daphnia magna</i>	48 hours
manganese	Acute LC50 800 mg/l Fresh water	Fish - <i>Oncorhynchus mykiss</i>	96 hours
	Chronic NOEC 500 mg/l Marine water	Algae - <i>Glenodinium halli</i>	72 hours
	Acute EC50 31000 µg/l Fresh water	Aquatic plants - <i>Lemna minor</i>	4 days
	Acute LC50 29000 µg/l	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute LC50 28 mg/l Fresh water	Fish - <i>Pimephales promelas</i>	96 hours
Aluminium powder (stabilized)	Chronic NOEC 1.7 mg/l Fresh water	Daphnia - Water Flea- <i>Ceriodaphnia dubia</i>	8 days
	Acute LC50 38000 µg/l	Daphnia - <i>Daphnia magna</i>	48 hours
	Acute LC50 120 µg/l Fresh water	Fish - <i>Oncorhynchus mykiss</i> - Embryo	96 hours
	Chronic NOEC 9 mg/l Fresh water	Aquatic plants - <i>Ceratophyllum demersum</i>	3 days

Conclusion/Summary : Not available.

Persistence and degradability

Conclusion/Summary : Not available.

Bioaccumulative potential

Section 12. Ecological information

Product/ingredient name	LogP _{ow}	BCF	Potential
cobalt	-	15600	high
silicon	57 to 77	-	high

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Section 14. Transport information

	TDG Classification	DOT Classification	ADR/RID	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-	-
Transport hazard class(es)	-	-	-	-	-
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.
Additional information	-	-	-	-	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

Canadian lists

Canadian NPRI : The following components are listed: Nickel (and its compounds); Manganese (and its compounds); Copper (and its compounds); Cobalt (and its compounds); Chromium (and its compounds); Aluminum (fume or dust only)

CEPA Toxic substances : None of the components are listed.

Canada inventory : Not determined.

International regulations

Section 15. Regulatory information

[Chemical Weapon Convention List Schedules I, II & III Chemicals](#)

Not listed.

[Montreal Protocol \(Annexes A, B, C, E\)](#)

Not listed.

[Stockholm Convention on Persistent Organic Pollutants](#)

Not listed.

[Rotterdam Convention on Prior Informed Consent \(PIC\)](#)

Not listed.

[UNECE Aarhus Protocol on POPs and Heavy Metals](#)

Not listed.

Section 16. Other information

[History](#)

Date of issue/Date of revision : 16/12/2016

Date of previous issue : No previous validation

Version : 1

[Key to abbreviations](#)

: ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations
HPR = Hazardous Products Regulations

[Procedure used to derive the classification](#)

Classification	Justification
Not classified.	

References : HPR = Hazardous Products Regulations

✔ Indicates information that has changed from previously issued version.

[Notice to reader](#)

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