ZO-60

COPPER COATED SOLID WIRE

KISWEL

Rev.0

■ Description & Application

- **For butt and fillet welding of machineries, heavy equipment, pressure vessels and steel that demand for creep-resistant in high temperature.**
- **Superior arc stability and X-ray soundness**
- **Stable weldability on high welding current**
- **Beautiful weld appearance due to low spatter.**

■ Classification

- **AWS A5.18-2005 : ER70S-G**
- **KS D 7022-2005 : YGW21**
- **JIS Z 3312-2012 : G 62 A 1 2U C 3M1T**
- **EN ISO 16834-A : G 55 2 C1 Z**
- **EN ISO 16834-B : G 62A 2U C1 3M1T**

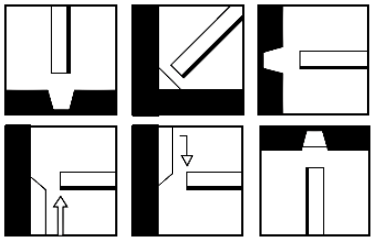
■ Typical Chemical Composition of Weld Metal (%)

	C	Si	Mn	P	S	Mo
AWS ER80S-G	--	-	-	-	-	-
EN ISO 3M1T	≤0.12	0.40-1.00	1.40-2.10	≤0.025	≤0.025	0.10-0.45
ZO-60	**0.05**	**0.82**	**1.90**	**0.012**	**0.005**	**0.29**

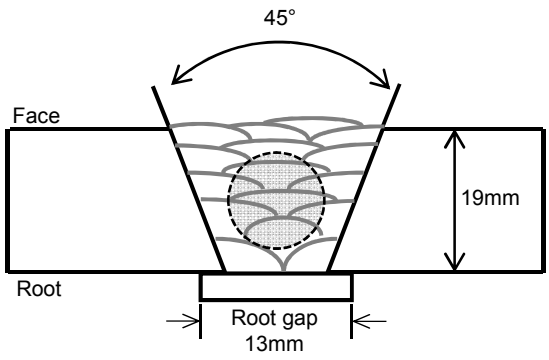
■ Shielding Gas

- **100% CO_2 (15~25ℓ/min)**
- **Ar + 20% CO_2 (15~25ℓ/min)**

■ Welding Position



All Weld Metal Test Specimen



Base metal	A515 Gr.70
Diameter	1.2mm
Current / Voltage	280A / 30V
Stick out	20mm
Travel Speed	30 CPM
Welding Position	PA / 1G

Typical Mechanical Properties of Weld Metal

	Shielding Gas	PWHT	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J) (Joule @ Temp)
AWS ER80S-G	-	AW	-	< 480	-	-
EN ISO 3M1T	-	AW	< 550	640~820	< 18	≥ 47 @ -20℃
JIS YGW21	-	AW	< 550	640~820	< 18	≥ 47 @ -20℃
ZO-60	**100%CO_2**	**AW**	**580**	**640**	**27**	**110 @ -20℃**
ZO-60	**Ar + 20%CO_2**	**AW**	**580**	**660**	**2**	**120 @ -20℃**

Typical Operating Procedures

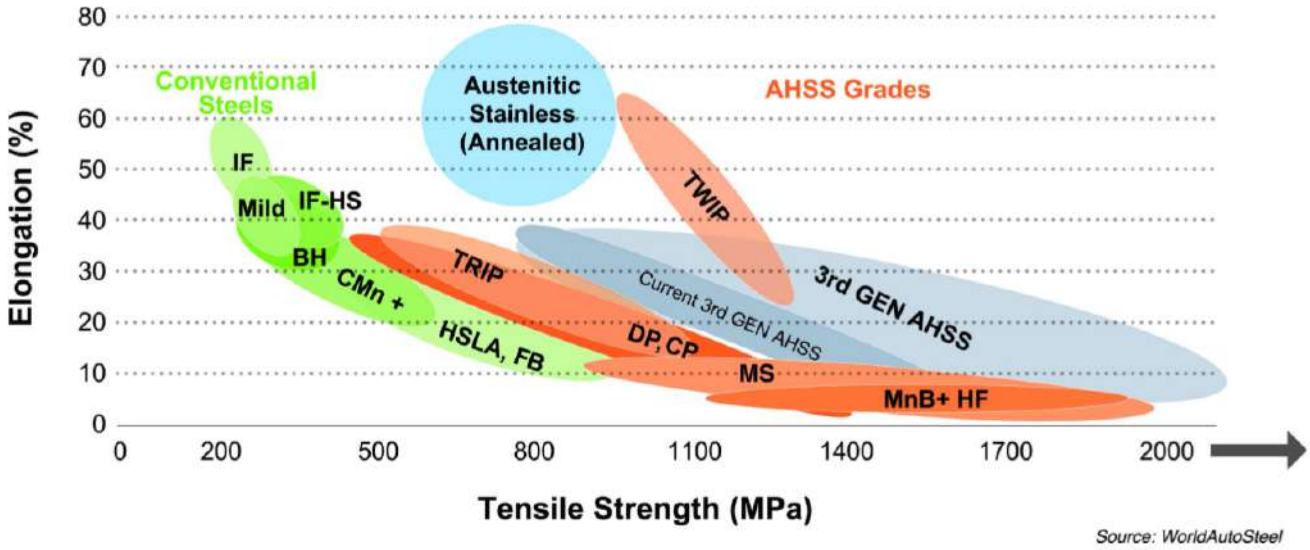
Dia (mm)	Shielding Gas	Current (amps)	Voltage (volts)	Feed speed (m/min)	Melt-off Rate (Kg/Hr)
0.9	100% CO_2	80-250	18-22	2.5-6.5	0.7-1.7
	Ar + 10% CO_2	190-280	24-30	9.5-15.5	2.4-4.2
1.2	100% CO_2	140-200	19-21	3.0-5.0	1.4-2.3
	Ar + 10% CO_2	280-340	27-30	8.5-12.5	4.2-6.2
1.4	Ar + 10% CO_2	300-440	30-34	7.5-12.5	5.1-8.5
1.6	Ar + 10% CO_2	320-440	28-32	5.5-7.5	4.9-6.7

* Polarity : DCEP (DC+)

■ AHSS

As part of the global CO2 reduction plan, regulations on vehicle fuel efficiency are being strengthened, and the application of advanced high strength steel plates is increasing.

Advanced high strength steel (AHSS) are complex, with carefully selected chemical compositions and multiphase microstructures resulting from precisely controlled heating and cooling processes. Various strengthening mechanisms are employed to achieve a range of strength, ductility, toughness, and fatigue properties.



■ 600MPa High tensile steel Brand and manufacturer

Grade	Brand	Mill	Y.S(MPa)	T.S(MPa)	EL(%)
600 MPa	DASS 60	Dongbu/Korea	440	890	19
	WEL-TEN 590	NSSMC/Japan	450	890-710	20
	HITEN 590	JFE/Japan	450	590-710	20
	ATOS 60	POSCO/Korea	451	588-706	20
	DOMEX 600	SAAB/Sweden	600	650-820	16
	NAXTRA M700	ThyssenKrupp/Germany	690	770-940	14
	Dillimax 690	Dillinger hutte/Germany	690	770-940	14

■ Specification

Brand	Specification (EN, AWS)	Mechanical Properties				
		Y.S(MPa)	T.S(MPa)	EL(%)	CVN(J)	Sheilding
ZO-60	EN ISO 16834-A G 62 3 M21 Z EN ISO 16834-B G 62A 2 U C 3MIT AWS A5.28 ER80S-G	680	740	24	110@-30℃	Ar+20%CO_2
ZO-90	EN ISO 16834-A G 62 3 M21 Mn3Ni1Mo EN ISO 16834-B G 69A 3U M21 N2M1T AWS A5.28 ER90S-G	680	740	24	110@-30℃	Ar+20%CO_2
		660	740	25	60@-60℃	Ar+20%CO_2
ZH-100	EN ISO 16834-A G 62 2 M21 Mn3Ni1.5Mo EN ISO 16834-B G 69A 2U M21(M13) N4CM21T AWS A5.28 ER110S-1	720	780	20	130@-50℃	Ar+2%O_2
		700	760	22	70@-50℃	Ar+20%CO_2
ZO-110	EN ISO 16834-A G 69 4 M21 Mn3Ni1CrMo AWS A5.28 ER120S-G	756	845	19	56@-50℃	Ar+20%CO_2
ZH-120	EN ISO 16834-A G 89 M21 Mn4Ni2CrMo EN ISO 16834-B G 83A 6U M21 G AWS A5.28 ER120S-G	868	930	21	110@-40℃	Ar+2%O_2
		910	975	21	66@-40℃	Ar+20%CO_2

■ Comparison table

Grade	KISWEL	Böhler	ESAB	Lincoln	Oerlikon
550 MPa	ZO-60 (3MIT)	NiMo 1-IG (Mn3Ni1Mo)	OK AristoRod 55 (Mn3NiCrMo	LNM NiMo1 (Mn3Ni1Mo)	Carbofil NiMo1 (Mn3Ni1Mo)
620 MPa	ZO-90 (Mn3Ni1Mo)				
690 MPa	ZH-100 (Mn3Ni1.5Mo)	NiMoCr (Mn3Ni1.5Mo)	OK AristoRod 69 (Mn3Ni1Mo)	LNM MoNiVa (Mn3Ni1CrMo)	Carbofil NiMoCr (Mn3Ni1CrMo)
760 MPa	ZO-110 (Mn3Ni1CrMo)	X70-IG (Mn3Ni1CrMo)	OK AristoRod 69 (Mn3Ni1CrMo)		
830 MPa	ZH-120 (Mn4Ni2CrMo)	X 90-IG (Mn4Ni2CrMo)	OK AristoRod 79 (Mn4Ni2CrMo)		

■ Packaging





■ Size and Weight

Dia. (mm)	0.6, 0.8, 0.9, 1.0, 1.14, 1.2, 1.32, 1.4, 1.6			
Weight (kg)	2	5	12.5, 15, 20	100~450
Packaging	Plastic Spool			Pail-pack / DPP
	-		Wire Basket	

■ Approval

Shielding gas	NK	RS
CO_2	KSW3Y46G	4Y46S

■ Handling

• Do not speed up or brake loaded products to prevent rollover during transport.

• Please run out product within two weeks of its packaging release.

• If the product is discontinued for more than two weeks, it should be packed and stored separately to prevent air contact.

• Products that are in use on the supply line must be prevented by covering to prevent product contamination and electric shock accidents.

• When using Drum or DPP, check the enclosed installation and handling manual, and use it after proper installation.

■ Storage

• Do not stock Drum or DPP packaging palettes more than 2 layers and Spool or Wire basket packaging palettes more than 3 layers. To prevent damage to the products and external packaging.

• Store the product without removing the packaging to prevent air contact.

• To prevent product packaging damage and condensation due to moisture. Keep the product at a relative humidity of less than 50%

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

