SECTION 1  PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: CEMENTED CARBIDE PRODUCT WITH COBALT/NICKEL BINDER

Trade Names/Synonyms
CEMENTED TUNGSTEN CARBIDE; CEMENTED CARBIDE PRODUCT WITH COBALT/NICKEL BINDER

Recommended Use
Cutting tools for machining of various work materials, Fixtures and wear resistance parts for various material

Restrictions on Use
None known.

Manufacturer Information
TaeguTec
1040, GACHANG-RO GACHANG-MYEON DALSEONG-GUN DAEGU KOREA
Tel : +82-53-760-7451, Fax : +82-53-760-7446

SECTION 2  HAZARDS IDENTIFICATION

GHS Classification
Skin Corrosion / Irritation, Category 2
Eye Damage / Irritation, Category 2A
Respiratory sensitizer, Category 1
Skin sensitizer, Category 1
Carcinogenicity, Category 1A
Toxic to Reproduction, Category 1B
Specific Target Organ Toxicity - Single Exposure, Category 1 (kidneys and respiratory system)
Specific Target Organ Toxicity - Repeated Exposure, Category 1 (respiratory system)
Hazardous to the Aquatic Environment - Chronic Hazard, Category 3 (50 % unknown)

GHS LABEL ELEMENTS
Symbol(s)

Signal Word
DANGER
Hazard Statement(s)

Causes skin irritation
Causes serious eye irritation
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction
May cause cancer
May damage fertility or the unborn child
Causes damage to kidneys and respiratory system.
Causes damage to respiratory system through prolonged or repeated exposure.
Harmful to aquatic life with long lasting effects

Precautionary Statement(s)

Prevention
Do not breathe dust. Wash thoroughly after handling. Wear protective gloves and eye/face protection. In case of inadequate ventilation wear respiratory protection. Contaminated work clothing should not be allowed out of the workplace. Do not eat, drink, or smoke when using this product. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Avoid release to the environment.

Response
IF exposed: Call a POISON CENTER or doctor/physician. IF INHALED: If breathing is difficult, oxygen should be administered by qualified personnel. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash before re-use. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Storage
Store locked up.

Disposal
Dispose in accordance with all applicable regulations.

Other Hazards which do not Result in Classification
May form combustible dust concentrations in air (during handling or processing).

SECTION 3 COMPOSITION, INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Component</th>
<th>Percent</th>
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<tr>
<td>12070-12-1</td>
<td>TUNGSTEN CARBIDE</td>
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<tr>
<td>7440-48-4</td>
<td>COBALT</td>
<td>0 - 30</td>
</tr>
<tr>
<td>7440-02-0</td>
<td>NICKEL</td>
<td>0 - 20</td>
</tr>
<tr>
<td>12070-08-5</td>
<td>TITANIUM CARBIDE</td>
<td>0 - 15</td>
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</tbody>
</table>
Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Tungsten compounds, n.o.s., Cobalt compounds, Cobalt, inorganic compounds, Nickel compounds, Titanium compounds, Vanadium compounds, Chromium compounds, Chromium, inorganic compounds.

SECTION 4  FIRST AID MEASURES

Inhalation
If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin
Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Eyes
Flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

Ingestion
If swallowed, get medical attention.

Note to Physicians
For inhalation, consider oxygen.

Symptoms: Immediate
respiratory tract irritation, skin irritation, eye irritation, allergic reactions, kidney damage, respiratory system damage

Symptoms: Delayed
allergic reactions, cancer, reproductive effects, respiratory system damage

SECTION 5  FIRE FIGHTING MEASURES

See Section 9 for Flammability Properties

Flammable Properties
Negligible fire and explosion hazard in bulk form. Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Extinguishing Media
dolomite, dry powder for metal fires, dry sand, graphite, soda ash, sodium chloride
Do not get water directly on material.
Unsuitable Extinguishing Media

None known.

Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products.

SECTION 6   ACCIDENTAL RELEASE MEASURES

Personal Precautions

Wear personal protective clothing and equipment, see Section 8.

Environmental Precautions

Avoid release to the environment.

Methods for Containment

Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. If sweeping of a contaminated area is necessary, use a dust suppressant agent.

Cleanup Methods

Collect spill using a vacuum cleaner with a HEPA filter or wet and scoop up dry spills. Avoid sweeping spilled dry material. Eliminate ignition sources including sources of electrical, static or frictional sparks. Small spills: Collect spilled material in appropriate container for disposal. Move containers away from spill to a safe area. Large spills: Wet down area with water. Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.

SECTION 7   HANDLING AND STORAGE

Handling Procedures

Do not breathe dust. Wash thoroughly after handling. Wear protective gloves and eye/face protection. In case of inadequate ventilation wear respiratory protection. Contaminated work clothing should not be allowed out of the workplace. Do not eat, drink, or smoke when using this product. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required.
Storage Procedures

Store and handle in accordance with all current regulations and standards. Avoid generating dust. Store locked up. See original container for storage recommendations. Keep separated from incompatible substances.

Incompatibilities No data available.

---

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

Component Exposure Limits

**COBALT (7440-48-4)**

ACGIH: 0.02 mg/m³ TWA

NIOSH: 0.05 mg/m³ TWA (dust and fume)

OSHA: 0.1 mg/m³ TWA (dust and fume)

OSHA (Vacated): 0.05 mg/m³ TWA (dust and fume)

Korea: 0.02 mg/m³ TWA (metal dust and fume, Serial No. 519)

2 - Limited evidence of human or animal carcinogenicity (metal dust and fume, Serial No. 519)

**NICKEL (7440-02-0)**

ACGIH: 1.5 mg/m³ TWA (inhalable fraction)

NIOSH: 0.015 mg/m³ TWA

OSHA: 1 mg/m³ TWA

OSHA (Vacated): 1 mg/m³ TWA

Korea: 1 mg/m³ TWA (metal, Serial No. 045)

2 - Limited evidence of human or animal carcinogenicity (metal, Serial No. 045)

**NICKEL CARBIDE (12710-36-0)**

NIOSH: 0.015 mg/m³ TWA (except Nickel carbonyl, as Ni, related to Nickel compounds)

**VANADIUM CARBIDE (12070-10-9)**

NIOSH: 1 mg/m³ TWA

3 mg/m³ STEL

0.05 mg/m³ Ceiling (except Vanadium metal and Vanadium carbide, as V, dust and fume, 15 min, related to Vanadium compounds)

Component Biological Limit Values

**COBALT (7440-48-4)**

ACGIH: 15 µg/L Medium: urine Time: end of shift at end of workweek Parameter: Cobalt (background); 1 µg/L Medium: blood Time: end of shift at end of workweek Parameter: Cobalt (background, semi-quantitative)
Engineering Controls

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Eye Protection

Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Body Protection

Wear appropriate chemical resistant clothing.

Hands Protection

Wear appropriate chemical resistant gloves.

Respiratory Protection

Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum.

Consider warning properties before use.

Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100 or P100.

Any air-purifying full-facepiece respirator equipped with an N95, R95, or P95 filter. The following filters may also be used: N99, R99, P99, N100, R100 or P100.

Any powered, air-purifying respirator with a high-efficiency particulate filter.

Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
### SECTION 9  PHYSICAL AND CHEMICAL PROPERTIES

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<td>Auto Ignition temp.</td>
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<tr>
<td>Volatility</td>
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</table>

### SECTION 10  STABILITY AND REACTIVITY

**Reactivity**

No reactivity hazard is expected.

**Chemical Stability**

Stable at normal temperatures and pressure.

**Conditions to Avoid**

Avoid accumulation of airborne dusts. Avoid heat, flames, sparks and other sources of ignition.

**Possibility of Hazardous Reactions**

Will not polymerize.

**Incompatible Materials**

No data available.

**Decomposition Products**

miscellaneous decomposition products

### SECTION 11  TOXICOLOGICAL INFORMATION

**Likely Routes of Exposure**

inhalation, skin, eyes

**Acute and Chronic Toxicity**

**Component Analysis - LD50/LC50**

The components of this material have been reviewed in various sources and the following selected endpoints are published:
COBALT (7440-48-4)
Inhalation LC50 Rat >10 mg/L 1 h; Oral LD50 Rat 6170 mg/kg
NICKEL (7440-02-0)
Oral LD50 Rat >9000 mg/kg

RTECS Acute Toxicity (selected)
The components of this material have been reviewed, and RTECS publishes the following endpoints:

COBALT (7440-48-4)
Oral: 6171 mg/kg Oral Rat LD50

Acute Toxicity Level
COBALT (7440-48-4)
Slightly Toxic: ingestion

Immediate Effects
respiratory tract irritation, skin irritation, eye irritation, allergic reactions, kidney damage, respiratory system damage

Delayed Effects
allergic reactions, cancer, reproductive effects, respiratory system damage

Irritation/Corrosivity Data
respiratory tract irritation, skin irritation, eye irritation

RTECS Irritation
The components of this material have been reviewed and RTECS publishes no data as of the date on this document.

Local Effects
COBALT (7440-48-4)
Irritant: inhalation, skin, eye
NICKEL (7440-02-0)
Irritant: inhalation, skin
VANADIUM CARBIDE (12070-10-9)
Irritant: inhalation, skin, eye

Target Organs
COBALT (7440-48-4)
immune system (sensitizer)
NICKEL (7440-02-0)
immune system (sensitizer)
NICKEL CARBIDE (12710-36-0)
immune system (sensitizer)

Serious Eye Damage/Eye Irritation
eye irritation

Respiratory Sensitizer
Component data indicate the substance is sensitizing.
Dermal Sensitizer

Component data indicate the substance is sensitizing.

Carcinogenicity

Component Carcinogenicity

COBALT (7440-48-4)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 86 [2006] (without tungsten carbide); Monograph 52 [1991] (Group 2B (possibly carcinogenic to humans))
OSHA: Present

NICKEL (7440-02-0)

ACGIH: A5 - Not Suspected as a Human Carcinogen
IARC: Monograph 100C [2012]; Monograph 49 [1990] (evaluated as a group) (Group 1 (carcinogenic to humans), related to Nickel compounds)
OSHA: Present
NTP: Known Human Carcinogen (related to Nickel compounds)
Reasonably Anticipated To Be A Human Carcinogen
NIOSH: potential occupational carcinogen

NICKEL CARBIDE (12710-36-0)

IARC: Monograph 100C [2012]; Monograph 49 [1990] (evaluated as a group) (Group 1 (carcinogenic to humans), related to Nickel compounds)
OSHA: Present (related to Nickel compounds)
NTP: Known Human Carcinogen (related to Nickel compounds)
NIOSH: potential occupational carcinogen (related to Nickel compounds)

Mutagenic Data

No data available for the mixture.

RTECS Mutagenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Reproductive Effects Data

Available data characterizes this substance as a reproductive hazard.

RTECS Reproductive Effects

The components of this material have been reviewed, and RTECS publishes the following endpoints:

NICKEL (7440-02-0)
158 mg/kg Oral Rat TDLo (Multigeneration)

Tumorigenic Data

No data available for the mixture.

RTECS Tumorigenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.
Specific Target Organ Toxicity - Single Exposure
respiratory system, kidneys

Specific Target Organ Toxicity - Repeated Exposure
respiratory system

Aspiration Hazard
No data available.

Medical Conditions Aggravated by Exposure
respiratory disorders, immune system disorders or allergies, skin disorders and allergies

Additional Data
May cross the placenta. Alcohol may enhance the toxic effects. May be excreted in breast milk.

SECTION 12    ECOLOGICAL INFORMATION

Persistence and Degradability
No data available for the mixture.

Bioaccumulative Potential
No data available for the mixture.

Mobility in Environmental Media
No data available for the mixture.

Other Ecological Information
No additional information is available.

SECTION 13    DISPOSAL CONSIDERATIONS

Disposal Methods
If regulated under Waste Management Act, dispose the contaminated container and packaging in accordance with the regulations.

Disposal Precaution
Dispose in accordance with all applicable regulations including the disposal methods of contaminated container and packaging.

SECTION 14    TRANSPORT INFORMATION

IATA Information
No Classification assigned.

ICAO Information
No Classification assigned.

IMDG Information
No Classification assigned.

Special precautions
None known.
Component Analysis - Inventory

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No.</th>
<th>KOREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUNGSTEN CARBIDE</td>
<td>12070-12-1</td>
<td>Yes</td>
</tr>
<tr>
<td>COBALT</td>
<td>7440-48-4</td>
<td>Yes</td>
</tr>
<tr>
<td>NICKEL</td>
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<tr>
<td>VANADIUM CARBIDE</td>
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</tr>
<tr>
<td>CHROMIUM CARBIDE</td>
<td>12012-35-0</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Other Regulations

Toxic Release Inventory

The following component(s) are listed on the Toxic Release Inventory (TRI):

- **COBALT** (7440-48-4)
  - TRI Groups I & II: >=0.1 % (by weight)
- **NICKEL** (7440-02-0)
  - TRI Groups I & II: >=0.1 % (by weight)
- **NICKEL CARBIDE** (12710-36-0)
  - TRI Groups I & II: >=0.1 % (by weight, related to Nickel compounds)
- **VANADIUM CARBIDE** (12070-10-9)
  - TRI Groups I & II: >=1.0 % (by weight, related to Vanadium compounds)
- **CHROMIUM CARBIDE** (12012-35-0)
  - TRI Groups I & II: >=0.1 % (by weight, related to Chromium compounds)

Industrial Safety and Health Act

The following substances are recognized as harmful according to the Korean Industrial Safety and Health Act:

- **TUNGSTEN CARBIDE** (12070-12-1)
  - Metals: 1 % (related to Tungsten compounds, n.o.s.)
  - Metals: 1 % (as W, related to Tungsten compounds, n.o.s.)

- **COBALT** (7440-48-4)
  - Carcinogens: 2 - Limited evidence of human or animal carcinogenicity (metal dust and fume, Serial No. 519)
  - Metals: 1 %
  - Metals: 1 %
  - Metals: 1 % (dust, fume)
NICKEL (7440-02-0)

Carcinogens: 2 - Limited evidence of human or animal carcinogenicity (metal, Serial No. 045)

Metals: 1 %

Metals: 1 % (element)

Metals: 1 %

NICKEL CARBIDE (12710-36-0)

Metals: 1 % (related to Nickel compounds)

CHROMIUM CARBIDE (12012-35-0)

Metals: 1 % (related to Chromium compounds)

Metals: 1 % (as Cr, related to Chromium, inorganic compounds)

Metals: 1 % (as Cr, related to Chromium compounds)

Toxic Chemicals Control Act (TCCA)

No component(s) of this product are identified in the Toxic Chemicals Control Act.

Dangerous Materials Safety Control Act

No component(s) of this product are identified in the Dangerous Materials Safety Control Act.

Wastes Management Act

No component(s) of this product are identified in the Waste Management Act.

Other requirements in domestic and other countries

No data available.
SECTION 16 OTHER INFORMATION

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

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Other Information

None known

End of Sheet 00224277