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

1.1 Product identifier: For 620MPa tensil strength steel
Product name: ZO-90
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 **R43, R42, Xn; R68/20, Xn;R48/20,21,22**

2.1.2 ***Classification in accordance with Regulation (EC) No 1272/2008:*** Mixture is classified as **Skin Sens. 1. H317, Resp. Sens. 1 H334, STOT SE 2 H371, STOT RE 2 H373**

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
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled
H371 May cause damage to respiratory system
H373 May cause damage to respiratory system through prolonged or repeated exposure
Precautionary statements:
P260 Do not breathe fume.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P309+P311 IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
P405 Store locked up.
P501 Dispose of contents and container in accordance with local and national regulations.

The mixture does not require a label according to Annex I.
Annex I, section 1.3 Derogations from labelling requirements for special cases:
In accordance with Article 23 the following derogation shall apply:
Metals in massive form, alloys, mixtures containing polymers and mixtures containing elastomers do not require a label according to this Annex, if they do not present a hazard to human health by inhalation,

ingestion or contact with skin or to the aquatic environment in the form in which they are placed on the market, although classified as hazardous in accordance with the criteria of this Annex.

※ On the other hand, we want to offer classification and label of welding fume for workers.

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		
[1]Silicon	231-130-8	-	-	-	-	-	0.1~1.0	-
[2,3]Manganese	231-105-1	-	Xn; R68/20/21/22	STOT RE 2	H373	 Warning	0.5~3	-
[1]Copper	231-159-6	-	-	-	-	-	0.1~1.0	-
[2,3]Iron	231-096-4	-	Xn; R68/20/21/22 Xn; R68/20/21/22	STOT SE 2 STOT RE 2	H371 H373	 Warning	95~99	-

[1]Substance with workplace exposure limits.
*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.

Japan Occupational Exposure Limits (Manganese and compounds (as Mn except organic compounds): OEL 0.2 mg/m^3

Japan Working Environment Evaluation Standards (Manganese and its compounds (excluding basic manganese oxide) : 0.2 mg/m^3

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	7440-21-3					
inhalable dust		-	10	-	-	
respirable dust		-	4	-	-	
Manganese and its inorganic compounds (as Mn)		-	0.5	-	-	
Copper	7440-50-8					
fume		-	0.2	-	-	
dusts and mists (as Cu)		-	1	-	2	

*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: No data available.

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:

15.1.1 Japan

Silicon (CAS No. 7440-21-3)
Industrial Safety and Health Act - Dangerous·flammable articles
Fire Service Law - Type 1 Flammable Solid
Ships Safety Law - Flammable
Civil Aeronautics Law - Flammable Solids
Port Regulation Law - Dangerous Goods

Manganese (CAS No. 7439-96-5)
Civil Aeronautics Law - Flammable Solids
Port Regulations Law (Japanese) - Dangerous Goods
Ships Safety Law - Flammable Substances
Air Pollution Control Law - Hazardous Air Pollutants
PRTR Law (Manganese and its compounds) - Cabinet Order No. 412

15.1.2 EU

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: -

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.

16.6 This (M)SDS has been authorized according to EU CLP(European implementation of UN GHS 2nd Edition).