1 IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier: For 620MPa tensil strength steel
Product name: ZH-90
Contains: nickel (EC: 231-111-4).
1.2 Relevant identified uses of the substance or mixture and uses advised against:
1.2.1 Relevant identified uses : For butt and fillet welding of machineries, heavy equipments, pressure vessels and steel that demand for creep-resistant in high temperature
1.2.2 Uses advised : Reference the [7. Handling and storage]
1.3 Details of the supplier of the safety data sheet:
Producer: #58-2, Seongju-dong, Changwon-si, Gyeongsangnam-do,South Korea
Distributor: Changwon factory QA Team
1.4 Emergency telephone number
1.4.1 KOREA : Changwon factory(82-55-269-7200), Busan factory(82-51-310-7200)
1.4.2 CHINA : KISWEL DALIAN LTD.(86-411-8751-7780)
1.4.3 MALAYSIA : KISWEL SDN. BHD.(60-7-2515-933)
1.4.4 U.S.A : KISWEL INC.(1-859-371-0070)
1.4.5 JAPAN : KISWEL JAPAN LTD.(Osaka : 81-6-6636-6615, Tokyo : 81-3-3669-2490)
1.4.6 EUROPE : KISWEL EUROPE(352-26-52-6827)
1.4.7 U.A.E : KISWEL M.E.Asia(971-4-883-3673)
1.4.8 THAILAND : KISWEL Bangkok(66-2-653-0066)
1.4.9 VIETNAM : KISWEL Hochiminh(84-8-6291-4556)

2 HAZARDS IDENTIFICATION

2.1 Classification of the mixture:
The product is placed on the market in solid form.

2.1.1 ***Classification in accordance with Directive 1999/45/EC:*** Mixture is classified as **Carc. Cat 3; R40, T; R48/23, R43**

2.1.2 ***Classification in accordance with Regulation (EC) No 1272/2008:*** Mixture is classified as **Carc. 2 H351, STOT RE 1 H372, Skin Sens. 1. H317**

2.2 Label elements:

Labeling in accordance with Regulation (EC) No 1272/2008:
Pictograms:



GHS08 GHS07

Signal word: Danger

Hazard statements:
H317 May cause an allergic skin reaction.
H351 Suspected of causing cancer.
H372 Causes damage to organs through prolonged or repeated exposure.

Precautionary statements:
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe vapours.
P270 Do no eat, drink or smoke when using this product.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P405 Store locked up.

2.3 Other hazards: No data available.

3 COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances: No data available.

3.2 Mixtures: The mixture contains dangerous substances:

Substance name	EC No.	Registr. no	Classification				Conc. (%) Volume	Note
			67/548/EEC	Hazard Class and Category Code(s)	Hazard state-ment	Pictogram/ Signal word		
[2]Silicon	231-130-8	-	-	-	-	-	0.1~1.0	
[2]Manganese	231-105-1	-	-	-	-	-	0.5~3	-
[2]Copper	231-159-6	-	-	-	-	-	0.1~1.0	-
[1,2]Nickel	231-111-4	-	Toxic Carc. Cat 3; R40 T; R48/23 R43	Carcinogenicity Carc. 2 Specific target organ toxicity — repeated exposure STOT RE 1 Respiratory/ skin sensitisation Skin Sens. 1	H351 H372 H317	 Danger	1.0~3.0	S, 7
Iron	231-096-4	-	-	-	-	-	94.0~97.0	-

[1]Substance is classified in terms of Regulation (EC) No. 1272/2008 Annex VI.
[2]Substance with workplace exposure limits.
Note S: This substance may not require a label according to Article 17 (see section 1.3 of Annex I) (Table 3.1). This substance may not require a label according to Article 23 of Directive 67/548/EEC (see section 8 of Annex VI to that Directive) (Table 3.2).
Note 7: Alloys containing nickel are classified for skin sensitisation when the release rate of 0,5 µg Ni/cm2/week, as measured by the European Standard reference test method EN 1811, is exceeded.
Note T: This substance may be marketed in a form which does not have the physical hazards as indicated by the classification in the entry in Part 3. If the results of the relevant method or methods in accordance with Part 2 of Annex I of this Regulation show that the specific form of substance marketed does not exhibit this physical property or these physical hazards, the substance shall be classified in accordance with the result or results of this test or these tests. Relevant information, including reference to the relevant test method(s) shall be included in the safety data sheet.
* Classification according to Regulation (EC) No. 1272/2008 only applies to powder form.
**See all the hazard statements in chapter 16.

4 FIRST AID MEASURES

4.1 Description of first aid measures:

In case of respiratory exposure: Remove to fresh air and keep at rest. If breathing is difficult or has stopped, administer artificial respiration as necessary. Seek medical attention.

In case of skin contamination: Wash contaminated area thoroughly with soap and water. Remove and wash contaminated clothing. If a persistent rash or irritation occurs, seek medical attention.

In case of intrusion into eye: Immediately flush eyes with large amounts of running water for at least 15 minutes, lifting the upper and lower eyelids. Get medical attention.

In case of oral intake: Ingestion is considered unlikely due to product form. However, if swallowed do not induce vomiting. Seek medical attention. Advice to doctor: treat symptomatically.

4.2 Most important symptoms and effects, both acute and delayed: No data available.

4.3 Indication of any immediate medical attention and special treatment needed: No data available.

5 FIREFIGHTING MEASURES

5.1 Extinguishing media:

Suitable extinguishing media: Carbon dioxide, dry chemical, water spray. Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media: No data available.

5.2 Special hazards arising from the substance or mixture: Fire may produce irritating or poisonous gases.

5.3 Advice for firefighters: In the event of a fire, wear self-contained breathing apparatus and protective clothing.

6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:

For non-emergency personnel: Wear appropriate personal protective equipment as specified in Section 8. Ensure adequate ventilation**.**

For emergency responders: No data available.

6.2 Environmental precautions: Avoid dispersal of spilled material and contact with soil, ground and surface water, drains and sewers.

Methods and material for containment and cleaning up: Take up mechanically. Collect the material in labeled containers and dispose of according to local and regional authority requirements.

6.3 Reference to other sections: See Section 7 for information on safe handling. See Section 8 for information on personal protection equipment. See Section 13 for disposal information.

7 HANDLING AND STORAGE

7.1 Precautions for safe handling: Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. Use adequate ventilation. Keep away from sources of ignition. Avoid contact with skin, eyes and clothing. Do not eat, drink and smoke in work areas.

7.2 Conditions for safe storage, including any incompatibilities: Store in cool, dry and well-ventilated place. Keep away from incompatible materials. Keep away from heat and open flame.

7.3 Specific end use(s): No data available.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters: Exposure limits were not established for this product.
Workplace exposure limits for substances contained in the mixture are listed in *EH40/2005* Workplace exposure limits:

Substance	CAS number	Workplace exposure limit				Comments
		Long-term exposure limit (8-hour TWA reference period)		Short-term exposure limit (15-minute reference period)		
		ppm	mg.m^{-3}	ppm	mg.m^{-3}	
Silicon inhalable dust respirable dust	7440-21-3	 - -	 10 4	 - -	 - -	
Manganese and its inorganic compounds (as Mn)		-	0.5	-	-	
Copper fume dusts and mists (as Cu)	7440-50-8	 - -	 0.2 1	 - -	 - 2	
Iron oxide, fume (as Fe)	1309-37-1	-	5	-	10	

*A skin notation assigned to the OEL identifies the possibility of significant uptake through the skin.

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 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 Information on basic physical and chemical properties:

Appearance:	solid (metal rod)
Odour:	-
Odour threshold:	-
pH:	-
Melting point/freezing point:	-
Initial boiling point and boiling range:	-
Flash point:	-
Evaporation rate:	-
Flammability (solid, gas):	-
Upper/lower flammability or explosive limits:	-
Vapour pressure:	-
Vapour density:	-
Relative density:	-
Solubility(ies):	-
Partition coefficient: n-octanol/water:	-
Auto-ignition temperature:	-
Decomposition temperature:	-
Viscosity:	-
Explosive properties:	-
Oxidising properties:	-

9.2 Other information: No data available.

10 STABILITY AND REACTIVITY

10.1 Reactivity: No data available.

10.2 Chemical stability: The product is stable under normal conditions. When using it may produce dangerous fumes and gases.

10.3 Possibility of hazardous reactions: No data available.

10.4 Conditions to avoid: Avoid contact with incompatible materials.

10.5 Incompatible materials: Acids, bases, oxidizing agents.

10.6 Hazardous decomposition products: Metal oxide fumes and gases are produced during welding.

11 TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

The mixture may cause an allergic skin reaction. It is suspected of causing cancer. It causes damage to organs through prolonged or repeated exposure.

12 ECOLOGICAL INFORMATION

12.1 Toxicity: No data available

12.2 Persistence and degradability: No data available.
12.3 Bioaccumulative potential: No data available.
12.4 Mobility in soil: No data available.
12.5 Results of PBT and vPvB assessment: No data available.
12.6 Other adverse effects: No data available.

13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose off in accordance with local and national regulations.

14 TRANSPORT INFORMATION

14.1 ADR/RID/ADN: The mixture is not subject to international regulations on transport of dangerous goods.

UN number:	-
UN proper shipping name:	-
Transport hazard class(es):	-
Packing group:	-
Environmental hazards:	-
Special precautions for user:	-
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:	-

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

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture: There are restrictions for nickel under Title VIII of REACH Regulation.

Annex XVII to Regulation (EC) No 1907/2006 - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles:

Nickel CAS No 7440-02-0 EC No 231-111-4 and its compounds:

1. Shall not be used: (a) in any post assemblies which are inserted into pierced ears and other pierced parts of the human body unless the rate of nickel release from such post assemblies is less than 0,2 µg/cm 2 /week (migration limit); (b) in articles intended to come into direct and prolonged contact with the skin such as: — earrings, — necklaces, bracelets and chains, anklets, finger rings, — wrist-watch cases, watch straps and tighteners, — rivet buttons, tighteners, rivets, zippers and metal marks, when these are used in garments, if the rate of nickel release from the parts of these articles coming into direct and prolonged contact with the skin is greater than 0,5 µg/cm 2 / week. (c) in articles referred to in point (b) where these have a non-nickel coating unless such coating is sufficient to ensure that the rate of nickel release from those parts of such articles coming into direct and prolonged contact with the skin will not exceed 0,5 µg/cm 2 / week for a period of at least two years of normal use of the article.

2. Articles which are the subject of paragraph 1 shall not be placed on the market unless they conform to the requirements set out in that paragraph.

3. The standards adopted by the European Committee for Standardisation (CEN) shall be used as the test methods for demonstrating the conformity of articles to paragraphs 1 and 2.

Corrigendum to Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (OJ L 396, 30.12.2006);

Corrigendum to Directive No 2006/121/EC of the European Parliament and of the Council of 18 December 2006 amending Council Directive 67/548/EEC on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labeling of dangerous substances in order to adapt it to Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency (OJ L 396, 30.12.2006);

Regulation (EC) No 1272/2008 of the European parliament and of the Council of 16 December 2008 on classification, labeling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (OJ L 353, 31.12. 2008).

COMMISSION REGULATION (EC) No 790/2009 of 10 August 2009 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labeling and packaging of substances and mixtures.

COMMISSION REGULATION (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

15.2 Chemical safety assessment: Chemical safety assessment is not available.

16 OTHER INFORMATION

16.1 List of relevant risk phrases and hazard statements:

R15 Contact with water liberates extremely flammable gases.
R17 Spontaneously flammable in air.
R40 Limited evidence of a carcinogenic effect.
R43 May cause sensitisation by skin contact.
R48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.
H317 May cause an allergic skin reaction.
H351 Suspected of causing cancer.
H372 Causes damage to organs through prolonged or repeated exposure.
H261 In contact with water releases flammable gases
H250 Catches fire spontaneously if exposed to air

16.2 Instructions for the training: Product handling instruction shall be included into the educational system about the safety work (initial training, training at the workplace, repeated training) according to specific conditions at the workplace.

16.3 Recommended restrictions on use (i.e. non-statutory recommendations by supplier): Mixture should not be used for any other purpose than for which is appointed (point 1.2). Because of the fact that specific conditions of use of mixture are out of supplier's control, it is responsibility of the user to adjust the prescribed warnings to local laws and regulations. Safety information describes the product in terms of safety and it cannot be considered as technical information about product.

16.4 Sources of key data used to compile the Safety Data Sheet: SDS was prepared using data from the producer.

16.5 Purpose of SDS: Purpose of this SDS is to provide relevant information for users of product to ensure proper handling and control of risks/hazards.