

Covered Electrodes

FOR CARBON STEEL

FOR HIGH TENSILE STRENGTH STEEL

**FOR ATMOSPHERIC CORROSION
RESISTING STEEL**

FOR LOW TEMPERATURE SERVICE STEEL

FOR HEAT-RESISTING STEEL

FOR HARDFACING

FOR STAINLESS STEEL

FOR CAST IRON

FOR SPECIAL PURPOSE



Classifications

EN ISO 2560-A:2006	: E 38 0 C 22	KS D 7004	: E4311
EN ISO 2560-B:2006	: E 43 10 A	JIS Z 3211	: E4310
AWS A5.1-04	: E6010		

Description

- Covering is high cellulose type for welding of pipe, shipbuildings, tanks or galvanized surfaces and steel casting repairs.
- Good penetration combined with freedom from lack of fusion makes this electrode an excellent choice for pipe welding.
- Gives high ductility root weld and easy slag removal.
- Redry the electrode at 70~80°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.11	0.36	0.63	0.015	0.013	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-30°C	
AWS A5.1	min. 330	min. 430	min. 22		≥ 27	
EN ISO 2560-A	min. 380	470~600	min. 20	≥ 47		
Example	420	500	29	60	40	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	350	350
Amp.	F	50~80	70~110	110~150	160~200
(A)	V · OH	40~70	60~100	90~130	140~170

Approvals

ABS	BV	GL	LR	NK
3,E6010	3	3	3m	KMW3

* Others : JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 2 C 12	KS D 7004	: E4311
EN ISO 2560-B:2006	: E 43 10 A	JIS Z 3211	: E4311
AWS A5.1-04	: E6011		

Description

- Covering is high cellulose type for welding of steel sheets, pipes in building or shipbuilding.
- As the welding in poor groove fit up and vertical-down welding can be performed easily, it is used in all position welding of pipes.
- Good mechanical properties and the weld metal meets requirement X-ray.
- Gives high ductility root weld and easy slag removal.
- Redry the electrode at 70~80°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.08	0.31	0.58	0.017	0.018	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-20°C	-30°C	
AWS A5.1	min. 330	min. 430	min. 22		≥ 27	
EN ISO 2560-A	min. 380	470~600	min. 20	≥ 47		
Example	410	500	24	60	40	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	350	350
Amp. (A)	F V · OH	50~80 40~70	70~110 60~100	110~150 90~130	160~200 140~170

Approvals

ABS	BV	GL	LR
3,E6011	3	3	3m

* Others : JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 0 R 12	KS D 7004	: E4313
EN ISO 2560-B:2006	: E 43 12 A	JIS Z 3211	: E4312
AWS A5.1-04	: E6012		

Description

- Covering is high titania type for welding of shells of railway vehicles, cars and other steel structures and general light structural steels.
- Good weldability in vertical-down welding.
- Excellent X-ray quality and good bead appearance.
- Redry the electrode at 70~100°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.39	0.52	0.020	0.011	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				RT	0°C	
AWS A5.1	min. 330	min. 430	min. 17			
EN ISO 2560-A	min. 380	470~600	min. 20		≥ 47	
Example	400	490	30	60	40	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC -)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	50~95 40~95	80~120 70~110	130~170 100~140	180~230 120~160	240~300

Approvals

JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 0 R 11	KS D 7004	: E4313
EN ISO 2560-B:2006	: E 43 13 A	JIS Z 3211	: E4313
AWS A5.1-04	: E6013		

Description

- Covering is high titania type for welding of all kinds of light constructional work in all positions, including pipe welding.
- Excellent striking and restriking properties.
- Excellent slag removal and bead appearance without undercut.
- Redry the electrode at 70~100°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.06	0.35	0.40	0.020	0.011	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J) RT 0°C	Remarks
AWS A5.1	min. 330	min. 430	min. 17		
EN ISO 2560-A	min. 380	470~600	min. 20	≥ 47	
Example	430	490	28	60	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~100 60~90	80~130 80~110	130~180 90~140	160~220 120~190	210~280

Approvals

ABS	BV	DNV	GL	KR	LR	NK
2	2	2	2	2	2m	KMW2

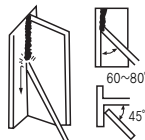
* Others : KS, JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 0 R 15	KS D 7004	: E4313
EN ISO 2560-B:2006	: E 43 13 A	JIS Z 3211	: E4313
AWS A5.1-04	: E6013		

Description

- Welding of shells of railway vehicles, cars and other steel sheet structures and general light structural steels.
- In vertical-down welding, excellent bead appearance can be obtained by taking a little bit higher welding amperage and holding the electrode at the illustrated angles.
- Welding under excessive amperage conditions can cause the deterioration of radiographic soundness.
- Redry the electrode at 70~100°C for 30~60 minutes prior to use.



Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.09	0.38	0.49	0.020	0.013	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	RT	IV (J) 0°C	Remarks
AWS A5.1	min. 330	min. 430	min. 17			
EN ISO 2560-A	min. 380	470~600	min. 20		≥ 47	
Example	420	490	29	65	50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp.(A)	V-down	80~120	100~150	150~200	210~250

Approvals

ABS	BV	LR
2	2	2m

* Others : KS, JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 2 RA 12	KS D 7004	: E4301
EN ISO 2560-B:2006	: E 43 19 A U	JIS Z 3211	: E4319
AWS A5.1-04	: E6019		

Description

- Covering is ilmenite type for welding of high pressure boilers, ship hulls, building, bridges and other structural fabrications.
- The most excellent mechanical properties and also suitable for welding of structural steels of heavy section about 25mm thickness.
- Redry the electrode at 70~100°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.15	0.47	0.020	0.012	0.01	0.02	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-20°C	
AWS A5.1	min. 330	min. 430	min. 22		≥ 27	
EN ISO 2560-A	min. 380	470~600	min. 20		≥ 47	
Example	400	490	30	100	80	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +, -)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~75	80~135 60~120	135~190 100~160	180~240 135~210	250~310 -

Approvals

ABS	BV	DNV	GL	KR	LR	NK
3	3	3	3	3	3m	KMW3

* Others : KS, JIS, CE

Classifications

EN ISO 2560-A:2006 : E 38 0 A 23
 AWS A5.1-04 : E6022

Description

- Covering is high iron oxide type for welding of flat and horizontal fillet welding of sheet metal.
- Highly efficient welding.
- Welding under excessive amperage conditions can cause the deterioration of radiographic soundness.
- Redry the electrode at 70~100°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.14	0.28	1.20	0.025	0.012	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	RT	IV (J) 0°C	Remarks
AWS A5.1		min. 430				
EN ISO 2560-A	min. 380	470~600	min. 20		≥ 47	
Example	450	480	26	75	55	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC -)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~110	80~140	160~200	180~240	260~320

Approvals

JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 0 A 53	KS D 7004	: E4327
EN ISO 2560-B:2006	: E 43 27 A	JIS Z 3211	: E4327
AWS A5.1-04	: E6027		

Description

- Covering is high iron oxide, iron powder type for welding of flat and horizontal fillet welding of ship hull constructions, bridges and general structures.
- Beautiful bead appearance with undercut.
- Extremely high efficient welding because of high deposition rate by much iron powder.
- Easy slag removal.
- Redry the electrode at 120~150°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.47	0.76	0.020	0.014	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-30°C	
AWS A5.1	min. 330	min. 430	min. 22		≥ 27	
EN ISO 2560-A	min. 380	470~600	min. 20	≥ 47		
Example	490	560	28	60	40	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC -)

Dia.	(mm)	4.0	4.5	5.0	5.5	6.0	6.4
Length	(mm)	550	550	550	550	550	550
			700	700	700	700	700
Amp. (A)	F H-Fillet	150~180	180~200	180~230	220~270	250~290	280~310
Leg	(mm)	5.0~5.5	5.5~6.0	6.0~6.5	6.5~7.0	7.0~8.0	7.5~8.5

Approvals

ABS	BV	DNV	GL	KR	LR	NK
3	3	3	3	3	3m	KMW3

* Others : KS, JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 0 RB 12	KS D 7004	: E4303
EN ISO 2560-B:2006	: E 43 03 A U	JIS Z 3211	: E4303

Description

- Covering is lime titania type for welding of cars, other vehicles, light structural steels and pedestrian bridges.
- High welding efficiency and restriking property.
- Suitable for tack welding and intermittent welding.
- Excellent slag removal.
- Redry the electrode at 70~100°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.06	0.24	0.40	0.017	0.016	0.01	0.02	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-20°C	
JIS Z 3211	min. 330	min. 430	min. 20	≥ 27		
EN ISO 2560-A	min. 380	470~600	min. 20	≥ 47		
Example	420	530	32	100	60	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +, -)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	65~100 50~90	100~140 80~130	140~190 110~170	200~260 140~210	250~330 -

Approvals

ABS	DNV	GL	KR	LR	NK
3,D4303	3	3	3	3m	KMW3

* Others : KS, JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 3 B 12 H10	KS D 7006	: E4316
EN ISO 2560-B:2006	: E 43 16 A U H10	JIS Z 3211	: E4316
AWS A5.1-04	: E7016		

Description

- Covering is low hydrogen type for welding of strength members of ship hulls and general heavy structural steels, medium carbon steel, high sulphur steel. Underlying of hardfacing.
- Excellent mechanical properties and radiographic soundness.
- Excellent crack resistance even in the welding of difficult to weld steels.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.07	0.46	0.96	0.015	0.011	0.02	0.03	0.01	0.01	1.03

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-20°C	-30°C	
JIS Z 3211	min. 330	min. 430	min. 20		≥ 27	
EN ISO 2560-A	min. 380	470~600	min. 20		≥ 47	
Example	460	540	28	120	100	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~80	90~130 80~110	140~190 120~160	180~240 160~200	250~300 -

Approvals

ABS	BV	DNV	GL	KR	LR	NK
3YH10	3YHH	3YH10	3YH10	3YH15	3YmH15	KMW3H

* Others : KS, JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 0 B 12 H10	KS D 7006	: E4316
EN ISO 2560-B:2006	: E 43 16 A H10	JIS Z 3211	: E4316
AWS A5.1-04	: E7016		

Description

- Covering is low hydrogen type for tack welding of steels of ships, buildings and bridges.
- Good arc restriking properties.
- Designed for tack welding and intermittent welding.
- Easy slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.07	0.59	0.86	0.018	0.009	0.02	0.03	0.01	0.01	0.93

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-30°C	
JIS Z 3211	min. 330	min. 430	min. 20		≥ 27	
EN ISO 2560-A	min. 380	470~600	min. 20	≥ 47		
Example	450	550	29	65	50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	4.0	5.0
Length	(mm)	350	400	400
Amp.(A)	All	90~150	140~200	190~240

Approvals

KS, JIS, CE

KH-500W

For 490MPa high tensile steel

Classifications

EN ISO 2560-A:2006	: E 38 0 B 14 H10	KS D 7006	: E4316
EN ISO 2560-B:2006	: E 43 16 A H10	JIS Z 3211	: E4316
AWS A5.1-04	: E7016		

Description

- Specifically designed for one side welding of pipes and general structures.
- Covering is low hydrogen type for welding of all positions except vertical-down.
- Extremely good usability in flat positions.
- Easy slag removal and beautiful bead appearance.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.09	0.58	0.98	0.014	0.011	0.02	0.03	0.01	0.01	1.05

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-30°C	
JIS Z 3211	min. 330	min. 430	min. 20		≥ 27	
EN ISO 2560-A	min. 380	470~600	min. 20	≥ 47		
Example	460	560	32	70	50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	4.5	5.0
Length	(mm)	350	350	400	400	400
Amp.(A)	F • OSW	30~70	60~110	90~140	120~160	130~180

Approvals

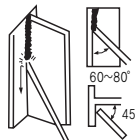
KS, JIS, CE

Classifications

EN ISO 2560-A:2006	: E 38 0 B 35 H10	KS D 7006	: E4316
EN ISO 2560-B:2006	: E 43 16 A H10	JIS Z 3211	: E4948
AWS A5.1-04	: E7048		

Description

- Covering is low hydrogen type for vertical-down welding of general structures and strength members of machinery, ship construction, bridges.
- In vertical-down welding, excellent bead appearance can be obtained by taking a little bit higher welding amperage and holding the electrode at the illustrated angles.
- Excellent mechanical properties and crack resistance.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.



Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.06	0.53	0.72	0.012	0.011	0.02	0.03	0.01	0.01	0.79

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-30°C	
JIS Z 3211	min. 330	min. 430	min. 20		≥ 27	
EN ISO 2560-A	min. 380	470~600	min. 20	≥ 47		
Example	460	550	33	70	60	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	4.5	5.0	5.5
Length	(mm)	400	450	450	450	450
Amp.(A)	V-down	120~160	150~210	180~240	220~280	260~330

Approvals

ABS	BV	DNV	KR	LR	NK
3YH10	3YHH	3YH10	3YH15	3YmH15	KMW3H

* Others : KS, JIS, CE

Classifications

EN ISO 2560-A:2006	: E 42 A RR 32	JIS Z 3211	: E4914
EN ISO 2560-B:2006	: E 49 14 A		
AWS A5.1-04	: E7014		

Description

- Covering is iron powder, titania type for fillet welding of ship structure, bridges, structural steels.
- Designed for high efficiency in single pass and multiple pass welding.
- Excellent slag removal and good bead appearance.
- Quiet and stable arc.
- Redry the electrode at 120~150°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.08	0.41	0.73	0.020	0.014	0.02	0.03	0.01	0.01	0.80

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				RT	0°C	
AWS A5.1	min. 400	min. 490	min. 17			
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 47		
Example	470	550	30	65	50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +, -)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~100 50~90	90~140 80~130	140~200 110~170	190~240 150~200	250~310 -

Approvals

ABS	KR	LR	NK
2Y, E7014	2Y	2Ym	KMW52

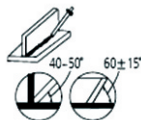
* Others : JIS, CWB, CE

Classifications

EN ISO 2560-A:2006	: E 42 A RR 53	KS D 7004	: E4324
EN ISO 2560-B:2006	: E 49 24 A	JIS Z 3211	: E4924
AWS A5.1-04	: E7024		

Description

- Covering is iron powder, titania type for flat and horizontal fillet welding of ship structure, bridges, structural steels for buildings and general structures.
- Designed for high efficiency in single pass.
- Excellent slag removal and good bead appearance.
- Redry the electrode at 120~150°C for 30~60 minutes prior to use.

**Welding positions****Typical chemical composition of all-weld metal (%)**

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.08	0.35	0.78	0.020	0.014	0.02	0.03	0.01	0.01	0.85

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J) RT	0°C	Remarks
AWS A5.1	min. 400	min. 490	min. 17			
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 47		
Example	480	570	28	65	50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +, -)

Dia.	(mm)	3.2	4.0	4.5	5.0	5.5	6.0
		400	450	450	450	450	450
Length	(mm)		550	550	550	550	550
				700	700	700	700
Amp. (A)	F H-Fillet	100~150	140~190	180~230	200~250	230~270	260~300

Approvals

ABS	BV	DNV	GL	KR	LR	NK
2Y, E7024	2Y	3	2Y	2Y	2Ym	KMW52

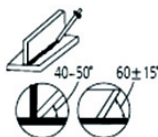
* Others : JIS, CWB, CE

Classifications

EN ISO 2560-A:2006	: E 42 0 RR 53	KS D 7004	: E4324
EN ISO 2560-B:2006	: E 49 24 A	JIS Z 3211	: E4924-1
AWS A5.1-04	: E7024-1		

Description

- Covering is iron powder, titania type for flat and horizontal fillet welding of ship structure, bridges, structural steels for buildings and general structures.
- Designed for high efficiency in single pass.
- Good notch toughness of the deposited weld metal.
- Excellent slag removal and good bead appearance.
- Redry the electrode at 120~150°C for 30~60 minutes prior to use.



Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.08	0.63	0.88	0.024	0.020	0.15	0.03	0.01	0.01	1.08

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0	-20°C	
AWS A5.1	min. 400	min. 490	min. 17		≥ 27	
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 47		
Example	500	590	27	60	40	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +, -)

Dia.	(mm)	3.2	4.0	4.5	5.0	5.5	6.0
		400	450	450	450	450	450
Length	(mm)		550	550	550	550	550
				700	700	700	700
Amp. (A)	F H-Fillet	100~150	140~190	180~230	200~250	230~270	260~300

Approvals

JIS, CE

Classifications

EN ISO 2560-A:2006	: E 42 0 C 22	JIS Z 3211	: E4910-G
EN ISO 2560-B:2006	: E 49 10-G A		
AWS A5.5-06	: E7010-G		

Description

- Covering is high cellulose type for all positions welding of pipes, general light structural steels.
- This electrode is characterized by deeply penetrating, forceful, spray type arc.
- Readily removable, thin friable slag.
- Good mechanical properties and the weld metal meets requirement X-ray.
- Redry the electrode at 70~80°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.10	0.56	0.87	0.014	0.013	0.34	0.03	0.28	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-30°C	
AWS A5.5	min. 390	min. 490	min. 22			
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 47		
Example	470	570	27	60	40	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	300	350	400	400
Amp.	F	50~80	70~110	110~150	160~200
(A)	V · OH	40~70	60~100	90~130	140~170

Approvals

JIS, CE

Classifications

EN ISO 2560-A:2006	: E 42 3 B 12 H10	KS D 7006	: E5016
EN ISO 2560-B:2006	: E 49 16 A U H10	JIS Z 3211	: E4916
AWS A5.1-04	: E7016		

Description

- Covering is low hydrogen type for welding of 490MPa class high tensile steel in ships, bridges.
- Excellent mechanical properties and radiographic soundness.
- Excellent crack resistance even in the welding of difficult to weld steels.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.07	0.53	0.93	0.013	0.012	0.02	0.03	0.01	0.01	1.00

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-20°C	-30°C	
AWS A5.1	min. 400	min. 490	min. 22		≥ 27	
EN ISO 2560-A	min. 420	500~640	min. 20		≥ 47	
Example	480	560	32	110	80	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~80	90~130 80~110	140~190 120~160	180~240 160~200	250~310 —

Approvals

ABS	BV	DNV	GL	KR	LR	NK
3YH10	3YHH	3YH10	3YH10	3YH15	3YmH15	KMW53H

* Others : KS, JIS, CE

Classifications

EN ISO 2560-A:2006	: E 42 3 B 12 H5	KS D 7006	: E5016
EN ISO 2560-B:2006	: E 49 16 A U H5	JIS Z 3211	: E4916 H5
AWS A5.1-04	: E7016 H4R		

Description

- Covering is low hydrogen type for welding of 490MPa class high tensile steel in ships, bridges.
- Excellent mechanical properties and radiographic soundness.
- Good impact properties and very low hydrogen contents. (HD ≤ 4ml/100g)
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.07	0.57	0.87	0.013	0.011	0.02	0.03	0.01	0.01	0.94

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-20°C	-30°C	
AWS A5.1	min. 400	min. 490	min. 22		≥ 27	
EN ISO 2560-A	min. 420	500~640	min. 20		≥ 47	
Example	500	610	27	110	90	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~80	90~130 80~110	140~190 120~160	180~240 160~200	250~310

Approvals

ABS	BV	DNV	GL	KR	LR	NK
3YH5	3YHHH	3YH5	3YH5	3YH5	3YmH5	KMW53H5

* Others : JIS, CCS, CE

Classifications

EN ISO 2560-A:2006	: E 42 3 B 32 H10	KS D 7006	: E5016
EN ISO 2560-B:2006	: E 49 18 A U H10	JIS Z 3211	: E4918
AWS A5.1-04	: E7018		

Description

- Covering is low hydrogen, iron powder type for welding of 490MPa class high tensile steel in ships, bridges, storage tank, building and industrial machinery.
- Excellent mechanical properties and radiographic soundness.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.07	0.61	0.87	0.015	0.011	0.02	0.03	0.01	0.01	0.94

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-20°C	-30°C	
AWS A5.1	min. 400	min. 490	min. 22		≥ 27	
EN ISO 2560-A	min. 420	500~640	min. 20		≥ 47	
Example	480	570	30	100	70	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~100 50~80	90~130 80~120	130~180 110~170	200~250 160~210	250~310 —

Approvals

ABS	BV	DNV	GL	KR	LR	NK
3YH10,E7018	3YHH	3YH10	3YH10	3YH15	3YmH15	KMW53H

* Others : KS, JIS, CWB, CE

Classifications

EN ISO 2560-A:2006	: E 42 3 B 32 H5	KS D 7006	: E5016
EN ISO 2560-B:2006	: E 49 18 A U H5	JIS Z 3211	: E4918 H5
AWS A5.1-04	: E7018 H4R		

Description

- Covering is low hydrogen, iron powder type for welding of 490MPa class high tensile steel in ships, bridges, storage tank, building and industrial machinery.
- Good impact properties and very low hydrogen contents. (HD ≤ 4ml/100g)
- Excellent bead appearance and radiographic soundness.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.07	0.60	0.98	0.015	0.012	0.02	0.03	0.01	0.01	1.05

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J) -20°C -30°C	Remarks
AWS A5.1	min. 400	min. 490	min. 22	≥ 27	
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 47	
Example	550	620	29	110 80	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp.	F	60~100	90~130	130~180	200~250	250~310
(A)	V · OH	50~80	80~120	110~170	160~210	—

Approvals

ABS	BV	DNV	GL	KR	LR	NK
3YH5	3YHHH	3YH5	3YH5	3YH5	3YmH5	KMW53H5

* Others : JIS, CCS, CE

Classifications

EN ISO 2560-A:2006	: E 42 3 B 32 H10	JIS Z 3214	: E4918-1
EN ISO 2560-B:2006	: E 49 18-1 A U H10		
AWS A5.1-04	: E7018-1		

Description

- Covering is low hydrogen, iron powder type for welding of nuclear reactor vessels, LPG tankers, LPG storage tanks and similar installations at low temperature.
- Good impact value at -45°C
- Excellent mechanical properties and radiographic soundness.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.07	0.58	1.38	0.013	0.012	0.15	0.03	0.01	0.01	1.58

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30°C	-45°C	
AWS A5.1	min. 400	min. 490	min. 22		≥ 27	
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 47		
Example	510	590	32	100	75	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	70~100 60~90	90~130 85~120	150~190 110~160	160~220 130~180	180~230 —

Approvals

DNV	LR
5YH10	5Y40mH15

* Others : JIS, CWB, CE

Classifications

EN ISO 2560-A:2006	: E 42 0 B 52	KS D 7006	: E5026
EN ISO 2560-B:2006	: E 49 28 A	JIS Z 3211	: E4928
AWS A5.1-04	: E7028		

Description

- Covering is low hydrogen type for flat and horizontal fillet welding of 490MPa class high tensile steel.
- Extremely high deposition rate and good slag removal.
- For application of gravity welding and auto-contact welding.
- Quiet and stable arc.
- Redry the electrode at 200~250°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn*	P	S	Ni*	Cr*	Mo*	V*	*Sum
0.06	0.37	0.98	0.021	0.013	0.02	0.03	0.01	0.01	1.05

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0℃	-20℃	
AWS A5.1	min. 400	min. 490	min. 22		≥ 27	
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 47		
Example	470	550	31	65	50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	5.0	5.5	6.0	6.4
		550	550	550	550
Length	(mm)	700	700	700	700
			900	900	900
Amp. (A)	F H-Fillet	200~250	220~280	270~320	290~340

Approvals

ABS	BV	DNV	GL	KR	LR	NK
3YH10	3YHH	3YH10	3YH10	3YH10	3YmH15	KMW53H

* Others : JIS, CE

Classifications

EN ISO 2560-A:2006	: E 46 0 C 22	JIS Z 3211	: E5510-G
EN ISO 2560-B:2006	: E 55 10-G A		
AWS A5.5-06	: E8010-G		

Description

- Covering is high cellulose type for all positions welding of pipes, general light structural steels.
- This electrode is characterized by deeply penetrating, forceful, spray type arc.
- Readily removable, thin friable slag.
- Good mechanical properties and the weld metal meets requirement X-ray.
- Redry the electrode at 70~80°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.09	0.43	0.76	0.011	0.009	0.32	0.03	0.25	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-30°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 2560-A	min. 460	530~680	min. 20	≥ 47		
Example	520	610	24	65	50	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	300	350	350	350
Amp. (A)	F V · OH	50~80 40~70	70~110 60~100	110~150 90~130	160~200 140~170

Approvals

JIS, CE

Classifications

EN ISO 2560-A:2006	: E 46 3 B 12 H10	KS D 7006	: E5316
EN ISO 2560-B:2006	: E 55 16-G A H10	JIS Z 3211	: E5516-G
AWS A5.5-06	: E8016-G		

Description

- Covering is low hydrogen type for welding of 560MPa class high tensile steel.
- Satisfactory bead appearance and slag removal.
- Excellent mechanical properties and radiographic soundness.
- Good weldability and usability.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.66	1.45	0.016	0.011	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30°C	-40°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 2560-A	min. 460	530~680	min. 20	≥ 47		
Example	540	600	28	60	45	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp.	F	60~90	90~130	140~190	180~240	250~310
(A)	V · OH	50~80	80~120	110~170	160~200	—

Approvals

JIS, CE

Classifications

EN ISO 2560-A:2006	: E 42 3 B 32 H10	KS D 7006	: E5316
EN ISO 2560-B:2006	: E 49 18-G H10	JIS Z 3211	: E5518-G
AWS A5.5-06	: E8018-G		

Description

- Covering is low hydrogen, iron powder type for welding of 560MPa class high tensile steel in ships, bridges, penstocks and rails.
- Excellent mechanical properties and radiographic soundness.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.06	0.56	1.32	0.018	0.011	0.35	0.03	0.25	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-20°C	-30°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 2560-A	min. 460	530~680	min. 20		≥ 47	
Example	490	590	28	95	80	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~80	90~130 80~110	140~190 120~170	180~230 160~200	250~310 —

Approvals

ABS
3Y

* Others : JIS, CE

Classifications

EN ISO 2560-A:2006	: E 50 0 1Ni B 12 H10	KS D 7006	: E5816
EN ISO 2560-B:2006	: E 55 16-G A H10	JIS Z 3211	: E6216-G
AWS A5.5-06	: E9016-G		

Description

- Covering is low hydrogen type for welding of 620MPa class high tensile steel in bridges, vehicles.
- Mn-Ni-Mo type deposits weld metal.
- Satisfactory bead appearance and slag removal.
- Excellent mechanical properties and radiographic soundness.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.58	1.04	0.018	0.011	0.64	0.03	0.29	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-20°C	
AWS A5.5	min. 530	min. 620	min. 17			
EN ISO 2560-A	min. 500	560~720	min. 18		≥ 47	
Example	550	650	28	80	50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~80	90~130 80~110	140~190 120~170	180~230 160~200	250~300 —

Approvals

JIS, CE

Classifications

EN 757:1997 : E 55 3 Z B 12 H10

AWS A5.5-06 : E10016-G

KS D 7006 : E7016

JIS Z 3211 : E6916-G

Description

- Covering is low hydrogen type for welding of 690MPa class high strength low alloy steel, yield point 620MPa of pressure vessels, penstocks and bridges.
- Satisfactory bead appearance and slag removal.
- Excellent crack resistance and radiographic soundness.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.49	1.05	0.015	0.011	1.87	0.05	0.37	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-20°C	-30°C	
AWS A5.5	min. 600	min. 690	min. 16			
EN ISO 2560-A	min. 550	610~780	min. 18		≥ 47	
Example	640	730	26	100	90	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~80	90~130 80~110	140~190 120~170	180~230 160~200	250~300 —

Approvals

JIS, CE

Classifications

EN 757:1997 : E 62 0 Z B 12 H10
 AWS A5.5-06 : E11016-G

KS D 7006 : E8016
 JIS Z 3211 : E7616-G

Description

- Covering is low hydrogen type for welding of 760MPa class high strength low alloy steel, yield point 690MPa of pressure vessels, penstocks and bridges.
- Satisfactory bead appearance and slag removal.
- Excellent crack resistance and radiographic soundness.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.60	1.10	0.013	0.012	1.84	0.23	0.43	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-20°C	
AWS A5.5	min. 670	min. 760	min. 15			
EN ISO 2560-A	min. 620	690~890	min. 18	≥ 47		
Example	730	830	22	60	40	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~80	90~130 80~110	140~190 120~170	180~230 160~200	250~300 —

Approvals

JIS, CE

K-9018M

For 620MPa high tensile steel

Classifications

EN ISO 2560-A:2006	: E 50 5 Z B 32 H10	KS D 7006	: E5816
AWS A5.5-06	: E9018-M	JIS Z 3211	: E6218-N3M1

Description

- Covering is low hydrogen, iron powder type for welding of 620MPa class high tensile steel in bridge, pressure vessels, penstocks and machinery.
- Excellent mechanical properties especially in notch toughness.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.05	0.51	0.88	0.013	0.011	1.58	0.10	0.20	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-40°C	-50°C	
AWS A5.5	540~620	min. 620	min. 24		≥ 27	
EN ISO 2560-A	min. 500	560~720	min. 18		≥ 47	
Example	570	670	30	110	90	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	50~100 40~80	90~130 80~115	140~190 110~160	190~240 140~170	250~310 —

Approvals

ABS

E9018M-H8

* Others : JIS, CE

Classifications

EN 757:1997 : E 55 3 Z B 32 H10
 AWS A5.5-06 : E10018-M

KS D 7006 : E7016
 JIS Z 3211 : E6918-N3M2

Description

- Covering is low hydrogen, iron powder type for welding of 690MPa class high tensile steel in bridge, pressure vessels, penstocks and machinery.
- Excellent mechanical properties especially in notch toughness.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.46	1.35	0.015	0.012	1.63	0.20	0.28	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30°C	-50°C	
AWS A5.5	610~690	min. 690	min. 16		≥ 27	
EN 757	min. 550	610~780	min. 18	≥ 47		
Example	640	750	29	80	45	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp.	F	90~130	130~180	180~240	250~320
(A)	V · OH	80~115	110~170	140~200	—

Approvals

JIS, CE

K-11018M

For 760MPa high tensile steel

Classifications

EN 757:1997 : E 62 3 Z B 32 H10
 AWS A5.5-06 : E11018-M

KS D 7006 : E8016
 JIS Z 3211 : E7618-N4M2

Description

- Covering is low hydrogen, iron powder type for welding of low alloy high strength steels having tensile properties of about 740~790MPa such as HY80, etc.
- Excellent mechanical properties especially in notch toughness.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.08	0.41	1.49	0.015	0.012	1.86	0.25	0.35	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30°C	-50°C	
AWS A5.5	680~760	min. 760	min. 20		≥ 27	
EN 757	min. 620	690~890	min. 18	≥ 47		
Example	730	830	22	80	45	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	50~100 40~90	90~130 80~120	130~180 110~160	180~240 140~200	240~320 —

Approvals

ABS

E11018M-H8

* Others : JIS, CE

Classifications

EN 757:1997 : E 69 3 Z B 32 H10
 AWS A5.5-06 : E12018-M

JIS Z 3211 : E8618-N4C2M2

Description

- Covering is low hydrogen, iron powder type for welding of 890MPa class high tensile steel in bridge, pressure vessels, penstocks and machinery.
- Excellent mechanical properties especially in notch toughness.
- Good radiographic soundness.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.08	0.30	1.46	0.014	0.013	1.86	0.95	0.41	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30°C	-50°C	
AWS A5.5	740~830	min. 830	min. 18		≥ 27	
EN 757	min. 690	760~960	min. 17	≥ 47		
Example	800	940	20	70	40	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp.	F	70~100	90~130	150~190	180~230	220~300
(A)	V · OH	60~90	70~100	120~160	140~180	—

Approvals

JIS, CE

K-8018D1

For 560MPa high tensile steel (Mn-Mo steel)

Classifications

EN ISO 2560-B:2006 : E 55 18-3M2 P H5 JIS Z 3211 : E5518-3M2 P H5
 AWS A5.5-06 : E8018-D1 H4

Description

- Covering is low hydrogen, iron powder type for welding of 560MPa class high tensile steel or 1.5%Mn-0.35%Mo steel.
- Very low hydrogen contents. (HD ≤ 4ml/100g)
- Excellent mechanical properties and radiographic soundness.
- Good notch toughness at -50°C.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.47	1.33	0.013	0.013	0.77	0.02	0.30	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-40°C	-50°C	
AWS A5.5	min. 460	min. 550	min. 19		≥ 27	
EN ISO 2560-B	min. 460	min. 550	min. 17		≥ 27	
Example	640	690	25	60	40	PWHT

* PWHT : 620°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F V · OH	70~100 60~90	90~150 80~130	150~190 120~170	190~260 140~200

Approvals

JIS, CE

K-10018D2

For 690MPa high tensile steel (Mn-Mo steel)

Classifications

EN 757:1997 : E 55 3 Z B T 32 H5
 AWS A5.5-06 : E10018-D2 H4

JIS Z 3211 : E6918-4M2 P H5

Description

- Covering is low hydrogen, iron powder type for welding of 560MPa class high tensile steel (ASTM A302 Gr.B) or 1.85%Mn-0.35%Mo steel.
- Very low hydrogen contents. ($HD \leq 4\text{ml}/100\text{g}$)
- Excellent mechanical properties especially in notch toughness.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.10	0.58	1.71	0.017	0.015	0.74	0.02	0.31	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30°C	-50°C	
AWS A5.5	min. 600	min. 690	min. 16		≥ 27	
EN 757	min. 550	610~780	min. 18	≥ 47		
Example	680	760	23	60	40	PWHT

* PWHT : 620°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F V · OH	70~100 60~90	90~150 80~130	150~190 120~170	190~260 140~200

Approvals

JIS, CE

K-8018D3

For 560MPa high tensile steel (Mn-Mo steel)

Classifications

EN ISO 2560-B:2006	: E 55 18-3M3 P H5	JIS Z 3211	: E5518-3M3 P H5
AWS A5.5-06	: E8018-D3 H4		

Description

- Covering is low hydrogen, iron powder type for welding of 560MPa class high tensile steel or 1.5%Mn-0.5%Mo steel.
- Very low hydrogen contents. (HD $\leq$ 4ml/100g)
- Excellent mechanical properties and radiographic soundness.
- Good notch toughness at -50°C.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.05	0.37	1.39	0.014	0.010	0.77	0.05	0.55	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-40°C	-50°C	
AWS A5.5	min. 460	min. 550	min. 19		≥ 27	
EN ISO 2560-B	min. 460	min. 550	min. 17		≥ 27	
Example	660	730	23	55	35	PWHT

* PWHT : 620°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F V · OH	70~100 60~90	90~150 80~130	150~190 120~170	190~260 140~200

Approvals

JIS

Classifications

EN ISO 2560-A:2006	: E 42 3 Z B 12 H10	KS D 7101	: DA5016W
EN ISO 2560-B:2006	: E 49 16-G A H10	JIS Z 3214	: DA5016W
AWS A5.5-06	: E7016-G		

Description

- Covering is low hydrogen type for welding of 490MPa class high tensile strength weathering type structural steel for vehicles, building and bridges.
- Excellent weather-proof property and crack resistance.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400℃ for 1~2 hours prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu
0.06	0.46	0.74	0.018	0.009	0.63	0.52	0.01	0.01	0.40

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J) -20℃ -30℃	Remarks
AWS A5.5	min. 400	min. 490	min. 22		
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 27	
Example	450	610	28	70 50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F V · OH	90~130 70~110	150~190 120~160	180~230 130~170	240~280 —

Approvals

CE

Classifications

AWS A5.5-06	: E7016-G
KS D 7101	: DA5016G
JIS Z 3214	: DA5016G

Description

- Covering is low hydrogen type for vertical-down welding of 490MPa class high tensile strength weathering type structural steel for vehicles, building and bridges.
- Excellent working efficiency in vertical-down welding.
- Excellent weather-proof property and crack resistance.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V	Cu
0.06	0.54	0.86	0.015	0.011	0.60	0.51	0.01	0.01	0.27

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-30°C	
AWS A5.5	min. 400	min. 490	min. 22			
JIS Z 3214	min. 390	min. 490	min. 23	≥ 47		
Example	440	540	32	100	50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0
Length	(mm)	350	400	400
Amp. (A)	V-down	120~160	170~210	220~280

Classifications

KS D 7101 : DA5026W

JIS Z 3214 : DA5026W

Description

- Covering is low hydrogen, iron powder type for flat and horizontal fillet welding of 490MPa class high tensile strength weathering type structural steel for buildings, bridges and other steel structures.
- Extremely high deposition rate and easy slag removal.
- Quiet and stable arc.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.07	0.30	0.92	0.015	0.012	0.53	0.51	0.01	0.39

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-30°C	
JIS Z 3214	min. 390	min. 490	min. 23	≥ 47		
Example	510	560	27	65	40	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	4.0	5.0	5.5	6.0
		400	450	450	450
Length	(mm)		500	500	500
			550	550	550
Amp. (A)	F H-fillet	160~200	200~250	220~270	250~300

Classifications

EN ISO 2560-A:2006	: E 50 0 Z B 12	KS D 7101	: DA5816W
EN ISO 2560-B:2006	: E 55 16-G A	JIS Z 3214	: DA5816W
AWS A5.5-06	: E8016-G		

Description

- Covering is low hydrogen type for welding of 560MPa class high tensile strength weathering type structural steel for buildings, bridges and other steel structures.
- Excellent weather-proof property and crack resistance.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.07	0.65	0.75	0.016	0.011	0.62	0.53	0.01	0.50

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				0°C	-20°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 2560-A	min. 500	560~720	min. 18	≥ 47		
Example	530	590	24	100	70	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F V · OH	90~130 70~110	150~190 120~160	180~230 130~170	240~280 —

Approvals

CE

Classifications

EN ISO 2560-A:2006	: E 46 2 Z B 32 H10
EN ISO 2560-B:2006	: E 55 18-NCC1 A U H10
AWS A5.5-06	: E8018-W2

Description

- Covering is low hydrogen, iron powder type for welding of 560MPa class high tensile strength weathering type structural steel for buildings, bridges and other steel structures. (ASTM A67 Gr.1 ; A242 Gr.all ; A588 Gr.all ; A606 Gr.all ; A709 Gr.70W)
- Excellent weather-proof properties and crack resistance of the deposited weld metal.
- Good weldability and usability.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.05	0.47	0.70	0.015	0.015	0.69	0.54	0.01	0.45

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-20°C	-30°C	
AWS A5.5	min. 460	min. 550	min. 20			
EN ISO 2560-A	min. 460	530~680	min. 20	≥ 47		
Example	530	590	24	80	60	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp.	F	70~110	90~130	150~190	180~230
(A)	V · OH	60~90	70~110	120~160	130~170

Approvals

CE

Classifications

EN ISO 2560-A:2006	: E 42 3 Z B 12 H10	KS D 7101	: DL5016-4A0
EN ISO 2560-B:2006	: E 49 16-G A H10	JIS Z 3211	: E4916-G
AWS A5.5-06	: E7016-G		

Description

- Covering is low hydrogen type for welding of aluminium-killed steel to be used for LPG tankers, LPG storage tanks, machineries and structures.
- Excellent notch toughness of deposited weld metal at low temperature.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.08	0.42	1.35	0.014	0.011	0.47	0.02	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30°C	-45°C	
AWS A5.5	min. 400	min. 490	min. 22			
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 47		
Example	490	570	30	130	90	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	50~100 30~80	70~130 70~100	150~190 120~160	220~250 150~200	250~310 —

Approvals

DNV	LR
5YH10	5Y40mH15

* Others : CE

Classifications

EN ISO 2560-A:2006	: E 42 5 Z B 12 H10	KS D 7101	: DL5016-6A1
EN ISO 2560-B:2006	: E 49 16-G A H10	JIS Z 3211	: E4916-G
AWS A5.1-04	: E7016-G		

Description

- Covering is low hydrogen type for welding of aluminium-killed steel to be used for LPG tankers, and LPG storage tanks, etc.
- Excellent notch toughness of deposited weld metal at low temperature.
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.37	1.45	0.013	0.010	1.37	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-50°C	-60°C	
AWS A5.5	min. 400	min. 490	min. 22			
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 27		
Example	520	590	28	120	100	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp.	F	50~100	70~130	150~190	220~250	250~300
(A)	V · OH	30~80	70~100	120~160	130~200	—

Approvals

CE

K-8016C1

For low temperature service steel (560MPa)

Classifications

EN ISO 2560-A:2006	: E 46 6 2Ni B 12 H10	KS D 7023	: DL5016-6P2
EN ISO 2560-B:2006	: E 55 16-N5 P U H10	JIS Z 3211	: E5516-N5 P U
AWS A5.5-06	: E8016-C1		

Description

- Covering is low hydrogen type for welding of 2.5%Ni steel and aluminium-killed steel used at low temperature, LPG tanks, etc.
- Excellent impact value at -60°C
- Good weldability and usability.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.45	0.98	0.016	0.013	2.25	0.03	0.02	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-50°C	-60°C	
AWS A5.5	min. 460	min. 550	min. 19		≥ 27	
EN ISO 2560-B	min. 460	500~550	min. 17		≥ 47	
Example	520	600	30	140	120	AW

* PWHT : 605°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~80	110~150 100~140	150~190 120~170	200~240 150~200	250~310 —

Approvals

CE

Classifications

EN ISO 2560-A:2006	: E 46 6 2Ni B 32 H10	JIS Z 3211	: E5518-N5 P U
EN ISO 2560-B:2006	: E 55 18-N5 P U H10		
AWS A5.5-06	: E8018-C1		

Description

- Covering is low hydrogen, iron powder type for welding of 2.5%Ni steel and aluminium-killed steel used at low temperature, LPG tanks, etc.
- Stable arc in flat and horizontal fillet welding.
- Weld metal of fine ripple mark without undercut can be obtained.
- Redry the electrode at 300~400℃ for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.06	0.60	0.96	0.015	0.012	2.41	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-50℃	-60℃	
AWS A5.5	min. 460	min. 550	min. 19		≥ 27	
EN ISO 2560-B	min. 460	500~550	min. 17		≥ 47	
Example	500	600	32	120	100	PWHT

* PWHT : 605℃x1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp.	F	60~100	90~130	130~190	190~250	250~300
(A)	V · OH	60~90	85~120	110~160	—	—

Approvals

ABS	DNV	LR
3YH10,E8018-C1	3YH15	3YmH15

* Others : CE

Classifications

EN ISO 2560-A:2006	: E 46 6 3Ni B 12 H10	KS D 7023	: DL5016-6P3
EN ISO 2560-B:2006	: E 55 16-N7 P H10	JIS Z 3211	: E5516-N7 P
AWS A5.5-06	: E8016-C2		

Description

- Covering is low hydrogen type for welding of 3.5%Ni steel and aluminium-killed steel used at low temperature, LPG tanks, etc.
- Excellent impact value at -75°C
- Good weldability and usability.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.45	1.10	0.014	0.011	3.46	0.04	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-60°C	-75°C	
AWS A5.5	min. 460	min. 550	min. 19		≥ 27	
EN ISO 2560-B	min. 460	500~550	min. 17		≥ 27	
Example	500	610	30	70	55	PWHT

* PWHT : 605°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	50~90 50~80	90~130 80~120	130~180 110~160	180~240 150~200	220~260 —

Approvals

CE

Classifications

EN ISO 2560-A:2006	: E 46 6 3Ni B 32 H10	JIS Z 3211	: E5518-N7 P
EN ISO 2560-B:2006	: E 55 18-N7 P H10		
AWS A5.5-06	: E8018-C2		

Description

- Covering is low hydrogen, iron powder type for welding of 3.5%Ni steel and aluminium-killed steel used at low temperature, LPG tanks, etc.
- Fast, efficient metal transfer in all positions.
- Excellent notch toughness of the deposited weld metal at low temperature.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.32	1.12	0.013	0.012	3.45	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-60°C	-75°C	
AWS A5.5	min. 460	min. 550	min. 19		≥ 27	
EN ISO 2560-B	min. 460	500~550	min. 17		≥ 27	
Example	530	620	28	55	40	PWHT

* PWHT : 605°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp.	F	60~90	90~130	135~180	190~240	250~310
(A)	V · OH	50~80	80~120	110~170	—	—

K-8018C3

For low temperature service steel (560MPa)

Classifications

EN ISO 2560-A:2006	: E 46 6 3Ni B 32 H10	JIS Z 3211	: E5518-N2 U
EN ISO 2560-B:2006	: E 55 18-N2 A U H10		
AWS A5.5-06	: E8018-C3		

Description

- Covering is low hydrogen, iron powder type for welding of 1%Ni steel and high tensile strength steel for military and commercial applications where good impact property.
- Fast, efficient metal transfer in all positions.
- Excellent deposited weld metal with both AC and DC power source.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.45	0.91	0.013	0.012	1.03	0.02	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30°C	-40°C	
AWS A5.5	470~550	min. 550	min. 24		≥ 27	
EN ISO 2560-B	min. 460	530~680	min. 20		≥ 47	
Example	530	600	28	100	60	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp. (A)	F V · OH	60~95 60~90	90~130 80~120	135~180 110~170	190~240 —

Approvals

ABS	LR
3YH10,E8018-C3	3YmH15

* Others : CE

Classifications

EN ISO 2560-A:2006	: E 42 3 1Ni B 32 H5	JIS Z 3211	: E4918-N2 H5
EN ISO 2560-B:2006	: E 49 18-N2 A H5		
AWS A5.5-06	: E7018-C3L H4R		

Description

- Covering is low hydrogen, iron powder type for welding of 1%Ni steel and aluminium-killed steel used at low temperature, LPG tanks, etc.
- Fast, efficient metal transfer in all positions and very low hydrogen contents. (HD ≤4ml/100g)
- Excellent notch toughness of the deposited weld metal at low temperature.
- Redry the electrode at 300~400℃ for 1~2 hours prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.05	0.31	0.86	0.016	0.016	1.01	0.05	0.02	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30℃	-50℃	
AWS A5.5	min. 390	min. 490	min. 22		≥ 27	
EN ISO 2560-A	min. 420	500~640	min. 20	≥ 47		
Example	530	620	34	90	50	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp. (A)	F V · OH	60~90 50~80	90~140 80~120	150~190 120~160	180~230 —

Approvals

CE

K-8016C4

For low temperature service steel (560MPa)

Classifications

EN ISO 2560-A:2006	: E 46 5 Z B 12 H5	JIS Z 3211	: E5516-N3 U H5
EN ISO 2560-B:2006	: E 55 16-N3 A U H5		
AWS A5.5-06	: E8016-C4 H4		

Description

- Covering is low hydrogen, iron powder type for welding of 1.5%Ni steel and aluminium-killed steel used at low temperature, LPG tanks, etc.
- Excellent notch toughness of the deposited weld metal at low temperature.
- Good weldability and usability and very low hydrogen contents. ($HD \leq 4\text{ml}/100\text{g}$)
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.06	0.56	0.85	0.013	0.011	1.26	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				-30°C	-50°C	
AWS A5.5	min. 460	min. 550	min. 19		≥ 27	
EN ISO 2560-A	min. 460	530~680	min. 20		≥ 47	
Example	530	600	28	110	70	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp.	F	60~90	90~140	150~190	180~230
(A)	V · OH	50~80	80~120	120~160	—

Approvals

CE

Classifications

EN ISO 3580-B:2008	: E 49 10-1M3
AWS A5.5-06	: E7010-A1

Description

- Covering is high cellulose type for all positions welding of 0.5%Mo steel pipes used for high pressure, high temperature steam service, structural steel and plates or castings.
- Extremely good radiographic soundness and mechanical properties.
- Not to use the currents exceeding the recommended currents.
- Redry the electrode at 70~80°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.09	0.14	0.43	0.015	0.009	0.05	0.06	0.58	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 390	min. 490	min. 22			
EN ISO 3580-B	min. 390	min. 490	min. 20			
Example	440	550	29	60	50	PWHT

* PWHT : 620°Cx1Hr

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	350	350
Amp.	F	50~75	70~110	110~150	160~200
(A)	V · OH	30~70	60~100	90~130	130~170

Approvals

ABS

3Y,E7010-A1

* Others : CE

K-7016A1

For heat-resisting steel (0.5%Mo)

Classifications

EN ISO 3580-A:2008	: E Mo B 12 H10	KS D 7022	: DT1216
EN ISO 3580-B:2008	: E 49 16-1M3 H10	JIS Z 3223	: DT1216
AWS A5.5-06	: E7016-A1		

Description

- Covering is low hydrogen type for welding of alloys used for high temperature service such as C-Mn steel pipes(STPA 12, A335-P1), boiler and heat exchanger steel tubes, rolled steel and cast steel.
- Preheat at 100~200°C and postheat treat at 620~680°C
- Satisfactory bead appearance and slag removal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.54	0.83	0.015	0.009	0.02	0.03	0.52	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 390	min. 490	min. 22			
EN ISO 3580-A	min. 355	min. 510	min. 22	≥ 47		
Example	560	650	31	60	50	PWHT

* PWHT : 620°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	55~85 50~80	90~130 80~120	140~190 110~170	180~250 130~200	240~300 —

Approvals

CE

Classifications

EN ISO 3580-A:2008	: E Mo B 32 H10
EN ISO 3580-B:2008	: E 49 18-1M3 H10
AWS A5.5-06	: E7018-A1

Description

- Covering is low hydrogen, iron powder type for welding of alloys steel of 490MPa minimum yield point 0.5%Mo steel of pressure pipe, casting and general fabrication of pressure vessel.
- Preheat at 100~200℃ and postheat treat at 620~680℃
- High deposition rate in all positions.
- Redry the electrode at 300~400℃ for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.06	0.49	0.72	0.015	0.011	0.02	0.03	0.53	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20℃	0℃	
AWS A5.5	min. 390	min. 490	min. 22			
EN ISO 3580-A	min. 355	min. 510	min. 22	≥ 47		
Example	590	680	28	130	110	PWHT

* PWHT : 620℃x1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~80	80~120 70~110	130~180 100~160	190~240 —	240~300 —

Approvals

CE

K-8016B1

For heat-resisting steel (0.5%Cr-0.5%Mo)

Classifications

EN ISO 3580-A:2008	: E CrMo0.5 B 12 H10
EN ISO 3580-B:2008	: E 55 16-CM H10
AWS A5.5-06	: E8016-B1

Description

- Covering is low hydrogen type for welding of 0.5%Cr-0.5%Mo steel used high temperature high pressure boilers, chemical equipment and oil refining plants.(A335-P2, A213-T2)
- Preheat at 150~250°C and postheat treat at 620~680°C
- Excellent crack resistance because of low hydrogen contents.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.07	0.51	0.81	0.014	0.010	0.02	0.51	0.49	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 3580-A	min. 355	min. 510	min. 22	≥ 47		
Example	590	670	26	70	50	PWHT

* PWHT : 690°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	50~85 40~80	90~130 80~120	130~180 100~160	190~240 130~200	250~320 —

Approvals

CE

Classifications

EN ISO 3580-A:2008	: E CrMo1 B 12 H10	KS D 7022	: DT2316
EN ISO 3580-B:2008	: E 55 16-1CM H10	JIS Z 3223	: DT2316
AWS A5.5-06	: E8016-B2		

Description

- Covering is low hydrogen type for welding of 1.25%Cr-0.5%Mo steel used for super-heater tubes, steam pipes, heaters of boilers for thermoelectric power plant and equipments oil refining industries.
- Preheat at 150~300°C and postheat treat at 680~730°C
- Excellent crack resistance because of low hydrogen contents.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.06	0.47	0.65	0.014	0.012	0.03	1.31	0.52	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 3580-A	min. 355	min. 510	min. 22	≥ 47		
Example	570	650	26	80	60	PWHT

* PWHT : 690°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp.	F	60~90	80~120	130~180	180~230	240~300
(A)	V · OH	50~80	75~110	100~160	—	—

Approvals

CE

K-8018B2

For heat-resisting steel (1.25%Cr-0.5%Mo)

Classifications

EN ISO 3580-A:2008	: E CrMo1 B 32 H10	KS D 7022	: DT2318
EN ISO 3580-B:2008	: E 55 18-1CM H10	JIS Z 3223	: DT2318
AWS A5.5-06	: E8018-B2		

Description

- Covering is low hydrogen, iron powder type for welding of 1.25%Cr-0.5%Mo steel used for steam pipes of boilers, oil refining industries, pressure vessels for high temperature service.
- Preheat at 150~300°C and postheat treat at 680~730°C
- High deposition rate in all positions.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.06	0.61	0.70	0.014	0.011	0.02	1.32	0.55	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 3580-A	min. 355	min. 510	min. 22	≥ 47		
Example	590	670	25	80	65	PWHT

* PWHT : 690°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp.	F	65~95	90~130	130~190	190~250	250~300
(A)	V · OH	60~90	80~120	110~170	—	—

Approvals

ABS	DNV	LR
3YH10, E8018-B2	3YH10	3YmH15

* Others : CE

Classifications

EN ISO 3580-A:2008	: E CrMo2 B 12 H10	KS D 7022	: DT2416
EN ISO 3580-B:2008	: E 62 16-2CM H10	JIS Z 3223	: DT2416
AWS A5.5-06	: E9016-B3		

Description

- Covering is low hydrogen type for welding of 2.25%Cr-1%Mo steel used for super-heater tubes, steam pipes, heaters of boilers for thermoelectric power plant and equipments oil refining industries.
- Preheat at 150~300°C and postheat treat at 680~730°C
- Excellent crack resistance because of low hydrogen contents.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.08	0.45	0.78	0.016	0.011	0.03	2.37	1.03	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 530	min. 620	min. 17			
EN ISO 3580-A	min. 400	min. 500	min. 18	≥ 47		
Example	620	710	24	55	40	PWHT

※ PWHT : 690°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp. (A)	F V · OH	60~100 60~90	90~130 75~115	130~190 110~170	190~240 —

Approvals

CE

K-9018B3

For heat-resisting steel (2.25%Cr-1%Mo)

Classifications

EN ISO 3580-A:2008	: E CrMo2 B 32 H10	KS D 7022	: DT2418
EN ISO 3580-B:2008	: E 62 18-2CM H10	JIS Z 3223	: DT2418
AWS A5.5-06	: E9016-B3		

Description

- Covering is low hydrogen, iron powder type for all positions welding of 2.25%Cr-1%Mo steel used for steam pipe of boilers, oil refining industries, pressure vessels for high temperature service.
- Preheat at 150~300°C and postheat treat at 680~730°C
- High deposition rate in all positions.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.08	0.50	0.77	0.018	0.011	0.03	2.25	1.02	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 530	min. 620	min. 17			
EN ISO 3580-A	min. 400	min. 500	min. 18	≥ 47		
Example	680	750	21	50	35	PWHT

* PWHT : 690°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp. (A)	F V · OH	60~100 60~90	90~130 80~120	140~190 110~170	190~250 —

Approvals

CE

Classifications

EN ISO 3580-A:2008	: E CrMo5 B 22 H10	KS D 7022	: DT2516
EN ISO 3580-B:2008	: E 55 15-5CM H10	JIS Z 3223	: DT2516
AWS A5.5-06	: E8015-B6		

Description

- Covering is low hydrogen type for welding of 5%Cr-0.5%Mo steel used in oil refining and chemical industries, heat treated high tensile strength steel for aircraft part such as SAE 4130.
- Preheat at 250~350°C and postheat treat at 750~850°C
- Excellent crack resistance because of low hydrogen contents.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.08	0.35	0.84	0.017	0.012	0.04	5.25	0.55	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 3580-A	min. 400	min. 500	min. 17	≥ 47		
Example	670	720	23	60	50	PWHT

* PWHT : 740°Cx1Hr

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp.	F	50~90	75~115	120~160	160~210	210~260
(A)	V · OH	50~80	70~110	90~130		

Approvals

CE

K-8016B6

For heat-resisting steel (5%Cr-0.5%Mo)

Classifications

EN ISO 3580-A:2008	: E CrMo5 B 12 H10	KS D 7022	: DT2416
EN ISO 3580-B:2008	: E 55 16-5CM H10	JIS Z 3223	: DT2416
AWS A5.5-06	: E8016-B6		

Description

- Covering is low hydrogen type for welding of 5%Cr-0.5%Mo steel used in oil refining and chemical industries, heat treated high tensile strength steel for aircraft part such as SAE 4130.
- Preheat at 250~350°C and postheat treat at 750~850°C
- Excellent crack resistance because of low hydrogen contents.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.06	0.43	0.57	0.018	0.012	0.04	4.98	0.51	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 3580-A	min. 400	min. 500	min. 17	≥ 47		
Example	680	740	22	55	45	PWHT

* PWHT : 740°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	5.0
Length	(mm)	350	350	400	400	400
Amp. (A)	F V · OH	50~90 50~80	80~120 70~110	120~160 90~130	160~210 —	210~260 —

Approvals

CE

Classifications

EN ISO 3580-B:2008	: E 62 15-9C1M H10	KS D 7022	: DT2616
AWS A5.5-06	: E8015-B8	JIS Z 3223	: DT2616

Description

- Covering is low hydrogen type for welding of super-heater tubes of high temperature and high pressure boilers, heater tubes of oil refining equipments.
- Preheat at 250~350°C and postheat treat at 750~850°C because of high self-hardening property of the deposited weld metal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.08	0.45	0.88	0.018	0.011	0.03	8.86	0.95	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 3580-B	min. 530	min. 620	min. 15			
Example	670	760	22	45	40	PWHT
* PWHT : 740°Cx1Hr						

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	60~90 50~60	80~120 70~110	120~160 90~150	160~220	210~260

Approvals

CE

K-8016B8

For heat-resisting steel (9%Cr-1%Mo)

Classifications

EN ISO 3580-B:2008	: E 62 16-9C1MH10	KS D 7022	: DT2616
AWS A5.5-06	: E8016-B8	JIS Z 3223	: DT2616

Description

- Covering is low hydrogen type for welding of super-heater tubes of high temperature and high pressure boilers, heater tubes of oil refining equipments.
- Preheat at 250~350°C and postheat treat at 750~850°C because of high self-hardening property of the deposited weld metal.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	V
0.08	0.74	0.98	0.020	0.013	0.03	8.48	0.90	0.01

Typical mechanical properties of all-weld metal

	Y.S (MPa)	T.S (MPa)	El. (%)	IV (J)		Remarks
				20°C	0°C	
AWS A5.5	min. 460	min. 550	min. 19			
EN ISO 3580-B	min. 530	min. 620	min. 15			
Example	690	780	21	50	45	PWHT

* PWHT : 740°Cx1Hr

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0	6.0
Length	(mm)	350	350	400	400	450
Amp. (A)	F V · OH	55~90 50~80	80~120 70~110	120~160 90~150	160~220 —	210~260 —

Approvals

CE

Classifications

EN 14700:2005	: E Fe 1
KS D 7035	: DF2A-250-R
JIS Z 3251	: DF2A-250-R

Description

- Covering is high titania type for hardfacing of shafts, tires, gears, crane wheels, etc.
- Easy slag removal.
- Beautiful, smooth bead appearance.
- Extremely machinable the deposited weld metal.
- Preheat at 150~200°C only for low alloy steel and high carbon steel.
- Redry the electrode at 70~100°C for 30-60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.11	0.42	0.98	0.016	0.013	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded	
	Continuous surfacing	Interpass temperature max. 100°C
HV	225~240	245~265
HRC	16~20	21~25
HS	33~34	35~38

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	80~120	140~170	170~210	200~250

Classifications

EN 14700:2005	: E Fe 1
KS D 7035	: DF2A-250-B
JIS Z 3251	: DF2A-250-B

Description

- Covering is low hydrogen type for hardfacing and repairing of worn parts such as shafts, gears, wheels, etc.
- Stable arc, smooth bead appearance and easy slag removal.
- High abrasion resistance and impact resistance.
- Good machinable the deposited weld metal.
- Preheat at 150~200°C only for multilayer welding of low alloy steell and high carbon steel.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.18	0.69	2.28	0.013	0.009	0.02	0.03	0.01	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded	Heat treated	
	Interpass temp. 150°C	900°C oil quenching	650°C stress relief
HV	278	395	250
HRC	26.8	40.3	22.2
HS	39	54	36

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	90~130	140~180	180~240	220~300

Classifications

KS D 7035 : DF2A-300-R

JIS Z 3251 : DF2A-300-R

Description

- Covering is high titania type for hardfacing of shaft, roller, spindle, crane wheel, etc.
- Excellent slag removal and smooth bead appearance.
- Good machinable the deposited weld metal.
- Preheat at 150°C only for multilayer welding of low alloy steel and high carbon steel.
- Redry the electrode at 70~100°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.20	0.28	0.30	0.025	0.022	0.03	2.40	0.01	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded	Heat treated	
	Interpass temp. 150°C	900°C oil quenching	650°C stress relief
HV	308	420	285
HRC	30.8	42.7	27.8
HS	43	57	41

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	80~130	140~180	170~240	240~300

Classifications

EN 14700:2005	: E Fe 1
KS D 7035	: DF2A-300-B
JIS Z 3251	: DF2A-300-B

Description

- Covering is low hydrogen type for hardfacing of shafts, roller, spindle, crane wheel, etc.
- Good usability.
- High abrasion resistance and impact resistance.
- Good machinable the deposited weld metal.
- Preheat at 150°C only for multilayer welding of low alloy steel and high carbon steel.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.20	0.60	1.48	0.018	0.011	0.02	0.70	0.01	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded	Heat treated	
	Interpass temp. 150°C	900°C oil quenching	650°C stress relief
HV	308	408	280
HRC	30.8	41.6	27.1
HS	43	56	40

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	80~130	140~180	170~240	240~300

Classifications

EN 14700:2005	: E Fe 1
KS D 7035	: DF2A-350-R
JIS Z 3251	: DF2A-350-R

Description

- Covering is high titania type for hardfacing of shaft and clutch lugs, etc.
- Easy slag removal and smooth bead appearance.
- Extremely machinable the deposited weld metal.
- Preheat at 150°C and over only for cast steel, low alloy steel and high carbon steel.
- Redry the electrode at 70~100°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.19	0.44	0.74	0.015	0.011	0.02	2.60	0.01	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded	Heat treated	
	Interpass temp. 150°C	900°C oil quenching	650°C stress relief
HV	350	435	300
HRC	35.5	44.1	29.8
HS	48	59	42

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	90~120	140~170	190~230	220~280

Classifications

KS D 7035	: DF2B-350-B
JIS Z 3251	: DF2B-350-B

Description

- Covering is low hydrogen type for hardfacing of fans, upper rollers, shafts and sprockets.
- Machining is possible in general.
- Hardness increases by quenching after machining.
- Suitable for intermetallic abrasion and moderate impact abrasion.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.36	0.65	0.74	0.014	0.011	0.02	2.00	0.01	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded	Heat treated	
	Interpass temp. 150°C	900°C oil quenching	650°C stress relief
HV	358	440	300
HRC	36.1	44.5	29.8
HS	49	59	42

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	90~130	140~180	190~240	220~300

Classifications

KS D 7035 : DF2B-450-B

JIS Z 3251 : DF2B-450-B

Description

- Covering is low hydrogen type for hardfacing of idlers, rollers, bulldozer blades, sprockets, caterpillar links, crushers, dipper teeth and conveyors, etc.
- The deposited weld metal has typical martensite structure and high grade of hardness and ductility as welded.
- Machining is impossible as welded.
- Preheat at 150°C and over in general.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.38	0.84	1.56	0.014	0.011	0.02	2.52	0.03	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded		Heat treated (furnace coding)	
	Interpass temp. 150°C	Interpass temp. 300°C	550°Cx6Hr.	625°Cx6Hr.
HV	452	408	443	348
HRC	45.5	41.6	44.8	35.8
HS	60	56	59	48

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	80~120	130~170	170~230	220~280

Classifications

KS D 7035	: DF2B-700-B
JIS Z 3251	: DF2B-700-B

Description

- Covering is low hydrogen type for hardfacing of cutter knives, dredger and mixer.
- The deposited weld metal has martensite structure.
- In the case of multilayer build-up welding base plates of hardening properties, under-laying with low hydrogen type carbon steel electrode.
- Preheat at 150°C and over in general.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.48	1.42	1.36	0.015	0.012	0.03	3.65	0.02	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded		Heat treated	
	Interpass temp. 200°C	Interpass temp. 300°C	600°C stress relief	
HV	688	690	585	
HRC	59.6	59.7	54.4	
HS	81	81	73	

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	90~130	140~170	190~240	220~300

Classifications

KS D 7035 : DF3B-600-BR

JIS Z 3251 : DF3B-600-BR

Description

- Covering is lime titania type for hardfacing of dies, clutch cams and metal mould.
- Excellent working efficiency.
- Excellent slag removal and restriking properties.
- Excellent heat-resisting, crack-resisting, wear-resisting and impact-resisting properties.
- In the case of multilayer build-up welding base plates of hardening properties, under-laying with low hydrogen type carbon steel electrode.
- Redry the electrode at 70~120°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	V	W
0.50	0.09	0.52	0.021	0.012	0.04	6.1	0.4	1.8

Typical mechanical properties of all-weld metal

Conditions	Continuous surfacing	As welded Interpass temp. max.100°C	Preheating 200°C, Continuous surfacing
HV	570	650	580
HRC	53.6	57.8	54.1
HS	71	78	72

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0
Length	(mm)	350	400	400
Amp. (A)	F	80~100	120~150	160~200

Classifications

KS D 7035	: DF3C-700-B
JIS Z 3251	: DF3C-700-B

Description

- Covering is low hydrogen type for hardfacing of impellers, pump casings.
- The deposited weld metal has an extremely hard martensite structure.
- Machining is impossible as welded.
- Preheat at 200°C and over.
- Postheat treat at about 600°C immediately after welding.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.47	1.45	1.51	0.017	0.012	0.03	4.10	0.02	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded		Heat treated	
	Interpass temp. 150°C	Interpass temp. 200°C	600°C stress relief	
HV	723	810	535	
HRC	61.1	64.4	51.4	
HS	83	89	69	

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	90~130	140~170	190~240	220~300

Classifications

KS D 7035 : DF4B-500-B

JIS Z 3251 : DF4B-500-B

Description

- Covering is low hydrogen type for hardfacing of cold or hot shearer blade, liner pump casing generator water turbine, liner dredger.
- The deposited weld metal has the microstructure of martensite.
- Abrasion resisting properties is good at elevated temperature, so it is used for repairing of hot tool.
- Preheating is not necessary in general, but preheat at 150 and over only for high carbon steels and low alloy steels.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.40	1.28	0.46	0.025	0.010	0.35	11.2	1.40	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded Interpass temp. 150°C
HV	540
HRC	51.7
HS	69

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0
Length	(mm)	350	400	400
Amp. (A)	F	90~110	110~150	150~200

Classifications

KS D 7035	: DFMA-250-B
JIS Z 3251	: DFMA-250-B

Description

- Covering is high titania type for hardfacing of crushers, high manganese rails, buckets, bulldozer parts and build-up of parts subject to severe impact and abrasion.
- The deposited weld metal has austenite structure.
- Extremely ductile deposited weld metal.
- When the base metal of 13% Mn steel is hardened, cut off the hardened zone before welding.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.52	0.30	12.10	0.018	0.012	0.02	2.52	0.03	0.01

Typical mechanical properties of all-weld metal

Conditions	As welded Interpass temp. 150°C	Work hardenability
HV	225	510
HRC	16.9	49.8
HS	33	66.5

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0	6.0
Length	(mm)	350	400	400	450
Amp. (A)	F	90~130	140~180	190~240	220~300

Classifications

KS D 7035 : DFWA-700-S

JIS Z 3251 : DFWA-700-S

Description

- Hardfacing of cutter knives, shovel teeth, cutter for coal, concrete cutters and earth drills.
- The deposited weld metal is harder than other kinds of deposited weld metal.
- Extremely excellent heavy soil abrasion resistance.
- The deposited weld metal has tungsten carbide alloy.
- Machining is impossible.
- Preheat at 300°C and high over.
- Postheat treat at about 600°C immediately after welding.
- Redry the electrode at 70~120°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	W
2.98	0.60	1.88	0.022	0.014	0.04	0.02	0.01	48.0

Sizes available and recommended currents (AC or DC +)

Conditions	As welded Interpass temp. max. 350°C
HV	820
HRC	64.7
HS	90

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0
Length	(mm)	350	400	400
Amp. (A)	F	90~130	120~180	170~230

Description

- Covering is low hydrogen type for hardfacing of press mould, forged metal mould, tool steel and hardened part by quenching.
- The microstructure of deposited weld metal has martensite.
- Excellent impact-resisting and wear-resisting properties at high temperature as well as room temperature.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.30	0.36	0.3	0.035	0.009	0.45	9.4	1.3	12.1

Typical mechanical properties of all-weld metal

Conditions	As welded	
	Continuous surfacing	Interpass temp, max. 100°C
HV	580~620	590~610
HRC	54~56	55~56
HS	70~75	73~75

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0
Length	(mm)	350	400	400
Amp. (A)	F	70~90	100~120	130~170

Description

- Covering is lime titania type for hardfacing of hot roller dies, tong punch and hot cutting knife, etc.
- The deposited weld metal has the microstructure of a fine carbide precipitation in austenite matrix.
- The high temperature hardness over 600°C is high, so it has excellent abrasion-resistance.
- Machining is possible in general.
- Good bead appearance and restriking properties, preheating is not necessary in general, but preheat at 150°C and over only for high carbon steels and low alloy steels.
- Redry the electrode at 70~120°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.30	0.48	12.4	0.016	0.014	0.02	11.8	1.5	1.8

Typical mechanical properties of all-weld metal

Conditions	As welded
HV	310
HRC	31
HS	43

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	4.0	5.0
Length	(mm)	400	400
Amp. (A)	F	140~170	190~230

Description

- Hardfacing of roller and shear used at elevated temperature, ingot tongs and forged metal mould.
- The deposited weld metal has the microstructure of carbide precipitation in the austenite matrix.
- Preheat at about 150°C and maintain the interpass temperature above 150°C for multilayer welding of low alloy steels and high carbon steel.
- Redry the electrode at 70~120°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	W
0.29	0.15	1.25	0.015	0.012	8.2	16.4	45.0	5.4

Typical mechanical properties of all-weld metal

Conditions	As welded	
	Continuous surfacing	Interpass temp. max. 150°C
HV	250	320
HRC	22.2	32.2
HS	36	45

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0
Length	(mm)	350	400	400
Amp. (A)	F	100~120	120~150	150~180

KOSPEL-600H

For hardfacing (Hv 600)

Description

- Covering is low hydrogen type for hardfacing of metal mould, thermal cutting off machine, forging moule, dotting punch, compression tap, impact tap and axis of rotation.
- The microstructure of deposited weld metal has mertsense.
- Preheat at 200~300°C and postheat treat at 500~600°C, if possible.
- Keep up interpass temperature same as preheating temperature, if possible.
- Redry the electrode at 300~400°C for 1~2 hours prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	V	W
0.25	0.59	0.95	0.018	0.013	0.02	2.5	1.0	4.2

Typical mechanical properties of all-weld metal

Conditions	As welded		Heat treated (Air cooling)			
	Continuous surfacing	Preheat and interpass temp. 150°C	350°C X 2Hr	550°C X 2Hr	650°C X 2Hr	780°C X 2Hr
HV	520~570	560~600	570~620	640~690	530~580	280~320
HRC	51~54	53~55	54~56	57~60	51~54	27~32
HS	67~71	71~74	71~75	77~81	67~72	40~45

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	400	400	400
Amp. (A)	F	90~130	100~150	120~170	150~200

KOSPEL-800R

For hardfacing (Hv 800)

Description

- Covering is lime titania type for hardfacing of conveyor screw, caterpillar, crusher and dredger teeth.
- Excellent friction and impact abrasion resisting properties.
- Preheat at 200°C and postheat treat at 500-600°C.
- Redry the electrode at 70-120°C for 30-60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	V	W
0.38	0.42	0.32	0.025	0.015	0.04	5.5	0.8	2.5

Typical mechanical properties of all-weld metal

Conditions	As welded	
	Continuous surfacing	Preheat and interpass tem. max 300°C
HV	760~820	700~750
HRC	63~65	60~62
HS	86~90	81~85

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp. (A)	F	80~140	90~160	120~180	140~200

KST-307-15

For stainless steel (19%Cr-9%Ni-5%Mn)

Classifications

AWS A5.4-06	: E307-15
KS D 7014	: E307-15
JIS Z 3221	: ES307-15

Description

- Welding of dissimilar steel such as austenitic manganese steel to carbon steel forgings. Joining work-hardenable steels, armour plate, austenitic manganese steels, and heat-resisting steels for temperatures up to 350°C and dissimilar metals. Hardfacing of hot working tools, stainless valve steels and carbon steel items that must possess abrasion resistance in cold working.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.06	0.76	4.68	0.028	0.012	9.3	18.5	0.6	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 590	min. 30	
JIS Z3221		min. 590	min. 25	
Example	470	650	48	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	300	350	350	350
Amp. (A)	F V · OH	55~80 45~60	80~120 70~90	100~150 90~130	140~180 —

KST-308-15

For stainless steel (18%Cr-8%Ni)

Classifications

EN 1600:1997	: E 19 9 B 22	KS D 7014	: E308-15
AWS A5.4-06	: E308-15	JIS Z 3221	: ES308-15

Description

- Covering is lime titania type for welding of 18%Cr-8%Ni stainless steel. (AISI 301, 302, 304, 308)
- Easy welding performance without hardening brittleness because of austenitic structure of the deposited weld metal.
- Good heat resistance and corrosion resistance.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.06	0.38	1.54	0.025	0.016	9.6	20.5	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 35	
EN 1600	min. 350	min. 550	min. 30	
Example	480	600	38	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	40~50 35~45	50~80 40~60	80~110 70~100	110~150 90~130	140~180 —

Approvals

CE

Classifications

EN 1600:1997 : E 19 9 R 12
 AWS A5.4-06 : E308-16

KS D 7014 : E308-16
 JIS Z 3221 : ES308-16

Description

- Covering is lime titania type for welding of 18%Cr-8%Ni stainless steel. (AISI 301, 302, 304, 308)
- Easy welding performance without hardening brittleness because of austenitic structure of the deposited weld metal.
- Good heat resistance and corrosion resistance.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.05	0.78	1.22	0.024	0.018	9.3	19.3	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 35	
EN 1600	min. 350	min. 550	min. 30	
Example	470	620	45	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	40~50 35~45	50~80 40~60	80~110 70~100	110~150 90~130	140~180 -

Approvals

ABS	BV	DNV	GL	KR
E308-16	UP	308	4306	RD308

* Others : CWB, CE

KST-308L-15

For stainless steel (Low C, 18%Cr-8%Ni)

Classifications

EN 1600:1997	: E 19 9 L B 22	KS D 7014	: E308L-15
AWS A5.4-06	: E308L-15	JIS Z 3221	: ES308L-15

Description

- Covering is lime titania type for welding of 18%Cr-8%Ni stainless steel. (AISI 301, 302, 304, 308)
- Excellent welding efficiency because of high deposition rate.
- Remove water, rust, oil and all foreign matters from the groove prior to welding.
- Preheating is not necessary in general.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.03	0.41	1.67	0.022	0.015	9.5	20.6	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 520	min. 35	
EN 1600	min. 320	min. 510	min. 30	
Example	430	590	44	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	40~50 35~45	50~80 40~60	90~130 70~90	110~150 90~130	140~180 —

Approvals

CE

Classifications

EN 1600:1997 : E 19 9 L R 12
 AWS A5.4-06 : E308L-16

KS D 7014 : E308L-16
 JIS Z 3221 : ES308L-16

Description

- Covering is lime titania type for welding of 18%Cr-8%Ni stainless steel. (AISI 301, 302, 304, 308)
- Excellent welding efficiency because of high deposition rate.
- Remove water, rust, oil and all foreign matters from the groove prior to welding.
- Preheating is not necessary in general.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.03	0.80	0.84	0.023	0.016	9.6	19.3	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 520	min. 35	
EN 1600	min. 320	min. 510	min. 30	
Example	430	600	44	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	40~50 35~45	55~80 40~60	90~130 70~90	110~150 90~130	140~180

Approvals

ABS	BV	GL	LR
E308L-16	UP	4306	304Lm

* Others : CWB, TÜV, CE

KST-308H

For stainless steel (High C, 18%Cr-8%Ni)

Classifications

EN 1600:1997 : E 19 9 H R 12
AWS A5.4-06 : E308H-16

JIS Z 3221 : ES308H-16

Description

- Covering is lime titania type for welding of 18%Cr-8%Ni stainless steel and it is recommended to be use for high temperature (about 600°C) service. (STS 304H, 307H)
- Excellent creep resistance at elevated temperature.
- Good heat resistance and corrosion resistance.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.06	0.75	0.85	0.025	0.016	9.3	19.6	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 35	
EN 1600	min. 350	min. 550	min. 30	
Example	480	600	38	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp. (A)	F V · OH	50~80 40~70	70~110 60~90	110~150 90~130	140~180 —

Approvals

CE

KST-308Mo

For stainless steel (18%Cr-8%Ni-2.5%Mo)

Classifications

EN 1600:1997 : E 20 10 3 R 12

AWS A5.4-06 : E308Mo-16

KS D 7014 : E308Mo-16

JIS Z 3221 : ES308Mo-16

Description

- Covering is lime titania type for butt and fillet welding of ASTM CF8M stainless steel castings.
- Used for welding wrought materials such as Type 316L stainless when increased ferrite is desired.
- Good heat resistance and corrosion resistance.
- Welds are carefully cleaned using a stainless steel wire brush.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.05	0.36	1.42	0.024	0.016	9.4	19.8	2.1	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 35	
EN 1600	min. 400	min. 620	min. 20	
Example	580	700	20	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	300	350	350	350
Amp. (A)	F V · OH	50~80 40~70	70~110 60~90	110~150 90~130	140~180 —

Approvals

CE

KST-309-15

For stainless steel (Dissimilar joint welding)

Classifications

AWS A5.4-06	: E309-15
KS D 7014	: E309-15
JIS Z 3221	: ES309-15

Description

- Covering is lime titania type for welding of 22%Cr-12%Ni stainless steel and heat-resisting castings, clad side of type 304 clad steels.
- As the deposited weld metal contains ferrite in austenitic structure, its crack resistance is good.
- Good heat resistance and corrosion resistance.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.05	0.36	1.83	0.029	0.011	13.3	24.5	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 30	
JIS Z 3221		min. 550	min. 25	
Example	450	590	40	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	40~50 35~45	50~80 45~60	80~110 70~90	110~150 90~130	140~180 —

Classifications

AWS A5.4-06	: E309-16
KS D 7014	: E309-16
JIS Z 3221	: ES309-16

Description

- Covering is lime titania type for welding of 22%Cr-12%Ni stainless steel and heat-resisting castings, clad side of type 304 clad steels. Welding of dissimilar steels such as Cr-Mo steel or carbon steel to stainless steel.
- As the deposited weld metal contains ferrite in austenitic structure, its crack resistance is good.
- Good heat resistance and corrosion resistance.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.06	0.72	1.36	0.028	0.012	12.6	23.6	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 30	
JIS Z 3221		min. 550	min. 25	
Example	490	610	38	AW
* AW : As-Welded				

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp.	F	40~50	50~80	80~110	110~150	140~180
(A)	V · OH	35~45	45~60	70~90	90~130	—

Approvals

ABS	BV	DNV	GL	KR	LR
E309-16	UP	309	4332	RD309	SS/CMn m

* Others : CWB

KST-309L-15

For stainless steel (Dissimilar joint welding)

Classifications

EN 1600:1997 : E 23 12 L B 22
AWS A5.4-06 : E309L-16

KS D 7014 : E309L-16
JIS Z 3221 : ES309L-16

Description

- Covering is lime titania type for welding of 22%Cr-12%Ni stainless steel and heat-resisting castings, clad side of type 304 clad steels. Welding of dissimilar steels such as Cr-Mo steel or carbon steel to stainless steel.
- As its deposited weld metal has austenitic structure, with suitable ferrite, crack resistance is good and intergranular corrosion resistance is superior to that of E309 type.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.03	0.40	1.92	0.026	0.014	13.2	24.3	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 30	
EN 1600	min. 320	min. 510	min. 25	
Example	470	590	39	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	30~50 25~45	50~80 45~60	80~110 70~90	110~150 90~130	140~180 —

Approvals

CE

Classifications

EN 1600:1997 : E 23 12 L R 12

AWS A5.4-06 : E309L-16

KS D 7014 : E309L-16

JIS Z 3221 : ES309L-16

Description

- Covering is lime titania type for welding of 22%Cr-12%Ni stainless steel and heat-resisting castings, clad side of type 304 clad steels. Welding of dissimilar steels such as Cr-Mo steel or carbon steel to stainless steel.
- As its deposited weld metal has austenitic structure, with suitable ferrite, crack resistance is good and intergranular corrosion resistance is superior to that of E309 type.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.03	0.71	1.34	0.027	0.013	12.6	23.7	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 520	min. 30	
EN 1600	min. 320	min. 510	min. 25	
Example	480	600	40	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp.	F	30~50	50~80	80~110	110~150	140~180
(A)	V · OH	25~45	45~60	70~90	90~130	

Approvals

ABS

E309L-16

* Others : CWB, CE

KST-309Mo-15

For stainless steel (Dissimilar joint welding)

Classifications

AWS A5.4-06	: E309Mo-15
KS D 7014	: E309Mo-15
JIS Z 3221	: ES309Mo-15

Description

- Build-up welding of Cr-Mo steel or carbon steel. Welding of AISI(SUS)316 clad steel or dissimilar steels.
- Excellent crack resistance especially in the welding of dissimilar steels such as stainless steel to carbon steel.
- It is only used in the direct current condition.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.06	0.35	1.84	0.027	0.012	12.4	22.2	2.4	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 30	
JIS Z 3221		min. 550	min. 25	
Example	490	630	36	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	30~50 25~45	50~80 50~60	80~110 70~90	110~140 90~130	140~180 —

KST-309Mo

For stainless steel (Dissimilar joint welding)

Classifications

AWS A5.4-06	: E309Mo-16
KS D 7014	: E309Mo-16
JIS Z 3221	: ES309Mo-16

Description

- Build-up welding of Cr-Mo steel or carbon steel. Welding of AISI(SUS)316 clad steel or dissimilar steels.
- Excellent crack resistance especially in the welding of dissimilar steels such as stainless steel to carbon steel.
- It is only used in the direct current condition.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.06	0.35	1.84	0.027	0.012	12.4	22.2	2.4	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 30	
JIS Z 3221		min. 550	min. 25	
Example	500	630	34	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	300	350	350	350
Amp.	F	50~70	80~110	110~140	140~170
(A)	V · OH	40~60	70~90	90~130	—

Approvals

DNV
309Mo

KST-309LMo

For stainless steel (Dissimilar joint welding)

Classifications

EN 1600:1997	: E 23 12 2 L R 12	KS D 7014	: E309MoL-16
AWS A5.4-06	: E309LMo-16	JIS Z 3221	: ES309LMo-16

Description

- Build-up welding of AISI(SUS)316 clad steel or dissimilar steels.
- Excellent crack resistance especially in the welding of dissimilar steels such as stainless steel to carbon steel.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.03	0.76	1.78	0.026	0.013	13.1	23.2	2.4	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 520	min. 30	
EN 1600	min. 350	min. 550	min. 25	
Example	490	650	35	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	30~55 25~45	55~80 45~60	90~120 70~90	110~140 90~130	140~180 —

Approvals

KR

RD309MoL

* Others : CE

Classifications

EN 1600:1997 : E 25 20 R 12
 AWS A5.4-06 : E310-16

KS D 7014 : E310-16
 JIS Z 3221 : ES310-16

Description

- Covering is lime titania type for welding of AISI(SUS) 310S, SCS 18 and clad side of 18%Cr-8%Ni stainless clad steel.
- The deposited weld metal has perfect austenitic structure.
- Good mechanical property and heat resistance of the deposited weld metal.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.11	0.40	1.86	0.025	0.013	20.8	25.6	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 30	
EN 1600	min. 350	min. 550	min. 20	
Example	490	620	40	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp.	F	30~50	50~80	80~110	110~140	140~180
(A)	V · OH	25~45	45~60	70~90	90~130	—

Approvals

CWB, CE

Classifications

EN 1600:1997	: E 29 9 R 12	KS D 7014	: E312-16
AWS A5.4-06	: E312-16	JIS Z 3221	: ES312-16

Description

- Covering is lime titania type for welding of 29%Cr-9%Ni type cast steels and difficult to weld steels. Joint welding and hardfacing of stainless steel and heat resisting steels.
- Good crack resistance because of extremely much quantity of ferrite of the deposited weld metal.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.08	0.45	1.30	0.028	0.012	8.5	29.1	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 660	min. 22	
EN 1600	min. 450	min. 650	min. 15	
Example	510	760	25	AW
* AW : As-Welded				

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	300	350	350	350
Amp. (A)	F V · OH	40~80 35~75	70~110 70~90	110~140 80~120	140~180 —

Approvals

CE

TENSILE WELD

For stainless steel (Cladding or Dissimilar joint)

Description

- Covering is lime titania type for welding of 29%Cr-9%Ni type cast steels and difficult to weld steels. Joint welding and hardfacing of stainless steel and heat resisting steels.
- Good crack resistance because of extremely much quantity of ferrite of the deposited weld metal.
- Good usability and weldability.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.08	0.95	1.48	0.032	0.015	8.6	29.8	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
Example	520	770	24	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia. Length	(mm) (mm)	2.6 300	3.2 350	4.0 350	5.0 350
Amp. (A)	F V · OH	40~80 35~75	70~100 70~100	110~140 90~130	140~180 —

KST-316-15

For stainless steel (18%Cr-12%Ni-Mo)

Classifications

EN 1600:1997 : E 19 12 2 B 22
AWS A5.4-06 : E316-15

KS D 7014 : E316-15
JIS Z 3221 : ES316-15

Description

- Covering is lime titania type for welding of 18%Cr-12%Ni-Mo stainless steel. (AISI 316) or dissimilar steels.
- Especially suitable for flat and horizontal fillet welding.
- Excellent corrosion resistance against sulphurous acid, phosphoric acid and acetic acid.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.06	0.39	1.18	0.029	0.013	11.5	18.9	2.3	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 520	min. 30	
EN 1600	min. 350	min. 550	min. 25	
Example	470	580	41	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp.	F	40~50	50~70	80~120	110~140	140~170
(A)	V · OH	35~45	45~60	70~90	90~130	—

Approvals

CE

Classifications

EN 1600:1997 : E 19 12 2 R 12

AWS A5.4-06 : E316-16

KS D 7014 : E316-16

JIS Z 3221 : ES316-16

Description

- Covering is lime titania type for welding of 18%Cr-12%Ni-Mo stainless steel. (AISI 316) or dissimilar steels.
- Especially suitable for flat and horizontal fillet welding.
- Excellent corrosion resistance against sulphurous acid, phosphoric acid and acetic acid.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.06	0.73	1.18	0.028	0.012	12.5	18.3	2.3	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 520	min. 30	
EN 1600	min. 350	min. 550	min. 25	
Example	460	590	42	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp.	F	30~50	50~80	80~110	110~140	140~180
(A)	V · OH	25~45	45~60	70~90	90~130	—

Approvals

ABS	BV	GL
E316-16	UP	4435

* Others : CWB, CE

KST-316L-15

For stainless steel (Low C, 18%Cr-12%Ni-Mo)

Classifications

EN 1600:1997	: E 19 12 3 L B 22	KS D 7014	: E316L-15
AWS A5.4-06	: E316L-15	JIS Z 3221	: ES316L-15

Description

- Covering is lime titania type for welding of 18%Cr-12%Ni-Mo stainless steels, austenitic stainless steels which are required and the place where heat treatment after welding is impossible.
- Good Crack resistance and usability.
- As low carbon welded metal can be obtained, intergranular corrosion resistance is superior to that of E316 type.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.03	0.40	1.21	0.025	0.022	11.4	19.2	2.5	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 490	min. 30	
EN 1600	min. 320	min. 510	min. 25	
Example	470	580	39	AW

* AW : As-Welded

Sizes available and recommended currents (DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	40~50 35~45	55~70 45~60	80~110 70~90	110~150 90~130	140~170 —

Approvals

CE

KST-316L

For stainless steel (Low C, 18%Cr-12%Ni-Mo)

Classifications

EN 1600:1997 : E 19 12 3 L R 12
AWS A5.4-06 : E316L-16

KS D 7014 : E316L-16
JIS Z 3221 : ES316L-16

Description

- Covering is lime titania type for welding of 18%Cr-12%Ni-Mo stainless steel. (AISI 316) or dissimilar steels.
- Especially suitable for flat and horizontal fillet welding.
- Excellent corrosion resistance against sulphurous acid, phosphoric acid and acetic acid.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.03	0.72	1.08	0.028	0.013	12.5	18.4	2.5	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 490	min. 30	
EN 1600	min. 320	min. 510	min. 25	
Example	440	570	43	AW
* AW : As-Welded				

Sizes available and recommended currents (AC or DC +)

Dia. Length	(mm) (mm)	2.0 250	2.6 350	3.2 350	4.0 350	5.0 350
Amp. (A)	F V · OH	40~50 35~45	55~70 45~60	80~110 70~90	120~150 90~130	140~180 -

Approvals

ABS	BV	DNV	GL	KR	LR
E316L-16	UP	316L	4435	RD316L	316Lm

* Others : CWB, TÜV, CE

Classifications

AWS A5.4-06	: E317-16
KS D 7014	: E317-16
JIS Z 3221	: ES317-16

Description

- Covering is lime titania type for welding of AISI 317 or dissimilar steels such as carbon steel to stainless steels.
- Good weldability and performance.
- Reduce the susceptibility of pitting.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.06	0.74	1.20	0.026	0.017	12.3	18.5	3.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 550	min. 30	
JIS Z 3221		min. 550	min. 20	
Example	490	580	43	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	40~60 35~45	55~90 45~60	80~110 70~90	110~150 90~130	140~180 —

Classifications

EN 1600:1997 : E 19 13 4 N L R12
 AWS A5.4-06 : E317L-16

KS D 7014 : E317L-16
 JIS Z 3221 : ES317L-16

Description

- Covering is lime titania type for welding of 18%Cr-12%Ni-3%Mo which requires excellent corrosion resistance to sulfuric acid, solutions containing these salts and much hot organic acids such as formic acid.
- Good weldability and performance.
- Reduce the susceptibility of pitting.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.03	0.75	1.24	0.025	0.016	12.4	18.6	3.3	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 520	min. 30	
EN 1600	min. 350	min. 550	min. 25	
Example	450	570	44	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp.	F	40~60	55~90	80~110	110~150	140~180
(A)	V · OH	35~45	45~60	70~90	90~130	—

Approvals

CE

Classifications

AWS A5.4-06	: E318-16
KS D 7014	: E318-16
JIS Z 3221	: ES318-16

Description

- Covering is lime titania type for welding of AISI 318, 316, 316L stainless steel.
- The deposited weld metal is highly resistant to pitting and general type of corrosion.
- Insensitive to intergranular corrosion because of Nb.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.05	0.76	1.32	0.022	0.015	11.9	18.5	2.3	0.7

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 520	min. 30	
JIS Z 3221		min. 550	min. 20	
Example	500	630	38	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	40~60 35~45	50~80 45~60	80~110 60~90	120~150 90~130	140~180 —

Classifications

EN 1600:1997 : E 19 9 Nb R 12
 AWS A5.4-06 : E347-16

KS D 7014 : E347-16
 JIS Z 3221 : ES347-16

Description

- Covering is lime titania type for welding of AISI 304L, 321, 347 stainless steel and the place where heat treatment after welding is impossible.
- Excellent intergranular corrosion resistance.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	Nb
0.06	0.42	1.98	0.029	0.012	9.5	19.9	0.2	0.6

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 520	min. 30	
EN 1600	min. 350	min. 550	min. 25	
Example	460	620	42	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp. (A)	F V · OH	40~60 35~45	50~70 45~60	70~110 65~90	100~150 90~130	140~180 —

Approvals

CE

KST-347L

For stainless steel (Low C, 18%Cr-8%Ni-Nb)

Classifications

KS D 7014	: E347L-16
JIS Z 3221	: ES347L-16

Description

- Covering is lime titania type for welding of AISI 304L, 321, 347 stainless steel and the place where heat treatment after welding is impossible.
- Excellent intergranular corrosion resistance.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Nb
0.03	0.46	1.68	0.028	0.011	9.8	19.4	0.2	0.7

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
JIS Z 3221		min. 510	min. 30	
Example	440	600	39	AW
* AW : As-Welded				

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.0	2.6	3.2	4.0	5.0
Length	(mm)	250	350	350	350	350
Amp.	F	40~60	55~80	80~110	110~140	140~170
(A)	V · OH	35~45	45~60	70~90	90~130	—

Classifications

EN 1600:1997 : E 13 R 12

AWS A5.4-06 : E410-16

KS D 7014 : E410-16

JIS Z 3221 : ES410-16

Description

- Covering is lime titania type for welding of 13%Cr steel and surfacing of the part where require cavitation or corrosion resistance is required.
- Excellent oxidation corrosion and abrasion resistance of the deposited weld metal.
- Preheat at 100~250°C and postheat treat at 700~800°C because of high self-hardening property of the deposited weld metal.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.08	0.70	0.76	0.030	0.012	0.2	12.1	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 450	min. 20	
EN 1600	min. 250	min. 450	min. 15	
Example	400	560	24	PWHT

* PWHT : 750°Cx1Hr.

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	300	350	350	350
Amp.	F	60~90	80~110	110~150	150~170
(A)	V · OH	45~60	70~90	90~130	—

Approvals

CE

Classifications

EN 1600:1997 : E 17 R 12
AWS A5.4-06 : E430-16

KS D 7014 : E430-16
JIS Z 3221 : ES430-16

Description

- Covering is lime titania type for welding of 17%Cr stainless steel or AISI 403, 405
- Preheat at 200~300°C and postheat treat at 700~800°C.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	Cu
0.07	0.42	0.75	0.028	0.009	0.2	17.4	0.2	0.3

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 450	min. 20	
EN 1600	min. 300	min. 450	min. 15	
Example	380	530	27	PWHT
* PWHT : 780°Cx2Hr.				

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	300	350	350	350
Amp. (A)	F V · OH	55~75 45~60	80~100 70~90	110~140 90~130	140~170 —

Approvals

CE

Classifications

EN 1600:1997 : E 22 9 3 N L R 12
 AWS A5.4-06 : E2209-16

JIS Z 3221 : ES2209-16

Description

- Covering is lime titania type for welding of 22%Cr-9%Ni-3%Mo duplex stainless steels, the principal applications are chemical plant and shipbuilding as well as nuclear plant industries. (UNS S31803)
- Excellent pitting corrosion resistance and stress corrosion cracking resistance.
- Please perform welding with selecting proper heat input according to the required mechanical properties.
- Redry the electrode at 250~350°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cr	Mo	N
0.02	0.62	0.80	0.025	0.011	9.3	21.9	3.2	0.18

Typical mechanical properties of all-weld metal

	Y.S (0.2%OS) (MPa)	T.S (MPa)	El. (%)	Remarks
AWS A5.4		min. 690	min. 20	
EN 1600	min. 450	min. 550	min. 20	
Example	550	780	24	AW

* AW : As-Welded

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	300	350	350	350
Amp. (A)	F V · OH	50~80 40~60	80~110 70~100	110~150 90~130	140~180 —

Approvals

CE

Classifications

KS D 7008	: DFCCI
JIS Z 3252	: DFCCI

Description

- Covering is graphite type for repairing of all kind of cast iron product cavity filling.
- Preheat at minimum 200°C. The temperature to be applied varies in accordance with kind, shape and size of base metal.
- Gradual cooling is recommended after welding.
- Redry the electrode at 70~120°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Fe
3.16	6.27	0.42	0.015	0.006	Rem.

Typical mechanical properties of all-weld metal

Hv	HRC
280	27.1

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	3.2	4.0	5.0
Length	(mm)	350	400	400
Amp. (A)	F	110~140	150~190	190~220

Classifications

AWS A 5.15-90 : Est

Description

- Covering is graphite type for repairing of all kind of cast iron product.
- Stable arc, easy slag removal and beautiful bead appearance.
- Preheat at minimum 200°C. The temperature to be applied varies in accordance with kind, shape and size of base metal.
- Gradual cooling is recommended after welding.
- Redry the electrode at 70~120°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Fe
1.68	0.50	0.35	0.021	0.006	Rem.

Typical mechanical properties of all-weld metal

T.S (MPa)	El. (%)	Hardness (Hv)
490	33	200

Sizes available and recommended currents (AC or DC +)

Dia.	(mm)	2.6	3.2	4.0	5.0
Length	(mm)	350	350	400	400
Amp. (A)	F	60~90	90~130	130~180	150~200

Classifications

EN ISO 1071:2003	: E C NiFe-CI 1	KS D 7008	: DFCNiFe
AWS A 5.15-90	: ENiFe-CI	JIS Z 3252	: DFCNiFe

Description

- Covering is graphite type for joining of spheroidal graphite cast iron or repairing of cast iron products such as cylinder covers, motor beds, casings and gears.
- Good crack resistance and mechanical properties.
- Preheat at 150~300°C. The temperature to be applied varies in accordance with kind, shape and size of base metal.
- Redry the electrode at 70~120°C for 30~60 minutes prior to use.

Welding positions



Typical chemical composition of all-weld metal (%)

C	Si	Mn	P	S	Ni	Cu	Fe	Al
0.80	0.36	0.45	0.008	0.002	55.5	0.05	Rem.	0.05

Typical mechanical properties of all-weld metal

T.S (MPa)	HV	Hardness HB	HS
550	180~210	171~200	26~30

Sizes available and recommended currents (AC or DC +)

Dia. Length	(mm) (mm)	2.6 300	3.2 350	4.0 350	5.0 550
Amp. (A)	F	60~90	80~120	120~150	140~190

Approvals

CE

Classifications

EN ISO 1071:2003	: E C Ni-CI 1	KS D 7008	: DFCNi
AWS A 5.15-90	: ENi-CI	JIS Z 3252	: DFCNi

Description

- Covering is graphite type for repairing and joining of various kinds of cast iron products such as cylinder covers, motor beds, casings and gears or repairing co cast iron, alloy cast iron and malleable cast iron.
- Easily machinable deposited weld metal.
- Chip off base metal completely at the repairing part.
- Preheat at 150~300°C. The temperature to be applied varies in accordance with kind, shape and size of base metal.
- Redry the electrode at 70~120°C for 30~60 minutes prior to use.

Welding positions**Typical chemical composition of all-weld metal (%)**

C	Si	Mn	P	S	Ni	Cu	Fe	Al
0.55	0.40	0.35	0.009	0.001	Rem.	0.05	0.85	0.05

Typical mechanical properties of all-weld metal

T.S (MPa)	HV	Hardness HB	HS
420	160~190	152~181	24~28

Sizes available and recommended currents (AC or DC +)

Dia. Length	(mm) (mm)	2.6 300	3.2 350	4.0 350	5.0 550
Amp. (A)	F	60~90	70~110	110~130	130~150

Approvals

CE

CUTTING ROD

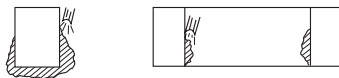
For special purpose (Cutting operation)

Description

- Cutting of carbon steels, cast irons, stainless steels and nonferrous alloys, etc.
- Designed for high efficiency in cutting of all kinds of steel.
- Quiet and stable arc.
- Excellent usability.
- When the electrodes have absorbed moisture, redry the electrode at 70~80°C for 30 minutes prior to use.

Illustration

- Removal of protrusion



- Removal of down gate, cross gate, etc.



Sizes available and recommended currents (AC or DC -)

Dia.	(mm)	3.2	4.0	5.0
Length	(mm)	350	400	400
Amp. (A)	F	150~130	230~180	300~400

GOUGING ROD

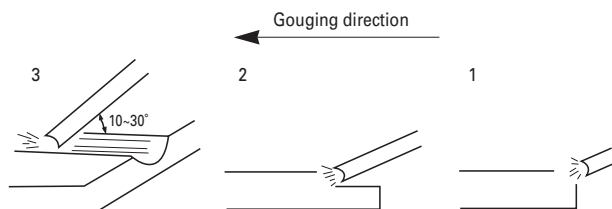
For special purpose (Gouging operation)

Description

- Gouging of carbon steels, cast irons, stainless steels and nonferrous alloy, etc.
- Designed for high efficiency in gouging of all kinds of steel.
- Operated surface is very clean.
- Suitable for rapid removal of unnecessary parts.
- When the electrodes have absorbed moisture, redry the electrode at 70~80°C for 30 minutes prior to use.

Gouging hints

In gouging operation worker must maintain 10~30° between the electrode and base plate.



Sizes available and recommended currents (AC or DC -)

Dia.	(mm)	3.2	4.0	5.0
Length	(mm)	350	400	400
Amp. (A)	F	150~180	230~260	270~320