



KISWEL
www.kiswel.com



Always with you
Bridge to World, Nature, Future

KISWEL **WELDING BUSINESS**

Solution by Industry

THE GRAND JOURNEY.

Amongst all mammals, the African Elephant is second to none in terms of long-distance travelling as a herd.



Like the elephant that symbolizes trust and longevity, KISWEL aims to carry on this symbol by always going back to our Management Philosophy of Creativity, Trust, Persistence and Substantiality



CONTENTS PROFILE

I

Company Overview

Introduction	01
Chronology	02
Product	03
Research & Development	04
Production Plant	05
Sales & Marketing	06
The Expert's Response POSCO / KOMATSU	07-10

II

Welding Solution

Automotive & Exhaust systems	13-16
Construction & Mining Equipment	17-18
Offshore Structure & Shipbuilding	19-21
Chemical Tankers	22-24
Building & Bridge Construction	25-27
Thermal Power Station	28-30
Storage Tank	31-32
Hydro Power Plant	33-35
Pipe & Wind Tower	36-39
Pipeline	40-43

III

INDEX - Welding Material by Base Metal

IV

Key Process & Key Products

Storage Tank	49-51
Pipeline	52-55

V

Global Production

KISWEL INC. (USA)	56-59
KISWEL SDN BHD (Malaysia)	60-75
KISWEL DALIAN LTD. (China)	76-79

INTRODUCTION

Since its founding, KISWEL has earned the trust of customers by focusing only on welding materials. We aim to become the leading specialty welding materials company that places its highest priority on customer value.

KISWEL has solely focused on manufacturing welding materials for a solid period of over 50 years.

While the welding material industry was still in their early stages during the 1970s and 80s, we have invested, dedicated and took part in contributing to the growth of the domestic industrial foundation.

With the demand for high quality and technology taking place in the 1990s, we have followed through with the establishment of an R&D Center equipped with cutting-edge equipment and the automation of our manufacturing processes. The certification of the global standards of QS-9000, ISO/TS 16949, and ISO 14001 are a small display of our contribution to the enhancement of the global steel industry.

Along with the Headquarters located in Seoul, KISWEL has four manufacturing plants and an R&D Center located in Korea. Globally, KISWEL operates manufacturing plants in the U.S., Malaysia, and China along with branches located in the U.S., Japan, China, Vietnam, Malaysia Thailand, and Luxembourg.

Today, our products with the trademark "Elephant logo" can be seen in over 120 countries worldwide.

KISWEL will always strive to maintain the highest quality of materials and continue as an industry leader with pride in enhancing the national competitive edge and ultimately the global market. We would like to thank you for providing us with the opportunity to better satisfy you.

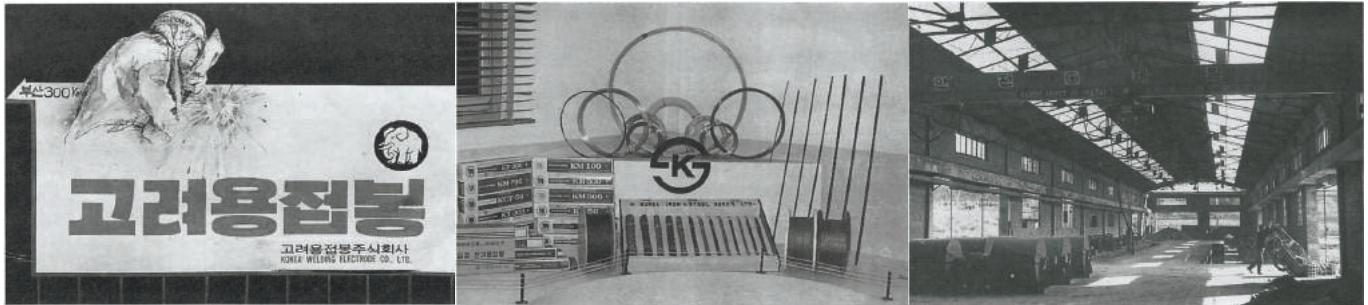
KISWEL Family

			
<p>Sam Hwa Steel Co., Ltd IHTW Induction Heated, Quenched and Tempered Wire ESW Energy Saver Wire</p>	<p>Korea Heat Treatment Co., Ltd. PC Bar Prestressed Concrete Steel Wire</p>	<p>Heung Kuk Steel Wire Co., Ltd. FCW</p>	<p>Korea Omega Co., Ltd Investment Consultation Services</p>

Affiliated Companies

			
<p>KISWIRE Co., Ltd. Wire Popes Steel Tire Cord Bead Wire</p>	<p>KOS Co., Ltd. Stainless Wire Products</p>	<p>Jisan Resort Co., Ltd.</p>	<p>ET Land Co., Ltd Electrical Appliance Distributions</p>

CHRONOLOGY



- 2010**
 - 16. 06 Selected as a 'World Class 300' Company (Korea's 300 most prominent medium-sized enterprise)
 - 14. 12 Establishment of Monterrey branch (Mexico)
 - 12. 08 Establishment of Poswelding, Joint Venture with POSCO
 - 11. 04 Establishment of Pohang Factory (FCW)
 - 10. 05 Certified with ASME QSC (American Society of Mechanical Engineers Quality System Certificate)
- 2000**
 - 09. 08 Establishment of Ho Chi Minh Branch (Vietnam)
 - 09. 07 Establishment of Bangkok Branch (Thailand)
 - 08. 12 Awarded for 100 Million Dollar Export from the Government
 - 07. 02 Establishment of Dubai Branch (UAE)
 - 06. 08 Establishment of KISWEL INC. (Manufacturing plant in the U.S.)
 - 05. 02 Certified with ISO/TS 16949
 - 04. 05 Establishment of KISWEL DALIAN LTD. (Manufacturing plant in China), R&D Center Kickoff
 - 02. 03 Awarded 'Bronze Tower Medal of Industry' in commemoration of National Tax Day
 - 01. 03 Establishment of KISWEL SDN BHD (Manufacturing plant in Malaysia)
- 1990**
 - 99. 09 Certified with QS 9002 and ISO 14001
 - 99. 01 Renamed as KISWEL LTD
 - 97. 09 Selected as a 'Top 50 Company' for excellence in quality by the Korean National Agency for Technology and Quality.
 - 96. 11 Awarded for 50 Million Dollar Export from the Government.
 - 95. 10 Certified with ISO 9002
- 1980**
 - 89. 10 Completion of stainless steel welding manufacturing facility
 - 89. 02 Establishment of Sales Company in Japan (KISWEL JAPAN LTD.)
 - 88. 10 Completion of Flux-cored wire plant in Changwon
 - 87. 06 Certified with 1st grade certificate for Quality Management from Korean Industrial Advancement Administration, No. E41-16
 - 87. 02 Establishment of R&D Center for Welding Technology
 - 84. 06 Acquired additional certification by the Japanese Industrial Standards (JIS Z3321)
 - 82. 12 Certified with Japanese Industrial Standards (JIS Z3211, Z3212)
- 1970**
 - 78. 10 First production of specialized welding materials
 - 78. 06 Joint technical partnership with the Japanese electrode manufacturer TOKUDEN
 - Expansion of facility and establishment of specialized welding electrode plant
 - 73. 07 Founded KOREA WELDING ELECTRODE CO., LTD. Spin-off from KISWIRE
- 1960**
 - 69. 07 Established technical partnership with Nippon Steel & Sumikin Welding (formerly Fuji Welding Electrodes Corporation)
 - 69. 03 Establishment of Welding business department in KISWIRE

PRODUCT OVERVIEW

SMAW



Industrial Equipment
Pressure vessels
Boilers
Ocean & Shipbuilding
Pipe-lines
Construction

GMAW



Heavy construction
machinery
Automotive pipes
Pressure vessels
Boilers

FCAW



Shipbuilding
Ocean plant
Construction
Bridges
Pressure vessels
Automobile exhaust
systems

MIG/TIG



Heavy Industry
Chemical Industry
Vehicles
Railway systems,
Refrigerating containers

NONFERROUS



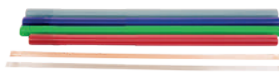
Oil & Gas Industry
Petrochemical
Refinery
Desalination
Power Generation

SAW



Shipbuilding
Steel extruding
Steel structures
Pressure vessels

Oxy-Acetylene, gas welding



Heavy Ships
Chemical field
Industrial road
Aerospace industry
Automotive
Shipbuilding

Titanium Powder



Electronics
Military
Medical
Industrial parts

RESEARCH & DEVELOPMENT OVERVIEW

Originally starting as a technology department in 1973, our R&D center has come a long way from becoming the premier R&D center in the industry to be registered with the Ministry of Science & Technology in 1987 to moving to its current location in 1995 for enhancement of efficiency and finally constructing today's state-of-the-art R&D center in 2002. Today, our R&D center is even equipped with pilot manufacturing lines so the production of newly developed products according to the requirements of our customers' can be supplied in real time.

All comprising top-caliber researchers, the 5 different teams of Materials R&D, Advanced Materials Development, Technology Development, and the Analysis team collectively and extensively aim to :

- 1) Expand globally through joint research with scholar/industrial/research organizations along with a customer-oriented mentality.
- 2) Develop the general, specialized, eco-friendly and value-added categories of our FCW, MCW, SMAW, MIG/TIG, and SAW products.
- 3) Focus on the development of new materials such as our Ti-powder while offering professional training on welding techniques and expert customer support with their.

Our R&D Center continues their research on specialized welding technologies in the sectors of energy (wind and solar), offshore plants, oil & gas drilling, and subsea equipment. As a proud sponsor of the IIW (International Institute of Welding), we contribute our passion and support to the welding society and thrive to eventually lead the welding industry.

Chronology

2010	10. 10	Merged into the Central Technology Institute
	10. 05	Selected as the Leading R&D Center in Changwon
2000	04. 05	R&D Center Kickoff
	02. 07	New Wing Construction Completed
1990	98. 10	Expansion of R&D Center
	98. 10	Relocation of R&D Center within Changwon Plant
1980	87. 07	Registered as Corporate R&D Center (Ministry of Science & Technology)
	87. 02	Opening of Welding Technology Lab in Busan Plant
1970	73. 07	Established as Technology Department in KISWEL

Location



ADDRESS	[51544] 704, Gongdan-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do, Korea
TEL	+82-55-269-7293
FAX	+82-55-266-4487
E-mail	research@kiswel.com

PRODUCTION PLANT LOCATION

KOREA

CHANGWON



Solid Wire
FCW (All types)
Bonded SAW Flux
MIG / TIG

BUSAN



Covered Electrode
(All types)

POHANG

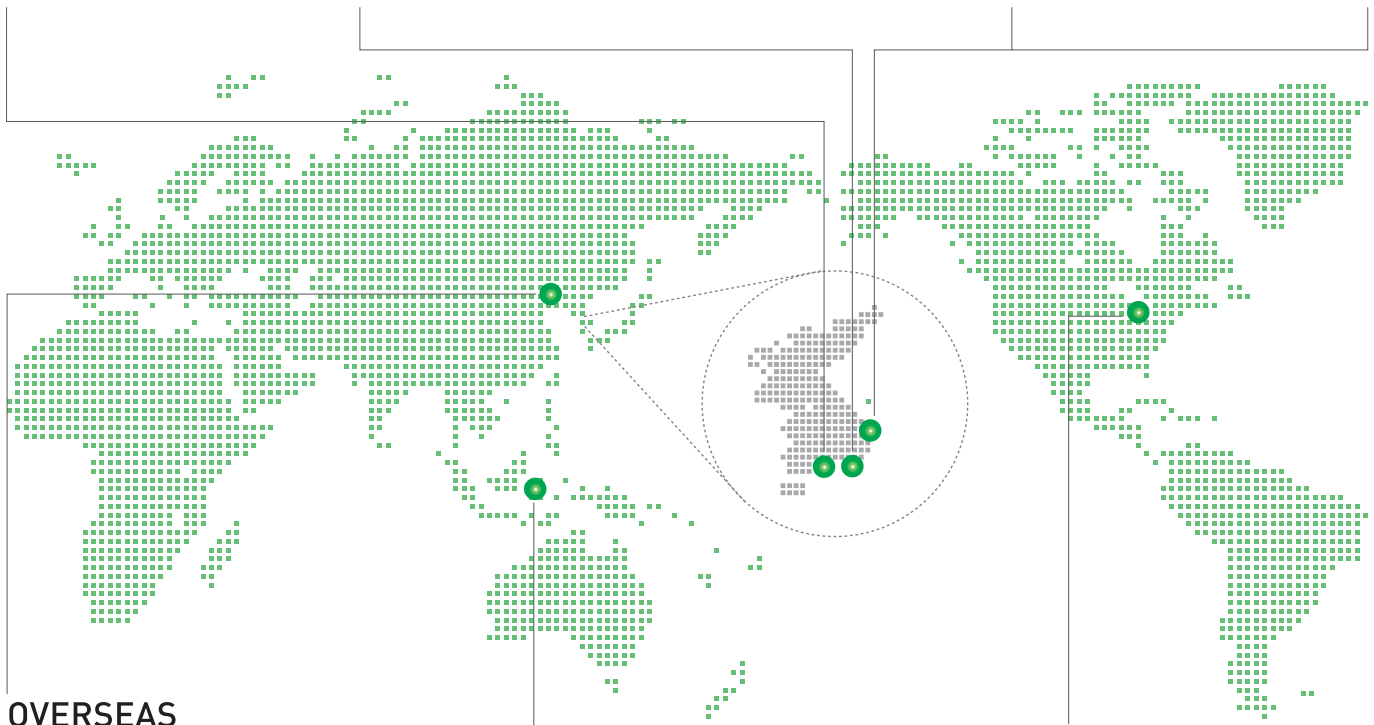


FCW (Baking)
- For General Sectors

POSWELDING



Composite Wire
Bonded SAW Flux
Seamless FCW (Baking)



OVERSEAS

CHINA



FCW
(Non baking, Baking)
- STS 400
- Self shielded

MALAYSIA



Covered Electrode
(All types)
Solid Wire
FCW (Baking)

USA



Premium FCW
(All types)
- Self-shielded
- For low temp.



SALES & MARKETING HOW KISWEL SERVES

QUALITY

KISWEL commits 100% to quality. Our wide range of welding consumables are manufactured in ISO certified facilities. On top of detailed certifications, we are readily available to provide special quality requirements such as specialized certifications and testing upon request.

TECHNICAL SERVICE

Manufacturing is merely a minor aspect of what we have to offer. We at KISWEL are prepared in making sure the optimum product is selected depending on the welding performance needed on site. With a team of more than competent engineers, we are ready to provide technological and practical solutions. We not only thrive to benefit our customers in terms of technicality but also in terms of providing and guiding our customers towards cost efficient methods while enhancing productivity.

SOLUTION MARKETING

Our product range is a direct reflection to the rapid changes occurring constantly in all industrial sectors. Additionally, with new steel types developing everyday, we continuously seek to develop our products accordingly to provide the optimum welding consumable.

INFORMATION

Detailed information regarding our wide product range can be found both offline and online through our website www.kiswel.com. When further detailed information is required, we are always ready to provide technical data documents upon request.

TRACK RECORD

As a major supplier of welding consumables to a wide variety of large industries, KISWEL has proudly established to become a supplier of highly approved products encompassing high quality, technology and satisfaction.

※ For detailed information regarding our track record by industry,
※ please contact our Solution Marketing Team at solution@kiswel.com

THE EXPERT'S RESPONSE

WHY WE WORK WITH KISWEL



posco

Mr. Yoo Jang-Yong, Ph.D

Group leader
Energy and Shipbuilding Marketing Dept.
Energy and Shipbuilding Solution Group

Even good quality steel products cannot be used by customers if they are uneconomical, or inconvenient for consumption. POSCO pursues Solution Marketing which provides not only hardware - "top performance steel products"-but also accompanying software-"application technology" and "commercial support," so that the customer can use POSCO's products more easily and economically.

POSCO held the Global EVI Forum under the theme of "From Steel Supplier to Solution Partner," to explain solution marketing to more customers and strengthen the partnership between POSCO and its customers. At the event, the CEO of POSCO introduced Solution Marketing to over 1,200 participants from more than 500 client companies, including domestic automakers, shipbuilders and home appliance manufacturers, as well as global companies such as Volkswagen and Nissan. Here, he delivered the message that POSCO will contribute to its customer's success and advancement by providing differentiated solutions. This event also provided an opportunity for POSCO to materialize the results of Solution Marketing by enabling the initiation of over a hundred technology cooperations and sales agreements with its customers.

In Solution Marketing, the application of welding technology is a crucial aspect. Therefore, KISWEL's R&D group has been of tremendous help to us in actually putting our Solution Marketing to practice.

We would like to use this opportunity to truly express our appreciation to KISWEL.

Truly yours,

A handwritten signature in black ink, appearing to read 'J. Yoo', written in a cursive style.

Yoo Jang-Yong

POSCO OVERVIEW

POSCO (formerly Pohang Iron and Steel Company) is a multinational steel-making company headquartered in Pohang, South Korea. With the output of 42 million tonnes of crude steel in 2015, this made POSCO the world's fourth-largest steelmaker by this measure. In 2016, it was named as the 173th world's largest corporation by the Fortune global 500. POSCO has also been selected as the world's No.1 steelmaker for 7 consecutive years in 2016 by World Steel Dynamics (WSD) in New York.

POSCO on KISWEL

Following the establishment of KOREA SANGSA in 1945, KISWIRE and KISWEL were established in 1961 and 1973, respectively. Ever since 1980 - a year after POSCO's establishment of their 1st wire-rod plant - KISWIRE and KISWEL has consistently covered the largest portion of POSCO's wire-rod products supply.

KISWEL's support of welding technologies for the application of steels in the major industries of Shipbuilding, Pipeline, Automobile, and so on has been ongoing. Furthermore, POSCO's Welding & Joining Research Group and KISWEL's R&D team has been working closely in expanding to new market's through the development of welding consumables and processes for new types of steels.

Inquiry to Solution Marketing Team
solution@kiswel.com



THE EXPERT'S RESPONSE

WHY WE WORK WITH KISWEL



KOMATSU

Mr. Akio Iwasaki

President, Casting Division, Production Division
President, Komatsu Castex Ltd.

Although KISWEL and KOMATSU have been cooperating from long before, I personally formed a business relationship with KISWEL since my early days as a section chief at the Osaka Plant in 1997.

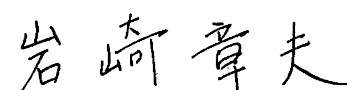
65 years since establishment, our Osaka plant has become a core foundation in the manufacturing of Excavators and Bulldozers for KOMATSU. Under direct control from the HQ along with entailing our Manufacturing Engineering Development Center, we are taking on the key role of leading the 39 plants located globally by leading in the handling production, development, and primary production.

In manufacturing Construction and mining equipment, welding is absolutely crucial. To maintain a uniform quality worldwide, our assembly plans and parts are the same regardless of location. In short, the welding consumables used in our Osaka plant can be used in any of our other manufacturing sites. Besides the widely considered variables of QCD, we are faced daily with high and unexpected demands from our customers which applies to our suppliers as well.

With such high requirements, I have come to realize that only a handful of welding consumables manufacturers can cope to the likes of KISWEL. Through my ever-growing trust towards KISWEL in assisting us to step up our competitive edge, the KISWEL brand is definitely a brand to count on. Today, we at KOMATSU, continue to lead in the Construction Machinery sector with the help of KISWEL in not only Osaka but in Southeast Asia and Europe.

I would like to take this opportunity to sincerely thank KISWEL for their reliability and thus far failing to ever disappoint us.

Truly yours,



Akio Iwasaki

KOMATSU OVERVIEW

KOMATSU is a Japanese multinational corporation that manufactures construction, mining, and utility equipment, as well as industrial equipment like press machines, lasers and thermoelectric modules.

Its headquarters are in Minato-ku, Tokyo, Japan. The corporation was named after the city of Komatsu, Ishikawa prefecture, where the company was founded in 1921.

Worldwide, the KOMATSU GROUP consists of KOMATSU LTD. and 181 other companies (143 consolidated subsidiaries and 38 companies accounted for by the equity method).

KOMATSU is the world's second largest manufacturer of construction equipment and mining equipment.

However, in some areas KOMATSU has the largest sales. It has manufacturing operations in Japan, Asia, Americas and Europe.

KOMATSU manufacturing makes the largest bulldozers in the world, the D575 with KISWEL welding material solutions.

KOMATSU on KISWEL

Among foreign welding consumables manufacturing companies, KISWEL takes pride in being the first to acquire the JIS (Japanese Industrial Standards) Certification.

With the help of KOMATSU being the first to open its door to a foreign company,

KISWEL has become globally competitive within the welding sector.

KISWEL takes pride in having the world's largest producing Solid Wire factory located in Changwon, Korea.

All this being said, we thank KOMATSU, for helping us to dominate in supplying to heavy equipment productions.

In order to effectively cope with the evolving market of construction machinery, the R&D teams of KISWEL and KOMATSU's have regularly conducted technical exchange meetings since 2000.

Through these cooperative meetings KISWEL has been able to provide according to the requests of KOMATSU.

Inquiry to Solution Marketing Team

solution@kiswel.com





MANAGEMENT POLICY

1. POWER OF UNITY

2. QUALITY INNOVATION

3. SOUND MANAGEMENT

The KISWEL FAMILY Management Policy of "Power of Unity, Quality Innovation, and Sound Management", KISWEL promises to commit in providing quality welding solutions while maintaining a rock solid management foundation, united as ONE.



WELDING SOLUTION CONTENTS

01

Automotive & Exhaust systems

Product by Base metal 13

Characteristics of Product 14-16

02

Construction & Mining Equipment

Product by Base metal 17

Characteristics of Product 18

03

Offshore Structure & Shipbuilding

Product by Base metal 19

Characteristics of Product 20-21

04

Chemical Tankers

Product by Base metal 22

Characteristics of Product 23-24

05

Building & Bridge Construction

Product by Base metal 25

Characteristics of Product 26-27

06

Thermal Power Station

Product by Base metal 28

Characteristics of Product 29-30

07

Storage Tank

Product by Base metal 31

Characteristics of Product 32

08

Hydro Power Plant

Product by Base metal 33

Characteristics of Product 34-35

09

Pipe & Wind Tower

Product by Base metal 36-37

Characteristics of Product 38

MIG, FCW, SMAW 39

10

Pipeline

Product by Base metal 40-41

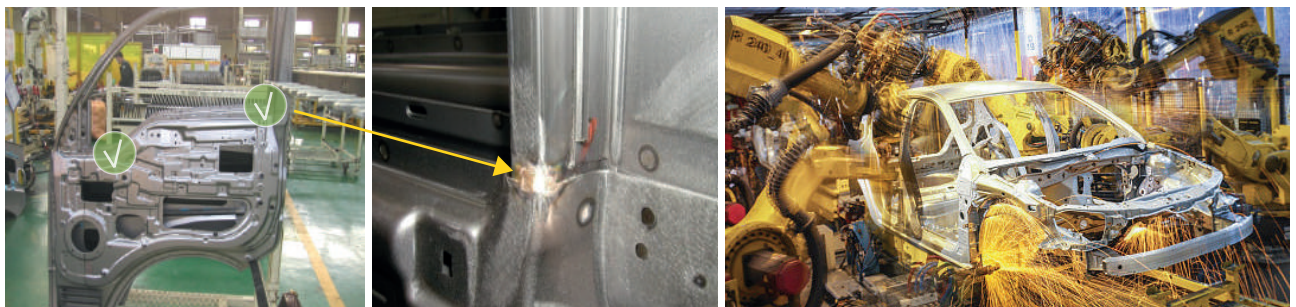
Characteristics of Product 42-43

Automotive & Exhaust systems

Product by Base Metal

KISWEL Product Line

Base Metal (PARTS NAME)	TYPE	THICKNESS (mm)	Process	Shielding Gas	Brand Name	
CAR BODY AND FRAME	LOW CARBON STEEL	2.5 - 4.0	GMAW	100% CO2	KC-28, KC-28CF	
				MAG	KC-25M	
CHASSIS AND FRONT BUMPER	LOW CARBON STEEL	1.5 - 2.5	GMAW	100% Ar	KW-MCuSi	
					MAG	KC-28, KC-28CF
LOW PARTS OF FRAME	STEEL COATED WITH ZINC	1.5 - 2.5	GMAW	100% CO2	KC-28, KC-28CF	
					MAG	KC-25M
SEAT AND INSIDE FRAME	CORROSION RESISTANCE	1.5 - 2.5	GMAW	100% CO2	KC-28, KC-28CF	
					MAG	KC-25M
EXTERNAL CAR BODY	STEEL COATED WITH ZINC	1.5 - 2.5	GMAW	100% CO2	KC-28, KC-28CF	
					MAG	KC-25M
MUFFLERS PARTS	STS	0.8 - 2.5	FCAW	Ar+2%O2	K-409TiT, K-409TiC	
						K-430T, K-430LNb
			MIG	Ar+2%O2		K-436T
			M-409Cb			
				M-430		
					M-430Ti, M-430LNb	
					M-308L(Si), M-309L(Si), KW-MNF1	



CAR BODY AND FRAME : KW-MCuSi



Automotive & Exhaust systems

Characteristics of Product

Characteristics of Welding Consumables

Process	Brand Name	AWS Specification	EN Specification
GMAW	KC-28	A5.18 : ER70S-6	EN ISO 14341 : G 49A 3 C/M G6
	KC-28CF	A5.18 : ER70S-6	EN ISO 14341 : G 49A 3 C/M G6
	KC-25M	A5.18 : ER70S-3	EN ISO 14341 : G 49A 2 M G3
	KC-70S2	A5.18 : ER70S-2	EN ISO 14341 : G 49A 3 C/M G2
MIG	KW-MCuSi	A5.7 : ERCuSi-A	EN ISO 14640 : SNI6650 [CuSi3Mn1]
	M-409Cb	A5.9 : ER409Nb	EN ISO 14343 : SS 409Nb
	M-430	A5.9 : ER430	EN ISO 14343 : SS 430
	M-430Ti	A5.9 : ER430 Modified	-
	M-430LNb	-	EN ISO 14343 : G 18 L Nb
	M-308LSi	A5.9 : ER308LSi	EN ISO 14343 : SS 308L Si
	M-309LSi	A5.9 : ER309LSi	EN ISO 14343 : SS 309L Si
	KW-MNF1	-	EN ISO 1071 : NiFe-1
FCAW	K-409TiT	A5.9 : EC409	EN ISO 17633 : TS409-MA0
	K-409TiC	A5.9 : EC409	EN ISO 17633 : TS409-MA0
	K-430T	A5.22 : E430T0-G	-
	K-430LNb	-	EN ISO 17633 : TS430Nb-MA0
	K-436T	-	-
	K-309LMT	A5.9 : EC309L	EN ISO 17633 : TS309L-MA0



Automotive & Exhaust systems

Characteristics of Product

Chemical Composition of All-Weld Metal (%)

Process	Brand Name	C	Si	Mn	Cr	Ni	Ti
GMAW	KC-28	0.07	0.86	1.53	-	-	-
	KC-28CF	0.07	0.86	1.53	-	-	-
	KC-25M	0.07	0.67	1.20	-	-	-
	KC-70S2	0.07	0.67	1.20	-	-	0.07
MIG	KW-MCuSi	Cu Rem.	2.94	0.85	-	-	-
	M-409Cb	0.02	0.45	0.52	11.57	0.34	-
	M-430	0.01	0.32	0.39	16.67	0.24	-
	M-430Ti	0.04	0.69	0.41	17.19	0.32	0.32
	M-430LNb	0.02	0.40	0.39	18.01	0.25	-
	M-308LSi	0.01	0.85	1.68	19.63	9.89	-
	M-309LSi	0.01	0.91	1.86	23.07	13.62	-
FCAW	KW-MNF1	0.03	0.12	0.27	-	54.59	-
	K-409TiT	0.02	0.50	0.45	12.10	-	0.80
	K-409TiC	0.02	0.44	0.62	11.50	-	1.00
	K-430T	0.02	0.61	0.49	16.80	-	1.00
	K-430LNb	0.02	0.26	0.27	17.80	-	- (Nb 0,56) 0,50
	K-309LMT	0.03	0.50	1.65	23.90	12.60	- (Mo 1,10) -



Automotive & Exhaust systems

Characteristics of Product

Mechanical Properties (AWS Specification)

Process	Brand Name	Y.S (Mpa)	T.S (Mpa)	EL.(%)	CVN longitudinal	
					Test Temp. (°C)	Absorb energy(J)
GMAW	KC-28	Min. 400	Min. 480	Min. 22	-30	≥27
	KC-28CF	Min. 400	Min. 480	Min. 22	-30	≥27
	KC-25M	Min. 400	Min. 480	Min. 22	-20	≥27
	KC-70S2	Min. 400	Min. 480	Min. 22	-30	≥27
MIG	KW-MCuSi	-	Min. 345	43 (Actual)	-	-
	M-409Cb	-	Min. 450	Min. 20	-	-
	M-430	-	Min. 520	Min. 20	-	-
	M-430Ti	-	-	-	-	-
	M-430LNb	Min. 220	Min. 410	Min. 15	-	-
	M-308LSi	-	Min. 520	Min. 35	-196	60 (Actual)
	M-309LSi	-	Min. 520	Min. 30	-196	56 (Actual)
	KW-MNF1	Min. 290	Min. 420	Min. 6	-	-
FCAW	K-409TiT	-	Min. 450	Min. 15	-	-
	K-409TiC	-	Min. 450	Min. 15	-	-
	K-430T	-	Min. 450	Min. 20	-	-
	K-430LNb	-	Min. 450	Min. 13	-	-
	K-436T	[Actual→]385	490	23	-	-
	K-309LMT	-	Min. 520	Min. 30	-30	50 (Actual)

NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.

Construction & Mining Equipment

Product by Base Metal

KISWEL Product Line for Manufacture

Base Metal (PARTS NAME)	Base Material	Process	Brand Name
Boom	SS400 + Casting	GMAW	KC-26, ZO-27
Arm	SS400	GMAW	KC-26, ZO-27
Bucket	Hardox450	N/A	N/A
Main Beam	SS400	GMAW	KC-26, ZO-27
Center Frame	SS400	GMAW	KC-26, ZO-27

KISWEL Product Line for Repair

Base Metal (PARTS NAME)	Base Material	Process	Brand Name
Boom	SS400 + Casting	GMAW	KC-26, ZO-27
		SMAW	KK-50LF, K-7018
		FCAW	K-71T, K-81T
Arm	SS400	GMAW	KC-26, ZO-27
		SMAW	KK-50LF, K-7018
		FCAW	K-71T, K-81T
Bucket	Hardox450	SMAW	KM-700, KM-800
		FCAW	K-700HT, K-800HT
Main Beam	SS400	GMAW	KC-26, ZO-27
		SMAW	KK-50LF, K-7018
		FCAW	K-71T, K-81T
Center Frame	SS400	GMAW	KC-26, ZO-27
		SMAW	KK-50LF, K-7018
		FCAW	K-71T, K-81T



Construction & Mining Equipment

Characteristics of Product

Characteristics of Welding Consumables

Process	Brand Name	AWS Specification	EN Specification
GMAW	KC-26	A5.18 : ER70S-G	EN 14341 B : G 49A 2 C/M G11
	ZO-27	A5.18 : ER70S-G	EN 14341 B : G 49A 2 M G15
SMAW	KK-50LF	A5.1 : E7016	EN 14341 B : E 49 16 A U H10
	K-7018	A5.1 : E7018	EN 14341 B : E 49 18 A U H10
	KM-700	-	-
	KM-800	-	-
FCAW	K-71T	A5.20 : E71T-1C	EN 17632 B : T49 0 T1-1CA-U
	K-81T	A5.29 : E81T1-Ni1C	EN 17632 B : T55 3 T1-1CA-N2
	K-700HT	-	-
	K-800HT	-	-

Chemical Composition of all-weld metal (%)

Process	Brand Name	C	Si	Mn	P	S	Cr	Ni
GMAW	KC-26	0.06	0.80	1.53	0.014	0.010	-	-
	ZO-27	0.07	0.62	1.18	0.014	0.010	-	-
SMAW	KK-50LF	0.07	0.53	0.93	0.013	0.012	0.03	0.02
	K-7018	0.07	0.61	0.87	0.015	0.011	0.03	0.02
	KM-700	0.48	1.42	1.36	0.015	0.012	3.65	0.03
	KM-800	0.47	1.45	1.51	0.017	0.012	4.10	0.03
FCAW	K-71T	0.04	0.55	1.25	0.015	0.011	-	-
	K-81T	0.02	0.51	1.28	0.014	0.011	0.95	-
	K-700HT	0.40	3.20	0.60	0.012	0.010	7.00	(W 0.80)
	K-800HT	0.44	3.40	0.55	0.013	0.011	7.50	(W 1.00)

Mechanical properties (AWS Specification)

Process	Brand Name	Y.S (Mpa)	T.S (Mpa)	El. (%)	CVN longitudinal	
					Test Temp. (°C)	Absorb energy(J)
GMAW	KC-26	Min. 400	Min. 480	Min. 22	-20	120 (Actual)
	ZO-27	Min. 400	Min. 480	Min. 22	-20	160 (Actual)
SMAW	KK-50LF	Min. 400	Min. 490	Min. 22	-30	≥ 27
	K-7018	Min. 400	Min. 490	Min. 22	-30	≥ 27
	KM-700			Hv 600 - 700		
	KM-800			Hv 700 - 800		
FCAW	K-71T	Min. 390	490 - 670	Min. 22	-20	≥ 27
	K-81T	Min. 470	550 - 690	Min. 19	-30	≥ 27
	K-700HT			Hv 600 - 800		
	K-800HT			Hv 700 - 850		

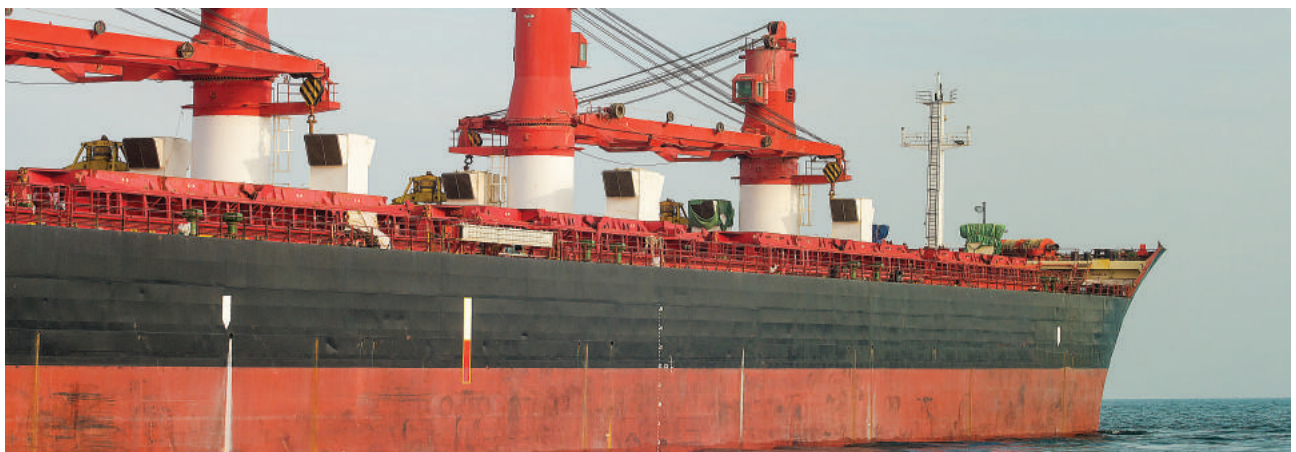
NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.

Offshore Structure & Shipbuilding

Product by Base Metal

KISWEL Product Line

Base Metal (IACS)	Y.S (Mpa)	CVN longitudinal		Process	Brand Name
		Test Temp. (°C)	Absorb energy(J)		
A					
B				FCAW	K-71T, KX-200
D	A/B/D : Min. 235				
AH32	AH32/DH32 : Min. 315	A/B/AH32/36/40 : 0			
AH36	AH36/DH36 : Min. 355	D/DH32/36/40 : -20	Min. 47		
DH32	AH40/DH40 : Min. 390			SAW	EF-200V x KD-50, EF-200LT x KD-50
DH36					
AH40					
DH40					
E	Min. 235			FCAW	K-71UT, K-81TK2, KX-200H
EH32	Min. 315	-40	Min. 47		
EH36	Min. 355			SAW	EF-200V x KD-50, EF-200LT x KD-50
EH40	Min. 390				
FH32	Min. 315			FCAW	K-71TNi2
FH36	Min. 355	-60	Min. 47	SAW	EF-200LT x KD-50
FH40	Min. 390				
E500	Min. 500	-40	Min. 33	FCAW SAW	K-92T, K-90T EF-200LT x KD-60
F690	Min. 690	-60	Min. 46	FCAW SAW	K-110TK3 EF-200UV x KD-120



Offshore Structure & Shipbuilding

Characteristics of Product

Characteristics of Welding Consumables

Process	Brand Name	AWS Specification	EN Specification
FCAW	K-71T	A5.20 : E71T-1C	EN 17632 B : T49 0 T1-1CA-U
	KX-200	A5.20 : E70T-1C	EN 17632 B : T49 0 T1-0CA-U H10
	K-71UT	A5.20 : E71T-1C / -9CJ	EN 17632 B : T49 4 T1-1CA-U H5
	K-81TK2	A5.29 : E81T1-K2C H4	EN 17632 B : T55 6 T1-1CA-N3-U H5
	KX-200H	A5.20 : E70T-1C/9C	EN 17632 B : T49 2 T1-0CA-U H10
	K-71TNi2	A5.29 : E71T1-GC	EN 17632 B : T49 6 T1-1 C A-N5 H5
	K-92T	A5.29 : E91T1-Ni2CJ	EN 17632 B : T62 4 T1-1CA-N4M1-U H5
	K-90T	A5.29 : E90T1-K2C	EN 17632 B : T62 4 T1-0CAP-G H5
	K-110TK3	A5.29 : E111T1-K3C	EN 17632 B : T76 2 T1-1CA-N3M2 H5
SAW	EF-200V x KD-50	A5.17 : F7A(P)6-EH14	EN ISO 14171 : S 46 5 CS S4
	EF-200LT x KD-60	A5.23 : F9A8-EA3-G	EN ISO 14171 : S 50 5 CS SZ
	EF-200UV x KD-120	A5.23 : F11A6-EG-G	EN ISO 14171 : S 69 5 FB SZ

Chemical Composition of all-weld metal (%)

Process	Brand Name	C	Si	Mn	P	S	Ni	Mo
FCAW	K-71T	0.04	0.55	1.25	0.015	0.011	-	-
	KX-200	0.04	0.41	1.25	0.014	0.011	-	-
	K-71UT	0.04	0.30	1.35	0.014	0.010	0.39	-
	K-81TK2	0.03	0.45	1.50	0.012	0.009	1.50	-
	KX-200H	0.04	0.56	1.61	0.013	0.010	-	-
	K-71TNi2	0.04	0.33	1.18	0.011	0.010	2.15	-
	K-92T	0.03	0.36	1.34	0.013	0.009	2.21	-
	K-90T	0.03	0.43	1.51	0.013	0.010	1.64	-
	K-110TK3	0.04	0.51	1.72	0.011	0.009	2.04	0.42
SAW	EF-200V x KD-50	0.09	0.12	1.70	0.025	0.008	-	-
	EF-200LT x KD-60	0.07	0.14	1.50	0.022	0.009	-	0.46 (Ti 0.02)
	EF-200UV x KD-120	0.05	0.16	1.75	0.023	0.011	2.50	0.67

Offshore Structure & Shipbuilding

Characteristics of Product

Mechanical properties (AWS Specification)

Process	Brand Name	Y.S (Mpa)	T.S (Mpa)	EL.(%)	CVN longitudinal	
					Test Temp. (°C)	Absorb energy(J)
FCAW	K-71T	Min. 390	490 - 670	Min. 22	-20	≥27
	KX-200	Min. 390	490 - 670	Min. 22	-20	≥27
	K-71UT	Min. 390	490 - 670	Min. 22	-40	≥27
	K-81TK2	Min. 470	550 - 690	Min. 19	-30	≥27
	KX-200H	Min. 390	490 - 670	Min. 22	-30	≥27
	K-71TNi2	Min. 390	490 - 670	Min. 22	-60	≥27
	K-92T	Min. 540	620 - 760	Min. 17	-60	94 (Actual)
	K-90T	Min. 540	620 - 760	Min. 17	-60	50 (Actual)
	K-110TK3	Min. 680	760 - 900	Min. 15	-20	≥27
SAW	EF-200V x KD-50	Min. 400	480 - 660	Min. 22	-51	≥27
	EF-200LT x KD-60	Min. 540	620 - 760	Min. 17	-62	≥27
	EF-200UV x KD-120	Min. 680	760 - 900	Min. 15	-51	≥27

NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.



Major Supply ; "Gumusut Kakap FPS", "BP Angola FPSO PSVM", "FPSO Kwame Nkrumah".

Chemical Tankers

Product by Base Metal

KISWEL Product Line

Base Metal (ASTM/AISI)	Process	Brand Name	AWS Specification	EN Specification
Standard 22% Cr duplex stainless steel	SMAW	KST-2209	A5.4 : E2209-16	EN 3581 B : ES2209-16
	FCAW	K-329T	A5.22 : E2209T1-1/4	EN 17633 B : TS2209-FB1
	SAW	EF-300N x M-2209	-	EN 14174 : SA AF 2 DC (Flux)
	GTAW	T-2209	A5.9 : ER2209	EN 14343 B : SS 2209
	MIG	M-2209	A5.9 : ER2209	EN 14343 B : SS 2209
AISI 316LN	SMAW	KST-316-15	A5.4 : E316L-15	EN 3581 B : ES316L-15
		KST-316LB	A5.4 : E316L-15	EN 3581 B : ES316L-15
		KST-316L	A5.4 : E316L-16	EN 3581 B : ES316L-16
		KST-316L-17	A5.4 : E316L-17	EN 3581 B : ES316L-17
	FCAW	K-316LT	A5.22 E316LT1-1/4	EN 17633 B : TS316L-FB1
		K-316LF	A5.22 E316LT0-1/4	EN 17633 B : TS316L-FB0
		K-316LS	A5.22 E316LT1-1/4	EN 17633 B : TS316L-FB1
	SAW	EF-300N x M-316L	-	EN 14174 : SA AF 2 DC (Flux)
	GTAW	T-316L	A5.9 ER316L	EN 14343 B : SS 316L
		T-316LSi	A5.9 ER316LSi	EN 14343 B : SS 316LSi
	MIG	M-316L	A5.9 ER316L	EN 14343 B : SS 316L
		M-316LSi	A5.9 ER316LSi	EN 14343 B : SS 316LSi
	Dissimilar joints (CS + STS)	SMAW	KST-309L	A5.9 E309L-16
KST-309LMo			A5.9 E309LMo-16	EN 3581 B : ES309LMo-16
FCAW		K-309LT	-	EN 17633 B : TS309L-FB1
		K-309LF	A5.22 E309LT0-1/4	EN 17633 B : TS309L-FB0
		K-309MoLT	A5.22 E309LMoT1-1	EN 17633 B : TS309LMo-FC1
		K-309MoLF	A5.22 E309LMoT0-1/4	EN 17633 B : TS309LMo-FB0
SAW		EF-300N x M-309L	-	EN 14174 : SA AF 2 DC (Flux)
GTAW		T-309L	A5.9 ER309L	EN 14343 B : SS 309L
		T-309LMo	A5.9 ER309LMo	EN 14343 B : SS 309LMo
MIG		M-309L	A5.9 ER309L	EN 14343 B : SS 309L
	M-309LMo	A5.9 ER309LMo	EN 14343 B : SS 309LMo	

Chemical Tankers



Chemical Tankers

Characteristics of Product

Chemical Composition of all-weld metal (%)

Process	Brand Name	C	Si	Mn	Cr	Ni	Mo
SMAW	KST-2209	0.02	0.62	0.80	22.63	8.73	3.19
	KST-316-15	0.03	0.40	1.08	19.22	11.67	2.43
	KST-316LB	0.03	0.61	1.65	18.00	12.69	2.52
	KST-316L	0.03	0.75	0.80	17.95	11.71	2.60
	KST-316L-17	0.03	0.75	0.80	18.02	11.71	2.75
	KST-309L	0.03	0.84	0.76	23.04	12.97	0.08
	KST-309LMo	0.03	0.76	1.78	22.84	13.02	2.15
FCAW	K-329T	0.03	0.52	0.80	23.20	9.60	3.20
	K-316LT	0.03	0.60	1.15	19.50	12.70	2.40
	K-316LF	0.03	0.58	1.38	19.50	12.50	2.4
	K-316LS	0.03	0.87	1.28	17.90	13.09	2.4
	K-309LT	0.03	0.60	1.12	23.70	13.20	-
	K-309LF	0.03	0.60	1.42	23.30	13.17	-
	K-309MoLT	0.03	0.60	1.00	23.75	14.60	2.50
SAW	M-2209 x EF-300N	0.02	0.50	1.20	22.5	8.5	3.1
	M-316L x EF-300N	0.02	0.60	1.30	18.6	11.6	2.4
	M-309L x EF-300N	0.02	0.50	1.60	23.0	13.5	-
GTAW	T-2209	0.01	0.40	1.67	22.70	8.70	3.10
	T-316L	0.02	0.40	1.73	18.15	11.17	2.22
	T-316LSi	0.01	0.87	1.55	18.58	11.57	2.54
	T-309L	0.01	0.45	1.65	23.09	13.78	-
	T-309LMo	0.01	0.45	1.51	21.59	14.62	2.60
GMAW	M-2209	0.01	0.40	1.67	22.70	8.70	3.10
	M-316L	0.02	0.51	1.61	18.78	11.81	2.49
	M-316LSi	0.01	0.87	1.55	18.58	11.57	2.54
	M-309L	0.01	0.45	1.64	23.09	13.78	-
	M-309LMo	0.01	0.45	1.51	21.59	14.62	2.60



Chemical Tankers

Characteristics of Product

Mechanical properties (AWS Specification)

Process	Brand Name	Y.S (Mpa)	T.S (Mpa)	El.(%)	CVN longitudinal	
					Test Temp. (°C)	Absorb energy(J)
SMAW	KST-2209	-	Min. 690	Min. 20	-	-
	KST-316-15	-	Min. 490	Min. 30	-196	25 (Actual)
	KST-316LB	-	Min. 490	Min. 30	-196	36 (Actual)
	KST-316L	-	Min. 490	Min. 30	-196	40 (Actual)
	KST-316L-17	-	Min. 490	Min. 30	-196	46 (Actual)
	KST-309L	-	Min. 520	Min. 30	-	-
	KST-309LMo	-	Min. 520	Min. 30	-	-
FCAW	K-329T	-	Min. 690	Min. 20	-40	42 (Actual)
	K-316LT	-	Min. 485	Min. 30	-105	40 (Actual)
	K-316LF	-	Min. 485	Min. 30	-105	40 (Actual)
	K-316LS	-	Min. 485	Min. 25	-196	39 (Actual)
	K-309LT	-	Min. 550	Min. 30	-30	48 (Actual)
	K-309LF	-	Min. 520	Min. 30	-30	43 (Actual)
	K-309MoLT	-	Min. 520	Min. 25	-30	35 (Actual)
	K-309MoLF	-	Min. 520	Min. 25	-60	30 (Actual)
SAW	M-2209 x EF-300N	[Actual→] 650	800	35	-60	70
	M-316L x EF-300N	[Actual→] 410	570	39	-196	80
	M-309L x EF-300N	[Actual→] 430	580	36	-196	80
GTAW	T-2209	-	Min. 690	Min. 20	-50	160 (Actual)
	T-316L	-	Min. 490	Min. 30	-196	45 (Actual)
	T-316LSi	-	Min. 490	Min. 30	-196	78 (Actual)
	T-309L	-	Min. 520	Min. 30	-196	52 (Actual)
	T-309LMo	Min. 350	Min. 550	Min. 25	-196	89 (Actual)
GMAW	M-2209	-	Min. 690	Min. 20	-196	50 (Actual)
	M-316L	-	Min. 490	Min. 30	-196	62 (Actual)
	M-316LSi	-	Min. 490	Min. 30	-196	57 (Actual)
	M-309L	-	Min. 520	Min. 30	-196	43 (Actual)
	M-309LMo	Min. 350	Min. 550	Min. 25	-196	89 (Actual)

NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.

Building & Bridge Construction

Product by Base Metal

KISWEL Product Line

Base Metal	T.S (Mpa)	CVN longitudinal		Process	Brand Name
		Test Temp. (°C)	Absorb energy(J)		
SS400	400 - 510	0	Min. 47	FCAW	K-71T, KX-200
SM400				SAW	EF-100H x KD-50
SMA400				GMAW	KC-28
SM490	490 - 610	0	Min. 47	FCAW	K-55T, KX-55
SM490Y				SAW	EF-100H x KD-60
SMA490				GMAW	ZO-55
HSB500	Min. 500	-5	Min. 47	FCAW	K-55T, KX-55
SM520				SAW	EF-100H x KD-60
				GMAW	ZO-55
SM570	570 - 720	-5	Min. 47	FCAW	K-81T, K-80ST
SMA570				SAW	EF-100H x KD-60
				GMAW	ZO-60
HSB600	Min. 600	-5	Min. 47	FCAW	K-91T, K-90T
				SAW	EF-200V x KD-100
				GMAW	ZO-60
HSA800	800 - 950	-5	Min. 47	FCAW	K-120TG
				SAW	EF-200UV x KD-120
				GMAW	ZH-120
HSB800	Min. 800	-20	Min. 47	FCAW	K-120TG
				SAW	EF-200UV x KD-120
				GMAW	ZH-120



Building & Bridge Construction

Characteristics of Product

Characteristics of Welding Consumables

Process	Brand Name	AWS Specification	EN Specification
FCAW	K-71T	A5.20 : E71T-1C	EN 17632 B : T49 0 T1-1CA-U
	K-55T	A5.29 : E81T1-GC	EN 17632-B : T55 2 T1-1CA H10
	KX-55	A5.29 : E80T1-GC	EN 17632-B : T55 2 T15-0CA H10
	K-81T	A5.29 : E81T1-Ni1C	EN 17632 B : T55 3 T1-1CA-N2
	K-80ST	A5.29 : E80T1-Ni1C	EN 17632 B : T55 3 T1-0CA-N2 H5
	K-91T	A5.29 : E91T1-GC H4	EN 17632 B : T62 4 T1-1CAP-G H5
	K-90T	A5.29 : E90T1-K2C	EN 17632 B : T62 4 T1-0CAP-G H5
	K-120TG	A5.29 : E121T1-GC	-
SAW	EF-100H x KD-50	A5.17 : F7A(P)2-EH14	EN 14171 : S 46 3 AB S4
	EF-100H x KD-60	A5.23 : F8A(P)0-EA3-G	EN 14171 : S 50 2 AB SZ
	EF-200V x KD-100	A5.23 : F10A(P)4-EM2-G	EN14171 : S 69 4 CS SZ
	EF-200UV x KD-120	A5.23 : F11A6-EG-G	EN 14171 : S 69 5 FB SZ
GMAW	KC-28	A5.18 : ER70S-6	EN 14341 : G 49A 3 C/M G6
	ZO-55	A5.18 : ER70S-G	EN 14341 : G 55A 0 U C G18
	ZO-60	A5.28 : ER80S-G	EN 16834 : G 62A 2 U C 3M1T
	ZH-120	A5.28 : ER120S-G	EN 16834 : G 83A 6 U M 0

Building & Bridge Construction

Chemical Composition of all-weld metal (%)

Process	Brand Name	C	Si	Mn	P	S	Ni	Mo
FCAW	K-71T	0.04	0.55	1.25	0.015	0.011	-	-
	K-55T	0.04	0.54	1.50	0.013	0.011	0.40	-
	KX-55	0.03	0.54	1.57	0.014	0.011	0.40	-
	K-81T	0.02	0.51	1.28	0.014	0.011	0.95	-
	K-80ST	0.03	0.48	1.42	0.012	0.013	0.91	-
	K-91T	0.03	0.42	1.37	0.012	0.010	0.93	-
	K-90T	0.03	0.43	1.51	0.013	0.010	1.64	-
	K-120TG	0.03	0.39	1.69	0.010	0.006	2.66	0.67
SAW	EF-100H x KD-50	0.09	0.29	1.42	0.025	0.011	-	-
	EF-100H x KD-60	0.06	0.35	1.50	0.022	0.012	-	0.47
	EF-200V x KD-100	0.06	0.29	1.40	0.024	0.011	1.70	0.35
	EF-200UV x KD-120	0.05	0.16	1.75	0.023	0.011	2.50	0.67
GMAW	KC-28	0.07	0.86	1.53	0.012	0.007	-	-
	ZO-55	0.07	0.92	1.92	0.012	0.004	-	- (Ti 0.18)
	ZO-60	0.07	0.84	1.95	0.014	0.005	-	0.31 (Ti 0.17)
	ZH-120	0.06	0.52	1.48	0.002	0.003	3.42	0.57

Building & Bridge Construction

Characteristics of Product

Mechanical properties (AWS Specification)

Material	Brand Name	Y.S (Mpa)	T.S (Mpa)	EL.(%)	CVN longitudinal	
					Test Temp. [°C]	Absorb energy(J)
FCAW	K-71T	Min. 390	490 - 670	Min. 22	-20	≥27
	K-55T	Min. 470	550 - 690	Min. 19	-20	≥27
	KX-55	Min. 470	550 - 690	Min. 19	-20	≥27
	K-81T	Min. 470	550 - 690	Min. 19	-30	≥27
	K-80ST	Min. 470	550 - 690	Min. 19	-30	≥27
	K-91T	Min. 540	620 - 760	Min. 17	-40	≥27
	K-90T	Min. 540	620 - 760	Min. 17	-60	50 (Actual)
	K-120TG	[Actual→] 792	864	19	-40	50
SAW	EF-100H x KD-50	Min. 400	480 - 660	Min. 22	-29	≥27
	EF-100H x KD-60	Min. 470	550 - 700	Min. 20	-40	≥27
	EF-200V x KD-100	Min. 610	690 - 830	Min. 16	-40	≥27
	EF-200UV x KD-120	Min. 680	760 - 900	Min. 15	-51	≥27
GMAW	KC-28	Min. 400	Min. 480	Min. 22	-30	≥27
	ZO-55	Min. 400	Min. 480	Min. 22	0	170
	ZO-60	-	Min. 550	-	-20	110
	ZH-120	-	Min. 830	-	-60	100

NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.

Lotte World Tower (555m, 123F)

SM570	HSA800
1184t(100%)	853t(72%)

SM520	HSA800
1811t(100%)	1075t(59%)

SM570	HSA800
270t(100%)	190t(70%)

Save 30-40% of steel qty

Thermal Power Station

Product by Base Metal

KISWEL Product Line

Base Metal (ASTM/AISI)		Recommended welding consumable			PWHT
		Process	Brand Name	AWS Specification	
0.5Mo	P/T1	SMAW	K-7016A1	E7016-A1	620°C×1Hr
		FCAW	K-81TA1	E81T1-A1C	
		SAW	EF-200H x KD-60	F8P0-EA3-A3	
1Cr-0.5Mo	P/T11	SMAW	K-8016B2	E8016-B2	690°C×1Hr
		FCAW	K-81TB2(L)	E81T1-B2(L)C	
		GM(T)AW	KC-80SB2 / T-80SB2	ER80S-B2	
		SAW	EF-200H×KD-B2	F8P0-EB2-B2	
2Cr-1Mo	P/T22	SMAW	K-9016B3	E9016-B3	690°C×1Hr
		FCAW	K-91TB3(L)	E91T1-B3(L)C	
		GM(T)AW	KC-90SB3 / T-90SB3	ER90S-B3	
		SAW	EF-200H×KD-B3	F9P0-EB3-B3	
2Cr-1Mo-V	P/T23	FCAW	K-91TB3LS	E91T1-B3LC	690°C×1Hr
5Cr-0.5Mo	P/T5	SMAW	K-8016B6	E8016-B6	740°C×2Hr
		FCAW	K-81TB6	E81T1-B6C	745°C×2Hr
9Cr-1Mo	P/T9	SMAW	K-8016B8	E8016-B8	740°C×2Hr
9Cr-1Mo-Nb-V	P/T91	SMAW	K-9015B9	E9015-B9 H4R	760°C×2Hr
		FCAW	K-91TB9	E91T1-B9C	
		GM(T)AW	KC-90SB9 / T-90SB9	ER90S-B9	
		SAW	EF-200HC×KD-B9	F10PZ-EB9-B9	

Thermal Power Station



Thermal Power Station

Characteristics of Product

Chemical Composition of all-weld metal (%)

Process	Brand Name	C	Si	Mn	P	S	Cr	Mo
SMAW	K-7016A1	0.07	0.54	0.83	0.015	0.009	0.03	0.52
	K-8016B2	0.06	0.47	0.65	0.014	0.012	1.31	0.52
	K-9016B3	0.08	0.45	0.78	0.016	0.011	2.37	1.03
	K-8016B6	0.06	0.43	0.57	0.018	0.012	4.98	0.51
	K-8016B8	0.08	0.74	0.98	0.020	0.013	8.48	0.90
	K-9015B9	0.09	0.27	0.62	0.010	0.010	8.92	1.08
FCAW	K-81TA1	0.02	0.55	1.21	0.008	0.010	-	0.53
	K-81TB2L	0.03	0.43	1.11	0.008	0.010	1.28	0.56
	K-91TB3L	0.03	0.51	1.18	0.007	0.011	2.25	1.03
	K-91TB3LS	0.06	0.33	1.06	0.015	0.013	2.19	1.04
	K-81TB6	0.06	0.58	0.42	0.008	0.009	4.52	0.48
	K-91TB9	0.10	0.23	0.81	0.014	0.012	9.10	1.00
SAW	EF-200H x KD-60	0.08	0.15	1.60	0.024	0.008	-	0.50
	EF-200H x KD-B2	0.10	0.18	0.90	0.022	0.009	1.11	0.48
	EF-200H x KD-B3	0.08	0.27	0.90	0.023	0.009	2.26	0.92
	EF-200HC x KD-B9	0.10	0.20	0.80	0.021	0.007	8.10	0.90 (Ni 0.40)
GMAW	KC-80SB2	0.09	0.54	0.51	0.015	0.006	1.26	0.45
	KC-90SB3	0.09	0.47	0.66	0.010	0.014	2.31	1.00
	KC-90SB9	0.10	0.23	0.75	0.005	0.002	9.10	0.94
GTAW	T-80SB2	0.09	0.54	0.51	0.015	0.006	1.26	0.45
	T-90SB3	0.09	0.47	0.66	0.010	0.014	2.31	1.00
	T-90SB9	0.10	0.23	0.75	0.005	0.002	9.10	0.94



K-8016B2 3.2Ø V-U / DC+ 140~150A

Thermal Power Station

Characteristics of Product

Mechanical Properties (AWS Specification)

Process	Brand Name	Y.S (Mpa)	T.S (Mpa)	El.(%)	CVN longitudinal		PWHT
					Test Temp. (°C)	Absorb energy(J)	
SMAW	K-7016A1	Min. 390	Min. 490	Min. 22	0	100 (Actual)	620°C×1Hr
	K-8016B2	Min. 460	Min. 550	Min. 19	0	60 (Actual)	690°C×1Hr
	K-9016B3	Min. 530	Min. 620	Min. 17	0	40 (Actual)	690°C×1Hr
	K-8016B6	Min. 460	Min. 550	Min. 19	0	45 (Actual)	740°C×2Hr
	K-8016B8	Min. 460	Min. 550	Min. 19	0	45 (Actual)	740°C×2Hr
	K-9015B9	Min. 530	Min. 620	Min. 17	0	40 (Actual)	760°C×2Hr
FCAW	K-81TA1	Min. 470	550-690	Min. 19	-	-	620°C×1Hr
	K-81TB2L	Min. 470	550-690	Min. 19	-	-	690°C×1Hr
	K-91TB3L	Min. 540	620-830	Min. 17	-	-	690°C×1Hr
	K-91TB3LS	Min. 540	620-760	Min. 17	-20	120 (Actual)	690°C×1Hr
	K-81TB6	Min. 470	550-690	Min. 19	-	-	745°C×2Hr
	K-91TB9	Min. 540	620-830	Min. 16	-	-	760°C×2Hr
SAW	EF-200H x KD-60	Min. 470	550-700	Min. 20	-18	≥27	620°C×1Hr
	EF-200H x KD-B2	Min. 470	550-700	Min. 20	-18	≥27	690°C×1Hr
	EF-200H x KD-B3	Min. 540	620-830	Min. 17	-18	≥27	690°C×1Hr
	EF-200HC x KD-B9	Min. 610	690-830	Min. 16	20	50 (Actual)	760°C×2Hr
GMAW	KC-80SB2	Min. 470	Min. 550	Min. 19	20	80 (Actual)	690°C×1Hr
	KC-90SB3	Min. 540	Min. 620	Min. 17	20	80 (Actual)	690°C×1Hr
	KC-90SB9	Min. 410	Min. 620	Min. 16	20	90 (Actual)	760°C×2Hr
GTAW	T-80SB2	Min. 470	Min. 550	Min. 19	0	80 (Actual)	690°C×1Hr
	T-90SB3	Min. 540	Min. 620	Min. 17	0	180 (Actual)	690°C×1Hr
	T-90SB9	Min. 410	Min. 620	Min. 16	20	334 (Actual)	760°C×2Hr

NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.

Storage Tank

Product by Base Metal

KISWEL Product Line

Base Metal (ASTM)	Y.S (Mpa)	T.S (Mpa)	CVN longitudinal		Process	Brand Name
			Test Temp. (°C)	Absorb energy(J)		
A283-C	Min. 205	380 - 515	-	-	FCAW	K-71T, K-81T
					SMAW	K-7018(Pipeweld)
					SAW	EF-100H x KD-50
					EGW(FCW)	K-EG3
A36	Min. 250	400 - 550	-	-	FCAW	K-71T, K-81T
					SMAW	K-7018(Pipeweld)
					SAW	EF-100H x KD-50
					EGW(FCW)	K-EG3
A516-70	Min. 260	485 - 620	-	-	FCAW	K-71T, K-81T
					SMAW	K-7018(Pipeweld)
					SAW	EF-100H x KD-50
					EGW(FCW)	K-EG3
A573-70N	Min. 290	485 - 620	-	-	FCAW	K-71T, K-81T
					SMAW	K-7018(Pipeweld)
					SAW	EF-100H x KD-50, EF-100H x KD-60
					EGW(FCW)	K-EG3
A537-CL2	Min. 415	550 - 690	-	-	FCAW	K-81T
					SMAW	K-8016C1, K-8018C1
					SAW	EF-100H x KD-50, EF-100H x KD-60
					EGW(FCW)	K-EG3
A841-CL2	Min. 415	550 - 690	-40	20	FCAW	K-81T
					SMAW	K-8016C1, K-8018C1
					SAW	EF-100H x KD-50, EF-100H x KD-60
					EGW(FCW)	K-EG3

Storage Tank



Storage Tank

Characteristics of Product

Characteristics of Welding Consumables

Process	Brand Name	AWS Specification	EN Specification
FCAW	K-71T	A5.20 : E71T-1C	EN 17632 B : T49 0 T1-1CA-U
	K-81T	A5.29 : E81T1-Ni1C	EN 17632 B : T55 3 T1-1CA-N2
SMAW	K-7018(Pipeweld)	A5.1 : E7018	EN 2560 B : E49 18 A U
	K-8016C1	A5.5 : E8016-C1	EN 2560 B : E55 16-N5 P U
	K-8018C1	A5.5 : E8018-C1	EN 2560 B : E55 18-N5 P U
SAW	EF-100H x KD-50	A5.17 : F7A(P)2-EH14	EN 756 : S 46 3 AB S4
	EF-100H x KD-60	A5.23 : F8A(P)4-EA3-G	EN 756 : S 50 3 AB SZ
EGW(FCW)	K-EG3	A5.26 : EG82T-NM2	-

Chemical Composition of all-weld metal (%)

Process	Brand Name	C	Si	Mn	P	S	Ni
FCAW	K-71T	0.04	0.55	1.25	0.015	0.011	-
	K-81T	0.02	0.51	1.28	0.014	0.011	0.95
SMAW	K-7018(Pipeweld)	0.07	0.61	0.87	0.015	0.011	-
	K-8016C1	0.07	0.45	0.98	0.016	0.013	2.25
	K-8018C1	0.06	0.60	0.96	0.015	0.012	2.41
SAW	EF-100H x KD-50	0.09	0.29	1.42	0.025	0.011	-
	EF-100H x KD-60	0.06	0.35	1.40	0.022	0.012	-
EGW(FCW)	K-EG3	0.04	0.20	1.50	0.011	0.012	1.80

Mechanical Properties (AWS Specification)

Process	Brand Name	Y.S (Mpa)	T.S (Mpa)	El.(%)	CVN longitudinal	
					Test Temp. (°C)	Absorb energy(J)
FCAW	K-71T	Min. 390	490 - 670	Min. 22	-20	≥27
	K-81T	Min. 470	550 - 690	Min. 19	-30	≥27
SMAW	K-7018(Pipeweld)	Min. 400	Min. 490	Min. 22	-30	≥27
	K-8016C1	Min. 460	Min. 550	Min. 19	-60	≥27
	K-8018C1	Min. 460	Min. 550	Min. 19	-60	≥27
SAW	EF-100H x KD-50	Min. 400	480 - 660	Min. 22	-29	≥27
	EF-100H x KD-60	Min. 470	550 - 700	Min. 20	-40	≥27
EGW(FCW)	K-EG3	Min. 410	550 - 700	Min. 20	-30	≥27

NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.

Hydro Power Plant

Product by Base Metal

KISWEL Product Line

Base Metal	Y.S (Mpa)	T.S (Mpa)	EL. (%)	Process	Brand Name
A255 Gr.C	Min.485	725-930	Min.20	FCAW	K-81T
				SAW	EF-200UV x KD-120
				SMAW	K-8018C1
A517 Gr.A-C	Min.690	725-930	Min.16	FCAW	K-110TK3
				SAW	EF-200UV x KD-120
				SMAW	K-11018M
13Cr 4Ni	Min.342	Min.445	Min.13	FCAW	K-410NiMoTC
				SMAW	KST-410NiMo
19Cr 9Ni 3Mo L	Min.175	Min.485	Min.40	FCAW	K-316LT
				SAW	EF-300N x M-316L
				SMAW	KST-316L-15
					KST-316L-17
23Cr 12Ni L	(Dissimilar joints repair and maintenance)			FCAW	K-309LT
				SAW	EF-300N x M-309L
				SMAW	KST-309L-17
23Cr 12Ni 2Mo L	(Dissimilar joints repair and maintenance)			FCAW	K-309MoLT
				SMAW	KST-309LMoT



Hydro Power Plant



Hydro Power Plant

Characteristics of Product

Characteristics of Welding Consumables

Process	Brand Name	AWS Specification	EN Specification
FCAW	K-81T	A5.29 : E81T1-Ni1C	EN 17632 B : T55 3 T1-1CA-N2
	K-110TK3	A5.29 : E111T1-K3C	EN 17632 B : T76 2 T1-1CA-N3M2 H5
	K-410NiMoTC	A5.22 : E410NiMoT1-1	EN 17633 B : TS410NiMo-FC1
	K-316LT	A5.22 E316LT1-1/4	EN 17633 B : TS316L-FB1
	K-309LT	-	EN 17633 B : TS309L-FB1
	K-309MoLT	A5.22 E309LMoT1-1	EN 17633 B : TS309LMo-FC1
SAW	EF-200UV x KD-120	A5.23 : F11A6-EG-G	EN ISO 14171 : S 69 5 FB SZ
	EF-300N x M-316L	-	EN ISO 14174 : SA AF 2 DC (Flux)
	EF-300N x M-309L	-	EN ISO 14174 : SA AF 2 DC (Flux)
SMAW	K-8018C1	A5.5 : E8018-C1	EN 2560 B : E55 18-N5 P U
	K-11018M	A5.5 : E11018-M	EN 757 : E 62 3 Z B 32 H10
	KST-410NiMo	A5.4 : E410NiMo-16	EN 3581 B : ES410NiMo-16
	KST-316L-15	A5.4 : E316L-15	EN 3581 B : ES316L-15
	KST-316L-17	A5.4 : E316L-17	EN 3581 B : ES316L-17
	KST-309L-17	A5.4 : E309L-17	EN 3581 B : ES309L-17
	KST-309LMoT	A5.4 : E309LMo-17	EN 3581 B : ES309LMo-17

Chemical Composition of all-weld metal (%)

Process	Brand Name	C	Si	Mn	Cr	Ni	Mo
FCAW	K-81T	0.02	0.51	1.28	-	0.95	-
	K-110TK3	0.04	0.51	1.72	-	2.04	0.42
	K-410NiMoTC	0.04	0.55	0.45	12.20	4.80	0.55
	K-316LT	0.03	0.60	1.15	19.50	12.70	2.40
	K-309LT	0.03	0.60	1.12	23.70	13.20	-
	K-309MoLT	0.03	0.60	1.00	23.75	14.60	2.50
SAW	EF-200UV x KD-120	0.05	0.16	1.75	-	2.50	0.67
	EF-300N x M-316L	0.02	0.60	1.30	18.6	11.6	2.4
	EF-300N x M-309L	0.02	0.50	1.60	23.0	13.5	-
SMAW	K-8018C1	0.06	0.60	0.96	-	2.41	-
	K-11018M	0.08	0.41	1.49	0.25	1.86	0.35
	KST-410NiMo	0.02	0.49	0.35	11.70	4.71	0.62
	KST-316L-15	0.03	0.40	1.08	19.22	11.67	2.43
	KST-316L-17	0.03	0.75	0.80	18.02	11.71	2.75
	KST-309L-17	0.03	0.84	0.76	23.14	12.95	-
	KST-309LMoT	0.02	0.76	0.82	22.78	13.12	2.75

Hydro Power Plant

Characteristics of Product

Mechanical Properties (AWS Specification)

Process	Brand Name	Y.S (Mpa)	T.S (Mpa)	El.(%)	CVN longitudinal	
					Test Temp. [°C]	Absorb energy(J)
FCAW	K-81T	Min. 470	550 - 690	Min. 19	-30	≥27
	K-110TK3	Min. 680	760 - 900	Min. 15	-20	≥27
	K-410NiMoTC	-	Min. 760	Min. 15	-	-
	K-316LT	-	Min. 485	Min. 30	-105	40 (Actual)
	K-309LT	-	Min. 550	Min. 30	-30	48 (Actual)
	K-309MoLT	-	Min. 520	Min. 25	-30	35 (Actual)
SAW	EF-200UV x KD-120	Min. 680	760 - 900	Min. 15	-51	≥27
	EF-300N x M-316L	(Actual→) 410	570	39	-196	80
	EF-300N x M-309L	(Actual→) 430	580	36	-196	80
SMAW	K-8018C1	Min. 460	Min. 550	Min. 19	-60	≥27
	K-11018M	680-760	Min. 760	Min. 20	-50	≥27
	KST-410NiMo	-	Min. 760	Min. 15	-	-
	KST-316L-15	-	Min. 490	Min. 30	-196	25 (Actual)
	KST-316L-17	-	Min. 490	Min. 30	-196	26 (Actual)
	KST-309L-17	-	Min. 520	Min. 30	-	-
	KST-309LMoT	-	Min. 520	Min. 30	-	-

NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.



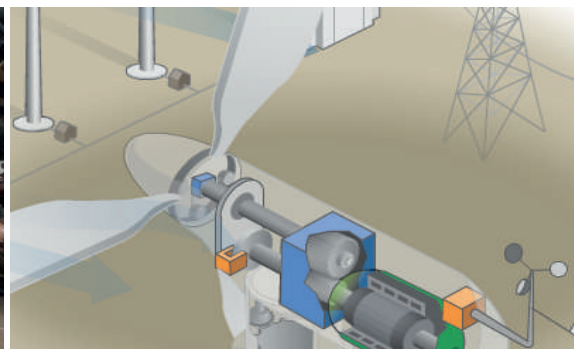
Pipe & Wind Tower

Product by Base Metal

KISWEL Product Line (Base Metal of API, ASTM standard)

Base Metal (API)	Y.S (Mpa)	T.S (Mpa)	CVN longitudinal		Brand Name (SAW)
			Test Temp. (°C)	Absorb energy(J)	
2H Gr.50	Min. 345	483 - 620	-40	≥41	EF-200V x KD-42
					EF-200K x KD-42
					EF-200UV x KD-EH12K
2W Gr.50	345 - 517	Min. 448	-40	≥41	EF-200LT x KD-50
					EF-200LT Plus x KD-50
5L B	241 - 448	414 - 758	0	≥27	EF-100H x KD-50 EF-100H x KD-EH12K EF-100S x KD-42 EF-200K x KD-42 EF-200V x KD-42
5L X42	290 - 496	414 - 758			
5L X46	317 - 524	434 - 758			
5L X52	359 - 531	455 - 758			
5L X56	386 - 544	490 - 758			
5L X60	414 - 565	517 - 758			
5L X65	448 - 600	531 - 758			
5L X70	483 - 621	565 - 758			
5L X80	552 - 690	621 - 827	0	≥27	EF-200V x EA2 EF-200V x KD-100

Base Metal (ASTM)	Y.S (Mpa)	T.S (Mpa)	CVN longitudinal		Brand Name (SAW)
			Test Temp. (°C)	Absorb energy(J)	
A516 Gr.70	Min. 260	485 - 620	-	-	EF-100H x KD-50 EF-200V x KD-50



Pipe & Wind Tower

Pipe & Wind Tower

Product by Base Metal

KISWEL Product Line (Base Metal of EN 10025 standard)

Base Metal (EN 10025)	Y.S (Mpa)	T.S (Mpa)	CVN longitudinal		Brand Name (SAW)	
			Test Temp. (°C)	Absorb energy(J)		
S275J	Min. 275	410 - 560	20	≥27	EF-200V x KD-42	
S275J0			0	≥27		
S275J2			-20	≥27		
S275N		370 - 510	-20	≥40	EF-200LT Plus x KD-50	
S275NL			-50	≥27		
S275M			-20	≥40		
S275ML			-50	≥27		
S355J		Min. 355	470 - 630	20	≥27	EH-200V x KD-EH12K
S355J0				0	≥27	
S355J2				-20	≥27	
S355K2	470 - 630		-20	≥40	EF-200LT Plus x KD-50	
S355N			-20	≥40		
S355NL			-50	≥27		
S355M			-20	≥40		
S355ML	-50		≥27			
S420N	Min. 420		520 - 680	-20	≥40	EF-200V x KD-EA2
S420NL				-50	≥27	EF-200SF x KD-EH12K EF-200LT Plus x KD-50
S420M		-20		≥40	EF-200V x KD-EA2	
S420ML		-50		≥27	EF-200SF x KD-EH12K EF-200LT Plus x KD-50	
S460N	Min. 460	540 - 720	-20	≥40	EF-200V x KD-EA2	
S460NL			-50	≥27	EF-200SF x KD-EH12K EF-200LT Plus x KD-50	
S460M			-20	≥40	EF-200V x KD-EA2	
S460ML			-50	≥27	EF-200SF x KD-EH12K EF-200LT Plus x KD-50	



Pipe & Wind Tower

Characteristics of Product

Characteristics of Welding Consumables

Brand Name	AWS Specification	EN Specification	Applications
EF-200V x KD-42	A5.17 : F7A6-EM12K	EN 14171 : S 42 5 CS S2Si	Thick section welding, 8-44mm.
EF-200K x KD-42	A5.17 : F7A(P)6-EM12K	EN 14171 : S 46 5 CS S2Si	Tough weld metal CVN Test at -50°C.
EF-200LT Plus x KD-50	A5.17 : F7A(P)8-EH14	EN 14171 : S 46 6 CS S4	Thick section welding, 20-150mm.
EF-200UV x KD-EH12K	A5.17 : F7A(P)8-EH12K	EN 14171 : S 46 6 FB S3Si	Tough weld metal CVN Test at -60°C,CTOD at -10°C.
EF-200SF x KD-EH12K	A5.17 : F7A(P)8-EH12K	EN 14171 : S 46 6 FB S3Si	High productivity joint filling.
EF-200V x KD-EA2	A5.17 : F8A(P)6-EA2-A2	EN 14171 : S 46 5 CS S2Mo	Thick section welding, 20-150mm. Tough weld metal CVN Test at -40°C

Chemical Composition of all-weld metal (%)

Brand Name	C	Si	Mn	P	S	Mo
EF-200V x KD-42	0.09	0.23	1.53	0.024	0.003	-
EF-200K x KD-42	0.09	0.28	1.63	0.027	0.001	-
EF-200LT Plus x KD-50	0.09	0.22	1.53	0.016	0.002	-
EF-200UV x KD-EH12K	0.09	0.32	1.51	0.015	0.003	-
EF-200SF x KD-EH12K	0.07	0.31	1.78	0.019	0.005	-
EF-200V x KD-EA2	0.09	0.14	1.10	0.022	0.008	0.41

Mechanical properties (EN Specification)

Brand Name	Y.S (Mpa)	T.S (Mpa)	El.(%)	CVN longitudinal	
				Test Temp. (°C)	Absorb energy(J)
EF-200V x KD-42	Min. 420	500 - 640	Min. 20	-50	≥47
EF-200K x KD-42	Min. 460	530 - 680	Min. 20	-50	≥47
EF-200LT Plus x KD-50	Min. 460	530 - 680	Min. 20	-60	≥47
EF-200UV x KD-EH12K	Min. 460	530 - 680	Min. 20	-60	≥47
EF-200SF x KD-EH12K	Min. 460	530 - 680	Min. 20	-60	≥47
EF-200V x KD-EA2	Min. 460	530 - 680	Min. 20	-50	≥47

NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.

Pipe & Wind Tower

MIG, FCW, SMAW

Chemical Composition of all-weld metal (%)

MIG Wire

Shielding gas : Ar+15-25%CO2

Consumables	AWS Specification	EN Specification	C	Si	Mn	P	S
KC-28	ER70S-6	14341-A: G 42 3 M G3Si1	0.07	0.86	1.52	0.011	0.007
KC-29	ER70S-6	14341-A: G 46 4 M G4Si1	0.08	0.99	1.63	0.015	0.007

FCW

Shielding gas : Ar+15-25%CO2

Consumables	AWS Specification	EN Specification	C	Si	Mn	P	S
KX-706MU	E70C-6M	17632-A: T46 4 M M 4 H5	0.04	0.70	1.60	0.010	0.009

SMAW

Consumables	AWS Specification	EN Specification	C	Si	Mn	P	S
K-7016HR	E7016 H4R	2560-A: E 42 3 B 12 H5	0.07	0.57	0.87	0.013	0.011
K-7018NP	E7018-1 H4R	2560-A: E42 4 B 42 H5	0.05	0.45	1.18	0.013	0.012

Chemical Composition of all-weld metal (%)

Consumables	Y.S (Mpa)	T.S (Mpa)	EL. (%)	CVN longitudinal	
				Test Temp.(°C)	Absorb energy(J)
KC-28	Min. 420	500 - 640	Min. 20	-30	≥ 47
KC-29	Min. 460	530 - 680	Min. 20	-40	≥ 47
KX-706MU	Min. 460	530 - 680	Min. 20	-40	≥ 47
K-7016HR	Min. 420	500 - 640	Min. 20	-30	≥ 47
K-7018NP	Min. 420	500 - 640	Min. 20	-30	≥ 47

Pipeline

Product by Base Metal

KISWEL Product Line (Base Metal of API Standard)

Base Metal (API)	Welding Layer	Brand Name			
		SMAW	FCAW-S	GMAW	GTAW
5L X42	Root Pass	KCL-10			T-50
5L X46	Fill & Cap Pass	KCL-10 /	K-NGS /	KC-29	T-50
5L X52		K-7010P1 /	K-NGSNi1		
		KH-500VLF			
5L X56	Root Pass	KCL-10			
5L X60	Fill & Cap Pass	K-7010P1 /	K-NGS /	KC-29	T-50 /
5L X65		K-8010P1	K-NGSNi1		T-80SNi1
	Root Pass	K-7010P1			T-50 /
5L X70	Fill & Cap Pass		K-NGS /	KC-80SNi1	T-80SNi1
			K-8010P1		K-NGSNi1
	Root Pass	K-7010P1			T-80SNi1
5K X80	Fill & Cap Pass		-	KC-80SNi1 /	
			-		ZH-90
	Root Pass	K-7010P1			T-80SNi1
5L X100	Fill & Cap Pass		-	KC-80SNi1	
			-		ZH-90 /
				ZH-100	



Pipeline

Product by Base Metal

Mechanical Properties of API Base Metal

Base Metal (API)	Y.S (Mpa)	T.S (Mpa)	CVN longitudinal	
			Test Temp. (°C)	Absorb energy (J)
5L X42	290 - 496	414 - 758	0	≥27
5L X46	317 - 524	434 - 758		
5L X52	359 - 531	455 - 758		
5L X56	386 - 544	490 - 758		
5L X60	414 - 565	517 - 758	0	≥27
5L X65	448 - 600	531 - 758		
5L X70	483 - 621	565 - 758	0	≥27
5L X80	552 - 690	621 - 827	0	≥27
5L X100	690 - 840	760 - 990	0	≥27

Standard of Welding Consumables

Consumables	AWS Specification	EN Specification
SMAW		
KCL-10	A5.1 : E6010	2560-A : E38 0 C 22
K-7010P1	A5.5 : E7010-P1	2560-A : E42 2 C 25
K-8010P1	A5.5 : E8010-P1	2560-A : E46 2 1Ni C 25
KH-500VLF	A5.1 : E7048	2560-A : E38 0 B 35 H10
KH-500W	A5.1 : E7016	2560-A : E38 3 B 12 H10
K-7018	A5.1 : E7018	2560-A : E42 3 B 32 H10
K-8018	A5.5 : E8018-G	2560-A : E46 3 B 32 H10
K-9018M	A5.5 : E9018-M	2560-A : E50 5 Z B 32 H10
K-11018M	A5.5 : E11018-M	757 : E62 3 Z B 32 H10
FCAW-S (Self-shielded)		
K-NGS	A5.20 : E71T-GS A5.36 : E71T14S-AZ-CS3	17632-B : T49 Z TG-1NS
K-NGSNi1	A5.29 : E71T8-Ni1 A5.36 : E71T18-AZ-Ni1-H8	17632-B : T49 3 T8-1NA-N2
GTAW(TIG)		
T-50	A5.18 : ER70S-6	636-A : W 46 3 W3Si1
T-80SNi1	A5.28 : ER80S-Ni1	636-A : W 46 6 W2Ni1
T-90	A5.28 : ER90S-G	16834-A : W 62 6 M Mn3Ni1Mo
T-100	A5.28 : ER100S-1	16834-B : W69A 5 U N3M2
GMAW(Solid wire)		
KC-29	A5.18 : ER70S-6	14341-A : G 46 4 C/M G4Si1
KC-80SNi1	A5.28 : ER80S-Ni1	14341-A : G 46 5 M G3Ni1
ZH-90	A5.28 : ER90S-G	16834-A : G 62 6 M Mn3Ni1Mo
ZH-100	A5.28 : ER100S-1	16834-B : G 69A 2 U M N3M2

Pipeline

Characteristics of Product

Chemical Composition of all-weld metal (%)

Consumables	C	Si	Mn	P	S	Ni
SMAW						
KCL-10	0.11	0.36	0.63	0.015	0.013	-
K-7010P1	0.17	0.32	0.65	0.014	0.006	0.18
K-8010P1	0.16	0.28	0.73	0.013	0.005	0.75
KH-500VLF	0.06	0.53	0.72	0.012	0.011	-
KH-500W	0.09	0.58	0.98	0.014	0.011	-
K-7018	0.06	0.61	1.18	0.014	0.009	-
K-8018	0.06	0.56	1.32	0.018	0.011	0.35
K-9018M	0.05	0.51	0.88	0.013	0.011	1.58
K-11018M	0.08	0.41	1.49	0.015	0.012	1.86
FCAW-S (Self-shielded)						
K-NGS	0.10	0.10	0.55	0.014	0.006	- (Al 1.21)
K-NGSNi1	0.04	0.25	1.15	0.008	0.007	0.88 (Al 0.91)
GTAW(TIG)						
T-50	0.07	0.82	1.52	0.012	0.015	-
T-80SNi1	0.09	0.63	1.11	0.009	0.008	0.83
T-90	0.08	0.61	1.60	0.014	0.002	0.86 (Mo 0.38)
T-100	0.05	0.26	1.51	0.006	0.005	1.95 (Mo 0.40)
GMAW(Solid wire)						
KC-29	0.08	0.99	1.63	0.015	0.007	-
KC-80SNi1	0.09	0.63	1.11	0.009	0.008	0.83
ZH-90	0.09	0.54	1.31	0.004	0.001	0.99 (Mo 0.32)
ZH-100	0.05	0.26	1.54	0.008	0.006	2.00 (Mo 0.35)



Pipeline

Characteristics of Product

Mechanical properties (AWS Specification)

Consumables	Y.S (Mpa)	T.S (Mpa)	El. (%)	CVN longitudinal	
				Test Temp. (°C)	Absorb energy (J)
SMAW					
KCL-10	≥ 330	≥ 430	≥ 22	-30	≥ 27
K-7010P1	≥ 415	≥ 490	≥ 22	-30	≥ 27
K-8010P1	≥ 460	≥ 550	≥ 19	-30	≥ 27
KH-500VLF	≥ 400	≥ 490	≥ 22	-30	≥ 27
KH-500W	≥ 400	≥ 490	≥ 22	-30	≥ 27
K-7018	≥ 400	≥ 490	≥ 22	-30	≥ 27
K-8018	≥ 460	≥ 550	≥ 19	-30 @EN	≥ 47 @EN
K-9018M	540 - 620	≥ 620	≥ 24	-50	≥ 27
K-11018M	680 - 760	≥ 760	≥ 20	-50	≥ 27
FCAW-S (Self-shielded)					
K-NGS	-	≥ 490	-	-	-
K-NGSNi1	≥ 400	490 - 620	≥ 20	-30	≥ 27
GTAW(TIG)					
T-50	≥ 400	≥ 480	≥ 22	-30	≥ 27
T-80SNi1	≥ 470	≥ 550	≥ 24	-45	≥ 27
T-90	-	≥ 620	≥ 18 @EN	-60 @EN	≥ 47 @EN
T-100	≥ 610	≥ 690	≥ 16	-50	≥ 68
GMAW(Solid wire)					
KC-29	≥ 400	≥ 480	≥ 22	-30	≥ 27
KC-80SNi1	≥ 470	≥ 550	≥ 24	-45	≥ 27
ZH-90	-	≥ 620	≥ 14 @EN	-60 @EN	≥ 47 @EN
ZH-100	≥ 610	≥ 690	≥ 16	-50	≥ 68

NOTE - Although actual values may slightly vary depending on the welding environment, all-weld metals satisfy the mechanical properties' value ranges within the specification.



INDEX

Welding Consumable by Base Metal

Boiler & Pressure Vessels	01
Linepipe	02
Offshore	03
Bridge Construction	04
Steel Structure	05
Wind Tower	06
Construction	07
Ship Building	08
Weather-Proof Steel	09
Low Temperature Vessel	10
Specialty Steel	11
Stainless Steel	12

Welding Consumable by Base Metal

Type	Industry	Specification	Base Material	Mechanical Properties				SMAW	FCAW	SAW	SOLID	TIG	
				Y.S (Mpa)	T.S (Mpa)	CVN Test							
						Test Temp. (°C)	Absorb energy (J)						
Normal Steel	Boiler & Pressure Vessels	ASTM	KS D3560	SB450M/480M	Min.275	480-620	-	-	K-7016A1	K-81TA1	EF-200H x KD-60	KC-80D2	T-80D2
			A285 Gr A/B/C	Min.205	380-515	-	-	K-7018	K-71T	EF-200V x KD-50	KC-28	T-50	
			A387 Gr 2/11/12	Min.275	450-585	-	-	K-8018B2	K-81TB2	EF-200H x KD-B2	KC-80SB2	T-80SB2	
			A387 Gr 21/22	Min.310	515-690	-	-	K-9018B3	K-91TB3	EF-200H x KD-B3	KC-90SB3	T-90SB3	
			A387 Gr 5	Min.310	515-690	-	-	K-8016B6	K-81TB6	-	-	-	
			A387 Gr 91	Min.415	585-760	-	-	K-9015B9	K-91TB9	EF-200HC x KD-B9	KC-90SB9	T-90SB9	
			A516 Gr 60/70	Min.260	485-620	-46	20	K-7018N	K-71UT	EF-200V x KD-50	KC-80SNi1	T-80SNi1	
	A537 Cl.1/2/3	Min.380	550-690	-	-	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2			
	Linepipe	API	API	2H Gr.50	Min.345	483-620	-40	41	K-7018N	K-71UT	EF-200V x KD-50	KC-80SNi1	T-80SNi1
				2W Gr.50	345-517	Min.448	-40	41	K-7018N	K-71UT	EF-200V x KD-50	KC-80SNi1	T-80SNi1
5L B/X42/X46/X52/X60/X65/X70				483-621	565-758	0	27	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2	
5L X80				555-705	625-825	0	68	KK-60	K-91T	EF-200V x KD-100	ZO-90	T-100	
5L X90				625-775	695-915	0	81	K-10018M	K-110TK3	EF-200V x KD-100	ZH-100	T-100	
Offshore	API	API	2H Gr.50	Min.345	483-620	-40	41	K-7018N	K-71UT	EF-200V x KD-50	KC-80SNi1	T-80SNi1	
			2W Gr.50	345-517	Min.448	-40	41	K-7018N	K-71UT	EF-200V x KD-50	KC-80SNi1	T-80SNi1	
	EN10025	EN10025	S355J/J0/J2/K2/N/M	Min.345	470-636	-20	40	K-7018	K-71TLF	EF-100H x KD-50	KC-28	T-50	
			S355NL/ML	Min.345	470-630	-50	27	K-7018C3L	K-71UT	EF-200LT x KD-50	KC-80SNi1	T-80SNi1	
			S420N/M	Min.420	520-680	-20	40	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2	
			S420NL/ML	Min.420	520-680	-50	27	K-8016C1	K-81TK2	EF200LT x KD-50	KC-80SNi1	T-80SNi1	
			S460N/M	Min.460	540-720	-20	40	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2	
			S460NL/ML	Min.460	540-720	-50	27	K-8016C1	K-81TK2	EF200LT x KD-60	KC-80SNi1	T-80SNi1	
	DIN OS B101	DIN OS B101	A420/D420	Min.420	530-680	-20	28	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2	
			E420	Min.420	530-680	-40	28	K-8018C3	K-81TK2	EF200LT x KD-50	KC-80SNi1	T-80SNi1	
NORSOK M-120	NORSOK M-120	NORSOK M-120	Y05	Min.355	470-630	-	-	K-7018	K-71T	EF-100H x KD-50	KC-28	T-50	
			Y20	Min.355	470-630	-	-	K-7018	K-71T	EF-100H x KD-50	KC-28	T-50	
			Y30	Min.420	500-660	-	-	KK-55	K-81T	EF-100H x KD-50	ZO-60	T-80D2	
			Y40	Min.460	540-700	-	-	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2	
			Y50	Min.1075	Min.1075	-	-	-	-	-	-	-	
Bridge Construction	KS D3868	KS D3868	HSB500	Min.380	Min.500	-5	47	KK-55	K-55T	EF-100H x KD-50	ZO-55	T-80D2	
			HSB500W	Min.380	Min.500	-5	47	KW-50G	K-71TW	-	-	-	
			HSB600	Min.450	Min.600	-5	47	KK-60	K-91T	EF-200V x KD-100	ZO-90	T-80D2	
			HSB600W	Min.450	Min.600	-5	47	K-8018W	K-81TW	-	-	-	
			HSB800	Min.690	Min.800	-20	47	K-12018M	K-120TG	EF-200UV x KD-120	ZH-120	T-120	
			HSB800W	Min.690	Min.800	-20	47	-	-	-	-	-	
Steel Structure	JIS G3101	JIS G3101	SS400/490	Min.275	490-610	-	-	K-7018	K-71T	EF-100H x KD-50	KC-28	T-50	
			SS540	Min.400	Min.540	-	-	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2	
	ASTM	ASTM	A36	Min.250	400-550	-	-	K-7018	K-71T	EF-100H x KD-50	KC-28	T-50	
			SM400A/B/C	Min.245	400-510	0	47	K-7018	K-71T	EF-100H x KD-50	KC-28	T-50	
	JIS G3106	JIS G3106	SM490A/B/C	Min.325	490-610	0	47	K-7018	K-71T	EF-100H x KD-50	KC-28	T-50	
			SM520B/C	Min.365	520-640	0	47	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2	
			SM570	Min.460	570-720	-5	47	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2	
			S275J/J0/J2/N/M	Min.275	410-560	-20	40	K-7018	K-71TLF	EF-100H x KD-50	KC-28	T-50	
	Wind Tower	EN10025	EN10025	S275NL/ML	Min.275	410-560	-50	27	KK-50N	K-71UT	EF-200LT x KD-50	KC-29	T-80SNi1
				S355J/J0/J2/K2/N/M	Min.345	470-636	-20	40	K-7018	K-71TLF	EF-100H x KD-50	KC-28	T-50
S355NL/ML				Min.345	470-630	-50	27	KK-50N	K-71UT	EF-200LT x KD-50	KC-80SNi1	T-80SNi1	
S420N/M				Min.420	520-680	-20	40	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2	
ASTM		ASTM	ASTM	S420NL/ML	Min.420	520-680	-50	27	K-8016C1	K-81TK2	EF200LT x KD-50	KC-80SNi1	T-80SNi1
				S460N/M	Min.460	540-720	-20	40	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2
				S460NL/ML	Min.460	540-720	-50	27	K-8016C1	K-81TK2	EF200LT x KD-60	KC-80SNi1	T-80SNi1
				A283 Gr A/B/C	Min.205	380-515	-	-	K-7018	K-71T	EF-100H x KD-50	KC-25	T-53
Construction	JIS G3136	JIS G3136	A283 Gr D	Min.230	415-550	-	-	K-7018	K-71T	EF-100H x KD-50	KC-25	T-53	
			A573 Gr 58/65	Min.290	485-620	-	-	K-7018	K-71T	EF-100H x KD-50	KC-28	T-50	
			SN400A/B/C	235-355	400-510	0	27	K-7018	K-71T	EF-100H x KD-50	KC-28	T-50	
			SN490B/C	325-445	490-610	0	27	K-7018	K-71T	EF-100H x KD-50	KC-28	T-50	
KS D5994	KS D5994	KS D5994	HSA800	650-770	800-900	-5	14	K-12018M	K-120TG	EF-200UV x KD-120	ZH-120	T-120	

Type	Industry	Specification	Base Material	Mechanical Properties				SMAW	FCAW	SAW	SOLID	TIG
				Y.S (Mpa)	T.S (Mpa)	CVN Test						
						Test Temp. (C)	Absorb energy (J)					
Normal Steel	Ship Building	DNV	A-DH36	Min.355	490-630	-20	55	K-7018	K-71T	EF-200V x KD-50	KC-28	T-50
			AH/DH40	Min.390	510-650	-20	55	KK-55	K-81T	EF-200V x KD-50	ZO-60	T-80D2
			E-EH36	Min.355	490-630	-40	55	KK-50N	K-71UT	EF-200LT x KD-50	KC-80SNi1	T-80SNi1
			EH40	Min.390	510-660	-40	55	K-8018C3	K-81TK2	EF-200LT x KD-50	KC-80SNi1	T-80SNi1
			A420/D420	Min.420	530-680	-20	28	KK-55	K-81T	EF-100H x KD-50	ZO-60	T-80D2
			A460/D460	Min.460	570-720	-20	31	KK-55	K-81T	EF-100H x KD-60	ZO-60	T-80D2
			E420	Min.420	530-680	-40	42	K-8018C3	K-81TK2	EF-200LT x KD-60	KC-80SNi1	T-80SNi1
			E460	Min.460	570-720	-40	46	K-8018C3	K-81TK2	EF-200LT x KD-60	KC-80SNi1	T-80SNi1
			F32/F36	Min.355	490-630	-60	50	K-8016C1	K-71TNi2	EF-200LT x KD-50	KC-80SNi2	T-80SNi2
			F40	Min.390	510-660	-60	55	K-8016C1	K-81TK2	EF-200LT x KD-50	KC-80SNi2	T-80SNi2
	F420	Min.420	530-680	-60	42	K-8016C1	K-81TK2	EF-200LT x KD-50	KC-80SNi2	T-80SNi2		
	F460	Min.460	570-720	-60	46	K-8016C1	K-81TK2	EF-200LT x KD-60	KC-80SNi2	T-80SNi2		
	Weather-Proof Steel	JIS G3114	SMA400AW/490AW	Min.365	490-610	-	-	KW-50G	K-71TW	-	-	-
			SMA400AP/490AP	Min.365	490-610	-	-	KW-50G	K-71TW	-	-	-
	Low Temperature Vessel	JIS G3127	SLN2N255	Min.255	450-590	-70	21	K-8016C2	K-71TNi2	-	-	-
			SLN3N255/275	Min.275	480-620	-101	21	-	-	-	-	-
			SLN3N440	Min.440	540-690	-110	27	-	K-81NT	-	-	-
			SLN5N590	Min.590	690-830	-130	41	-	-	-	-	-
			SLN9N520	Min.520	690-830	-196	34	-	-	-	-	-
			SLN9N590	Min.590	690-830	-196	41	-	-	-	-	-
Specialty Steel	ASTM	A203 Gr D/E	Min.275	485-620	-101	20	-	-	-	-	-	
		Corrosion Resisting Steel	S-TEN1	Min.245	400-510	-	-	KA-50G	K-71TSS	-	-	-
Specialty Steel	Dew Point Corrosion Resisting Steel	Hard Facing	HARDOX400/450 /500/550/600	HBW : 570-640			KM-700	K-700HT	-	-	-	
		Weather-Proof Steel	COR-TEN490	Min.355	490-610	-	-	K-8018W	K-71TW	-	-	-
		COR-TEN570	Min.460	570-720	-	-	K-8018W	K-81TW	-	-	-	
Specialty Steel	ALLOY	MONEL	MONEL 400/402	276-517	517-655	-	-	KW-A60	-	-	KW-M60	KW-T60
		INCONEL	INCONEL 600/601	240-450	580-760	-	-	KNCF-2	-	-	KW-M82	KW-T82
		INCONEL	INCONEL 617	Min.319	Min.769	-	-	KW-A617	-	-	KW-M617	KW-T617
		INCONEL	INCONEL 625	414-758	827-1103	-	-	KW-A625	-	EF-600NXKW-M625	KW-M625	KW-T625
		INCONEL	INCONEL 690	Min.283	Min.714	-	-	KW-A690	-	-	KW-M690A	KW-T690A
		INCONEL	INCONEL 718/X-750	Min.1035	Min.1242	-	-	-	-	-	KW-M718	KW-T718
		INCOLOY	INCOLOY 800/800H(T)	Min.779	Min.786	-	-	KW-A82	-	-	KW-M82	KW-T82
		INCOLOY	INCOLOY 825	Min.338	Min.662	-	-	KW-A625	-	-	KW-M625	KW-T625
		HASTELLOY	HASTELLOY C22	Min.405	Min.800	-	-	-	-	-	-	-
		HASTELLOY	HASTELLOY C276	Min.324	Min.690	-	-	KW-A276	-	-	KW-M276	KW-T276
CUPRONICKEL	CUPRONICKEL 90/10	-	Min.300	-	-	-	-	-	KW-MCuNi9	KW-TCuNi9		
	CUPRONICKEL 70/30	-	Min.330	-	-	-	-	-	KW-MCuNi	KW-TCuNi		
Stainless Steel	Austenite	JIS	STS304/304L	Min.175	Min.480	-	-	KST-308L	K-308L	EF300N x M-308L	M-308L	T-308L
			STS310S	Min.205	Min.520	-	-	KST-310	K-81T	-	M-310	T-310
			STS316/316L	Min.175	Min.480	-	-	KST-316L	K-316L	EF300N x M-316L	M-316L	T-316L
			SUS317	Min.205	Min.520	-	-	KST-317L	K-317LT	EF300N x M-317L	M-317L	T-317L
			SUS347	Min.205	Min.520	-	-	KST-347L	K-347T	EF300N x M-347	M-347	T-347
	Ferrite	JIS	SUS430	Min.205	Min.450	-	-	KST-430	K-430T	-	M-430	T-430
			SUS436L	Min.415	Min.520	-	-	-	K-436T	-	-	-
	Martensite	JIS	SUS410	Min.345	Min.540	-	-	KST-410	K-410T	-	M-410	T-410
			SUS431	Min.540	Min.740	-	-	-	K-430LNb	-	M-430	T-430
	Duplex	UNS	SUS329J1	Min.390	Min.590	-	-	KST-2209	K-329T	EF300N x M-2209	M-2209	T-2209
			S31803	Min.448	Min.621	-	-	KST-2209	K-329T	EF300N x M-2209	M-2209	T-2209
			S32750	Min.552	Min.800	-	-	KST-2594	K-325T	EF300N x M-2594	M-2594	T-2594
			S32760	Min.550	Min.760	-	-	KST-2594	K-325T	EF300N x M-2594	M-2594	T-2594
			S32550	Min.550	Min.760	-	-	KST-2594	K-325T	EF300N x M-2594	M-2594	T-2594
S31260	Min.450	Min.690	-	-	KST-2594	K-325T	EF300N x M-2594	M-2594	T-2594			

Always with you Bridge to World, Nature, Future

KISWEL

Readily available for your welding needs



CONTENTS PROFILE

IV Key Process & Key Products

Storage Tank 49-51

Pipeline 52-55

Storage Tank

Principle and Characteristic Of EGW

EGW Process

An acronym for Electro Gas Welding, is a welding method that has been developed to enhance the efficiency of upward direction vertical welding of thick plates. The welding consumable generally used are FCAW or GMAW.

- Principle and characteristic -

- (1) The Copper-shoe or Ceramic backing placed against the back prevents the molten pool from flowing.
- (2) On the front of the groove, the copper-shoe connected to the EGW-carriage not only provides the shielding gas but also prevents the molten pool from flowing. Also, in order to manage the relatively high heat input, a water chilling system is connected to the EGW-carriage.
- (3) The EGW-carriage is attached to a rail on the side, which guides the carriage upward as the welding is proceeded.
- (4) Generally, the mechanics of how the device goes up the rail is based on a sensor detecting the change of the current that can be derived from the differing CTWD (Contact Tip to Work Distance) upon the $V=IR$ theory. Thus, by maintaining a constant CTWD, the carriage automatically moves upward.

Characteristic of EGW

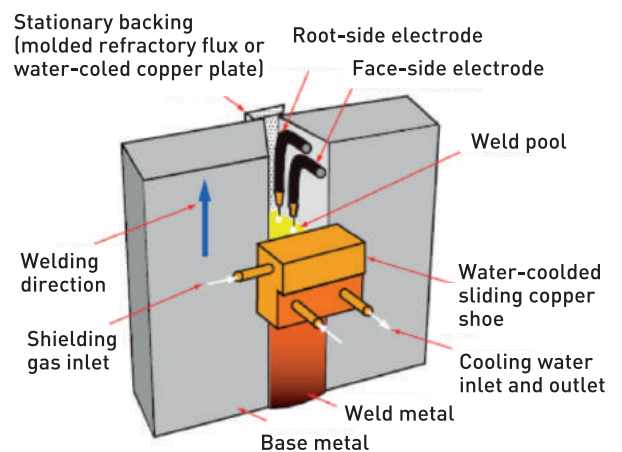
(1) Advantages

- Superior welding efficiency
- Welding thick plates in merely one pass
- Preventing spinal injury of welders
- (when performing the weld with FCAW, multiple passes are necessary)

(2) Downside

- The requirement of a longer set-up time
- (carriage, rail, copper-shoe, inspecting the weld direction, checking the weaving width, etc.)
- Generally Low CVN value due to a high heat- input
- compared to other welding methods

Schematic diagram of EGW



Storage Tank

K-EG3 AWS A5.26 EG82T-NM2

Brief Product Introduction

A Flux Cored Wire (FCW) designed for the purpose of Electro Gas Welding where "K" stands for Kisol and "EG" for Electro Gas Welding.

With CO₂ used as the shielding gas, it is designed to have a tensile strength of 550 Mpa and satisfies the 5Y-Level of ship's classifications.

Also all-weld metals possess a low-temperature impact value of at least 34J at -60.

Application of Product

EGW (Electro Gas Welding) has been developed to enhance the efficiency of thick plates and is currently limited only to the vertical upward direction welding method. EGW is widely used for pressure vessels and shipbuilding. Although depending on the thickness of the plate, EGW is prone to the highest heat input among the wide variety of welding methods.

The heat input can vary from 300kJ/cm to 500kJ/cm and can even go higher up to 600kJ/cm in the case of tandem welding.

Mechanical properties of the K-EG3

	Y.S (Mpa)	T.S (Mpa)	EL. (%)	IV (J)
AWS Spec.	≥ 410	550-700	≥ 20	≥ 27 (-30°C)
K-EG3	520	660	25	80

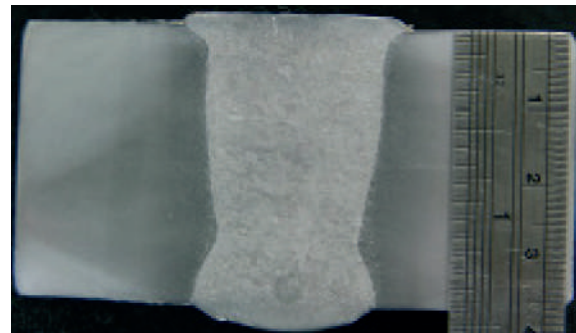
Typical chemical Composition (%)

	C	Si	Mn	P	S	Ni	Mo
AWS Spec.	≤ 0.12	0.20-0.60	1.10-2.10	≤ 0.03	≤ 0.03	1.10-2.00	0.10-0.35
K-EG3	0.04	0.22	1.50	0.011	0.012	1.80	0.24

Characteristic of product

As EGW, this product is mainly used for the welding of thick plates and can be particularly recognized for its welding efficiency, arc stability, slag removal, low spatter, and better bead appearance and shape. This product can be used simultaneously as tandem welding with K-EG3R with the approval of ship's classification.

Cross-sectional macrograph



EGW Display



Storage Tank

EF-100H x KD-50 AWS A5.17 F7A2-EH-14

Brief Product Introduction

Categorized under the SAW method, the flux is acidic. The "E" stands for the Elephant, the symbol of our company whereas the "F" stands for Flux. The number "100" designates that the flux is acidic (200 = basic) and "H" represents that the low-temperature impact test value is High. The tensile strength of the all weld metal is designed to be 490MPa and the low-temperature impact test value at -30°C is at least 47J. Welding can be done with either AC or DCEP welding machine currents.

Application of Product

Generally, due to the blanket flux, SAW is limited to the 1G (Flat) position. However, due to the characteristic of constructing pressure vessels, an additional device has been designed to enable the 2G (Horizontal) position by preventing the flux from flowing out. Therefore, our EF-100H X KD-50 minimizes the flowing of the bead and is designed to fit the needs of welding pressure vessels.

Mechanical properties of EF-100H x KD-50

	Y.S (Mpa)	T.S (Mpa)	EL. (%)	IV (J)
AWS Spec.	≥400	≥480	≥22	≥27 (-29°C)
EF-100H x KD-50	560	605	28	100

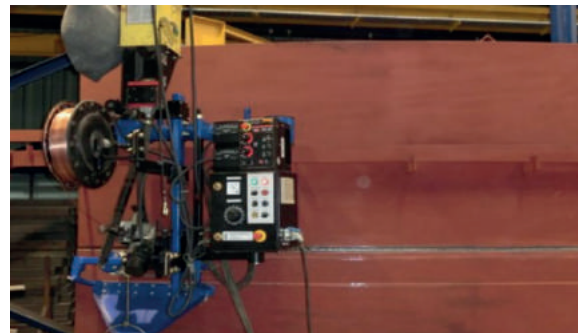
Typical chemical composition (%)

	C	Si	Mn	P	S
AWS Spec.	Not Specified				
EF-100H x KD-50	0.09	0.29	1.42	0.025	0.011

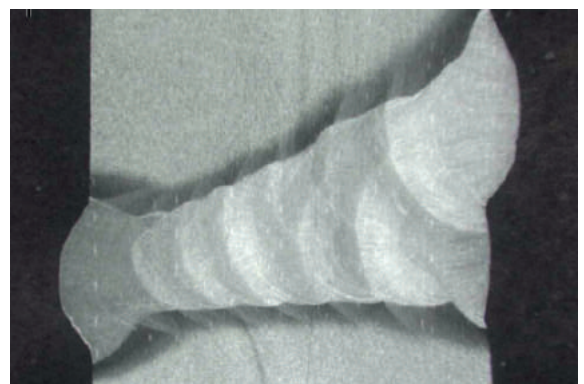
Characteristic of product

This product is available for use as single or multi pass(es) for shipbuilding, Bridge-construction, Pipes, and Steel structures. With the most remarkable characteristics being it's superior pit resistance ability, bead appearance, slag removal and low fume release leading to superior usability. On top of this, the low-temperature impact test value at -30°C is superior and approval of ship's certificate has been made.

Display of SAW 2G Position



Cross-sectional macrograph



Pipeline

FCAW-S (Self-shielded)

K-NGS Ni1
 AWS A5.29 E71T8-Ni1
 AWS A5.36 : E71T8-A2-Ni1-H8

Brief Product Introduction

This K-NGS Ni1 (DCEN) product is a Flux cored wire where a shielding gas is unnecessary. "K" stands for Kiswel and "NGS" stands for Non-gas shield. "Ni1" refers to the Nickel content according to the AWS specification. This product is designed as 490MPa and guarantees a low-temperature impact value of 27J at -30 degrees Celsius (All-weld metal). This product also ensures an all-positional welding and is suitable for the welding of Pipe Girths including the root pass.

Application of Product

This product is suitable for the pipeline construction in areas where the transportation of gas is inconvenient. Also, this product overcomes the obstacle of welding difficulties within narrow gaps due to the existence of self-shielded gas. Including the root-pass, our K-NGS Ni1 can be used for the welding of pipe joints. When welding girths, this product is shown to have a three-fold welding efficiency compared to the SMAW welding.

Mechanical properties of Product

	Y.S (Mpa)	T.S (Mpa)	EL. (%)	IV (J)
AWS Spec.	≥400	490 - 620	≥20	≥27 (-30°C)
K-NGS Ni1	495	561	34	80

Typical Chemical Composition (%)

	C	Si	Mn	P	S	Ni	Cr	Mo	Al
AWS Spec.	≥0.12	≥0.80	≥1.50	≥0.03	≥0.03	0.80 -1.10	≥0.15	≥0.35	≥1.80
K-NGS Ni1	0.04	0.25	1.15	0.008	0.007	0.88	0.018	0.011	0.91

Characteristic of product

According to the API NACE, this product can be well known for its low-temperature impact value at -30 degrees Celsius and a H8 diffusible hydrogen content is guaranteed. With all positional welding available, the bead appearance is superior.

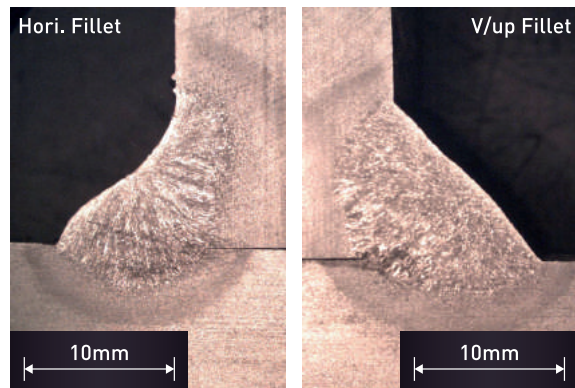
Bead appearance(v/up)



Diffusible hydrogen content

Diffusible hydrogen content(ml/100gr Weldmetal)				
Specimen 1	Specimen 2	Specimen 3	Specimen 4	Aver
5.5	5.4	5.6	5.4	5.5

Cross-sectional macrograph



Pipeline

GMAW (Solid wire)

KC-80SNi1

AWS A5.28 : ER80S-Ni1

Brief Product Introduction

The KC-80SNi1 (DCEP) is a Solid wire which can use either a Ar+2%O2 or Ar+15~25%CO2 shielding gas. The "KC" stands for Kisel and Chemical coating whereas the 80SNi1 refers to the AWS specification. 80 represents the minimum tensile strength and Ni1 symbolizes the main element of Nickel as according to the specification.

This product is designed as 550MPa and guarantees a 27J low temperature impact value at -45 degrees Celsius.

Application of Product

This product is designed for the need to withstand low temperature environments such as Shipbuilding, LPG transporting and Pipeline installment industries. This product can especially be utilized when welding the Girth in pipe joints through orbital welding in both vertical upwards and downwards positions (especially efficient when using two orbital welding devices towards the opposite directions).

This type of welding can be proven to show a four-fold efficiency compared to SMAW.

Mechanical properties of Product

	Y.S (Mpa)	T.S (Mpa)	EL. (%)	IV (J)
AWS Spec.	≥ 470	≥ 550	≥ 24	≥ 27 (-45°C)
K-EG3	576	675	34	124

Typical chemical Composition (%)

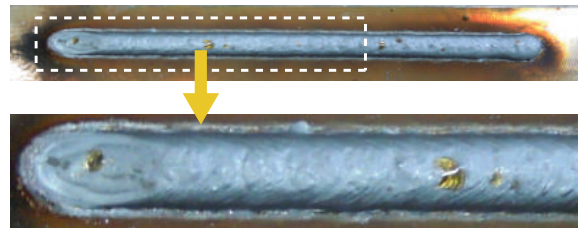
	C	Si	Mn	P	S	Ni	Cr	Mo
AWS Spec.	≤ 0.12	0.40 - 0.80	≤ 1.25	≤ 0.025	≤ 0.025	0.80 - 1.10	≤ 0.15	≤ 0.35
KC-80SNi1	0.09	0.63	1.11	0.009	0.008	0.83	0.10	0.12

Characteristic of product

As mentioned previously, due to the inclusion of 1% Nickel, this product displays excellent with holding properties in low temperatures and corresponds to the NACE specification. Also, as it is a Solid wire, the diffusible hydrogen is extremely low.

Furthermore, due to the use of mixed gases, such characteristic such as low spatter, efficient weldability and superior bead appearance can be shown for all positions.

Bead appearance(Bop)



Cross-sectional macrograph



GMAW Display



Pipeline

FCAW-G (Gas shielded)

K-81T

AWS A5.29 E81T1-Ni1C

AWS A5.36 E81T1/T9-C1A/P4-Ni1-H4

Brief Product Introduction

This K-81T (DCEP) product is a Flux cored wire where a CO₂ shielding gas is used. "K" stands for Kisel and "8" shows the minimum tensile strength according to the AWS specification. "1" shows that all-positional welding is possible for the base metal of PWHT. This product is designed as 560MPa and guarantees a low-temperature impact value of 27J at -40 degrees Celsius (All-weld metal).

Application of Product

This product can be widely used for shipbuilding and pipeline constructions and has actually been used for the welding of girths in large diameter pipe-welding for large Korean shipbuilding manufacturers. As this product can be recognized for its mechanical properties in the as-welded and PWHT condition, it can be used for the root, fill and cap pass. When welding girths, this product is shown to have a four-fold welding efficiency compared to the SMAW welding.

Mechanical properties of Product

	Y.S (Mpa)	T.S (Mpa)	EL. (%)	IV (J)
AWS Spec.	≥ 470	550 - 690	≥ 19	≥ 27 (-30°C)
As-welded	580	630	28	110
PWHT (2Hr@620°C)	540	585	29	80 (-46°C)

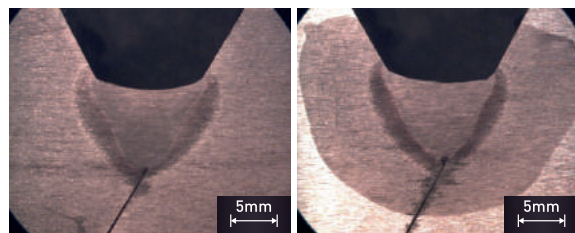
Typical chemical composition (%)

	C	Si	Mn	P	S	Ni	Cr	Mo
AWS Spec.	≤ 0.12	≤ 0.80	≤ 1.50	≤ 0.03	≤ 0.03	0.80 - 1.10	≤ 0.15	≤ 0.35
K-81T	0.02	0.37	1.33	0.013	0.004	0.84	0.024	0.005

Characteristic of product

According to API NACE, this product contains less than 1% content of Nickel and boasts a high low-temperature impact value. With H4 diffusible hydrogen content guaranteed, all-position welding is also possible. On top of this, with superior weldability, this product shows regular slag covering and a smooth bead appearance.

Specimen of y-groove Test



Bead appearance by Current(v/up)

Before slag removal



After slag removal



240A (Weaving) 220A (Weaving) 200A (Stringer) 180A (Stringer)

Cross-sectional macrograph

Diffusible hydrogen content(ml/100gr Weldmetal)

Specimen 1	Specimen 2	Specimen 3	Specimen 4	Aver
3.6	3.7	4.0	3.9	3.8

Pipeline

SMAW

K-7018

AWS A5.1 E7018 H4R

Brief Product Introduction

K-7018 (DCEP) is categorized under the Shielded Metal Arc Welding category. "K" represents Kiskel and "70" represents the minimum tensile strength as specified within AWS; next, "18" means that the flux covering the rod is of a low-hydrogen, iron powder type. This product is designed as 490MPa and guarantees a low-temperature impact value of 47J at -30 degrees Celsius (All-weld metal). This product also ensures an all-positional welding with the exception of vertical-downward welding and is suitable for the welding of the Pipe Girths.

Application of Product

This product can be widely used for pipeline welding where it is difficult to station gases as well as for steel-frame constructions. With its high deposition rate this product is extremely suitable for the Girth welding (especially the Fill & Cap pass) for Pipe joints. The upsides of the SMAW are the relatively low requirements of equipment and the fact that shielding-gases are unnecessary as well as the comparatively low maintenance cost.

Mechanical properties of Product

	Y.S (Mpa)	T.S (Mpa)	EL. (%)	IV (J)
AWS Spec.	≥400	≥490	≥22	≥27 (-30°C)
K-7018	490	570	31	110

Typical chemical Composition (%)

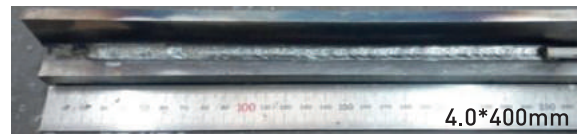
	C	Si	Mn	P	S	Ni	Cr	Mo	V
AWS Spec.	≥0.15	≥0.75	≥1.60	≥0.035	≥0.035	≥0.30	≥0.20	≥0.30	≥0.08
K-7018	0.06	0.61	1.18	0.014	0.009	0.03	0.04	0.02	0.02

Characteristic of product

This product satisfies the SSCC(Sulfide Stress Corrosion Cracking) under the NACE specification as shown in the results within the following page. Also, excluding the vertical-downward welding, the bead appearance is superior in all other welding positions. This product especially excels in bead-appearance when welded in a vertical-upward position. On top of this, there is less spatter due to smooth droplet transfer. Lastly, H4 diffusible hydrogen content is guaranteed.

Bead appearance

2F Position DCEP 160-170A



3F Position DCEP 130-140A



Diffusible hydrogen content

Diffusible hydrogen content(ml/100gr Weldmetal)				
Specimen 1	Specimen 2	Specimen 3	Specimen 4	Aver
3.6	3.4	3.5	3.5	3.5

Premium Quality - MADE IN USA

KISWEL INC.



KEY PRODUCTS

Superior Out-of-position FCW Weldability (K-71T Plus, K-71TP)	1
Slag-free MCW (KX-706M)	2
Lightweight 2lb & 10lb Portable Gas-shielded FCW (K-NGS, K-NGS11)	3
Low-alloy FCW customized to NACE regulations (K-81TMJ)	4
STS MIG Wire with superior weldability (M-308LSi, M-309LSi)	5
Aluminum Filler Metals (M-4043, M-5356)	6
Availabilty of DDP (Disposable Drum Pack) – (550lb & 900lb)	7
New product line release (Coming soon)	8



INTRODUCTION

Since our establishment in 2006, we are persevering in not only providing our customers with welding consumables of uncompromised quality but to also solidify KISWEL's next step in becoming a globally competitive player within the welding industry. Based on our obsession about the quality of our products and through our production facility located in Kentucky along with our Houston office, we are developing daily by facing cut throat challenges every moment. Looking forward not only 50 years but into the next century, each and every one of us are continuously trying to provide more.

In moving one step closer to achieving our goal in leading the North-American market, our top-notch facility and efficient production methods continuously enable us to thrive, not to mention, we refuse to use any other than the highly trusted CR Strip as our main source of raw material. We at KISWEL INC., with the aim to becoming a total solution provider, have recently expanded our range of products by adding Aluminum filler metals. Furthermore, in order to meet the needs of a wide variety of customers, our supply of light weight and portable 2lb/10lb spools of self-shielded FCW wires have been showing great success. Through countless trial tests and technical partnerships, we are currently at the final stages of developing our Slag-free MCW products where the demand is particularly significant in the Automobile manufacturing industry. With our current aim of supplying to Major EPC groups, we are currently in works with our headquarter's R&D center in perfecting our FCW wires, specialized for the construction of high-altitude and important structures using HSLA steel. On top of this, we are also under the development of fine-tuning our products to be customized to the NACE regulations in order to meet the demanding requirements of the Oil & Gas sector.

Our brand is widely receiving recognition through various partnerships as we have been putting our main focus on listening and solving the difficulties of all aspects of welding. We have also been closely and aggressively involved with EWI (Edison Welding Institute) in testing the weldability of our product range with the purpose of providing our customers with nothing less than reliable data. With all this being said, as a supplier that complies to the AWS specification, we prioritize in supplying our customers with pristine value and have no doubt of becoming a trusted welding solution provider within the North American market.

We thank you for your support in enabling us to create a premium line of products to better suit your needs.

MADE IN USA

PREMIUM QUALITY



WHAT IS PREMIUM QUALITY PRODUCT?

PREMIUM QUALITY wires are flux cored wires manufactured from our top-notch facility located in Kentucky, USA

Through our high-end quality control system maintained from the start to end of production, quality deviation is minimized.

PREMIUM QUALITY wires proudly represent superior mechanical properties and weldability for all sectors including General, Oil & Gas, Off-shore and On-shore plants.

MAIN PRODUCT & AWS SPECIFICATIONS

◆ K-71T Plus	: A5.20 E71T-9C/9M H4	: A5.36 E71T1-C1/M21A2-CS1 H4
◆ KX-706M	: A5.18 E70C-6M H4	: A5.36 E70T15-M21A2-CS1 H4
◆ K-71UT	: A5.20 E71T-1CJ/9CJ H4	: A5.36 E71T1/T9-C1A4-CS1 H4
◆ K-71UTM	: A5.20 E71T-1MJ/9MJ H4	: A5.36 E71T1/T9-M21A4-CS1 H4
◆ K-71TSR	: A5.20 E71T-1CJ/9CJ/12CJ H4	: A5.36 E71T1/T9/T12-C1A/P4-CS2 H4
◆ K-71TSRM	: A5.20 E71T-1MJ/9MJ/12MJ H4	: A5.36 E71T1/T9/T12-M21A/P4-CS2 H4
◆ K-81TMJ	: A5.29 E81T-Ni1CJ/Ni1MJ H4	: A5.36 E81T1/T9-C1/M21A4-Ni1 H4
◆ K-NGSNi1	: A5.29 E71T8-Ni1 H8	: A5.36 E71T8-A2-Ni1

Typical mechanical property of all weld-metal by product

Product	Spec/Type	Y-S(Mpa)	T-S(Mpa)	EL.(%)	V-Notch Impact Values		As-Welded/ PWHT
					Temp.(°C)	Absorb energy(J)	
K-71T Plus	AWS Spec.	≥390	490 - 670	≥22	-30	≥27	As-Welded
	100%CO2	528	574	29	-30	49	
KX-706M	Ar+25%CO2	558	607	28	-30	55	As-Welded
	AWS Spec.	≥400	≥480	≥22	-30	≥27	
K-71UT	100%CO2	540	600	27	-40	57	As-Welded
	AWS Spec.	≥390	490 - 670	≥22	-40	≥27	
K-71UTM	100%CO2	610	640	27	-40	125	As-Welded
	Ar+25%CO2	610	640	27	-40	125	
K-71TSR	100%CO2	558	600	27	-40	52	PWHT
	AWS Spec.	≥390	490 - 520	≥22	-40	≥27	
K-71TSRM	100%CO2	558	600	27	-40	52	[620°C x 2Hr]
	Ar+25%CO2	560	600	27	-40	55	
K-81TMJ	100%CO2	550	610	27	-40	69	As-Welded
	Ar+25%CO2	502	595	28	-40	73	
K-NGSNi1	AWS Spec.	≥400	490 - 620	≥20	-30	≥27	As-Welded
	N/A	440	544	22	-30	46	

MADE IN USA

PREMIUM QUALITY

Characteristics by products

Product	Core Characteristics
K-71T Plus	<ul style="list-style-type: none"> · Smooth arc formation and minimum spatter generation · Superior vertical-upward and Overhead weldability along with bead formation. · Excellent weldability for both CO2 and Mix gases · Outstanding compatibility with steel grades from A to DH
KX-706M	<ul style="list-style-type: none"> · Slag-free MCW with H8 hydrogen diffusion guaranteed · Smooth arc generation, Minimum spatter generation, Ability to handle 500A and higher · Generally produced for the industry of steel structure and Construction machineries
K-71UT / K-71UTM	<ul style="list-style-type: none"> · Minimum spatter generation and smooth arc formation for all pipe girth welding positions · Guaranteed impact values for low temperature environments (-40°C) · Excellent compatibility with the shipbuilding Steel grade EH
K-71TSR / K-71TSRM	<ul style="list-style-type: none"> · Easy slag removal, low spatter generation · Designed for welding of 490MPa low temperature steels (NACE/API steel) · Superior impact value at low temperatures down to -40°C under PWHT conditions
K-81TMJ	<ul style="list-style-type: none"> · Excellent weldability in all positions · Superior porosity prevention properties due to well-designed alloy composition. · Excellent weldability for both CO2 and Mix gases · Compatible for large-diameter pipe girth welding requiring low-temperature impact values (shipbuilding & off-shore plants)
K-NGSni1	<ul style="list-style-type: none"> · Excellent bead appearance formation for all positions · Guaranteed H8 hydrogen diffusion and impact values in low temperatures · Compatible for environments where the use of gas tanks are difficult (pipeline implementations)

KISWEL's Global March Forward

KISWEL SDN BHD



KEY PRODUCTS

- | | |
|---------------------------------------------------------------------------------------|---|
| Optimum SMAW wires for pipe welding (KH-500W[PW], KK-50LF[AP]) | 1 |
| SMAW encompassing a wide application range for general steel structures (KR-3000[AP]) | 2 |
| FCW with superior low temperature impact values (K-71UT) | 3 |
| FCW with excellent mechanical properties under PWHT condition (K-71TSR, K-81TSR) | 4 |
| Solid wire with smooth arc stability (KC-28CF) | 5 |



INTRODUCTION

As KISWEL's premier overseas plant, KISWEL SDN BHD - located in Johor, Malaysia - was established in 1997.

With an annual production capacity surpassing 60,000 MT, KISWEL SDN BHD has proudly become the largest welding consumables Manufacturer in Southeast Asia. Taking into account the large capacity and availability to deliver as requested, our Johor plant plays a key role as a frontier in penetrating the Middle-east and African market.

We are readily available to offer a wide range of welding consumables including electrodes of low hydrogen type and for low temperature use in addition to a wide range of FCW.

To meet the needs of the increasing demand for high-quality and premium facilities required within the energy industry, we have made substantial investments in upgrading and expanding our solid wire and electrode production line. With our newly implemented line operating since 2016, we have been supplying products of equal quality to our HQ by only using the finest wire rods and flux supplied directly from our HQ.

Equipped with our current production and R&D capability, we are supplying as requested. Starting from merely a supplier, we have developed to become a solution provider inspired to solve the welding needs of our customers today.

We would like to take this opportunity to thank you for using our products and always helping us to better serve your needs. In return, we promise to express our gratitude by providing you with products considering all aspects of QCD and an ever-improving solution marketing service package.

JOHOR

Johor, is one of the most developed Malaysian state, located in the southern part of Peninsular Malaysia.

The state capital city of Johor is Johor Bahru. Johor is surrounded by Pahang to the north, Melaka and Negeri Sembilan to the northwest, and the Straits of Johor to the south, which separates Johor and the Republic of Singapore.

The state also shares a maritime border with the Riau Archipelago from the east and Riau mainland on the west by the South China Sea and the Strait of Malacca respectively, both of Indonesian territories.

Johor has the second-largest population in Malaysia at 3.2 mill. as of 2010, which has increased to 3.6 mill. in 2016. The state's ethnic composition consists of Malay 51.2%, Chinese 33.5%, Indian 10.7%, other ethnic groups 0.1% and non-citizens 4.5%.

ALL POSITION E 6013 KR-3000(AP)



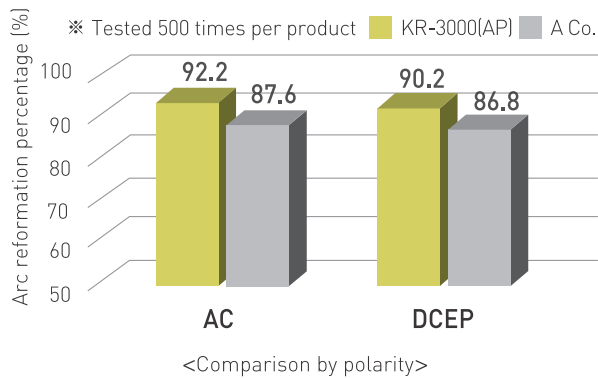
Characteristic

- ◆ Excellent weldability in all positions (Especially V-up & V-down)
- ◆ Smooth arc and consistent bead formation.
- ◆ Large range of applicable current
- ◆ Easy slag removal

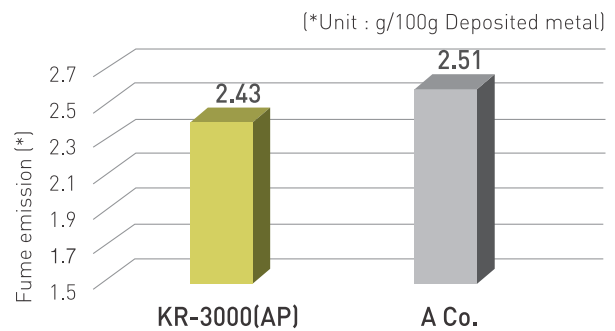
Applications

- ◆ Thin plate structures & General steel structures (esp. for clean outer appearance)
- ◆ Galvanized zinc steel & lightweight shaped steels.

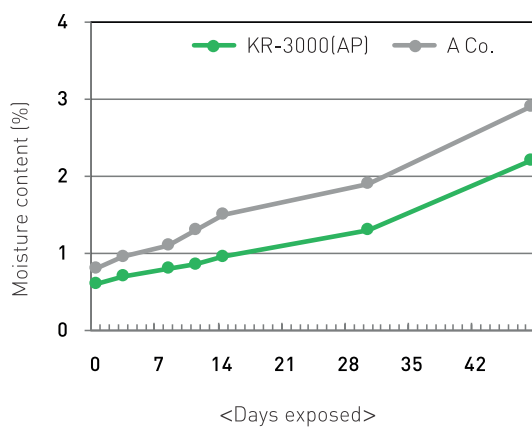
Comparison of arc reformation (Higher value signifying superiority)



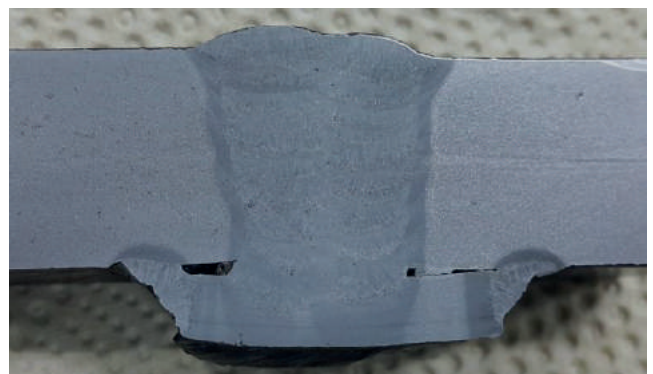
Fume emission rate (Lower value signifying superiority)



Moisture absorption comparison (Lower value signifying superiority)



Cross-sectional macrograph



ALL POSITION E 6013 KR-3000(AP)

Typical chemical composition of all weld-metal (%)

	C	Si	Mn	P	S
AWS SPEC.	≥0.20	≥1.00	≥1.20	-	-
KR-3000(AP)	0.08	0.32	0.42	0.012	0.010

Typical mechanical property of all weld-metal

	Y.S. (Mpa)	T.S. (Mpa)	El. (%)
AWS SPEC.	≥330	≥430	≥17
KR-3000(AP)	460	520	28

※ Approval : ABS, BKI, BV, DNV, GL, KR, LR, NK

1. Spec. : AWS A5.1
2. Base metal : SM 490
3. Thickness : 13mm
4. Electrode Size : 3.2mm
5. Welding Condition : 1st – 120A, 16cpm
5. Welding Condition : 2nd ~ Final. – 130A, 18cpm

Available sizes & recommended welding current

Diameter (mm)	Welding Position	Welding current (A)
2.6	F	45-95
	V-up, OH	45-95
3.2	F	60-125
	V-up, OH	60-125
4.0	F	105-170
	V-up, OH	100-150
5.0	F	150-220
	V-up, OH	125-190

Package

Diameter (mm)	Length (mm)	Inner-Pack (kg)	Outer-Pack (kg)
2.6	350	5	20
3.2	350	5	20
4.0	400	5	20
5.0	400	5	20

Note :

- ◆ When welded in extremely high currents, weldability worsens, spatter formation increases and undercuts are formed.
- ◆ When exposed to moisture, it is advised to store the product in a dry-oven of 70~100℃ for 30-60min

BENDING E 6013

KR-3000(B)



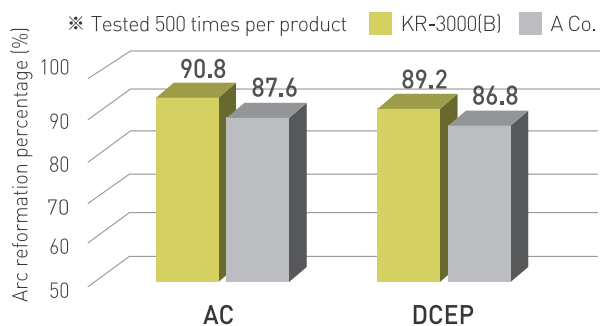
Characteristic

- ◆ Possible to weld in cramped conditions due to outstanding bendability of electrode
- ◆ Excellent weldability in all positions.
- ◆ Smooth arc and consistent bead formation.
- ◆ Large range of applicable current
- ◆ Easy slag removal

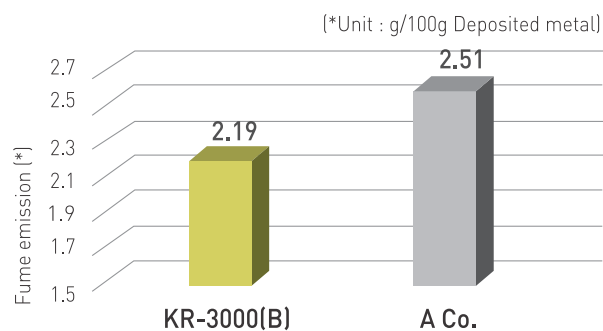
Applications

- ◆ Thin plate structures & General steel structures (esp. for clean outer appearance)
- ◆ Galvanized zinc steel & lightweight shaped steels.

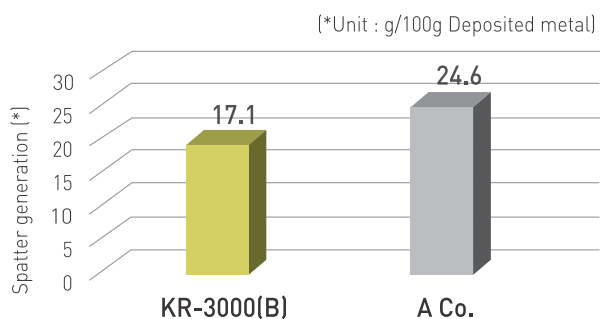
Comparison of arc reformation (Higher value signifying superiority)



Fume emission rate (Lower value signifying superiority)



Spatter Generation Comparison (Lower value signifying superiority)



Bent electrode image



BENDING E 6013

KR-3000(B)

Typical chemical composition of all weld-metal (%)

	C	Si	Mn	P	S
AWS SPEC.	≥0.20	≥1.00	≥1.20	-	-
KR-3000(B)	0.08	0.38	0.42	0.013	0.011

Typical mechanical property of all weld-metal

	Y.S. (Mpa)	T.S. (Mpa)	El. (%)
AWS SPEC.	≥330	≥430	≥17
KR-3000(B)	450	510	26

※ Approval : ABS, BKI, BV, DNVGL, KR, LR, NK

1. Spec. : AWS A5.1

2. Base metal : SM 490

3. Thickness : 13mm

4. Electrode Size : 3.2mm

5. Welding Condition : 1st – 125A, 15cpm

5. Welding Condition : 2nd ~ Final. – 135A, 17cpm

Available sizes & recommended welding current

Y.S. (Mpa)	T.S. (Mpa)	El. (%)
2.6	F	45-95
	V-up, OH	45-95
3.2	F	60-125
	V-up, OH	60-125
4.0	F	105-170
	V-up, OH	100-150
5.0	F	150-220
	< Comparison by polarity > V-up, OH	125-190

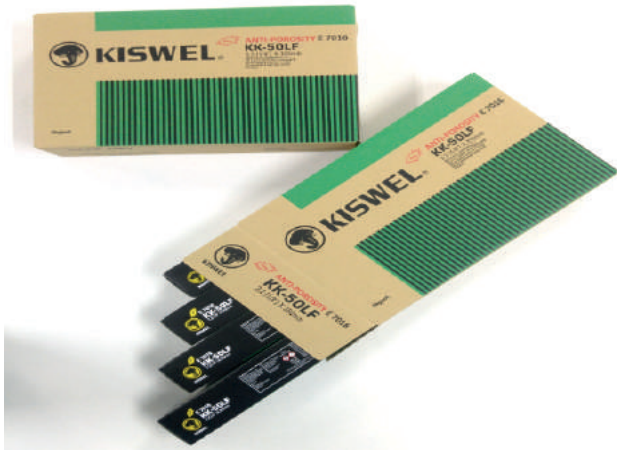
Package

Y.S. (Mpa)	T.S. (Mpa)	El. (%)	El. (%)
2.6	350	5	20
3.2	350	5	20
4.0	400	5	20
5.0	400	5	20

Characteristic

- ◆ When welded in extremely high currents, weldability worsens, spatter formation increases and undercuts are formed.
- ◆ When exposed to moisture, it is advised to store the product in a dry-oven of 70-100°C for 30-60min

ANTI-POROSITY E 7016 KK-50LF(AP)



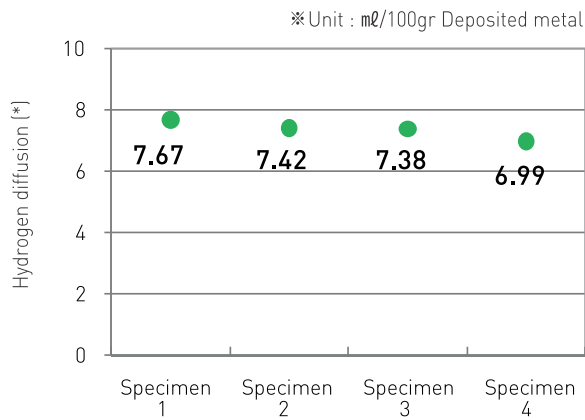
Characteristic

- ◆ Excellent weldability in all positions.
- ◆ High porosity resistance (NDT tested)
- ◆ Able to weld in low currents (Large current range)
- ◆ Low-hydrogen type covering

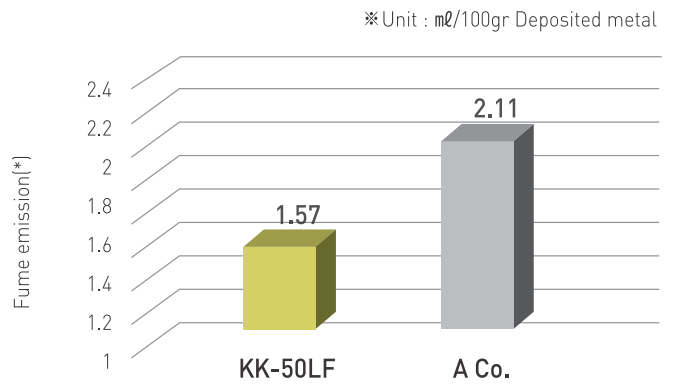
Applications

- ◆ Butt and fillet welding for Mid-sized steel structures
- ◆ Bridge, storage tanks, constructions

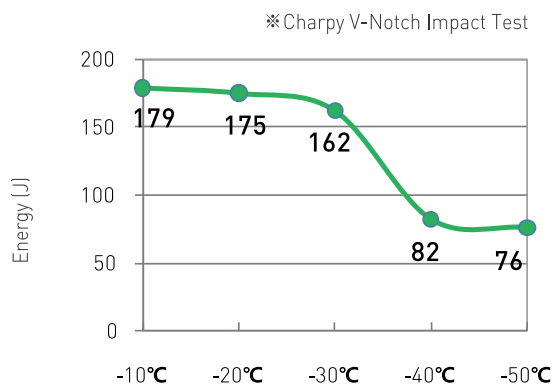
Hydrogen-diffusion comparison (Lower value signifying superiority)



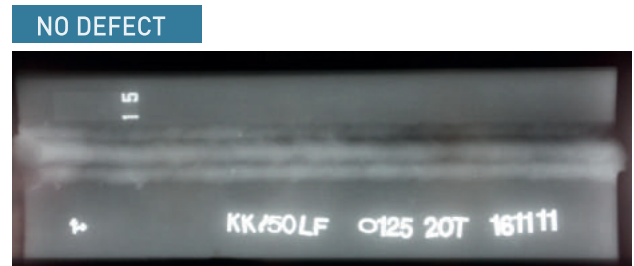
Fume emission rate (Lower value signifying superiority)



Low-temperature impact toughness



Radiographic test result



ANTI-POROSITY E 7016

KK-50LF(AP)

Typical chemical composition of all weld-metal (%)

	C	Si	Mn	P	S	Ni	Cr	Mo	V	Nb	Mn+Ni+Cr+Mo+V
AWS SPEC.	≤0.15	≤0.75	≤1.60	≤0.035	≤0.035	≤0.30	≤0.20	≤0.30	≤0.08	≤0.08	≤1.75
KK-50LF(AP)	0.07	0.61	0.96	0.013	0.010	0.01	0.02	0.01	0.01	0.01	0.99

Typical mechanical property of all weld-metal

	Y.S.(Mpa)	T.S.(Mpa)	El. (%)	IV-29°C(J)
AWS SPEC.	≥400	≥490	≥22.0	≥27
KK-50LF(AP)	515	565	33.0	140

※ Approval : ABS, BKI, BV, DNVGL, KR, LR, NK

1. Spec. : AWS A5.1
2. Base metal : SM 490
3. Thickness : 13mm
4. Electrode Size : 3.2mm
5. Welding Condition : 1st – 100A, 14cpm
5. Welding Condition : 2nd ~ Final. – 115A, 16cpm

Available sizes & recommended welding current

Diameter (mm)	Welding Position	Welding current (A)
2.6	F	55-85
	V-up, OH	50-80
3.2	F	90-130
	V-up, OH	80-120
4.0	F	130-190
	V-up, OH	110-170
5.0	F	180-240
	V-up, OH	150-200

Package

Diameter (mm)	Length (mm)	Inner-Pack (kg)	Outer-Pack (kg)
2.6	350	5	20
3.2	350	5	20
4.0	400	5	20
5.0	400	5	20

Note :

- ◆ Superior weldability in DCEP polarity.
- ◆ When exposed to moisture, it is advised to store the product in a dry-oven of 300~350°C for 30-60min

PIPEWELD E 7016

KH-500W(PW)



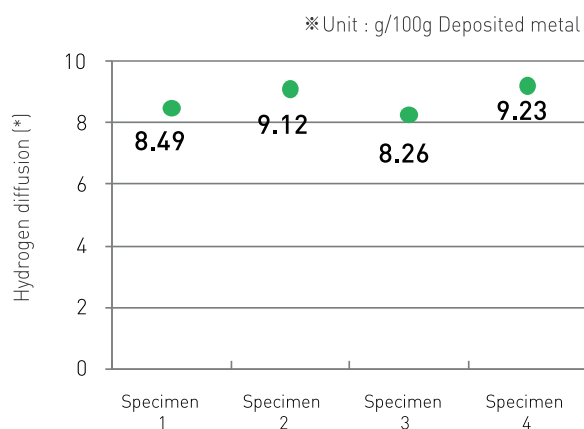
Characteristic

- ◆ Designed for root-pass welding of pipes and plates
- ◆ Able to weld in low currents (Large current range)
- ◆ Low-hydrogen type covering

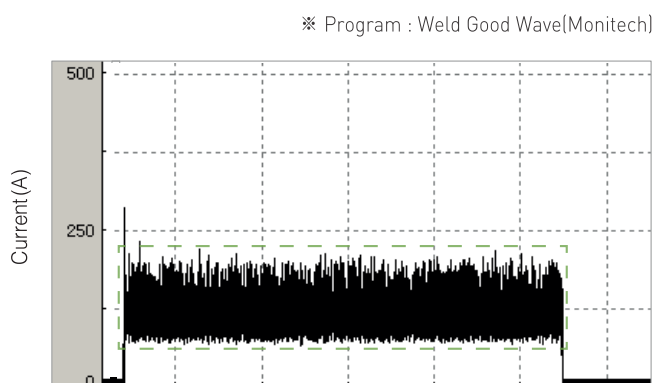
Applications

- ◆ Root-pass for pipes
- ◆ Excellent for one-sided welding

Hydrogen-diffusion comparison (Lower value signifying superiority)

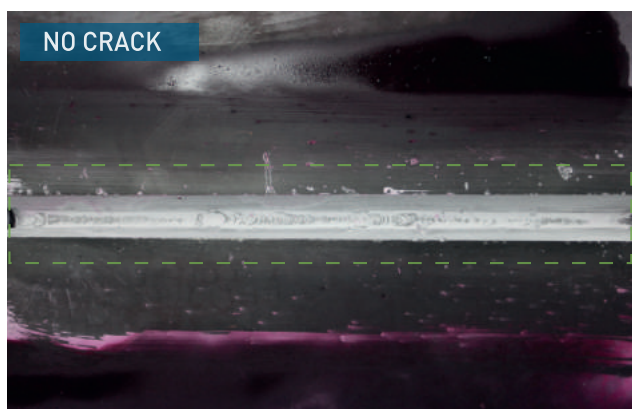


Current fluctuation chart when welded



- ◆ Result : Stable current flow when welded

Crack-test of Root pass (PT)



Back-bead of welded pipe



PIPEWELD E 7016

KH-500W(PW)

Typical chemical composition of all weld-metal (%)

	C	Si	Mn	P	S	Ni	Cr	Mo	V	Nb	Mn+Ni+Cr+Mo+V
AWS SPEC.	≤0.15	≤0.75	≤1.60	≤0.035	≤0.035	≤0.30	≤0.20	≤0.30	≤0.08	≤0.08	≤1.75
KH-500W(PW)	0.08	0.61	0.75	0.014	0.010	0.01	0.01	0.01	0.01	0.01	0.79

Typical mechanical property of all weld-metal

	Y.S.(Mpa)	T.S.(Mpa)	El.(%)	IV-29°C(J)
AWS SPEC.	≥400	≥490	≥22.0	≥27
KH-500W(PW)	465	575	32.5	75

1. Spec. : AWS A5.1
2. Base metal : SM 490
3. Thickness : 13mm
4. Electrode Size : 3.2mm
5. Welding Condition : 1st – 105A, 14cpm
5. Welding Condition : 2nd ~ Final. – 120A, 16cpm

Available sizes & recommended welding current

Diameter (mm)	Welding Position	Welding current (A)
2.6	F	60-90
	V-up, OH	50-80
	Root Pass	30-80
3.2	F	90-130
	V-up, OH	80-120
	Root Pass	60-110
4.0	F	130-180
	V-up, OH	110-170
	Root Pass	90-140

Package

Diameter (mm)	Length (mm)	Inner-Pack (kg)	Outer-Pack (kg)
2.6	350	5	20
3.2	400	5	20
4.0	400	5	20

Note :

- ◆ Recommended for One-side welding
- ◆ Excellent and stable weldability in first layer of pipe-welding.
- ◆ Superior weldability in DCEP polarity.
- ◆ When exposed to moisture, it is advised to store the product in a dry-oven of 300-350 °C for 30-60min

ANTI-POROSITY E 7018

K-7018(AP)



Characteristic

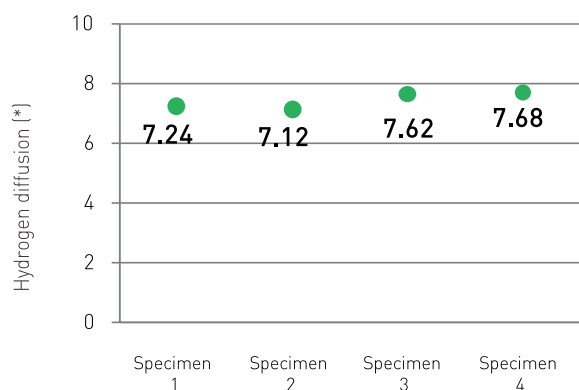
- ◆ Excellent weldability in all positions.
- ◆ High porosity resistance (NDT tested)
- ◆ Able to weld in low currents (Large current range)
- ◆ Low-hydrogen iron-powder covering

Applications

- ◆ Butt and fillet welding for Mid-sized steel structures
- ◆ Bridge, storage tanks, constructions

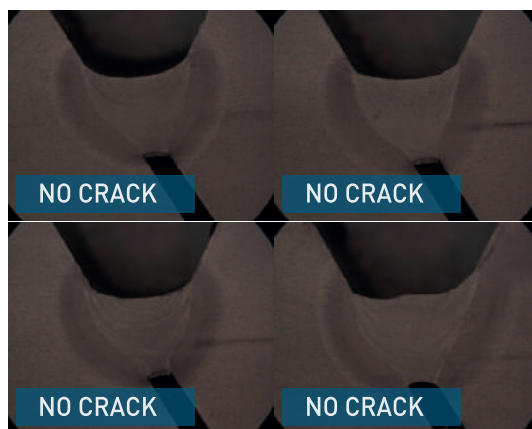
Hydrogen-diffusion comparison (Lower value signifying superiority)

※ Unit : g/100g Deposited metal

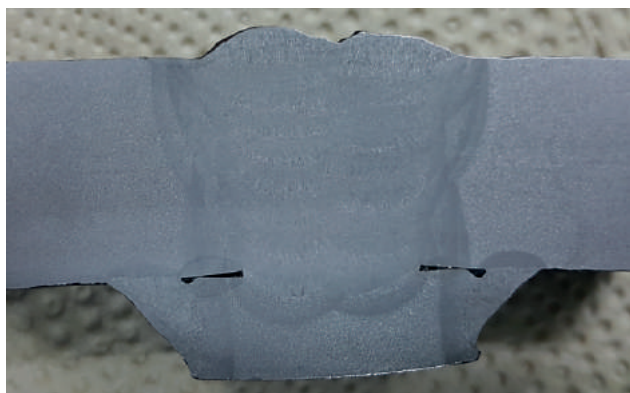


y-groove test result

※ According to JIS Z 3158 Test Method

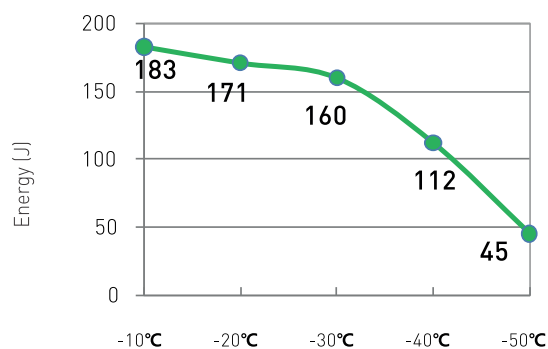


Cross-sectional macrograph



Low-temperature impact toughness

※ Charpy V-Notch Impact Test



ANTI-POROSITY E 7018

K-7018(AP)

Typical chemical composition of all weld-metal (%)

	C	Si	Mn	P	S	Ni	Cr	Mo	V	Nb	Mn+Ni+Cr+Mo+V
AWS SPEC.	≤0.15	≤0.75	≤1.60	≤0.035	≤0.035	≤0.30	≤0.20	≤0.30	≤0.08	≤0.08	≤1.75
K-7018(AP)	0.06	0.51	1.01	0.013	0.010	0.01	0.02	0.01	0.01	0.01	1.07

Typical mechanical property of all weld-metal

	Y.S.(Mpa)	T.S.(Mpa)	El. (%)	IV-29°C(J)
AWS SPEC.	≥400	≥490	≥22.0	≥27
K-7018(AP)	485	565	34.2	145

※ Approval : ABS, BKI, BV, DNVGL, KR, LR, NK

1. Spec. : AWS A5.1
2. Base metal : SM 490
3. Thickness : 13mm
4. Electrode Size : 3.2mm
5. Welding Condition : 1st – 105A, 15cpm
5. Welding Condition : 2nd ~ Final. – 120A, 17cpm

Available sizes & recommended welding current

Diameter (mm)	Welding Position	Welding current (A)
2.6	F	65-95
	V-up, OH	60-90
3.2	F	90-130
	V-up, OH	80-120
4.0	F	130-190
	V-up, OH	110-170
5.0	F	190-250
	V-up, OH	165-210

Package

Diameter (mm)	Length (mm)	Inner-Pack (kg)	Outer-Pack (kg)
2.6	350	5	20
3.2	400	5	20
4.0	450	5	20
5.0	450	5	20

Note :

- ◆ Superior weldability in DCEP polarity.
- ◆ When exposed to moisture, it is advised to store the product in a dry-oven of 300~350 °C for 30-60min

For Pipeline Industry

FOR PIPELINE GIRTH WELDING



SMAW - Welding Consumable by Mechanical Properties of Base Metal

Base Metal API 5L	Strength		Welding Pass	Low hydrogen type		High Cellulose type
	Y-S(Mpa)	T-S(Mpa)		Vertical-up Position	Vertical-down Position	
X42 X46 X52	Min. 360	Min. 490	Root	KH-500W(PW) K-7016NSU		
			Hot	K-7018(AP) K-7018NP		KCL-10
			Fill & Cap	KK-50LF(AP) KK-50NN		
X56 X60	Min. 410	Min. 540	Root	KH-500W(PW) K-7016NSU	KH-500VLF	
			Hot	K-7018(AP) K-7018NP		KCL-10 K-7010P1
			Fill & Cap	KK-50LF(AP) KK-50NN		K-7010P1
X65	Min. 450	Min. 550	Root	KH-500W(PW) K-7016NSU		K-7010P1 K-8010P1
			Hot	KK-55		
			Fill & Cap	K-8018		K-8010P1
X70	Min. 480	Min. 560	Root	-		K-7010P1
			Hot	KK-60		K-8010P1
			Fill & Cap	K-9018		K-8010P1
X80	Min. 550	Min. 620	Root	-		
			Hot	KK-70		
			Fill & Cap	K-10018M		
X100	Min. 670	Min. 760	Root	-		
			Hot	KK-80		
			Fill & Cap	K-12018M		

When exposed to moisture, it is advised to store the product in a dry-oven accordingly.

For Pipeline Industry

FOR PIPELINE GIRTH WELDING

TIG & FCAW - Welding Consumable by Mechanical Properties of Base Metal

Base Metal	Strength		Welding Pass	Temperature(°C)		
	Y-S(Mpa)	T-S(Mpa)		- 20	- 40	- 60
X42	Min. 360	Min. 490	Root & Hot	T-50G KX-706T	-	
X46			Fill & Cap	K-71TM	K-71UTM	K-81TK2M
X52						
X56	Min. 410	Min. 540	Root & Hot	T-80SNi1		
X60			Fill & Cap	K-71UTM K-71TSRM	K-81TK2M	
X65	Min. 450	Min. 550	Root & Hot	T-80SNi1		
			Fill & Cap	K-71UTM K-71TSRM	K-81TK2M	
X70	Min. 480	Min. 560	Root & Hot	T-80SNi1		
			Fill & Cap	K-71UTM K-71TSRM	K-81TK2M	
X80	Min. 550	Min. 620	Root & Hot	T-90		
			Fill & Cap	K-110TK3M	-	
X100	Min. 670	Min. 760	Root & Hot	T-120		
			Fill & Cap	K-110TK3M	-	

American Petroleum Institute

SAW PRODUCT FOR API



SAW Product Line-up

Base Metal (API)	CVN	AWS Specification	SAW Product (Flux x Wire)
	Temperature (°C)		
	0	A5.17 : F7A(P)0-EH14	EF-100xKD-50
5LX42	-20	A5.17 : F7A(P)2-EH14	EF-100HxKD-50
5LX46		A5.17 : F7A(P)6-EH14	EF-200VxKD-50
5LX52	-40/-46		
5LX56		A5.17 : F7A(P)8-EH12K	EF-200VxKD-EH12K
5LX60		A5.17 : F7A(P)8-EH14	EF-200LT PlusxKD-50
	-46/-51	A5.17 : F7A(P)8-EH12K	EF-200LT PlusxKD-EH12K
5LX65	-20	A5.23 : F8A(P)2-EA2-A2	EF-100HxKD-EA2
5LX70	-40	A5.23 : F8A(P)6-EA2-A2	EF-200VxKD-EA2
		A5.23 : F8A(P)6-EA3-G	EF-200VxKD-60
5LX80	-20/-40	A5.23 : F10A(P)4-EM2-G	EF-200VxKD-100
2H		A5.17 : F7A(P)8-EH14	EF-200LT PlusxKD-50
2W	-46/-51	A5.17 : F7A(P)8-EH12K	EF-200LT PlusxKD-EH12K

American Petroleum Institute

SAW PRODUCT FOR API

Mechanical Properties by Welding Consumable

SAW Product (Flux x Wire)	Y.S (Mpa)	T.S (Mpa)	El.(%)	CVN longitudinal	
				Test Temp.(°C)	Absorb energy(J)
EF-100×KD-50	Min. 400	480-660	Min. 22	-18	≥ 27
EF-100H×KD-50	Min. 400	480-660	Min. 22	-29	≥ 27
EF-200V×KD-50	Min. 400	480-660	Min. 22	-51	≥ 27
EF-200V×KD-EH12K	Min. 400	480-660	Min. 22	-62	≥ 27
EF-200LT Plus×KD-50	Min. 400	480-660	Min. 22	-62	≥ 27
EF-200LT Plus×KD-EH12K	Min. 400	480-660	Min. 22	-62	≥ 27
EF-100H×KD-EA2	Min. 470	550-700	Min. 20	-30	≥ 27
EF-200V×KD-EA2	Min. 470	550-700	Min. 20	-51	≥ 27
EF-200V×KD-60	Min. 470	550-700	Min. 20	-51	≥ 27
EF-200V×KD-100	Min. 610	690-830	Min. 16	-40	≥ 27
EF-200LT Plus×KD-50	Min. 400	480-660	Min. 22	-62	≥ 27
EF-200LT Plus×KD-EH12K	Min. 400	480-660	Min. 22	-62	≥ 27

KISWEL's Next Generation FCW

KISWEL DALIAN LTD.



KEY PRODUCTS

- Excellent weldability FCW (K-71T, K-71TLF) 1
- Highly applicable FCW for pipeline welding (K-NGSNi1) 2
- FCW with superior low temperature impact values (K-71UT) 3
- FCW with superior low temperature impact values (K-71UT, K-81TK2) 4
- FCW designed for mechanized fillet welding (KX-200H) 5



INTRODUCTION

To meet the increasing demand for automated welding processes, KISWEL DALIAN LTD. was established in 2003 with production starting in the subsequent year.

Our Dalian entity boasts a track record of supplying to EPC contractors in the energy industry (Oil & Gas, Pipeline, Storage tank, construction, etc.) and major shipyards for offshore plants.

With our competitive edge gained once again from KISWEL DALIAN LTD., we are once again thriving to expand our footprint in a global scale in supplying FCW.

DALIAN

Dalian is a major city and seaport in the southern part of Liaoning Province, China.

It is the southernmost city of Northeast China and at the tip of the Liaodong Peninsula.

Dalian is the province's second largest city and has a sub-provincial administrative status.

The Shandong Peninsula lies southwest across the Bohai Strait, Korea lies across the Yellow Sea to the east.

KISWEL DALIAN LTD. is located within the heart of the industrial zone of Dalian.

With many benefits given to Dalian by the Chinese government, the title of "open-city" (1984) allows it to receive considerable foreign investment.

The Development Zone was established in Jinzhou District, to which many Japanese companies, such as Canon, Mitsubishi Electric and Toshiba, followed by South Korean, American and European companies such as Pfizer.

Dalian also houses auto-manufacturing plants for Chery, Dongfeng Nissan Passenger Vehicle Company.

In 2016, Dalian ranks 48th in the Global Financial Centers Index published by the Qatar Financial Centre Authority, the other Chinese cities on the list being Hong Kong, Shanghai, Shenzhen, Beijing and Qingdao.

The city has a continuous annual double-digit percentage increase in GDP since 1992. In 2014, the city's GDP registered a 5.8% increase, reaching RMB 756.56 billion, while per capita GDP hit RMB 109,939. According to a nationwide appraisal by the National Bureau of Statistics, Dalian ranks eighth among Chinese cities in terms of overall strength. The city's main industries include machine manufacturing, petrochemicals and oil refining, and electronics.

We at KISWEL DALIAN LTD., aspire to contribute and follow the footsteps of Dalian city's development.

We would like to take this opportunity to express our greatest appreciation to all our customers in helping us to support your welding needs better.

CURATED COMMERCE

KISWEL DALIAN PRODUCT



FACTORY INTRODUCTION

Our production facility located in Dalian is focused on representing KISWEL's half century experience of Manufacturing Flux Cored Wires.

Comprised with top notch production facility and equipment, we produce our FCW with the basis of only using the finest Flux.

We are always readily available to support our customers needs with not only quality and delivery, but also in terms of providing the welding solution needed.

MAIN PRODUCT & AWS SPECIFICATIONS

◆ K-71T	: A5.20 E71T-1C	: A5.36 E71T1-C1A0-CS1 H8
◆ K-71TLF	: A5.20 E71T-1C/-1M	: A5.36 E71T1-C1/M21A0-CS1 H4/H8
◆ K-71UT	: A5.20 E71T-1C/9CJ H4	: A5.36 E71T1/T9-C1A4-CS1 H4
◆ K-81TK2	: A5.29 E81T1-K2C H4	: A5.36 E81T9-C1A8-K2 H4
◆ K-91TK2	: A5.29 E91T1-K2C H4	: A5.36 E91T1/T9-C1A4-K2 H4
◆ KX-200H	: A5.20 E70T-1C/9C	: A5.36 E70T1-C1A2-CS1 H8
◆ K-NGS	: A5.20 E71T-GS	: A5.36 E71T14S-AZ-CS3
◆ K-NGS308L	: A5.22 E308LT0-3	
◆ K-409TiT	: A5.22 EC409T0-G	

Typical mechanical property of all weld-metal by Product

Product	Spec/Type	Y.S (MPa)	T.S (Mpa)	El. (%)	V-Notch Impact Values		As-Welded/ PWHT
					Temp.(°C)	Absorb energy(J)	
K-71T	AWS Spec.	≥390	490-670	≥22	-20	≥27	As-Welded
	100%CO2	520	580	29	-20	55	
K-71TLF	AWS Spec.	≥390	490-670	≥22	-20	≥27	
	100%CO2	520	570	28	-20	80	
K-71UT	AWS Spec.	≥390	490-670	≥22	-40	≥27	
	100%CO2	540	600	27	-40	55	
K-81TK2	AWS Spec.	≥470	550-690	≥19	-30	≥27	
	100%CO2	528	574	29	-30	120	
K-91TK2	AWS Spec.	≥540	620-760	≥17	-20	≥27	
	100%CO2	550	640	25	-20	135	
KX-200H	AWS Spec.	≥390	490-670	≥22	-30	≥27	
	100%CO2	517	610	28	-30	45	
K-NGS	AWS Spec.	-	≥490	-	-	-	
	N/A	489	520	22	-	-	
K-NGS308L	AWS Spec.	-	≥520	≥35	-	-	
	N/A	440	620	39	-20	85	
K-409TiT	AWS Spec.	-	≥450	≥15	-	-	
	Ar+2%O2	460	520	25	-	-	

CURATED COMMERCE

KISWEL DALIAN PRODUCT

Characteristics by products

Product	Core Characteristics
K-71T / K-71TLF	<ul style="list-style-type: none"> · Smooth arc formation and minimum spatter generation · Excellent mechanical properties, easy slag removal, low spatter generation, smooth bead shape, high X-ray safety · Superior vertical-upward and Overhead weldability along with bead formation. · Outstanding compatibility with steel grades from A to DH
K-71UT	<ul style="list-style-type: none"> · Minimum spatter generation and smooth arc formation for all pipe girth welding positions · Guaranteed impact values for low temperature environments (-40°C) · Excellent compatibility with the shipbuilding steel grade EH
K-81TK2	<ul style="list-style-type: none"> · Excellent weldability in all positions · Superior porosity prevention properties due to well-designed alloy composition. · Typical applications including offshore structures, LNG and LPG carriers and storage tanks
K-91TK2	<ul style="list-style-type: none"> · The weld metal contain about 1.5% Ni leading to superior impact value at low temperatures down to -60°C · Excellent properties for the semi-automatic and automatic welding of many higher strength steels
KX-200H	<ul style="list-style-type: none"> · Smooth arc formation and minimum spatter generation · Excellent bead appearance formation for flat and horizontal positions · Superior porosity prevention properties due to well-designed alloy composition.
K-NGS	<ul style="list-style-type: none"> · Excellent bead appearance formation for all positions · Superior arc stability, low spatter generation, high efficiency, excellent bead shape and slag removal · Compatible for environments where the use of gas tanks are difficult (pipeline implementations)
K-NGS308L	<ul style="list-style-type: none"> · The weld metal contains low ferrite contents in their austenitic micro structures and provides excellent · corrosion resistance, heat resistance properties. · Easy slag removal, open transfer, low spatter generation, smooth bead surface and high X-ray safety.
K-409TiT	<ul style="list-style-type: none"> · K-409TiT is developed to meet the needs of the automotive exhaust fabricators looking for metal cored wire. · It excels in the pulsed GMAW mode and additional applications include heat exchangers and recuperators, power plant reheater tubes etc. · Slag quantity equal to solid wires with the deposition rate 20% higher than the solid wire.



KISWEL WELDING BUSINESS

PLANNED BY KISWEL Solution Marketing Team

DESIGNED BY E2nCommunications

EDITED BY Ryan Kim, Jin woo Kim, S-rah Lee
Jong soo Kim, Seung yeon Lee

TRANSLATED BY Gon Lee

INSPIRED BY JP Hong

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KISWEL

7F 43-1, Heungkook B/D Toegye-ro, Jung-gu, Seoul, Korea

www.kiswel.com / solution@kiswel.com

TEL +82 2 2270 9415

FAX +82 2 2272 7234

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KOREA

SEOUL OFFICE

8F 43-1, Heungkook B/D
Toegye-ro, Jung-gu,
Seoul, Korea
TEL : + 82 2 2270 9400
FAX : + 82 2 2272 7233/4
E-mail : solution@kiswel.com

R&D CENTER

58-2, Sungju-dong,
sungsan-gu Changwon,
Gyeongnam, Korea
TEL : + 82 55 269 7280
FAX : + 82 55 266 4487
E-mail : research@kiswel.com

CHANGWON PLANT

58-2, Sungju-dong,
sungsan-gu Changwon,
Gyeongnam, Korea
TEL : + 82 55 269 7200
FAX : + 82 55 285 1655
E-mail : changwon@kiswel.com

POHANG PLANT

70, Jangheung-ro Nam-gu,
Pohang-si, Gyeongsangbuk-do,
Pohang, Korea
TEL : + 82 54 285 1350
FAX : + 82 54 285 3350
E-mail : swanie@kiswelhk.com

BUSAN PLANT

721-3, Hakjang-dong,
Sasang-gu, Busan, Korea
TEL : +82 51 310 7200
FAX : + 82 51 325 3627
E-mail : lyr@kiswel.com

EAST ASIA / MIDDLE EAST ASIA

DALIAN PLANT

#73, Zhenpeng Industry
Area, Dalian E&T
Development Zone
Dalian, China
TEL : + 86 411 8751 7780/2
FAX : + 86 411 8751 7783
E-mail : min9281@kiswel.com

NANTONG OFFICE

R/N 907, No.3998 DIBAO Plaza,
Hongxin Road, Minhang District,
Shanghai, China
TEL : + 86 21 6151 3862-3
FAX : + 86 21 6151 3860
E-mail : min9281@kiswel.com

OSAKA OFFICE

KISWEL B/D 8-24, 3-Chome,
Namba Naka Naniwa-ku,
Osaka, Japan
TEL : + 81 6 6636 6615
FAX : + 81 6 6636 1275
E-mail : sungga_kim@kiswel.co.jp

TOKYO OFFICE

5F Otori B/D 4-5,
Chuo-ku, Tokyo, Japan
TEL : + 81 3 3669 2490
FAX : + 81 3 3669 2494
E-mail : jhoh@kiswel.co.jp

DUBAI OFFICE

P.O. 18394, Jebel Ali,
Dubai, U.A.E
TEL : + 971 4 883 3673
FAX : + 971 4 883 3654
E-mail : middleeast@kiswel.com

SOUTHEAST ASIA / WEST ASIA

BANGKOK OFFICE

26/56 TPI TOWER FL,
20 NANG LIN CHIRD
THUNGMAHAMEK SATHORN
BANGKOK 10120
TEL : + 66 2 678 5912
FAX : + 66 2 678 5912
E-mail : jameskang@kiswel.com

HOCHIMINH OFFICE

57-59 Ho Tung Mau Street,
Ben Bghe Ward District 1,
Ho Chi Minh City, Viet Nam
TEL : + 84 8 6291 4556
FAX : + 84 8 6291 4569
E-mail : chgj75@kiswel.com

JOHOR BAHRU PLANT

PLO 63, Jalan Keluli 2,
81700, Pasir Gudang,
Johor, Malaysia,
TEL : + 60 7 2515 933
FAX : + 80 7 2515 934
E-mail : kykim@kiswel.com

JAKARTA OFFICE

World Trade Center 5 3A floor,
Jl. Jendral Sudirman Kav. 29-31
Jakarta (PT. Regus Indonesia)
12920
TEL : + 62 813 1828 5818
E-mail : kykim@kiswel.com

NEW DELHI OFFICE

Opening soon

EUROPE

LUXEMBOURG PLANT

Krakelshaff, L-3235
Bettembourg, Luxembourg
TEL : + 352 26 52 6827
FAX : + 352 51 50 21224
E-mail : bernard@kiswel.com

DUSSELDORF OFFICE

Opening soon

NORTH AMERICA

USA PLANT

7950 Dixie Hwy Florence,
KT 41042, USA
TEL : + 1 859 371 0070
FAX : + 1 859 371 5210
E-mail : paulhyun@kiswelusa.com

HOUSTON OFFICE

11767 Katy Freeway,
Suite 620, Houston,
TX 77079
TEL : + 1 513 581 6146
FAX : + 1 859 371 5210
E-mail : paulhyun@kiswelusa.com

MEXICO S.A.

Av.jose Palomo Martinez 520-4
Parque Industrial OMOLAP
Apodaca, Nuevo Leon,
C.P. 66633
TEL : + 81 2040 6650
E-mail : paulhyun@kiswelusa.com