K-9015B9

COVERED ELECTRODE

FOR HEAT RESISTING STEEL

KISWEL

K-9015B9

■ Description

- Covering is low hydrogen type for welding of 9%Cr-1%Mo-Nb-V steel used in oil refining and chemical industries, heat treated high tensile strength steel for P91
- Preheat at 250~350℃ and post heat treat at 720~770℃
- Excellent mechanical properties and radiographic soundness
- Redry the electrode at 300~400℃ for 1~2hours prior to use

■ Classification

- AWS A5.5 : E9015-B91 H4R
- EN ISO 3580-A : E CrMo 91 B 42 H5
- EN ISO 3580-B : E 62 15-9C1MV H5

■ Welding Position

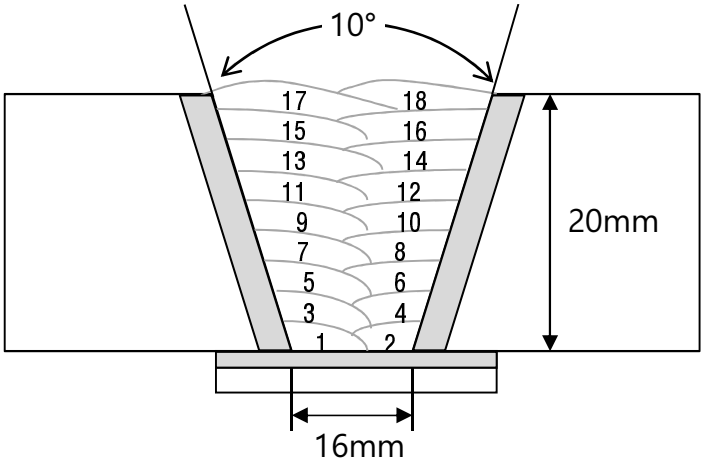


■ Base Materials

Industry	Steel Grades	Type
Creep resistant steels	EN 10222-2 / EN 10302	X10CrMoVNb9-1 (1.4903)
	ASTM A199	T91
	ASTM A200	T91
	ASTM A213	T91/P91
	ASTM A335	P91
	ASTM A336	F91

K-9015B9

■ All Weld Metal Test Specimen



Base metal	A36
Size	4.0*400mm
Polarity / Current	DC+ / 160~165A
Welding Position	PA / 1G
Heat Input	13.3~16.5 kJ/cm

■ Typical Mechanical Properties of Weld Metal

	Y.S (MPa)	T.S (MPa)	El. (%)	I.V (J) (J @ Temp.)	PWHT	Remark
AWS Spec.	≥530	≥620	≥17	-	760℃ x 2Hr	1G
K-9015B9	680	760	22	50 @ 0℃	760℃ x 2Hr	

* Diffusible hydrogen content (㎖/100gr W.M) : Avg 3.2 (G.C)

■ Typical Chemical Composition of Weld Metal (%)

	C	Si	Mn*	P	S	Ni*	Cr
AWS Spec.	0.08~ 0.13	≤0.30	≤1.20	≤0.01	≤0.01	≤0.80	8.0~ 10.5
K-9015B9	0.09	0.27	0.55	0.009	0.004	0.48	8.50
	Mo	**Cu**	**V**	**Al**	**Nb**	**N**	***Sum**
AWS Spec.	0.85~ 1.20	≤0.25	0.15~ 0.30	≤0.04	0.02~ 0.10	0.02~ 0.10	≤1.40
K-9015B9	1.07	0.03	0.23	0.01	0.04	0.04	1.03

* X-Factor(ppm) = (10P+5Sb+4Sn+As) / 100 : 10.6

■ Weldability

		Flat, H-Fillet	V-Up
Arc	Stability	Excellent	Excellent
	Concentration	Excellent	Excellent
	Force	Good	Good
Slag	Fluidity	Excellent	Excellent
	Removability	Excellent	Good
Spatter	Quantity	Good	Good
Fume	Quantity	Good	Good
Porosity	Occurrence	Excellent	Excellent

■ Bead Appearance



H-Fillet, 4.0*400mm, DC+ 160~170A

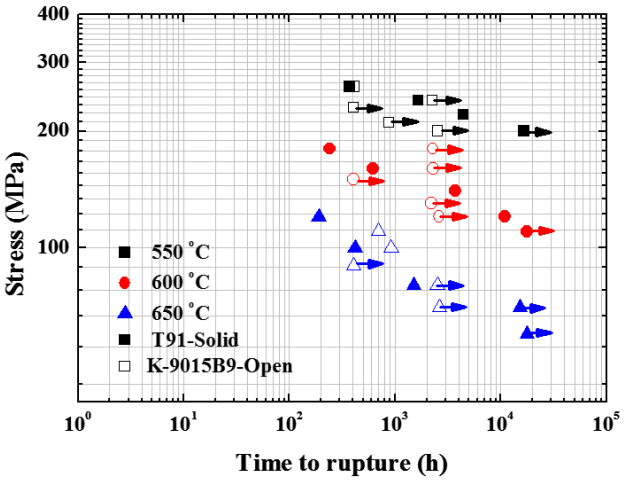


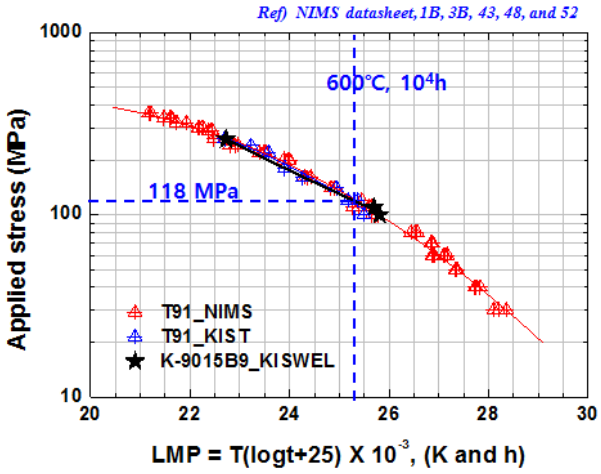
V-Up, 4.0*400mm, DC+ 125~130A

■ Mechanical Properties of Weld Metal (600℃ hot tensile test)

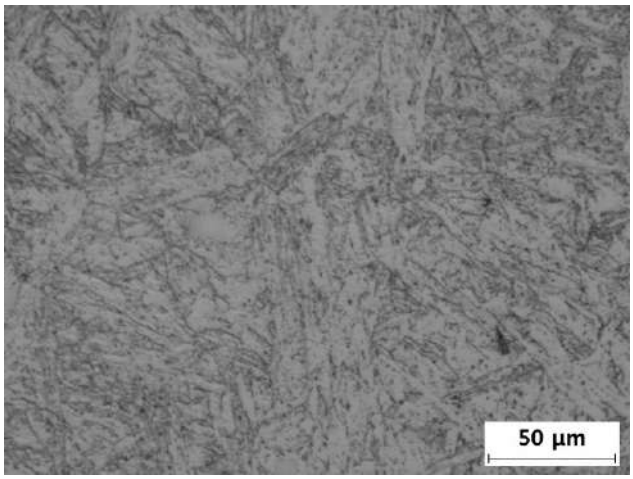
	Y.S (MPa)	T.S (MPa)	El. (%)	PWHT	Remark
K-9015B9	349	375	25	760℃ x 2Hr	1G

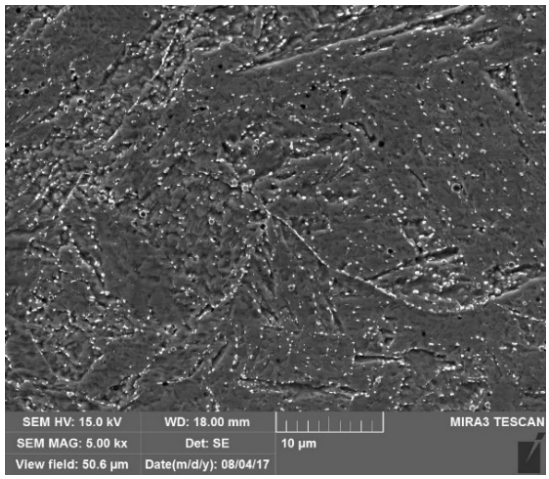
■ Creep rupture property





■ Microstructur





Tempered Martensite

K-9015B9

■ Packaging and Available sizes



Diameter (mm)		2.5	3.2	4.0	5.0
Length (mm)		350	350	400	450
Carton	Inner	5Kg			
	Out	20Kg (5Kg x 4EA)			
Vacuum	Inner	2Kg / 5Kg			
	Out	10Kg (2Kg x 5EA) / 20Kg (5Kg x 4EA)			

* Identification Imprint : E9015-B91 H4R

* Tip Color : None

■ Recommended Welding Parameter (DC+)

Diameter (mm)	2.5	3.2	4.0	5.0
Length (mm)	350	350	400	450
Flat, Fillet	60~90	90~140	150~190	180~230
V-Up	50~80	80~120	120~160	-

■ Control Instruction

1. Storage

1) On principle covered electrodes should be in their original packaging until used. If possible the packs of electrodes should be taken out of storage in the sequence in which they were received in warehouse.
2) The covered electrodes must be stored in dry rooms to protect them against damage caused by moisture. The room must be fitted out with pallets or shelves since storage directly on the floor or against the walls is not recommended.
3) Opened packs of electrodes should also be stored in dry and, if necessary, heated rooms so that there is no likelihood of the temperature dropping below the dew point.

AWS Classification	Store Condition (Opened packs of electrode)	
	Ambient Air	Holding Oven
E9015-B91 H4R	Not recommended	High 30~140℃ than room temperature

2. Re-drying

1) Where electrodes have become damp it is recommended that re-drying is carried out immediately prior to welding in accordance with the temperature details specified in the following table.
2) Electrodes that have been in direct contact with water, grease or oil should not be used for welding fabrication.

Type of coating	Re-drying temp. (℃)	Re-Drying time (min)
Low hydrogen	300~400	60~120

KISWEL

The Management System of KISWEL LTD, 704, Gongdan-ro, Seongsan-gu, Changwon-si, Gyeongnam 51544, Republic of Korea, 70, Saebyeok-ro 63beon-gil, Sasang-gu, Busan 47018, Republic of Korea has been approved by Lloyd's Register Quality Assurance to : IATF 16949:2016, ISO 14001:2015, applicable to : Manufacture of solid welding wires & rods, flux cored wires, submerged arc welding wires & fluxes, stainless steel welding wires & rods and covered electrodes.
More information : www.kiswel.com

