



# Material Safety Data Sheets (MSDS)

Document No.: CSW-0007

Rev. date : 2023.08.22

Rev. No. : 0

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

- 1-1. Brand Name : **NC-308, NC-308L, NC-308EL, NC-308H, NC-309L, NC-309EL, NC-309Mo, NC-309MoL, NC-309Cb, NC-310, NC-312, NC-316, NC-316L, NC-316EL, NC-317L, NC-318, NC-347, NC-410, NC-410NiMo, NC-430, NC-2209**
- 1-2. Product Type : Shield Metal Arc Welding Electrode for stainless steel
- 1-3. Manufacturer / Supplier
- 1) Manufacturer : Chosun Welding Co.Ltd
  - 2) Address : 43 Goedong-ro, Nam-gu, Pohang-si, Gyeongsangbuk-do, [37863] Korea
  - 3) Emergency Tel : +82-080-285-9080, +82-52-237-5301~6 Fax:+82-52-237-3311

## 2. HAZARD(S) IDENTIFICATION

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.

- o Pictograph



- o A signal : Danger
- o 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.
  - H372 Causes damage to respiratory system through prolonged or repeated exposure.
- o 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.
- o 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



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- 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.	NC-308	NC-308L	NC-308EL
Iron	7439-89-6	Rem.	Rem.	Rem.
Manganese	7439-96-5	1.0~5.0	1.0~5.0	1.0~5.0
Titanium Dioxide	13463-67-7	10.0~19.0	10.0~19.0	10.0~19.0
Nickel	7440-02-0	5.0~12.0	5.0~12.0	5.0~12.0
Chromium	7440-47-3	16.0~22.0	16.0~22.0	16.0~22.0
Mica	12001-26-2	1.0~8.0	1.0~8.0	1.0~8.0
Sodium Silicate	1344-09-8	0.5~7.0	0.5~7.0	0.5~7.0
Limestone	1317-65-3	0.5~5.0	0.5~5.0	0.5~5.0
Molybdenum	7439-98-7	-	-	-
Niobium	7440-03-1	-	-	-
Calcium Fluoride	7789-75-5	-	-	-
AWS Classification		AWS A5.4 E308-16	AWS A5.4 E308L-16	AWS A5.4 E308L-16

Ingredients	CAS No.	NC-308H	NC-309	NC-309L
Iron	7439-89-6	Rem.	Rem.	Rem.
Manganese	7439-96-5	1.0~5.0	1.0~5.0	1.0~5.0
Titanium Dioxide	13463-67-7	10.0~18.0	10.0~18.0	10.0~18.0
Nickel	7440-02-0	5.0~10.0	5.0~12.0	5.0~12.0
Chromium	7440-47-3	16.0~22.0	16.0~23.0	16.0~23.0
Mica	12001-26-2	1.0~8.0	1.0~8.0	1.0~8.0
Sodium Silicate	1344-09-8	0.5~7.0	0.5~5.0	0.5~5.0
Limestone	1317-65-3	0.5~5.0	0.5~5.0	0.5~5.0
Molybdenum	7439-98-7	-	-	-
Niobium	7440-03-1	-	-	-
Calcium Fluoride	7789-75-5	-	-	-
AWS Classification		AWS A5.4 E308H-16	AWS A5.4 E309-16	AWS A5.4 E309L-16

Ingredients	CAS No.	NC-309EL	NC-309Mo	NC-309MoL
Iron	7439-89-6	Rem.	Rem.	Rem.
Manganese	7439-96-5	1.0~5.0	1.0~5.0	1.0~5.0
Titanium Dioxide	13463-67-7	10.0~18.0	10.0~18.0	10.0~18.0
Nickel	7440-02-0	5.0~12.0	8.0~12.0	8.0~12.0



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Chromium	7440-47-3	16.0~23.0	16.0~23.0	16.0~23.0
Mica	12001-26-2	1.0~8.0	1.0~8.0	1.0~8.0
Sodium Silicate	1344-09-8	0.5~5.0	0.5~5.0	0.5~5.0
Limestone	1317-65-3	0.5~5.0	0.5~5.0	0.5~5.0
Molybdenum	7439-98-7	-	1.0~4.0	1.0~4.0
Niobium	7440-03-1	-	-	-
Calcium Fluoride	7789-75-5	-	-	-
AWS Classification		AWS A5.4 E309L-16	AWS A5.4 E309Mo-16	AWS A5.4 E309LMo-16

Ingredients	CAS No.	NC-309Cb	NC-310	NC-312
Iron	7439-89-6	Rem.	Rem.	Rem.
Manganese	7439-96-5	1.0~5.0	1.0~4.0	1.0~5.0
Titanium Dioxide	13463-67-7	10.0~18.0	10.0~18.0	10.0~18.0
Nickel	7440-02-0	8.0~12.0	18.0~22.0	7.0~10.0
Chromium	7440-47-3	18.0~25.0	23.0~28.0	18.0~25.0
Mica	12001-26-2	1.0~8.0	1.0~8.0	1.0~8.0
Sodium Silicate	1344-09-8	0.5~5.0	0.5~5.0	0.5~5.0
Limestone	1317-65-3	0.5~5.0	0.5~5.0	0.5~5.0
Molybdenum	7439-98-7	-	-	-
Niobium	7440-03-1	0.1~1.0	-	-
Calcium Fluoride	7789-75-5	-	-	-
AWS Classification		AWS A5.4 E309Nb-16	AWS A5.4 E310-16	AWS A5.4 E312-16

Ingredients	CAS No.	NC-316	NC-316L	NC-316EL
Iron	7439-89-6	Rem.	Rem.	Rem.
Manganese(Mn)	7439-96-5	1.0~5.0	1.0~5.0	1.0~5.0
Titanium Dioxide	13463-67-7	10.0~18.0	10.0~18.0	10.0~18.0
Nickel	7440-02-0	8.0~12.0	8.0~12.0	8.0~12.0
Chromium	7440-47-3	16.0~21.0	16.0~21.0	16.0~21.0
Mica	12001-26-2	1.0~8.0	1.0~8.0	1.0~8.0
Sodium Silicate	1344-09-8	0.5~5.0	0.5~5.0	0.5~5.0
Limestone	1317-65-3	0.5~5.0	0.5~5.0	0.5~5.0
Molybdenum	7439-98-7	1.0~4.0	1.0~4.0	1.0~4.0
Niobium	7440-03-1	-	-	-
Calcium Fluoride	7789-75-5	-	-	-
AWS Classification		AWS A5.4 E316-16	AWS A5.4 E316L-16	AWS A5.4 E316L-16

Ingredients	CAS No.	NC-317L	NC-318	NC-347
Iron	7439-89-6	Rem.	Rem.	Rem.
Manganese	7439-96-5	1.0~5.0	1.0~5.0	1.0~5.0
Titanium Dioxide	13463-67-7	10.0~18.0	10.0~18.0	10.0~18.0
Nickel	7440-02-0	7.0~10.0	8.0~10.0	8.0~10.0



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Chromium	7440-47-3	18.0~25.0	13.0~18.0	13.0~18.0
Mica	12001-26-2	1.0~8.0	1.0~8.0	1.0~8.0
Sodium Silicate	1344-09-8	0.5~5.0	0.5~5.0	0.5~5.0
Limestone	1317-65-3	0.5~5.0	0.5~5.0	0.5~5.0
Molybdenum	7439-98-7	0.5~3.0	0.5~3.0	0.5~3.0
Niobium	7440-03-1	-	0.1~1.0	0.1~.0
Calcium Fluoride	7789-75-5	-	-	-
AWS Classification		AWS A5.4 E317L-16	AWS A5.4 E318-16	AWS A5.4 E347-16

Ingredients	CAS No.	NC-410	NC-410NiMo	NC-430
Iron	7439-89-6	Rem.	Rem.	Rem.
Manganese	7439-96-5	1.0~5.0	1.0~5.0	1.0~5.0
Titanium Dioxide	13463-67-7	10.0~18.0	5.0~10.0	10.0~18.0
Nickel	7440-02-0	0.1~2.0	1.0~6.0	0.1~0.5
Chromium	7440-47-3	8.0~13.0	8.0~13.0	13.0~18.0
Mica	12001-26-2	3.0~8.0	-	1.0~8.0
Sodium Silicate	1344-09-8	0.5~5.0	-	0.5~5.0
Limestone	1317-65-3	1.0~4.0	-	0.5~5.0
Molybdenum	7439-98-7	-	1.0~3.0	-
Niobium	7440-03-1	-	-	-
Calcium Fluoride	7789-75-5	0.5~5.0	-	-
AWS Classification		AWS A5.4 E410-16	AWS A5.4 E410NiMo-16	AWS A5.4 E430-16

Ingredients	CAS No.	NC-2209
Iron	7439-89-6	Rem.
Manganese	7439-96-5	1.0~5.0
Titanium Dioxide	13463-67-7	10.0~16.0
Nickel	7440-02-0	1.0~6.0
Chromium	7440-47-3	15.0~22.0
Mica	12001-26-2	3.0~8.0
Sodium Silicate	1344-09-8	1.0~5.0
Limestone	1317-65-3	1.0~5.0
Molybdenum	7439-98-7	2.0~4.0
Niobium	7440-03-1	-
Calcium Fluoride	7789-75-5	0.5~5.0
AWS Classification		AWS A5.4 E2209-16

※ Nickel and chromium contained in this product exist in 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



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- 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. FIRE-FIGHTING 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



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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 PROPERTIES

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



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- 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. Decomposition temperature : Not applicable
- 9-18. Viscosity : Not applicable
- 9-19. Molecular weight : Not applicable

## 10. STABILITY AND REACTIVITY

- 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 cough, 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



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within one-two days due to have a tolerance.

## 12. ECOLOGICAL 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 CONSIDERATION

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)





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MSDS(KISCO-NET) of each materials

Data cooperation : Korea institute of industrial technology