| CHOSUN WELDING | **Material Safety Data Sheets (MSDS)** | Document No.: CSW-0016<br>Rev. date : 2023.10.26<br>Rev. No. : 5 |
|---|---|---|

## 1. IDENTIFICATION(BRAND NAME & MANUFACTURER INFORMATION)

1-1. Brand Name :

**CSF-308, CSF-308HP, CSF-308L, CSF-308LP, CSF-308LP(Cryogenic), CSF-308MoP, CSF-309, CSF-309L, CSF-309LP, CSF-309MoL, CSF-309MoLP, CSF-310, CSF-312, CSF-312P, CSF-316, CSF-316L, CSF-316LP, CSF-316LP(Cryogenic), CSF-317L, CSF-317LP, CSF-347, CSF-347P, CSF-409Ti, CSF-410, CSF-410NiMo, CSF-439, CSF-2209, CSF-2209P, CSF-2594P**

1-2. Product Type : Flux cored wire for stainless steel

1-3. Manufacturer / Supplier

1) Manufacturer : Chosun Welding Onsan Co., Ltd.
2) Address : 34-13 Hwasan 2-gil, Onsan-eup, Ulju-gun, Ulsan, Korea
3) Emergency Tel : +82-080-285-9080, +82-52-237-5301~6 Fax:+82-52-237-3311

## 2. HAZARD DATA

The ingredients are components of this product and hardly harmful to users because of the processed a series of progresses.

This section covers the materials and the hazard .

2-1. Classification of hazard

Skin Sensitization: Category 1
Respiratory Sensitization: Category 1
Carcinogenicity: Category 2
Specific Target Organ Toxicity, Single Exposure: Category 1
Specific Target Organ Toxicity, Repeated Exposure: Category 1

2-2. Warning signals including precaution.

○ Pictograph

○ A signal : Danger

○ Health hazard statements

- H317 May cause an allergic skin reaction.
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- H351 Suspected of causing cancer.
- H370 Causes damage to respiratory system.
- H372 Causes damage to respiratory system through prolonged or repeated exposure.

○ Prevention precautionary statements

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P260 Do not breathe fume.
- P261 Avoid breathing fume.
- P264 Wash thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P272 Contaminated work clothing should not be allowed out of the workplace.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.

- P284 In case of inadequate ventilation wear respiratory protection.

○ Response precautionary statements

- P302+P352 IF ON SKIN: Wash with plenty of soap and 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 or doctor/physician
- P308+P313 IF exposed or concerned: Get medical advice/attention.
- P314 Get medical advice/attention if you feel unwell.
- P321 Specific treatment, see supplemental first aid information.
- P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
- P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
- P362+P364 Take off contaminated clothing and wash it before reuse.

○ Storage precautionary statements

- P405 Store locked up.

○ Disposal precautionary statements

- P501 Dispose of contents and container in accordance with local and national regulations.

2-3. Other hazards : No data available

## 3. COMPOSITION/INFORMATION OF INGREDIENTS

Followed terms are related to components which constituted this product.

Various materials( fumes and gases) which are occurred by welding refer to *10.safety and reaction*

3-1. HAZARDOUS INGREDIENTS

| Ingredients | CAS No. | CSF-308 | CSF-308HP | CSF-308L |
|---|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. | Rem. |
| Manganese(Mn) | 7439-96-5 | 0.2~0.5 | 0.2~0.5 | 0.2~0.5 |
| Titanium Dioxide | 13463-67-7 | 2.0~5.0 | 8.0~12.0 | 2.0~5.0 |
| Silicon | 7440– 21-3 | 2.0~6.0 | 2.0~6.0 | 2.0~6.0 |
| Nickel | 7440-02-0 | 9.0~11.0 | 9.0~11.0 | 9.0~11.0 |
| Chromium | 7440-47-3 | 18.0~21.0 | 18.0~21.0 | 18.0~21.0 |
| Magnesium | 7439-95-4 | ≤ 0.5 | ≤ 0.5 | ≤ 0.5 |
| Aluminum | 7429-90-5 | ≤ 0.5 | ≤ 0.5 | ≤ 0.5 |
| Molybdenum | 7439-98-7 | - | - | - |
| Niobium(Nb) | 7440-03-1 | - | - | - |
| Titanium | 7440-32-6 | - | - | - |
| Tungsten(W) | 7440-33-7 | - | - | - |
| AWS Classification | | AWS A5.22 E308T0(1)-1/-4 | AWS A5.22 E308HT1-1/-4 | AWS A5.22 E308LT0-1/-4 |

| Ingredients | CAS No. | CSF-308LP | CSF-308LP (Cryogenic) | CSF-308MoP |
|---|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. | Rem. |

| | | | | |
|---|---|---|---|---|
| Manganese(Mn) | 7439-96-5 | 0.2~0.5 | 0.2~0.5 | 0.2~0.5 |
| Titanium Dioxide | 13463-67-7 | 8.0~12.0 | 8.0~12.0 | 8.0~12.0 |
| Silicon | 7440– 21-3 | 2.0~6.0 | 2.0~6.0 | 2.0~6.0 |
| Nickel | 7440-02-0 | 9.0~11.0 | 9.0~11.0 | 9.0~11.0 |
| Chromium | 7440-47-3 | 18.0~21.0 | 18.0~21.0 | 18.0~21.0 |
| Magnesium | 7439-95-4 | ≤ 0.5 | ≤ 0.5 | ≤ 0.5 |
| Aluminum | 7429-90-5 | ≤ 0.5 | ≤ 0.5 | ≤ 0.5 |
| Molybdenum | 7439-98-7 | - | - | 1.5~3.0 |
| Niobium(Nb) | 7440-03-1 | - | - | - |
| Titanium | 7440-32-6 | - | - | - |
| Tungsten(W) | 7440-33-7 | - | - | - |
| AWS Classification | | AWS A5.22 E308LT1-1/-4 | AWS A5.22 E308LT1-1/-4 | AWS A5.22 E308MoT1-1/-4 |

| Ingredients | CAS No. | CSF-309 | CSF-309L | CSF-309LP |
|---|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. | Rem. |
| Manganese(Mn) | 7439-96-5 | 0.2~0.5 | 0.2~0.5 | 0.2~0.5 |
| Titanium Dioxide | 13463-67-7 | 2.0~5.0 | 2.0~5.0 | 8.0~12.0 |
| Silicon | 7440– 21-3 | 2.0~6.0 | 2.0~6.0 | 2.0~6.0 |
| Nickel | 7440-02-0 | 12.0~14.0 | 12.0~14.0 | 12.0~14.0 |
| Chromium | 7440-47-3 | 22.0~25.0 | 22.0~25.0 | 22.0~25.0 |
| Magnesium | 7439-95-4 | ≤ 0.5 | ≤ 0.5 | ≤ 0.5 |
| Aluminum | 7429-90-5 | - | - | - |
| Molybdenum | 7439-98-7 | - | - | - |
| Niobium(Nb) | 7440-03-1 | - | - | - |
| Titanium | 7440-32-6 | - | - | - |
| Tungsten(W) | 7440-33-7 | - | - | - |
| AWS Classification | | AWS A5.22 E309T0(1)-1/-4 | AWS A5.22 E309LT0-1/-4 | AWS A5.22 E309LT1-1/-4 |

| Ingredients | CAS No. | CSF-309MoL | CSF-309MoLP | CSF-310 |
|---|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. | Rem. |
| Manganese(Mn) | 7439-96-5 | 0.2~0.5 | 0.2~0.5 | 3.0~5.0 |
| Titanium Dioxide | 13463-67-7 | 2.0~5.0 | 8.0~12.0 | 2.0~5.0 |
| Silicon | 7440– 21-3 | 2.0~6.0 | 2.0~6.0 | 2.0~6.0 |
| Nickel | 7440-02-0 | 12.0~14.0 | 12.0~14.0 | 18.0~22.0 |

| | | | | |
|---|---|---|---|---|
| Chromium | 7440-47-3 | 22.0~25.0 | 22.0~25.0 | 25.0~27.0 |
| Magnesium | 7439-95-4 | ≤ 0.5 | ≤ 0.5 | - |
| Aluminum | 7429-90-5 | - | - | - |
| Molybdenum | 7439-98-7 | 1.5~3.0 | 1.0~4.0 | - |
| Niobium(Nb) | 7440-03-1 | - | - | - |
| Titanium | 7440-32-6 | - | - | - |
| Tungsten(W) | 7440-33-7 | - | - | - |
| AWS Classification | | AWS A5.22 E309LMoT0-1/-4 | AWS A5.22 E309LMoT1-1/-4 | AWS A5.22 E310T0-4 |

| Ingredients | CAS No. | CSF-312 | CSF-312P | CSF-316 |
|---|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. | Rem. |
| Manganese(Mn) | 7439-96-5 | 0.5~2.5 | 0.5~2.5 | 0.5~2.5 |
| Titanium Dioxide | 13463-67-7 | 2.0~5.0 | 8.0~12.0 | 8.0~12.0 |
| Silicon | 7440– 21-3 | 2.0~6.0 | 2.0~6.0 | 2.0~6.0 |
| Nickel | 7440-02-0 | 11.0~14.0 | 11.0~14.0 | 11.0~14.0 |
| Chromium | 7440-47-3 | 17.0~20.0 | 17.0~20.0 | 17.0~20.0 |
| Magnesium | 7439-95-4 | ≤ 0.5 | ≤ 0.5 | ≤ 0.5 |
| Aluminum | 7429-90-5 | - | - | - |
| Molybdenum | 7439-98-7 | 1.0~4.0 | 1.0~4.0 | 1.0~4.0 |
| Niobium(Nb) | 7440-03-1 | - | - | - |
| Titanium | 7440-32-6 | - | - | - |
| Tungsten(W) | 7440-33-7 | - | - | - |
| AWS Classification | | AWS A5.22 E316LT0-1/-4 | AWS A5.22 E316LT1-1/-4 | AWS A5.22 E316LT1-1/-4 |

| Ingredients | CAS No. | CSF-316L | CSF-316LP | CSF-316LP (Cryogenic) |
|---|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. | Rem. |
| Manganese(Mn) | 7439-96-5 | 0.2~0.5 | 0.2~0.5 | 0.5~2.5 |
| Titanium Dioxide | 13463-67-7 | 8.0~12.0 | 8.0~12.0 | 2.0~5.0 |
| Silicon | 7440– 21-3 | 2.0~6.0 | 2.0~6.0 | 2.0~6.0 |
| Nickel | 7440-02-0 | 8.0~11.0 | 8.0~11.0 | 11.0~14.0 |
| Chromium | 7440-47-3 | 28.0~32.0 | 28.0~32.0 | 17.0~20.0 |
| Magnesium | 7439-95-4 | - | - | ≤ 0.5 |
| Aluminum | 7429-90-5 | - | - | - |

| | | | | |
|---|---|---|---|---|
| Molybdenum | 7439-98-7 | - | - | 1.0~4.0 |
| Niobium(Nb) | 7440-03-1 | - | - | - |
| Titanium | 7440-32-6 | - | - | - |
| Tungsten(W) | 7440-33-7 | - | - | - |
| AWS Classification | | AWS A5.22 E312T0-1/-4 | AWS A5.22 E312T1-1/-4 | AWS A5.22 E316T0(1)-1/-4 |

| Ingredients | CAS No. | CSF-317L | CSF-317LP | CSF-347 |
|---|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. | Rem. |
| Manganese(Mn) | 7439-96-5 | 0.5~2.5 | 0.5~2.5 | 0.2~0.5 |
| Titanium Dioxide | 13463-67-7 | 8.0~13.0 | 8.0~13.0 | 2.0~5.0 |
| Silicon | 7440– 21-3 | 2.0~6.0 | 2.0~6.0 | 2.0~6.0 |
| Nickel | 7440-02-0 | 10.0~15.0 | 10.0~15.0 | 9.0~11.0 |
| Chromium | 7440-47-3 | 17.0~22.0 | 17.0~22.0 | 18.0~21.0 |
| Magnesium | 7439-95-4 | - | - | - |
| Aluminum | 7429-90-5 | - | - | - |
| Molybdenum | 7439-98-7 | 2.0~4.0 | 2.0~4.0 | - |
| Niobium(Nb) | 7440-03-1 | - | - | 0.3~1.0 |
| Titanium | 7440-32-6 | - | - | - |
| Tungsten(W) | 7440-33-7 | - | - | - |
| AWS Classification | | AWS A5.22 E317LT0-1/-4 | AWS A5.22 E317LT1-1/-4 | AWS A5.22 E347T0-1/-4 |

| Ingredients | CAS No. | CSF-347P | CSF-409Ti | CSF-410 |
|---|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. | Rem. |
| Manganese(Mn) | 7439-96-5 | 0.2~0.5 | 0.2~1.5 | 1.0~4.0 |
| Titanium Dioxide | 13463-67-7 | 6.0~10.0 | ≤ 1.0 | 2.0~5.0 |
| Silicon | 7440– 21-3 | 2.0~6.0 | 0.2~1.5 | 1.0~5.0 |
| Nickel | 7440-02-0 | 9.0~11.0 | - | - |
| Chromium | 7440-47-3 | 18.0~21.0 | 10.0~15.0 | 10.0~15.0 |
| Magnesium | 7439-95-4 | - | - | - |
| Aluminum | 7429-90-5 | - | - | - |
| Molybdenum | 7439-98-7 | - | - | - |
| Niobium(Nb) | 7440-03-1 | 0.3~1.0 | - | - |
| Titanium | 7440-32-6 | - | 0.5~1.0 | - |
| Tungsten(W) | 7440-33-7 | - | - | - |

| AWS Classification | AWS A5.22 E347T1-1/-4 | AWS A5.22 E409T0-G | AWS A5.22 E410T0-1/-4 |
|---|---|---|---|

| Ingredients | CAS No. | CSF-410NiMo | CSF-439 | CSF-2209 |
|---|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. | Rem. |
| Manganese(Mn) | 7439-96-5 | 1.0~4.0 | 1.0~4.0 | 1.0~3.0 |
| Titanium Dioxide | 13463-67-7 | 2.0~5.0 | - | 5.0~10.0 |
| Silicon | 7440– 21-3 | 1.0~5.0 | 0.2~0.8 | 3.0~8.0 |
| Nickel | 7440-02-0 | 3.0~6.0 | - | 6.0~10.0 |
| Chromium | 7440-47-3 | 8.0~12.0 | 15.0~20.0 | 16.0~20.0 |
| Magnesium | 7439-95-4 | - | - | - |
| Aluminum | 7429-90-5 | - | - | - |
| Molybdenum | 7439-98-7 | 2.0~4.0 | - | 2.0~5.0 |
| Niobium(Nb) | 7440-03-1 | - | - | - |
| Titanium | 7440-32-6 | - | 0.3~1.0 | - |
| Tungsten(W) | 7440-33-7 | - | - | - |
| AWS Classification | | AWS A5.22 E410NiMoT0-1/-4 | - | AWS A5.22 E2209T0-1/-4 |

| Ingredients | CAS No. | CSF-2209P | CSF-2594P |
|---|---|---|---|
| Iron | 7439-89-6 | Rem. | Rem. |
| Manganese(Mn) | 7439-96-5 | 0.5~2.5 | 0.5~3.0 |
| Titanium Dioxide | 13463-67-7 | 5.0~15.0 | 11.0~15.0 |
| Silicon | 7440– 21-3 | 3.0~8.0 | 3.0~8.0 |
| Nickel | 7440-02-0 | 8.0~10.0 | 6.0~11.0 |
| Chromium | 7440-47-3 | 21.0~24.0 | 18.0~26.0 |
| Magnesium | 7439-95-4 | - | - |
| Aluminum | 7429-90-5 | - | - |
| Molybdenum | 7439-98-7 | 2.0~5.0 | 2.0~5.0 |
| Niobium(Nb) | 7440-03-1 | - | - |
| Titanium | 7440-32-6 | - | - |
| Tungsten(W) | 7440-33-7 | - | 0.5~1.5 |
| AWS Classification | | AWS A5.22 E2209T1-1/-4 | AWS A5.22 E2594T1-1 |

※ Nickel and chromium contained in this product exist in a metallic state (not substances subject to special management). However, nickel may appear as an insoluble compound due to a chemical reaction with the base metal during welding.

## 4. FIRST AID MEASURES

4-1. When it gets into your eyes

○ If foreign matter generated during welding gets into your eyes, do not rub them and wash them with water.

○ If discomfort is felt or pain continues even after washing with water, seek medical attention from an ophthalmologist.

4-2. When in contact with skin

○ If your skin is exposed to arc rays and hot heat generated during welding, you may suffer burns.

○ Wash with plenty of soapy water for at least 15 minutes to remove chemicals.

○ If you suffer a burn, quickly cool the affected area and seek medical attention.

○ In case of minor skin contact, prevent spread to contaminated areas.

○ Remove and remove clothing and shoes contaminated with chemicals and wash them before using again.

4-3. When inhaled

○ If breathing is difficult due to excessive inhalation of gas generated during welding, perform oxygen respiration or artificial respiration. Receive medical attention quickly.

○ If not breathing, perform artificial respiration.

○ If breathing is difficult, provide oxygen.

○ Do not make the person vomit.

4-4. When eaten

○ If a substance is ingested or inhaled, do not perform artificial respiration using the mouth-to-mouth method and use appropriate respiratory medical equipment. Please use it.

○ If swallowed, seek medical help (doctor) immediately.

○ If swallowed, rinse your mouth. Don't try to make him vomit.

4-5. Most important symptoms and effects, both acute and delayed

○ Acute: Electrical ophthalmia, metal fume fever, allergic reaction, dizziness, vomiting, etc. caused by arc rays and fumes generated during welding. If bronchial asthma occurs, stop work and seek medical attention.

○ Delay: Excessive exposure to arc rays and fumes generated during welding can cause serious damage to the eyes, lungs, and skin. I can give it.

4-6. First aid and doctor's precautions

○ Difficulty breathing due to welding gas and fumes

- Quickly move the patient to fresh air and loosen tight areas around the neck and lower back. do.
- If the patient is unconscious, secure the airway and administer oxygen supply or artificial respiration.
- Request medical help as quickly as possible.

○ Electric shock

- Immediately turn off the power and move the victim to a safe place.
- If the patient is unconscious, secure an airway, perform artificial respiration, and quickly receive help from medical staff.

## 5. FIREFIGHTING MEASURES

5-1. Appropriate (and inappropriate) extinguishing media

○ Suitable fire extinguishing media: carbon dioxide, powder fire extinguishing agent, regular foam, water, etc.

○ Unsuitable extinguishing media: No data available.

○ In case of large fire: No data.

5-2. Specific hazards arising from chemicals

○ Thermal decomposition products: carbon dioxide, fume

○ Fire and explosion hazard: Not applicable.

5-3. Protective equipment and precautions to wear when extinguishing a fire

○ When extinguishing a fire, wear protective equipment (protective clothing, gloves, shoes, goggles, mask, etc.).

○ There is a risk of fire during welding work, so remove flammables and combustibles from the surrounding area and ensure sufficient ventilation in the workplace. Fire extinguishing equipment must be provided to extinguish fires.

## 6. ACCIDENTAL RELEASE MEASURES

6-1. Measures and protective equipment required to protect the human body: 8. c. Wear personal protective equipment as indicated in the item.

6-2. Measures needed to protect the environment: Prevent entry into waterways, drains, basements and confined spaces.

6-3. Methods for purification or removal: Not applicable.

## 7. HANDLING AND STORAGE

7-1. Safe handling instructions

- Handle in a sufficiently ventilated area.
- Do not inhale fumes and gases generated during welding.
- Handle away from fire.
- Avoid contact with eyes, skin and clothing.
- Wear appropriate protective equipment as necessary.

7-2. Safe storage methods

- Store indoors in a dry and well-ventilated place.
- Store away from chemicals such as acids that may cause chemical reactions.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters: Community workplace exposure limits were not established for substances contained in the mixture.

8.2. Exposure controls: Do not eat, drink and smoke. Immediately remove all contaminated clothing. Wash hands before breaks and at the end of work.

8.2.1 Appropriate engineering controls: Use local exhaust ventilation during all welding operations.

8.2.2 In Individual protection measures, such as personal protective equipment:

8.2.2.1 Eye/face protection: Always wear eye protection during welding operations, helmet and/or face shield with filter lens.

8.2.2.2 Skin protection:

Hand protection: Wear appropriate protective (welding) gloves during welding.

Other: Wear appropriate protective clothing and boots.

8.2.2.3 Respiratory protection: If ventilation is insufficient, use appropriate respirator or self-contained breathing apparatus.

8.2.2.4 Thermal hazards: No data available.

8.2.3 Environmental exposure controls: Do not allow to enter sewers, surface and ground water.

## 9. PHYSICAL AND CHEMICAL CHARACTER

9-1. Physical State : Solid

9-2. Odor : Odorless
9-3. Odor threshold : Not applicable
9-4. pH Value : Not applicable
9-5. Melting point : Not applicable
9-6. early boiling point : Not applicable
9-7. Flash point : Not applicable

9-8. Evaporation rate : Not applicable
9-9. Flammability : Not applicable
9-10. Explosion limit - lower : Not applicable
Explosion limit - upper : Not applicable
9-11. Vapor pressure : Not applicable
9-12. Solubility in water : Not applicable
9-13. Vapor density : Not applicable
9-14. Density : 7~8.
9-15. Partition coefficient N-octanol / water : Not applicable
9-16. Spontaneous combustion temperature : Not applicable
9-17. Dcomposition temperature : Not applicable
9-18. Viscosity : Not applicable
9-19. Molecular weight : Not applicable

## 10.STABILITY AND REACTION

10.1. Chemical stability and potential for hazardous reactions
Chemically stable at room temperature and pressure.
Generates irritating fumes and gases when used.
10.2. Conditions to avoid (electrostatic discharge, shock, vibration, etc.): Not applicable.
10.3. Materials to avoid: Combustible materials, acids
10.4. Substances produced during decomposition: Fumes and gases are produced by welding heat.

## 11. TOXICOLOGICAL INFORMATION

Welding fume consist of complex materials and represent iron oxide, manganese oxide and fluorine oxide. follow section is a health hazard data..

11.1 Iron oxide
- Acute poisonous character : relatively non-poison at intake
- A generation of cancer : no data
- Health influence : (expose a eye and a skin) acute exposure – occur a physical stimulation.
  Chronic exposure – no data.
  (Ingestion) acute exposure - occur a physical stimulation.
  Chronic exposure – occur a iron-pneumoconiosis in case that a welding fume is piled in the lung.

11.2 Manganese oxide( manganese )
- Acute poisonous character : it is rare for worker to occur an acute poison.
- A generation of cancer : nothing
- Health influence : (Ingestion ) acute exposure – May occur a acute pneumonia in case that a welding fume of manganese steel is breathed in.
  May occur a metal fume fever.
  Chronic exposure - occur a nervous disease by reason of chronic poison when welded in a limited place.

※Metal fume fever - metal fume fever which have a symptoms like a cold is occurred when a worker ingest a corpuscle of metal oxide, below 1.5 micro(generally 0.02~0.05 micro)
First symptoms occur after 4~12h and are thirst, sweat, a metal smell or a stink in mouth.

Other symptoms are a couch, a stimulate, a dry of mucous membrane, a languor and a discomfort.
Occur a fever, a cold fit, a muscular pain and headache.

Occur a vomiting, a excess mental activity and have loose bowels.
Tolerance about a fume directly occur and disappear soon. Every symptoms is lessened less than 24~36h.
Chronic exposure – chronic metal fume fever don't occur but symptoms occur repeatedly and disappear within one-two days due to have a tolerance.

## 12. ECOLOGIVAL INFORMATION

12-1. Toxicity : No data available
12-2. Persistence–degradability : No data available
12-3. Bio accumulative potential : No data available
12-4. Mobility in soil : No data available
12-5. Results of PBT and vPvB assessment : No data available

## 13. DISPOSAL CONSIDERATIONS

Follow the rules of the government and the local government when dump wastes.

## 14. TRANSPORT INFORMATION

**14.1 ADR/RID/ADN:** The mixture is not subject to international regulations on transport of dangerous goods.
**14.1.1 UN number:** No data available.
**14.1.2 UN proper shipping name:** No data available.
**14.1.3 Transport hazard class(es):** No data available.
**14.1.4 Packing group:** No data available.
**14.1.5 Environmental hazards:** No data available.
**14.1.6 Special precautions for user:** No data available.
**14.1.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** No data available.
**14.2 IMDG:** The mixture is not subject to international regulations on transport of dangerous goods.
**14.3 ICAO/IATA:** The mixture is not subject to international regulations on transport of dangerous goods.

## 15. REGULATORY INFORMATION

Observing the article 39 ( express of hazardous materials ) of law of industry safety & health and the article 31 of this same law, express the precautionary label on the product.

California Proposition 65:

⚠ **WARNING**: This product may expose you to chemicals including [Cobalt (II) Oxide, Titanium dioxide (airborne, unbound particles of respirable size), Chromium (hexavalent compounds), Nickel, Lead and Lead Compounds, Carbon Black, Cadmium, Beryllium and Beryllium Compounds] which are known to the State of California to cause cancer, and [Chromium (hexavalent compounds), Nickel, Lead and Lead Compounds, Cadmium] which are known to the State of California to cause birth defects and/or other reproductive harm. For more information go to https://www.p65warnings.ca.gov/
Nickel, Titanium Dioxide, Quartz and Chromium as possible carcinogens

## 16. OTHER INFORMATION

16-1. This MSDS is made by CHOSUN WELDING CO., LTD and refer to the MSDS of each materials and data of welding fume & gas from the Korea Occupational Safety & Health Agency.

16-2. Read and understand the manufacturer's instruction and the precautionary label on the product, and follow the laws.

16-3. Reference data : FUMES and GASES in the welding Environment(AWS)
Welding : FUME And GASES (Australian Government Publishing Service Canberra)
MSDS(KISCO-NET) of each materials
Data cooperation : Korea institute of industrial technology