



## 1. IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND OF THE SUPPLIER

1.1. Product identifier : Pearl with Stopper

1.2. Identification of the supplier

Name NARA

Address (Namchang-dong, #9, 1F, Deado Market E-dong) 21,  
Namdaemunsijang 4-gil, Jung-gu, Seoul, Republic of Korea.

Emergency phone number + 82 70 8815 8970

1.3. Recommended use of the chemical and restriction on use

Recommended use Jewellery

Restriction on use No data available

## 2. HAZARDS IDENTIFICATION

2.1. GHS classification of the substance/mixture and any national or regional

GHS classification

- Acute toxicity - Oral : Category 4
- Acute toxicity - Inhalation : Category 4
- Skin corrosion/irritation : Category 2
- Eye damage/irritation : Category 2A
- Sensitization - Respiratory : Category 1
- Sensitization - Skin : Category 1
- Germ cell mutagenicity : Category 2
- Carcinogenicity : Category 2
- Toxic to reproduction : Category 1
- Specific target organ toxicity (Single exposure)  
: Category 1
- Specific target organ toxicity (Repeated exposure)  
: Category 1
- Hazardous to the aquatic environment - Long-term hazard  
: Category 2

Any national or regional Not applicable

2.2. GHS label elements, including precautionary statements

2.2.1. Symbols



2.2.2. Signal word **Danger**

2.2.3. Hazard statements

- H302 Harmful if swallowed
- H315 Causes skin irritation
- H317 May cause an allergic skin reaction
- H319 Causes serious eye irritation
- H332 Harmful if inhaled
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled



- H341 Suspected of causing genetic defects
- H351 Suspected of causing cancer
- H360 May damage fertility or the unborn child
- H370 Causes damage to organs(Lung, respiratory organ, central nervous system, kidney, liver, etc.)
- H372 Cause damage to organs(Liver, central nervous system, kidney, respiratory organ, blood system, skin, etc.) through prolonged or repeated exposure.
- H411 Toxic to aquatic life with long lasting effects

## 2.2.4. Precautionary statements

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- Prevention
- P201 Obtain special instruction before use.
  - P202 Do not handle until all safety precautions have been read and understood.
  - P260 Do not breathe dust/fume/gas/mist.
  - P264 Wash hand thoroughly after handling.
  - P270 Do not eat, drink or smoke when using this product.
  - P271 Use only outdoors or in a well-ventilated area.
  - P272 Contaminated work clothing should not be allowed out of the workplace.
  - P273 Avoid release to the environment.
  - P280 Wear protective gloves/protective clothing/eye protection/face protection.
  - P284 Wear respiratory protection.
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- Response
- P312 Call a POISON CENTER/doctor if you feel unwell.
  - P321 See First-aid measures on this MSDS.
  - P330 Rinse mouth.
  - P391 Collect spillage.
  - P301+P312 IF SWALLOWED : Call a POISON CENTER/doctor if you feel unwell.
  - P302+P352 IF ON SKIN : Wash with plenty of water.
  - P304+P340 IF INHALED : Remove person to fresh air and keep comfortable for breathing.
  - P308+P311 IF exposed or concerned : Call a POISON CENTER/doctor.
  - P332+P313 If skin irritation occurs : Get medical advice/attention.
  - P333+P313 If skin irritation or rash occurs : Get medical advice /attention.
  - P337+P313 If eye irritation persists : Get medical advice/attention.
  - P342+P311 If experiencing respiratory symptoms : Call a POISON CENTER /doctor.
  - P362+P364 Take off contaminated clothing and wash it 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.
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- Storage
- P405 Store locked up.
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# Material Safety Data Sheet

MSDS No. : 01-20140609-0100E

Disposal P501 Dispose of contents/container to REGULATORY.

## 2.3. Other hazards which do not result in classification

### NFPA

IRON	- Health : 1 - Fire : 3 - Reaction : 0
CHROMIUM	- Health : 1 - Fire : 3 - Reaction : 0
NICKEL	No data available
MOLYBDENUM	- Health : 1 - Fire : 1 - Reaction : 0
MANGANESE	- Health : 1 - Fire : 3 - Reaction : 1
ALUMINUM	- Health : 0 - Fire : 3 - Reaction : 1

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Parts	Composition	Identification Number	Concentration
Beads	IRON	CAS No. 7439-89-6	(52.7 ~ 62.1) %
	CHROMIUM	CAS No. 7440-47-3	(13.6 ~ 16.2) %
	NICKEL	CAS No. 7440-02-0	(8.5 ~ 12.6) %
	MOLYBDENUM	CAS No. 7439-98-7	(1.7 ~ 2.7) %
	MAGNESIUM	CAS No. 7439-95-4	(1.7 ~ 1.8) %
	Others	-	(0.92 ~ 0.99) %
Aluminum Coating	ALUMINUM	CAS No. 7429-90-5	(4.85 ~ 9.8) %
	MAGNESIUM	CAS No. 7439-95-4	(0.05 ~ 0.15) %
	Others	-	(0.09 ~ 0.18) %
Paint & Coating	Alkyd resin	-	(3 ~ 5) %
	Urethane acrylate prepolymer	-	
	Acrylic resin	-	
	Pigments	-	
	Others	-	



## 4. FIRST-AID MEASURES

### 4.1. Eye contact

- Call a POISON CENTER/doctor if you feel unwell.
- If eye irritation persists : Get medical advice/attention.
- IF IN EYES : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

### 4.2. Skin contact

- Call a POISON CENTER/doctor if you feel unwell.
- If skin irritation or rash occurs : Get medical advice/attention.
- Take off contaminated clothing and wash it before reuse.
- Wash with water and soap.

### 4.3. Inhalation

- IF exposed or concerned : Get medical advice/attention.
- If experiencing respiratory symptoms : Call a POISON CENTER/doctor.

### 4.4. Ingestion

- IF SWALLOWED : Immediately call a POISON CENTER/doctor.
- Rinse the mouth.

### 4.5. Indication of immediate medical attention and special treatment needed

- Notify to medical team or managers, and do appropriate measures.
- May be delayed symptoms for contact.

## 5. FIRE-FIGHTING MEASURES

### 5.1. Suitable (and unsuitable) extinguishing media

- Small/normal fire : Alcohol-resistant foam, dry chemical, carbon dioxide, dry sand
- Large fire : Water spray/fog, fire fighting foam
- Extinguishment by smothering : Dry sand or soil
- Unsuitable extinguishing media : High-pressure water

### 5.2. Specific hazards arising from the chemical

- Irritation or toxic gases may be occurred in fire-emergency.
- If contact heated or exploded liquid with skin and eyes, may occur burns.

### 5.3. Special precautions for fire-fighters

- Rescuers need to note the personal protective equipment.
- Leave the area and extinguish fire in safe range.
- Avoid release to the environment.
- If not danger, remove containers.
- Extinguish fire in maximum range or use automatic fire apparatus.
- Cool containers exposed to fire with water.
- Leave from tanks if high-sounds or discolorations are found in power-operated relief valve.

### 5.4. Special protective equipment for fire-fighters

- Chemical resisted equipment for fire-fighter.



## 6. ACCIDENTAL RELEASE MEASURES

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

- Cleaning up immediately, and follow the precaution.
- Remove all ignition sources.
- If not danger, stop to leak.
- If no protective equipment, do not touch exposure material and container.
- Notice the avoid conditions and materials.
- Do not breathe dust/fume/gas/mist.
- Ventilated exposed area.

### 6.2. Environmental precautions

- Harmful to environment.

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

- Clean up with cleaner and water.

## 7. HANDLING AND STORAGE

### 7.1. Precautions for safe handling

- Handling and storage with care.
- Notice the avoid conditions and materials.
- Do not handle until all safety precautions have been read and understood.
- Notice the engineering management and personal protection.
- Do not breathe dust/fume/gas/mist.
- Wash hand thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Handling and storage in outdoor or well-ventilated place.
- Avoid high-temperature.

Protective equipment : Chemical resisted respiratory protection, eye protection, protective gloves.

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

- Do not eat, drink or smoke when using this product.
- Notice the avoid conditions and materials.
- Keep container tightly closed in well-ventilated area.

Storage temperature : Room-temperature

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

CHROMIUM	The regulation of Korea	- TWA : 0.05 mg/m <sup>3</sup> chromic acid
		- TWA : 0.5 mg/m <sup>3</sup> metal
		- TWA : 0.01 mg/m <sup>3</sup> (VI)(insoluble inorganic compounds)
		- TWA : 0.05 mg/m <sup>3</sup> (VI)(soluble compounds)
		- TWA : 0.5 mg/m <sup>3</sup> (II) compounds
		- TWA : 0.5 mg/m <sup>3</sup> (III) compounds



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	ACGIH	- TWA : 0.5 mg/m <sup>3</sup>
	Biological limit values	No data available
NICKEL	The regulation of Korea	- TWA : 1 mg/m <sup>3</sup> metal - TWA : 0.5 mg/m <sup>3</sup> insoluble inorganic compounds - TWA : 0.1 mg/m <sup>3</sup> soluble compounds
	ACGIH	- TWA : 1.5 mg/m <sup>3</sup> - TWA : 0.1mg/m <sup>3</sup> soluble inorganic compounds - TWA : 0.2 mg/m <sup>3</sup> insoluble inorganic
	Biological limit values	No data available
MOLYBDENUM	The regulation of Korea	- TWA : 10 mg/m <sup>3</sup> Insoluble compounds(total fume/dust) - TWA : 5 mg/m <sup>3</sup> Insoluble compounds(inhaled fume/dust) - TWA : 0.5 mg/m <sup>3</sup> Soluble compounds
	ACGIH	- TWA : 10 mg/m <sup>3</sup>
	Biological limit values	No data available
MANGANESE	The regulation of Korea	- TWA : 1 mg/m <sup>3</sup> manganese and inorganic compounds - TWA : 0.1 mg/m <sup>3</sup> - STEL : 3 mg/m <sup>3</sup> fume
	ACGIH	- TWA : 0.2 mg/m <sup>3</sup>
	Biological limit values	No data available
ALUMINUM	The regulation of Korea	- TWA : 2 mg/m <sup>3</sup> soluble salt - TWA : 10 mg/m <sup>3</sup> metal mists - TWA : 2 mg/m <sup>3</sup> alkyl - TWA : 5 mg/m <sup>3</sup> welding fume - TWA : 5 mg/m <sup>3</sup> stress powder
	ACGIH	- TWA : 1 mg/m <sup>3</sup> (Aluminum metal)
	Biological limit values	No data available

## 8.2. Appropriate engineering controls

- Keep air level under exposure standard with the engineering management such as process isolation and local ventilation.
- Keep air pollution under exposure standard when occur fume or mist in handle.
- Washing/shower system.

## 8.3. Individual protection measures (personal protective equipment)

Respiratory protection	- Chemical resisted respiratory protection
Eye protection	- Chemical resisted eye protection



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Hand protection	- Chemical resisted hand protection
Skin and body protection	No data available

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Appearance

Physical state	Solid(bead) at 20 °C
Color	Gray, silver, gold

### 9.2. Odor

Odorless

### 9.3. Odor threshold

No data available

### 9.4. pH

No data available

### 9.5. Melting point/freezing point

No data available

### 9.6. Initial boiling point and boiling range

No data available

### 9.7. Flash point

No data available

### 9.8. Evaporation rate

No data available

### 9.9. Flammability(solid, gas)

No data available

### 9.10. Upper flammability or explosive limits

No data available

### 9.11. Lower flammability or explosive limits

No data available

### 9.12. Vapour pressure

No data available

### 9.13. Vapour density

No data available

### 9.14. Relative density

No data available

### 9.15. Solubility

No data available

### 9.16. Partition coefficient : n-octanol/water

No data available

### 9.17. Auto-ignition temperature

No data available

### 9.18. Decomposition temperature

No data available

### 9.19. Viscosity

No data available

### 9.20. Molecular weight

No data available

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## 10. STABILITY AND REACTIVITY

### 10.1. Chemical stability and possibility of hazardous reactions

- Toxic gases may be occurred in high-temperature.

### 10.2. Conditions to avoid

- Heat/sparks/open flames/hot surfaces.

### 10.3. Incompatible materials

- Combustible materials
- Reducing materials

### 10.4. Hazardous decomposition products

- Irritation, corrosive and toxic gases may be occurred in fire-emergency.

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## 11. TOXICOLOGICAL INFORMATION



## 11.1. Information on the likely routes of exposure

MANGANESE	- May be harmful for human.
ALUMINUM	- May be inhaled.

## 11.2. Health hazards information

### 11.2.1. Acute toxicity

IRON	- Oral : LD50 984 mg/kg Rat ※ Reference : IUCLID - Dermal : LD50 20 000 mg/kg Guinea pig - Inhalation : No data available
MOLYBDENUM	- Oral : No data available - Dermal : No data available - Inhalation : LC50 > 6.3 mg/L Rat
MANGANESE	- Oral : LD50 9 000 mg/kg Rat ※ Reference : RTECS - Dermal : No data available - Inhalation : No data available

### 11.2.2. Skin corrosion/irritation

IRON	- Rabbit : irritation. ※ Reference : IUCLID
MANGANESE	- rabbit : middle-irritation. ※ Reference : RTECS

### 11.2.3. Eye damage/irritation

CHROMIUM	- May occurred irritation.
MANGANESE	- Rabbit eye-irritation test : middle-irritation ※ Reference : RTECS

### 11.2.4. Sensitization - Respiratory

CHROMIUM	- Respiratory sensitization material
NICKEL	- Asthma ※ Reference : HSDB

### 11.2.5. Sensitization - Skin

CHROMIUM	- Skin-sensitization
NICKEL	- Skin-sensitization ※ Reference : HSDB

### 11.2.6. Germ cell mutagenicity

No data available

### 11.2.7. Carcinogenicity

ALUMINUM	- ACGIH : A4 (Aluminum insoluble compounds)
CHROMIUM	- The Ministry of Labor : 1A chromic acid - IARC : Group 3 (Chromium, metallic) - ACGIH : A4 (1A : chromic acid)





- NICKEL
- The Ministry of Labor : 2
  - IARC : Group 2B (Nickel, metallic and alloys)
  - ACGIH : A5
  - NTP : R
  - EU CLP : Carc. 2

## 11.2.8. Toxic to reproduction

- MANGANESE
- Reported to toxic to reproduction.
  - ※ Reference : CICAD

## 11.2.9. Specific target organ toxicity (Single exposure)

- CHROMIUM
- Reported to Specific target organ toxicity (Single exposure).

- NICKEL
- Reported to Specific target organ toxicity (Single exposure).
  - ※ Reference : ICSC2001, ATSDR (2005)

- MOLYBDENUM
- Upper respiratory tract irritation.
  - ※ Reference : CERL Hazard data (2002)

- MANGANESE
- Pneumonia
  - ※ Reference : CICAD

## 11.2.10. Specific target organ toxicity (Repeated exposure)

- NICKEL
- Respiratory organ(asthma, fibroid lung)
  - ※ Reference : ICSC2001, ECETOC TR33 (1989)

- MANGANESE
- Damage to respiratory organ and nervous system
  - ※ Reference : CICAD

- ALUMINUM
- Causes damage to organs(lung, nervous system) through prolonged or repeated exposure
  - ※ Reference : ICSC

11.2.11. Aspiration Hazard No data available

11.3. Other adverse effects

No data available

## 12. ECOLOGICAL INFORMATION

### 12.1. Ecotoxicity

- IRON
- Fish : LC50 13.6 mg/L 96 h
  - ※ Reference : IUCLID
  - Crustacean : No data available
  - Algae : No data available

- MOLYBDENUM
- Fish : LC50 800 mg/L 96 h
  - Crustacean : No data available
  - Algae : No data available

- MANGANESE
- Fish : LC50 > 50 mg/L 96 h
  - Crustacean : No data available
  - Algae : No data available



## 12.2. Persistence and degradability

MOLYBDENUM - Persistence : log Kow 0.23  
\* Reference : SRC (Access on Jan 2006)

## 12.3. Bioaccumulative potential No data available

## 12.4. Mobility in soil

CHROMIUM - log Kow = 0.23  
\* Reference : SRC

## 12.5. Other adverse effects

ALUMINUM - Crustacean : NOEC(Daphnia magna) > 100 mg/L/48h  
\* Reference : IUCLID

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## 13. DISPOSAL CONSIDERATIONS

### 13.1. Methods of disposal

- Follow federal, state and local regulations.

### 13.2. Caution of disposal

- Consider the notice in regulations.

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## 14. TRANSPORT INFORMATION

### 14.1. IMDG Code

IRON, CHROMIUM, NICKEL, - UN No. 3089  
MOLYBDENUM, MANGANESE - METAL POWDER, FLAMMABLE, N.O.S.  
- Classification. 4.1  
- Packing Group : II  
- Environmentally hazardous substance : Applicable  
- Precautions in fire-emergency : F-G  
- Precautions in exposure : S-G

ALUMINUM - UN No. 1396  
- ALUMINIUM POWDER, UNCOATED  
- Classification. 4.3  
- Packing Group : II  
- Environmentally hazardous substance : Applicable  
- Precautions in fire-emergency : F-G  
- Precautions in exposure : S-0

### 14.2. Other transport regulations

DRG No data available  
RID No data available  
ADR No data available  
AND No data available

### 14.3. Special precautions which a user needs to be aware of, or needs to comply with

No data available



## 15. REGULATORY INFORMATION

### 15.1. Korea Industrial Safety and Health Act

IRON	<ul style="list-style-type: none"> <li>- Working environment measurement (per 6 months)</li> <li>- Material for administration</li> </ul>
CHROMIUM	<ul style="list-style-type: none"> <li>- Working environment measurement (per 6 months)</li> <li>- Material for administration</li> <li>- Material for permission</li> <li>- Material for special health care (per 12 months)</li> <li>- Exposure standard Material</li> <li>- Acceptable standard Material</li> </ul>
NICKEL	<ul style="list-style-type: none"> <li>- Working environment measurement (per 6 months)</li> <li>- Material for administration</li> <li>- Material for special health care (per 12 months)</li> <li>- Exposure standard Material</li> <li>- Acceptable standard Material</li> </ul>
MOLYBDENUM	<ul style="list-style-type: none"> <li>- Acceptable standard Material</li> </ul>
MANGANESE	<ul style="list-style-type: none"> <li>- Working environment measurement (per 6 months)</li> <li>- Material for administration</li> <li>- Material for special health care (per 12 months)</li> <li>- Exposure standard Material</li> </ul>
ALUMINUM	<ul style="list-style-type: none"> <li>- Material for administration</li> <li>- Material for special health care (per 12 months)</li> <li>- Working environment measurement (per 6 months)</li> <li>- Exposure standard Material</li> </ul>

**15.2. Korea Toxic Chemicals Control Act** No data available

**15.3. Korea Hazardous Materials Safety Control Act** No data available

### 15.4. Korea Wastes Control Act

MOLYBDENUM	<ul style="list-style-type: none"> <li>- Designated waste</li> </ul>
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### 15.5. Other internal and foreign acts

CHROMIUM	<ul style="list-style-type: none"> <li>- CERCLA of USA : 2 267.995 kg 5 000 lb</li> <li>- EPCRA 313 of U.S.A : Registration</li> </ul>
NICKEL	<ul style="list-style-type: none"> <li>- CERCLA of USA : 45.359 9 kg 100 lb</li> <li>- EPCRA 313 of U.S.A : Registration</li> <li>- Classification result of EU : Carc. Cat. 3; R40 R43</li> <li>- Risk Phrases of EU : R40, R43</li> <li>- Safety Phrases of EU : S2, S22, S36</li> </ul>
MANGANESE	<ul style="list-style-type: none"> <li>- EPCRA 313 of U.S.A : Registration</li> </ul>
ALUMINUM	<ul style="list-style-type: none"> <li>- EPCRA 313 of U.S.A : Registration</li> <li>- Classification result of EU : F; R15-17</li> <li>- Risk Phrases of EU : R15, R17</li> <li>- Safety Phrases of EU : S2, S7/8, S43</li> </ul>



## 16. OTHER INFORMATION

Issued Date 2014 / 06 / 10

MSDS No. 01-20140609-0100E

Revision No. 00

Revision Date -

### Reference

- GHS Classification : Korea MSDS Testing Laboratory's Test Certificate, OECD SIDS, IUCLID, US NLM, IARC, etc.
- Physical and chemical properties : Korea MSDS Testing Laboratory's Test Certificate.
- Toxic Classification : OECD SIDS, IUCLID, US NLM, IARC, etc.
- Transport information : Korea MSDS Testing Laboratory's Test Certificate.

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- This MSDS is composed in line with The Korea Occupational Safety and Health Act Article 41 to protect the health of the employees, and for documentation.
- This MSDS is composed with reference to documents and criteria provided by KOSHA.

- END -