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

Product Identifier

Material Name
COATING MATERIAL ON CEMENTED TUNGSTEN CARBIDE, CERMET, CERAMIC COATED BY CVD AND/OR PVD METHOD

Product Description
Concerning MSDS for substrate, please refer to CTC-MSDS, Cermet-MSDS and Ceramic-MSDS supplied by TaeguTec.

Product Use
Cutting tools for (Non)metal material

Restrictions on Use
None known.

Details of the supplier of the safety data sheet
TaeguTec

Gachangro 1040(304 Yonggye-ri), Gachang, Dalsong, Daegu 42936
Korea
Phone: 82-53-760-7451
Emergency phone number
82-53-760-7283

SECTION 2    HAZARDS IDENTIFICATION

Hazard/Risk Classification
Respiratory Sensitization - Category 1
Skin Sensitization - Category 1
Specific target organ toxicity - Single exposure - Category 3 (respiratory system)
Specific target organ toxicity - Repeated exposure - Category 1 (lungs, respiratory system)
Label elements
Hazard symbols

Signal word
Danger

Hazard/Risk Statement
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H335 May cause respiratory irritation.
H372 Causes damage to organs through prolonged or repeated exposure.

Precautionary statements
Prevention
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P285 In case of inadequate ventilation wear respiratory protection.
P272 Contaminated work clothing should not be allowed out of the workplace.
P280.5 Wear protective gloves.
P271 Use only outdoors or in a well-ventilated area.
P270 Do not eat, drink or smoke when using this product.

Response
P314 Get medical advice/attention if you feel unwell.
P304 IF INHALED.
P340 Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P342 If experiencing respiratory symptoms.
P311 Call a POISON CENTER or doctor/physician.
P302 IF ON SKIN.
P352 Wash with plenty of water.
P333 If skin irritation or rash occurs.
P313 Get medical advice/attention.
P363 Wash contaminated clothing before reuse.

Storage
P403 Store in a well-ventilated place.
P233 Keep container tightly closed.
P405 Store locked up.
Disposal

P501 Dispose of contents/container in accordance with local/regional/national/international 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</th>
<th>Chemical name</th>
<th>Other Names</th>
<th>Percent</th>
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<tr>
<td>25658-42-8</td>
<td>ZIRCONIUM NITRIDE</td>
<td>--</td>
<td>0 - 15</td>
</tr>
<tr>
<td>24094-93-7</td>
<td>CHROMIUM NITRIDE</td>
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<td>0 - 15</td>
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<tr>
<td>7782-40-3</td>
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<td>TITANIUM CARBO-NITRIDE</td>
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<td>0 - 12</td>
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<td>ALUMINUM OXIDE</td>
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<td>0 - 10</td>
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<td>0 - 1</td>
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Impurities and stabilizing additives contributing to the GHS Classification

None

### SECTION 4  FIRST AID MEASURES

**Eye contact**

Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

**Skin contact**

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.

**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.

**Ingestion**

If swallowed, get medical attention.

Most Important Symptoms/Effects

**Symptoms: Immediate**

allergic reactions, respiratory tract irritation
Symptoms: Delayed
allergic reactions, lung damage, respiratory system damage
Indication of any immediate medical attention and special treatment needed
Inhalation: Consider oxygen.

SECTION 5     FIRE FIGHTING MEASURES

Suitable extinguishing media
Use extinguishing agents appropriate for surrounding fire.

Unsuitable Extinguishing Media
None known.

Specific hazards arising from the chemical
Negligible fire hazard. 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.

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. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

SECTION 6     ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Wear personal protective clothing and equipment, see Section 8.

Environmental precautions
Avoid release to the environment.

Methods for Containment
Avoid generating dust. If sweeping of a contaminated area is necessary, use a dust suppressant agent. Keep unnecessary people away, isolate hazard area and deny entry.

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. Collect spilled material in appropriate container for disposal.

SECTION 7     HANDLING AND STORAGE

Precautions for safe handling
Do not breathe dust. Wash thoroughly after handling. In case of inadequate ventilation wear respiratory protection. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves. Use only outdoors or
in a well-ventilated area. Do not eat, drink, or smoke when using this product. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions.

Conditions for safe storage, including any incompatibilities

Store in a well-ventilated place.

Keep container tightly closed.

Store locked up.

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

Incompatible Materials

Acids, bases, halocarbons, oxidizing materials.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Guidelines

Component Exposure Limits

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<tr>
<th>ZIRCONIUM NITRIDE 25658-42-8</th>
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<tbody>
<tr>
<td>Korea: 10 mg/m3 STEL as Zr (related to Zirconium compounds)</td>
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</tr>
<tr>
<td>5 mg/m3 TWA as Zr (related to Zirconium compounds)</td>
<td></td>
</tr>
<tr>
<td>ACGIH: 5 mg/m3 TWA as Zr (related to Zirconium compounds)</td>
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<td>10 mg/m3 STEL as Zr (related to Zirconium compounds)</td>
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<tbody>
<tr>
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</tr>
<tr>
<td>ACGIH: 1 mg/m3 TWA respirable particulate matter (related to Aluminum insoluble compounds)</td>
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</tr>
</tbody>
</table>

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)

There are no biological limit values for any of this product's components.

**Appropriate engineering controls**

Provide local exhaust 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/face protection**

Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.
Skin and Body Protection
Wear appropriate chemical resistant clothing.

Hand protection
Wear appropriate chemical resistant gloves.

Protective Materials
No data available.

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 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.

Further information
No data available.

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<tr>
<th>SECTION 9</th>
<th>PHYSICAL AND CHEMICAL PROPERTIES</th>
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<td>Freezing point</td>
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<tr>
<td>Boiling Point</td>
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MATERIAL SAFETY DATA SHEET
COATING MATERIAL ON CEMENTED TUNGSTEN CARBIDE CERMET, CERAMIC COATED
BY CVD AND/OR PVD METHOD

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<th>Boiling Point Range</th>
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<td>Evaporation Rate</td>
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<td>Density</td>
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<tr>
<td>Flammability (solid, gas)</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.

Possibility of Hazardous Reactions
Will not polymerize.

Conditions to avoid
Avoid accumulation of airborne dusts. Avoid contact with incompatible materials.

Materials to Avoid (Incompatibilities)
Acids, bases, halocarbons, oxidizing materials.

Hazardous Decomposition Products
miscellaneous decomposition products.

**SECTION 11    TOXICOLOGICAL INFORMATION**

Information on Likely Routes of Exposure

**Inhalation**

**Skin**

**Eye**
No data available for the mixture.

**Ingestion**

Health Hazards

**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:

**ALUMINUM OXIDE (1344-28-1)**

Oral LD50 Rat >5000 mg/kg

Acute Toxicity Estimate

| Oral | > 2000 mg/kg |

Immediate Effects

allergic reactions, respiratory tract irritation
Delayed Effects
allergic reactions, lung damage, respiratory system damage
Skin corrosive/irritant
No data available for the mixture.
Serious eye damage/irritation
No data available for the mixture.
Respiratory Sensitization
Component data indicate the substance is sensitizing.
Dermal Sensitization
Component data indicate the substance is sensitizing.

Component Carcinogenicity

<table>
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<tr>
<th>Substance</th>
<th>CAS Number</th>
<th>Carcinogenicity</th>
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<tr>
<td>ZIRCONIUM NITRIDE</td>
<td>25658-42-8</td>
<td>A4 - Not Classifiable as a Human Carcinogen (related to Zirconium compounds)</td>
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<tr>
<td>ALUMINUM OXIDE</td>
<td>1344-28-1</td>
<td>A4 - Not Classifiable as a Human Carcinogen (related to Aluminum insoluble compounds)</td>
</tr>
</tbody>
</table>

Mutagenic Data
No data available for the mixture.

Reproductive Effects Data
No data available for the mixture.

Tumorigenic Data
No data available for the mixture.

Specific Target Organ Toxicity - Single Exposure
respiratory system
Specific Target Organ Toxicity - Repeated Exposure
lungs, respiratory system

Aspiration hazard
no data available.

Medical Conditions Aggravated by Exposure
respiratory disorders, skin disorders and allergies

Additional Data
May cross the placenta.
SECTION 12  ECOLOGICAL INFORMATION

Ecotoxicity
Component Analysis - Aquatic Toxicity
No LOILI ecotoxicity data are available for this product's components.
Persistence and degradability
No data available for the mixture.
Bioaccumulative Potential
No data available for the mixture.
Mobility in soil
No data available for the mixture.
Other adverse effects
No additional information is available.

SECTION 13  DISPOSAL CONSIDERATIONS

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:
Shipping Name: True
No Classification assigned.

ICAO Information:
Shipping Name: True
No Classification assigned.

IMDG Information:
Shipping Name: True
No Classification assigned.
International Bulk Chemical Code
This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.
Special precautions
None known.
### SECTION 15 REGULATORY INFORMATION

Korea Regulations  
Industrial Safety and Health Act

#### ZIRCONIUM NITRIDE  
25658-42-8

<table>
<thead>
<tr>
<th>Hazardous Substances Subject to Control:</th>
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<tbody>
<tr>
<td>Metals:</td>
<td>1 % cut-off value allowed in mixture (related to Zirconium compounds)</td>
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| Harmful Agents Subject to Work Environment Monitoring  
(Measurement Cycle: 6 months): |  |
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<tr>
<td>Metals:</td>
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<table>
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<th>Harmful Agents Subject to Workers Requiring Health Examination (Diagnostic cycle : 12 Months):</th>
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<td>Metals:</td>
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<table>
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<th>Occupational exposure limit values:</th>
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<tbody>
<tr>
<td>TWA.</td>
<td>5 mg/m³ TWA as Zr Serial No. 489 (related to Zirconium compounds)</td>
</tr>
<tr>
<td>STEL</td>
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#### CHROMIUM NITRIDE  
24094-93-7

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| Harmful Agents Subject to Work Environment Monitoring  
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| ALUMINUM OXIDE | 1344-28-1 |

| Hazardous Substances Subject to Control: |  
| Metals: | 1 % cut-off value allowed in mixture (related to Aluminum compounds) |

| Hazardful Agents Subject to Work Environment Monitoring (Measurement Cycle: 6 months): |  
| Metals: | 1 % cut-off value allowed in mixture (related to Aluminum compounds) |

| Harmful Agents Subject to Workers Requiring Health Examination (Diagnostic cycle: 12 Months): |  
| Metals: | 1 % maximum cut-off value allowed in mixture (as Al) (related to Aluminum compounds) |

| Occupational exposure limit values: | TWA. 10 mg/m3 TWA Serial No. 379 |

Chemicals Control Act (CCA)  
None of the substances are regulated under the Chemicals Control Act.  

Dangerous Materials Safety Control Act  
This product is not regulated under the Dangerous Materials Safety Control Act.  

Waste Management Act  
Not applicable  

Other requirements in domestic and other countries  
No applicable  

No data available.  

Component Analysis - Inventory  

**ZIRCONIUM NITRIDE (25658-42-8)**

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Yes NSL EIN No No Yes Yes Yes No No No Yes No
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ALUMINUM OXIDE (1344-28-1)

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TITANIUM CARBIDE (12070-08-5)

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SECTION 16 OTHER INFORMATION

NFPA Ratings
Health: 1 Fire: 0 Reactivity: 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Information sources and references
No data available.

Preparation Date
06/15/15

Revision date
01/18/2019

Issue Date
04/24/2013

Key / Legend
ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC – European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; 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; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECl Annex 1 - Korea Existing Chemicals Inventory (KECl) / Korea Existing Chemicals List (KECL); KR KECl Annex 2 - Korea Existing Chemicals Inventory (KECl) / Korea Existing Chemicals List (KECL), KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR’s Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; NDSL – Non-Domestic Substance List (Canada); 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; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN NCI (Draft) - Vietnam National Chemicals Inventory (NCI) (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

Other Information

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