

**Eczacıbaşı - Lincoln Electric**

**ASKAYNAK® Products**

*Coated  
Electrodes*

*MIG/MAG  
Welding Wires*

*TIG Rods*

*Submerged Arc  
Welding Wires*

**ASKAYNAK®**

مركز البراغي والعدد  
**BOLTS & TOOLS CENTER** **BTGO**

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# Standards and Classifications

## ASKAYNAK Coated Electrodes for MMA Welding and Submerged Arc Welding Wires

### Rutile, Basic, Cellulosic and Iron Powder Coated Electrodes for Mild Steels

Product Name	C	Si	Mn	Mo	Ni	P	S	AWS A5.1 AWS A5.5 *	EN ISO 2560-A
AS R-116	0.08	0.40	0.60	-	-	-	-	E7014	E 42 0 RR 12
AS R-132	0.08	0.40	0.60	-	-	-	-	E6013	E 42 0 RR 12
AS R-143	0.08	0.35	0.65	-	-	-	-	E6013	E 42 0 RR 12
AS R-144	0.08	0.45	0.55	-	-	-	-	E6013	E 42 0 RC 11
AS R-146	0.07	0.20	0.40	-	-	-	-	E6013	E 38 0 R 12
AS B-204	0.06	0.50	1.20	-	-	-	-	E7018	E 46 4 B 32 H10
AS B-235	0.08	0.60	1.00	-	-	-	-	E7048	E 42 2 B 11
AS B-248	0.07	0.50	0.90	-	-	-	-	E7018	E 42 3 B 42 H10
AS B-248 H5	0.07	0.50	0.90	-	-	-	-	E7018	E 42 3 B 42 H5
AS B-255	0.07	0.50	1.20	-	-	-	-	E7018-1 H4	E 46 5 B 32 H5
AS B-268	0.07	0.50	1.10	-	-	<0.03	<0.03	E7016-1	E 46 6 B 22
AS S-6010	0.08	0.20	0.60	-	-	-	-	E6010	E 42 2 C 21
AS S-6011	0.09	0.30	0.60	-	-	-	-	E6011	E 42 2 C 11
AS S-7010 Mo	0.08	0.10	0.70	0.50	-	-	-	E7010-A1 *	E 46 2 Mo C 21
AS S-8010 Ni	0.10	0.30	1.10	-	0.20	-	-	E8010-G *	E 46 3 Z C 21
AS DT-165	0.08	0.40	0.70	-	-	-	-	E7024	E 46 0 RR 74
AS DT-180	0.08	0.45	0.90	-	-	-	-	E7024	E 46 0 RR 74

### Submerged Arc Welding Wires for Mild and Low Alloyed Steels

Product Name	C	Si	Mn	Cu	Mo	S	AWS A5.17 AWS A5.23 *	EN ISO 14171
AS S1	0.10	0.07	0.50	<0.30	-	<0.025	EL12	S1
AS S2	0.10	0.07	0.90	<0.30	-	<0.025	EM12	S2
AS EM12K	0.10	0.13	0.90	<0.30	-	<0.025	EM12K	S2
AS S2Si	0.07	0.15	1.00	<0.30	-	<0.025	EM12K	S2Si
AS S2Mo	0.10	0.10	1.00	<0.30	0.50	<0.030	EA2 *	S2Mo
AS S3Mo	0.08	0.15	1.40	<0.30	0.50	<0.030	EA4 *	S3Mo

# Standards and Classifications

## ASKAYNAK Coated Electrodes for MMA Welding

### Coated Electrodes for High Strength Low Alloyed Steels

Product Name	C	Si	Mn	Cr	Ni	Mo	Others	AWS A5.5	EN ISO 3580 EN ISO 2560-A * EN ISO 18275 **
AS DA-708	0.05	0.30	1.00	-	0.60	-	Cu 0.45	E 8018-G	E 42 2 Z B 42 *
AS DA-710	0.06	0.30	0.90	-	2.40	-	P+S <0.04	E 8018-C1	E 46 6 2 Ni B 42 *
AS DA-715	0.05	0.35	1.30	-	1.00	-	P+S <0.04	E 8018-C3 H4	E 50 6 1 Ni B 42 H5 *
AS DA-717	0.04	0.30	1.00	-	1.10	0.35	-	E 9018-G	E 55 6 1 NiMo B 42 **
AS DA-731	0.08	0.30	0.70	-	-	0.50	-	E 8013-G	E Mo R 22
AS DA-735	0.08	0.30	0.80	-	-	0.50	-	E 7018-A1	E Mo B 22
AS DA-737	0.06	0.40	1.30	-	-	0.40	-	E 9018-D1	E Mo B 22
AS DA-753	0.05	0.40	1.50	0.35	1.80	0.45	-	E 11018-G	E 69 5 Mn 2 NiCrMo BT 42 **
AS DA-771	0.06	0.30	0.80	1.20	-	0.40	-	(E 8013-B2)	(E CrMo 1 R 12)
AS DA-774	0.06	0.50	0.80	1.20	-	0.50	-	E 8018-B2	E CrMo 1 B 22
AS DA-777	0.05	0.40	0.80	2.40	-	1.10	-	E 9018-B3	E CrMo 2 B 22
AS DA-778	0.05	0.50	0.70	5.00	-	0.50	-	E 8018-B6	E CrMo 5 B 42

### Coated Electrodes for Stainless Steels

Product Name	C	Si	Mn	Cr	Ni	Mo	Nb	AWS A5.4	EN 1600 EN ISO 3581
AS P-307	0.10	0.40	4.50	20	10	1.0	-	E 307-15	E 18 9 Mn Mo B 22
AS P-308L	0.03	0.80	0.70	19	10	-	-	E 308L-16	E 19 9 LR 12
AS P-308Mn	0.10	0.50	6.00	18	9	-	-	(E 307-15)	E 18 8 Mn B 22
AS P-308Mo	0.05	0.35	2.50	19	10	2.5	-	E 308Mo-15	E 20 10 3 B 22
AS P-309L	0.03	0.80	0.70	23	13	-	-	E 309L-16	E 23 12 LR 12
AS P-309Mo	0.03	0.80	0.80	23	12.5	2.7	-	E 309MoL-16	E 23 12 2 LR 32
AS P-310R	0.10	0.60	1.70	26	21	-	-	E 310-16	E 25 20 R 12
AS P-312	0.10	0.90	0.80	29	9	-	-	E 312-16	E 29 9 R 12
AS P-316L	0.03	0.70	0.80	17	11	2.9	-	E 316L-16	E 19 12 3 LR 12
AS P-316S	0.06	0.70	0.60	17	11	2.9	-	(E 316-16)	E 19 12 3 R 73
AS P-318 Süper	0.04	0.90	0.80	18	12	2.5	0.5	(E 318-16)	E 19 12 3 Nb R 12
AS P-347	0.03	0.90	0.70	19	9.5	-	0.5	(E 347-16)	E 19 9 Nb R 12

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# Standards and Classifications

## ASKAYNAK Coated Electrodes for MMA Welding

### Coated Electrodes for Aluminium and Copper Alloys

Product Name	Cu	Al	Si	Mn	Fe	Sn	Others	AWS A5.3 AWS A5.6 *	DIN 1732 DIN 1733 *
AS Bronz	bal.	-	-	0.50	-	7	P 0.10	ECuSn-C *	EL-CuSn 7 *
AS AISi 5	-	bal.	5	<0.05	<0.20	-	Mg 0.05	E4043	EL-AISI 5
AS AISi 12	-	bal.	12	<0.10	<0.40	-	Mg 0.05	E4047	EL-AISI 12

### Coated Electrodes for Cast Irons

Product Name	C	Si	Mn	Fe	Ni	Cu	AWS A5.15	EN ISO 1071
AS Pik-55	1.00	-	-	43	bal.	-	E NiFe-CI	E C NiFe-1 3
AS Pik-65	0.50	0.40	1.00	3	bal.	30	E NiCu-B	E C NiCu-B 3
AS Pik-98 Süper	1.00	-	-	-	bal.	-	E Ni-CI	E Ni-C1 2

### Coated Electrodes for Overlay Welding and Hardfacing

Product Name	C	Si	Mn	Cr	Ni	Mo	Others	EN 14700	DIN 8555
AS SD-CR 10	0.70	0.60	0.70	10	-	-	-	E Fe8	E6-UM-55 R
AS SD-CR 13	0.10	0.50	0.30	13	-	-	-	E Fe7	E5-UM-45 R
AS SD-60	0.40	0.40	0.50	6	-	0.60	-	E Fe4	E6-UM-60
AS SD-65	0.70	4.00	0.30	2	-	-	-	E Fe4	E2-UM-60 Z
AS SD-300	0.07	0.20	0.60	3.40	-	-	-	E Fe1	E1-UM-300
AS SD-350	0.10	0.50	0.70	3.50	-	-	-	E Fe1	E1-UM-350
AS SD-HSS	0.90	1.20	1.30	4.50	-	7.50	W 1.80   V 1.50	E Fe4	E4-UM-60 (65) S
AS SD-MANGAN	0.70	0.10	14	-	3	-	-	E Fe9	E7-UM-200 K
AS SD-MANGAN 165	0.70	0.10	14	-	3.50	-	-	E Fe9	E7-UM-200 K
AS SD-ABRA Nb	3.40	-	-	22	-	-	Nb 10	E Fe15	(E10-UM-60 GR)
AS SD-ABRA Cr	4.50	-	-	33	-	-	-	E Fe15	E10-UM-60 G

# Standards and Classifications

## ASKAYNAK MIG/MAG Wires for GMA Welding and TIG Rods for GTA Welding

### MIG/MAG Wires for Mild and Low Alloyed Steels

Product Name	C	Si	Mn	Cr	Ni	Mo	Others	AWS A5.18 * AWS A5.28	ISO 14341-A * EN ISO 16834 ** EN ISO 21952-A
AS MIG SG2	0.10	0.90	1.50	-	-	-	-	ER70S-6 *	G 42 3CM G3Si1 *
AS MIG SG3	0.10	1.00	1.70	-	-	-	-	ER70S-6 *	G 42 3CM G4Si1 *
AS MIG Mo70	0.09	0.70	1.20	<0.15	-	0.50	Cu <0.25	ER70S-A1	G MoSi
AS MIG Mo80	0.09	0.70	1.90	<0.15	<0.15	0.50	Cu <0.25	ER80S-D2	G MnMo
AS MIG 100SG	0.09	0.75	1.60	0.55	0.60	0.25	Cu <0.25	ER100S-G	G Mn3NiCrMo **
AS MIG 110SG	0.09	0.60	1.65	0.30	1.50	0.30	Cu 0.25 V 0.10	ER110S-G	G Mn3Ni1CrMo **
AS MIG CrMo1	0.08	0.55	0.60	1.30	<0.20	0.55	Cu <0.30	ER80S-B2	(G CrMo1Si)
AS MIG CrMo2	0.08	0.50	0.60	2.40	<0.20	1.00	Cu <0.30	ER90S-B3	(G CrMo2Si)
AS MIG COR-Ni	0.09	0.60	1.40	-	0.90	-	Cu <0.40	ER80S-G	G Mn3Ni1Cu **







### TIG Rods for Mild and Low Alloyed Steels

Product Name	C	Si	Mn	Cr	Ni	Mo	Others	AWS A5.18 * AWS A5.28	EN ISO 636-A * EN ISO 21952-A
AS TIG SG2	0.08	0.85	1.50	-	-	-	-	ER70S-6 *	W 42 3 W3Si1 *
AS TIG SG3	0.10	1.00	1.70	-	-	-	-	ER70S-6 *	W 42 3 W4Si1 *
AS TIG Mo70	0.09	0.70	1.20	<0.15	-	0.50	Cu <0.25	ER70S-A1	W MoSi
AS TIG Mo80	0.09	0.70	1.90	<0.15	<0.15	0.50	Cu <0.25	ER80S-D2	W MnMo
AS TIG CrMo1	0.08	0.55	0.60	1.30	<0.20	0.55	Cu <0.30	ER80S-B2	(W CrMo1Si)
AS TIG CrMo2	0.08	0.50	0.60	2.40	<0.20	1.00	Cu <0.30	ER90S-B3	(W CrMo2Si)
AS TIG CrMo5	0.08	0.45	0.60	5.70	<0.20	0.60	Cu <0.25	ER80S-B6	W CrMo5Si
AS TIG CrMo91	0.09	0.30	0.50	9.10	0.50	0.90	-	ER90S-B9	W CrMo9 1
	V 0.20	Al 0.04	Nb 0.07	N 0.05	Cu <0.25				

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# Lloyd Approvals

## ASKAYNAK Coated Electrodes, GMA Welding Wires and SA Welding Wires

Product Name	 ABS	 BV	 DNV	 GL	 LRS	 RINA	 RMRS	 TL
AS R-116	2	2	2	2	2m	-	-	2
AS R-143	2	2	2	-	2m	2	-	2
AS R-146	-	-	-	-	-	-	-	2
AS B-204	3H10, 3Y	3YH	-	3YH15	3m 3Ym H15	-	-	3YH
AS B-248	3H10, 3Y	3YHH	3YH10	3YH10	3m 3Ym H10	3YH10	3Y40HH	3YH10
AS B-248 H5	3H5, 3Y	3YHHH	3YH5	3YH5	3m 3Ym H5	-	-	3YH5
AS B-255	3H5, 3Y	3YHHH	3YH5	3YH5	3m 3Ym H5	3YH5	3YHHH	3YH5
AS DT-165	2	2	-	-	-	2	-	2
AS DT-180	2	2	2	-	2m	-	-	2
AS DA-735	-	-	-	-	-	-	-	1
AS DA-753	-	-	-	-	-	-	-	1
AS P-308L	E308L-16	308L	NV 308L	4306	-	-	-	-
AS P-309L	E309L-16	309L	NV 309L	4332	-	309L	-	-
AS P-316L	E316L-16	316L	NV 316L	4404	-	316L	-	-
AS P-308Mn	-	-	-	4370	-	-	-	-
AS SD-350	-	-	-	(*)	-	-	-	-
AS SG2 (CO2)	3SA, 3YSA	3YM	III YMS	3YS	3S 3YS H15	3Y42	3Y	3YMS
AS SG2 (Ar+CO2)	3YSA	-	IIYMS	3YS	-	-	-	3YMS
AS SG3 (CO2)	-	3Y	-	3YS	-	-	-	-
AS SG3 (Ar+CO2)	-	-	-	3YS	-	-	-	-
AS S1 (LW 860)	3M	A3M	III M	3M	3M	-	-	3M
AS S2 (LW 761)	-	-	-	-	-	-	-	3YM
AS S2 (LW 780)	3M, 3YM	-	-	3YM	-	-	-	-
AS S2 (LW 860)	3M, 3YM	A3YM	III YM	3YM	3M, 3YM	3Y42	-	3YM

**ASKAYNAK**  
Welding Electrodes and Welding Wires



# Askaynak® Coated Electrodes



## Coated Electrodes



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# AS R-116



## Rutile Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 42 0 RR 12  
AWS A5.1 : E7014

### General Description

AS R-116 is a heavily coated rutile electrode. Weld metal has a high resistance to cracking in multipass applications. The slag is easy to remove and it gives high quality, smooth weld beads. It is easy to strike and re-strike and thus an ideal electrode for tacking. It is an easy to use electrode. It has about 100% metal recovery due to high iron powder content in its coating.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.08	0.40	0.60

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 470 N/mm <sup>2</sup>
Tensile Strength	: 550 N/mm <sup>2</sup>
Elongation (L=5d)	: 25 %
Impact (ISO-V)	: 60 J (0°C) 40 J (-20°C)

### Approvals

CE, GOST, SEPRO, TSE

ABS	BV	DNV	GL	LRS	TL
2	2	2	2	2m	2

### Welding Parameters / Packaging and Available Sizes / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (-)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.00	300	50 - 70	1130	1.7 / 150	2
2.50	350	60 - 100	2120	2.1 / 100	5
3.25	350	95 - 145	3190	3.2 / 100	5
4.00	350	140 - 190	4830	4.8 / 100	5
5.00	350	180 - 245	7410	4.8 / 65	5



1G/PA

2F/PB

2G/PC

4G/PE

3G/PF

# AS R-116

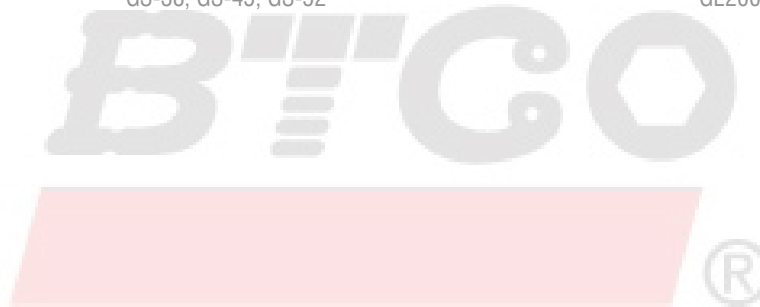


## Rutile Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS R-116 is a general purpose electrode for welding mild steels. Bridging over fairly large gaps that can occur in site welding where preheating is not possible, galvanized plates, rusty or dirty surfaces, ordinary ship's plate of A- and D- quality, automotive bodies and general structural steels are among its application areas.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3 St 37-4, St 44-4, St 52-4	S185, S235, S275, S355 P235TR2 - P355T2
<b>Fine Grained Steels</b>	StE 255 - StE 420	S255N - S420N
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM	L210 - L360NB L290MB - L360MB
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4 HI, HII, HIII	P295GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, D	-
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260



# AS R-132



## Rutile Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 42 0 RR 12  
AWS A5.1 : E6013

### General Description

AS R-132 is a heavily coated rutile electrode. Weld metal has a high resistance to cracking. The slag is easy to remove, and it gives high quality, excellent smooth weld beads. It is easy to strike and re-strike and thus an ideal and easy to use electrode. Basic component quantity is less than AS R-116.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.08	0.40	0.60

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 450 N/mm <sup>2</sup>
Tensile Strength	: 550 N/mm <sup>2</sup>
Elongation (L=5d)	: 25 %
Impact (ISO-V)	: 50 J (0°C)

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (-)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.00	300	45 - 70	1100	1.9 / 175	2
2.50	350	50 - 110	2140	2.1 / 100	5
3.25	350	90 - 140	3450	3.4 / 100	5
4.00	450	140 - 190	6670	6.7 / 100	6



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS R-132



## Rutile Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS R-132 is a general purpose electrode especially used for the welding of medium carbon steels and particularly suitable for butt welding of thin plates and sheet steels. It is also useful for welding mild structural steels and pressure and boiler vessel steels having a tensile strength up to 500 N/mm<sup>2</sup>. Ship's plate of A- quality, automotive bodies and welding of thin plates are among its application areas.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3 St 37-4, St 44-4, St 52-4	S185, S235, S275, S355 P235TR2 - P355T2
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255	S255N - S420N P255NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 H1, H11, H111	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, D AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260



# AS R-143



## Rutile Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 42 0 RR 12  
AWS A5.1 : E6013

### General Description

AS R-143 is a heavily coated rutile electrode. As its basic component quantity is higher than AS R-116, weld metal properties are superior accordingly. Weld metal has a high resistance to cracking. The slag is easy to remove, and it gives high quality, smooth and excellent weld beads. It is easy to strike and re-strike and thus an ideal, easy to use electrode.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.08	0.35	0.65

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 480 N/mm <sup>2</sup>
Tensile Strength	: 550 N/mm <sup>2</sup>
Elongation (L=5d)	: 25 %
Impact (ISO-V)	: 60 J (0°C) 40 J (-20°C)

### Approvals

CE, DB, GOST, SEPRO, TSE, TÜV

ABS	BV	DNV	LRS	RINA	TL
2	2	2	2m	2	2

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (-)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.00	300	50 - 70	1050	2.1 / 195	2
2.50	350	65 - 90	2070	2.1 / 100	5
3.25	350	90 - 140	3230	3.2 / 100	5
4.00	350	140 - 200	4770	4.8 / 100	5
4.00	450	140 - 190	6690	6.7 / 100	6
5.00	350	180 - 240	7550	4.9 / 65	5
5.00	450	180 - 230	9910	6.4 / 65	6



1G/PA    2F/PB    2G/PC    4G/PE    3G/PF

# AS R-143



## Rutile Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS R-143 is a general purpose electrode especially used for the welding of low and medium carbon structural steels ranging between St 33 and St 52.3. Machinery fabrications, bridge constructions; welding of boiler vessels, automotive bodies, steel furnitures, metal plate works, thin plates and small repairs are among its application areas.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3 St 37-4, St 44-4, St 52-4	S185, S235, S275, S355 P235TR2 - P355T2
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255	S255N - S420N P255NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII, HIII	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, D AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260



# AS R-144



## Rutile Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 42 0 RC 11  
AWS A5.1 : E6013

### General Description

AS R-144 is a rutile-cellulosic coated electrode. It can be used in all positions including vertical-downwards travel. As it is an easy to bend electrode, it brings great convenience to reach in difficult-to-reach areas. It has a good penetration respectively. The slag is easy to remove and it is very easy to strike and re-strike.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.08	0.45	0.55

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 440 N/mm <sup>2</sup>
Tensile Strength	: 550 N/mm <sup>2</sup>
Elongation (L=5d)	: 25 %
Impact (ISO-V)	: 50 J (0°C)

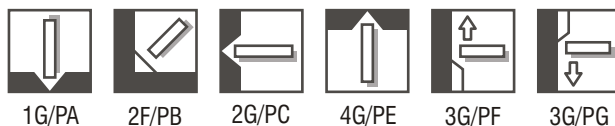
### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (-)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	70 - 100	1830	1.8 / 100	5
3.25	350	90 - 150	3040	3.0 / 100	5
4.00	350	140 - 200	4320	5.6 / 130	5
5.00	350	160 - 230	6700	5.4 / 80	5





# AS R-144



## Rutile Coated Electrode for Mild Steels

### Applications and Materials to be Welded

Welding of boiler vessels, steel constructions, automotive bodies, steel plate works, ordinary ship's plates, some assembly processes, machinery fabrication and welds required in tubular structures are among its application areas.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 35, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3 St 37-4, St 44-4, St 52-4	S185, S235, S275, S355 P235TR2 - P355T2
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255	S255N - S420N P255NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII, HIII	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, D*	-
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260

(\* ) It is recommended to use a basic coated electrode in the root pass.



# AS R-146



## Rutile Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 38 0 R 12  
AWS A5.1 : E6013

### General Description

AS R-146 is a medium coated general purpose rutile electrode. It is a very easy to use electrode. The slag is easy to remove and it gives high quality, smooth weld beads. It is easy to strike and re-strike and thus it is an ideal electrode for tacking .

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.07	0.20	0.40

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 400 N/mm <sup>2</sup>
Tensile Strength	: 480 N/mm <sup>2</sup>
Elongation (L=5d)	: 25 %
Impact (ISO-V)	: 60 J (0°C)

### Approvals

CE, GOST, SEPRO, TSE

TL

2

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (-)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	60 - 100	1990	2.0 / 100	5
3.25	350	110 - 140	3190	3.2 / 100	5
4.00	350	140 - 200	4790	4.8 / 100	5



1G/PA

2F/PB

2G/PC

4G/PE

3G/PF

# AS R-146



## Rutile Coated Electrode for Mild Steels

### Applications and Materials to be Welded

Welding of structures in thin and medium thick plates in all positions, bridging over the large gaps in steel constructions, welding of galvanized plates are among its application areas. AS R-146 is relatively insensitive to rust and other surface impurities and recommended especially for welding ordinary ship steels and for structural steels having similar mechanical strength and quality.

	<b>DIN</b>	<b>EN</b>
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3 St 37-4, St 44-4	S185, S235, S275 P235TR2 - P275T2
<b>Fine Grained Steels</b>	StE 255 - StE 285 WStE 255	S255N - S275N P255NH
<b>Pipe Materials</b>	StE 210-7 - StE 290-7 X42, X46 (API 5LX)	L210 - L290NB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII, HIII*	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, D*	-
<b>Cast Steels</b>	GS-38, GS-45, GS-52*	GE200, GE240, GE260

(\*) It is recommended to use a basic coated electrode in the root pass.



# AS B-204



## Basic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 46 4 B 32 H10  
AWS A5.1 : E7018

### General Description

AS B-204 is a basic coated electrode. It is used particularly to weld rigidly restrained mass structures where high welding stresses are unavoidable. Weld metal has a high resistance to cracking. The slag is easy to remove and it gives very high quality, smooth weld beads. It has 125% metal recovery.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.06	0.50	1.20

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 480 N/mm <sup>2</sup>	
Tensile Strength	: 560 N/mm <sup>2</sup>	
Elongation (L=5d)	: 30 %	
Impact (ISO-V)	: 110 J (-20°C)	Redrying Temperature : 250-400°C / 2-3 hrs
	: 80 J (-40°C)	

### Approvals

CE, GOST, SEPRO, TSE

ABS	BV	GL	LRS	TL
3YH10, 3Y	3YH	3YH15	3m 3Ym H15	3YH

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 70 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.00	300	50 - 80	1500	1.9 / 125	2
2.50	350	75 - 110	2390	4.8 / 200	5
3.25	350	110 - 150	3860	5.0 / 130	5
4.00	450	150 - 190	7260	6.2 / 85	6
5.00	450	170 - 240	10440	6.3 / 60	6



1G/PA    2F/PB    2G/PC    4G/PE    3G/PF

# AS B-204



## Basic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS B-204 is suitable for steel constructions and machines operating under dynamic forces. Ship building, boiler and pressure vessel manufacturing and pipe connections are among its application areas. It is recommended for the welding of high carbon steels having high P and S content; welding of high strength ship's plate of A-, D- and E- quality and vessel plates of 17 Mn 4 and 19 Mn 5 type. AS B-204 is also suitable for welding thin plates in the small diameters.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2 C 22 - C 35 ; Ck 22 - Ck 35	S185, S235, S275, S355 P235TR2 - P355T2 E295, E335 C22 - C35
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 420 TStE 255 - TStE 420	S255N - S420N P255NH - P420NH S255NL - S420NL / P275NL1 - P355NL1
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII HIII	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260



# AS B-235



## Basic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 42 2 B 11  
AWS A5.1 : E7048

### General Description

AS B-235 is a basic coated electrode especially designed for welding in vertical downwards position, with a relatively large diameter electrode, at a very high travelling speed and high current. Thus, it can replace cellulosic coated electrodes in some circumstances. Weld metal has a high resistance to cracking.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.08	0.60	1.00

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 460 N/mm <sup>2</sup>
Tensile Strength	: 560 N/mm <sup>2</sup>
Elongation (L=5d)	: 30 %
Impact (ISO-V)	: 80 J (-20°C)

Redrying Temperature : 250-400°C / 2-3 hrs

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 70 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	110 - 150	3020	5.1 / 170	5
4.00	350	140 - 200	4480	4.3 / 95	5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF



3G/PG

# AS B-235



## Basic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS B-235 is especially suitable for steel constructions and machines operating under dynamic forces. Ship building, boiler and pressure vessel manufacturing and pipe connections are among its application areas. It is recommended for the welding of high carbon steels having high (P) and (S) content; high strength ship's plate of A-, D- and E- quality and also for low alloyed and structural steels of similar strength with the electrode.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2	S185, S235, S275, S355 P235TR2 - P355T2 E295, E335
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 420 TStE 255 - TStE 420	S255N - S420N P255NH - P420NH S255NL - S420NL / P275NL1 - P355NL1
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 H1, H11 H111	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260



# AS B-248



## Basic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 42 3 B 42 H10  
AWS A5.1 : E7018

### General Description

AS B-248 is a basic coated electrode. It is used particularly to weld rigidly restrained mass structures where high welding stresses are unavoidable. Weld metal has a high resistance to cracking. The slag is easy to remove and it gives excellent quality, smooth weld beads. It is also suitable for welding in vertical upwards position at a high welding speed. It has 125% metal recovery.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.07	0.50	0.90

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 460 N/mm <sup>2</sup>	
Tensile Strength	: 530 N/mm <sup>2</sup>	
Elongation (L=5d)	: 28 %	
Impact (ISO-V)	: 110 J (-30°C) 80 J (-40°C)	Redrying Temperature : 250-400°C / 2-3 hrs

### Approvals

CE, DB, GOST, NAKS, SEPRO, TSE, TÜV

ABS	BV	DNV	GL	LRS	RINA	RMRS	TL <sup>®</sup>
3H10, 3Y	3YHH	3YH10	3YH10	3m 3Ym H10	3YH10	3Y40HH	3YH10

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.00	300	50 - 80	1400	1.8 / 130	2
2.50	350	80 - 110	2420	2.2 / 90	5
3.25	350	110 - 145	3800	3.4 / 90	5
4.00	450	130 - 190	7230	6.5 / 90	6
5.00	450	190 - 245	10700	6.4 / 60	6



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF



# AS B-248



## Basic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS B-248 is suitable for steel constructions and machines operating under dynamic forces. Ship building, boiler and pressure vessel manufacturing and pipe connections are among its application areas. It is recommended for the welding of high carbon, high strength low alloyed steels having high (P) and (S) content; high strength ship's plate of A-, D- and E- quality and vessel plates of 17 Mn 4 and 19 Mn 5 type. AS B-248 can join steel parts to steel casts and can be used in welding of thick parts. It is suitable for the root pass and welding in difficult positions. It gives excellent weld beads with high impact strength values at subzero temperatures. It is also very suitable for welding of GALVANIZED plates.

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2 C 55, Ck 55	S185, S235, S275, S355 P235TR2 - P355T2 E295, E335 C55
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 420 TStE 255 - TStE 420	S255N - S420N P255NH - P420NH S255NL - S420NL / P275NL1 - P355NL1
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 H1, H11 H111	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52, GS-60 GS-62	GE200, GE240, GE260, GE300 -

**Liability:** All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes:** Consult information on Welding Safety Sheet, available upon request.

# AS B-248 H5



## Basic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 42 3 B 42 H5  
AWS A5.1 : E7018

### General Description

AS B-248 H5 is a basic coated electrode. It is used particularly to weld rigidly restrained mass structures where high welding stresses are unavoidable. Weld metal has a high resistance to cracking. The slag is easy to remove and it gives excellent quality, smooth weld beads. It is also suitable for welding in vertical upwards position at a high welding speed. It has 125% metal recovery.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.07	0.50	0.90

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 460 N/mm <sup>2</sup>	
Tensile Strength	: 530 N/mm <sup>2</sup>	
Elongation (L=5d)	: 28 %	
Impact (ISO-V)	: 110 J (-30°C) 80 J (-40°C)	Redrying Temperature : 350-400°C / 3 hrs

### Approvals

CE, GOST, TSE

ABS	BV	DNV	GL	LRS	TL
3H5, 3Y	3YHHH	3YH5	3YH5	3m 3Ym H5	3YH5

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 110	2420	4.8 / 200	5
3.25	350	110 - 145	3800	5.1 / 135	5
4.00	450	130 - 190	7230	6.5 / 90	6
5.00	450	190 - 245	10700	6.4 / 60	6



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS B-248 H5



## Basic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS B-248 H5 is suitable for steel constructions and machines operating under dynamic forces. Ship building, boiler and pressure vessel manufacturing and pipe connections are among its application areas. It is recommended for the welding of high carbon, high strength low alloyed steels having high (P) and (S) content; high strength ship's plate of A-, D- and E- quality and vessel plates of 17 Mn 4 and 19 Mn 5 type. AS B-248 H5 can join steel parts to steel casts and can be used in welding of thick parts. It is suitable for the root pass and welding in difficult positions. It gives excellent weld beads with high impact strength values at subzero temperatures. It is also very suitable for welding of GALVANIZED plates.

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2 C 55, Ck 55	S185, S235, S275, S355 P235TR2 - P355T2 E295, E335 C55
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 420 TStE 255 - TStE 420	S255N - S420N P255NH - P420NH S255NL - S420NL / P275NL1 - P355NL1
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 H1, H11 H111	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52, GS-60 GS-62	GE200, GE240, GE260, GE300 -

**Liability:** All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes:** Consult information on Welding Safety Sheet, available upon request.

# AS B-255



## Basic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 46 5 B 32 H5  
AWS A5.1 : E7018-1 H4

### General Description

AS B-255 is a basic coated electrode. Weld metal has high impact strength at low temperatures. As the weld metal is very resistant to hot cracking, it is used particularly to weld rigidly restrained mass structures where high welding stresses are unavoidable. The slag is easy to remove and it gives very high quality, smooth weld beads. It has 125 % metal recovery.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.07	0.50	1.20

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 480 N/mm <sup>2</sup>	
Tensile Strength	: 580 N/mm <sup>2</sup>	
Elongation (L=5d)	: 30 %	
Impact (ISO-V)	: 180 J (-20°C)	Redrying Temperature : 300-400°C / 2-3 hrs
	: 120 J (-50°C)	

### Approvals

CE, GOST, NAKS, SEPRO, TSE

ABS	BV	DNV	GL	LRS	RINA	RMRS	TL
3H5, 3Y	3YHHH	3YH5	3YH5	3m 3Ym H5	3YH5	3YHHH	3YH5

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 65 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 110	2460	2.2 / 90	5
3.25	350	110 - 145	3890	3.5 / 90	5
4.00	450	140 - 190	7310	6.6 / 90	6
5.00	450	180 - 240	10640	6.4 / 60	6



1G/PA    2F/PB    2G/PC    4G/PE    3G/PF

# AS B-255



## Basic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS B-255 is especially suitable for fine grained structural steels having high yield strength values. It is designed for steel constructions and machines operating under dynamic forces at low temperatures. Welding of ship's plate of A-, D- and E- quality, boiler and pressure vessel manufacturing and pipe connections are among its application areas. AS B-255 can join steel parts to steel casts and can be used in the welding of thick parts. It is suitable for the root pass and welding in difficult positions. It gives excellent weld beads with high impact strength values at subzero temperatures.

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2, St 70-2 C 60, Ck 60	S185, S235, S275, S355 P235TR2 - P355T2 E295, E335, E360 C60
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 420 TStE 255 - TStE 420	S255N - S420N P255NH - P420NH S255NL - S420NL / P275NL1 - P355NL1
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM - X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB L415NB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 H1, H11 H111	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52, GS-60, GS-70 GS-62	GE200, GE240, GE260, GE300, S355JOC -

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# AS B-268



## Basic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 46 6 B 22  
AWS A5.1 : E7016-1

### General Description

AS B-268 is a basic coated electrode. It gives excellent quality, smooth and homogeneous weld beads with a very low impurity (like P and S) content. It guarantees a yield strength value up to 430 N/mm<sup>2</sup> for medium and high strength steels.

ø 2.5 or ø 3.25 mm electrode selection in the root pass brings homogeneous weld beads due to full penetration, which brings great advantage in special welding applications.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	P	S
0.07	0.50	1.10	< 0.03	< 0.03

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 460 N/mm <sup>2</sup>		Redrying Temperature : 250-400°C / 2-3 hrs
Tensile Strength	: 550 N/mm <sup>2</sup>		
Elongation (L=5d)	: 30 %		
Impact (ISO-V)	: 240 J (0°C)		
	: 240 J (-20°C) 180 J (-40°C) 120 J (-60°C)		

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	70 - 110	2080	4.2 / 200	5
3.25	350	100 - 140	3250	4.9 / 150	5
4.00	450	140 - 180	5940	6.5 / 110	6



1G/PA

2F/PB

2G/PC

4G/PE

3G/PF

# AS B-268



## Basic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS B-268 is designed for steel constructions and machines operating under dynamic forces. Ship building, boiler and pressure vessel manufacturing and pipe connections are among its application areas. It is recommended for the welding of high carbon, high strength low alloyed steels having high (P) and (S) content; high strength ship's plate of A-, D- and E- quality and vessel plates of 17 Mn 4 and 19 Mn 5 type. AS B-268 can join steel parts to steel casts and can be used in the welding of thick parts. It is suitable in the root pass and recommended especially in applications where high impact values are required at -30 or -40 °C.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2 C 22 - C 35 ; Ck 22 - Ck 35	S185, S235, S275, S355 P235TR2 - P355T2 E295, E335 C22 - C35
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 420 TStE 255 - TStE 420	S255N - S420N P255NH - P420NH S255NL - S420NL / P275NL1 - P355NL1
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII HIII	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260

# AS S-6010



## Cellulosic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 42 2 C 21  
AWS A5.1 : E6010

### General Description

AS S-6010 is an easy to strike cellulosic coated electrode. Excellent molten pool control due to easily-removable, low-volume slag and gaseous arc shielding eliminates porosity problems in weld beads. In all positions, it enables weld beads of high penetration and it minimizes problems that frequently occur in the welding of rusty or oily steels.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.08	0.20	0.60

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 420 N/mm <sup>2</sup>
Tensile Strength	: 530 N/mm <sup>2</sup>
Elongation (L=5d)	: 25 %
Impact (ISO-V)	: 45 J (-29°C)

### Approvals

CE, GOST, SEPRO, TSE

ABS	BV	DNV	GL	LRS	TL
3	3	3	3	3m	3

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]			Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
		[ Root Pass ]	[ Hot Pass ]	[ Cover Pass ]			
2.50	350	40 - 80	-	-	1590	5.2 / 325	5
3.25	350	80 - 100	100 - 125	80 - 100	2620	5.8 / 220	5
4.00	350	110 - 130	115 - 140	110 - 130	3970	5.6 / 140	5
5.00	350	-	160 - 185	140 - 160	6220	5.6 / 90	5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF



3G/PG



# AS S-6010



## Cellulosic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

Site welding of pipe and pipelines carrying natural gas, crude petroleum or alike; ship building; storage tanks, boiler and pressure vessel manufacturing, steel and bridge constructions are among its application areas. AS S-6010 can be used in applications requiring high penetration. It can be used for root and deposition pass and also for pipe connections of 5LX46 grade line pipes.

	DIN	EN
<b>General Structural Steels</b>	St 33, St 35, St 37, St 44, St 44-2, St 44-3, St 52 St 37-4, St 44-4, St 52-4	S185, S235, S275, S355 P235TR2 - P355T2
<b>Fine Grained Steels</b>	StE 255 - StE 355 WStE 255 - WStE 355	S255N - S355N P255NH - P355NH
<b>Pipe Materials</b>	StE 240-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X56 (API 5LX)	L245NB - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4 HI, HII, HIII	P295GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D, E	-
<b>Cast Steels</b>	GS-38 - GS-45	GE200, GE240, GE260



# AS S-6011



## Cellulosic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 42 2 C 11  
AWS A5.1 : E6011

### General Description

AS S-6011 is an easy to strike cellulosic coated electrode. Arc welding may be done with either AC or DC current. Excellent molten pool control due to easily-removable, low-volume slag and gaseous arc shielding eliminates porosity problems in weld beads. In all positions, it enables notch-free, smooth weld beads of high penetration. It also minimizes problems that frequently occur in the welding of rusty or oily steels.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.09	0.30	0.60

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 420 N/mm<sup>2</sup>  
Tensile Strength : 540 N/mm<sup>2</sup>  
Elongation (L=5d) : 25 %  
Impact (ISO-V) : 45 J (-29°C)

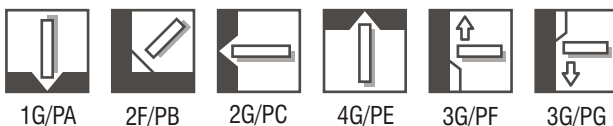
### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]			Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
		[ Root Pass ]	[ Hot Pass ]	[ Cover Pass ]			
2.50	350	40 - 80	-	-	1680	5.4 / 325	5
3.25	350	80 - 100	100 - 125	80 - 100	2950	4.7 / 160	5
4.00	350	110 - 130	115 - 140	110 - 130	4000	4.4 / 110	5



# AS S-6011



## Cellulosic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

Site welding of pipe and pipelines made particularly from unalloyed structural steels; ship building; storage tanks, boiler and pressure vessel manufacturing and steel constructions are among its application areas. AS S-6011 can be used in applications requiring high penetration. It can also be used for the root and deposit pass. As it is an easy to bend electrode, it brings great convenience to reach in difficult-to-reach areas. AS S-6011 is an ideal electrode for welding in vertical downwards position.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 35, St 37, St 44, St 44-2, St 44-3, St 52 St 37-4, St 44-4, St 52-4	S185, S235, S275, S355 P235TR2 - P355T2
<b>Fine Grained Steels</b>	StE 255 - StE 355 WStE 255 - WStE 355	S255N - S355N P255NH - P355NH
<b>Pipe Materials</b>	StE 240-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X56 (API 5LX)	L245NB - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4 H1, H11, H111	P295GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D, E	-
<b>Cast Steels</b>	GS-38 - GS-45	GE200, GE240, GE260



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# AS S-7010Mo



## Cellulosic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 46 2 Mo C 21  
AWS A5.5 : E7010-A1

### General Description

AS S-7010 Mo is a cellulosic coated electrode. It has 0.5 % Mo content. Excellent molten pool control due to easily-removable slag and gaseous arc shielding eliminates porosity problems in weld beads which have good mechanical properties. In all positions, it enables notch-free, smooth weld beads of high penetration.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Mo
0.08	0.10	0.70	0.50

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 480 N/mm<sup>2</sup>  
Tensile Strength : 600 N/mm<sup>2</sup>  
Elongation (L=5d) : 25 %  
Impact (ISO-V) : 50 J (-20°C)  
40 J (-30°C)

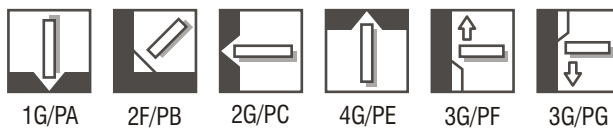
### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]			Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
		[ Root Pass ]	[ Hot Pass ]	[ Cover Pass ]			
3.25	350	80 - 100	100 - 125	80 - 100	2500	6.0 / 240	5
4.00	350	110 - 130	115 - 140	110 - 130	3860	6.0 / 155	5



# AS S-7010Mo



## Cellulosic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

It is especially designed for the site welding of higher strength pipe and pipelines with 0.5 % Mo, that carry content carrying natural gas, crude petroleum or alike. It is particularly used on pipe steels in the 5LX52 - 5LX56 range. Ship building; storage tanks, and boiler and pressure vessel manufacturing are among its application areas. AS S-7010 Mo is an ideal electrode for welding in vertical downwards position.

	DIN	EN
<b>General Structural Steels</b>	St 33, St 35, St 37, St 44, St 44-2, St 44-3, St 52 St 37-4, St 44-4, St 52-4	S185, S235, S275, S355 P235TR2 - P355T2
<b>Fine Grained Steels</b>	StE 255 - StE 355 WStE 255 - WStE 355	S255N - S355N P255NH - P355NH
<b>Pipe Materials</b>	StE 290-7 - StE 415-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X56, X60 (API 5LX)	L290NB - L415NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 5, 15 Mo 3 HI, HII, HIII	P295GH, P310GH, 16 Mo 3 P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D, E	-
<b>Cast Steels</b>	GS-38 - GS-45	GE200, GE240, GE260





# AS S-8010Ni

## Cellulosic Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 46 3 Z C 21  
AWS A5.5 : E8010-G

### General Description

AS S-8010 Ni is an easy to strike cellulosic coated electrode that provide the highest impact notch toughness values among our range of cellulosic coated electrodes. Due to its higher mechanical properties, it is useful for the root and deposit pass of large diameter pipe connections having high yield strength. In all positions, it enables notch-free, smooth weld beads of high penetration. It enables excellent molten pool control due to easily-removable, low-volume slag.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Ni
0.10	0.30	1.10	0.20

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 480 N/mm <sup>2</sup>
Tensile Strength	: 600 N/mm <sup>2</sup>
Elongation (L=5d)	: 24 %
Impact (ISO-V)	: 60 J (-20°C)
	50 J (-30°C)

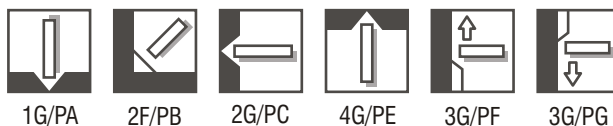
### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]			Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
		[ Root Pass ]	[ Hot Pass ]	[ Cover Pass ]			
2.50	350	40 - 80	-	-	1540	6.2 / 400	5
3.25	350	80 - 100	90 - 120	80 - 100	2600	5.7 / 220	5
4.00	350	110 - 130	120 - 140	110 - 130	3910	5.5 / 140	5
5.00	350	-	140 - 170	140 - 160	6060	5.8 / 95	5



# AS S-8010Ni



## Cellulosic Coated Electrode for Mild Steels

### Applications and Materials to be Welded

AS S-8010 Ni can be used in the site welding of pipe and pipelines made particularly from low alloyed high strength steels. Site welding of pipe steels in the 5LX60 - 5LX70 range is a good example to application areas. AS S-8010 Ni is an ideal electrode for welding in vertical downwards position.

	DIN	EN
<b>Pipe Materials</b>	StE 290-7 - StE 415-7 StE 290-7 TM - StE 415-7 TM X42, X46, X52, X56, X60, X70 (API 5LX)	L290NB - L415NB L290MB - L360MB -
<b>Ship Plates</b>	A, B, C, D, E	-



# AS DT-165



## Iron Powder Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 46 0 RR 74  
AWS A5.1 : E7024

### General Description

AS DT-165 is a heavily coated, high efficiency rutile iron powder electrode. It gives a metal recovery of about 165 % due to high iron powder content in its coating. It is particularly suitable for fillet welding of thick plates. It gives smooth weld bead appearance with a soft arc. The slag is easy to remove.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.08	0.40	0.70

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 500 N/mm <sup>2</sup>
Tensile Strength	: 580 N/mm <sup>2</sup>
Elongation (L=5d)	: 24 %
Impact (ISO-V)	: 60 J (0°C)

### Approvals

CE, GOST, SEPRO, TSE

ABS	BV	RINA	TL
2	2	2	2

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 70 V ; DC (-)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	450	130 - 155	6540	5.9 / 90	6
4.00	450	170 - 240	10050	6.0 / 60	6
5.00	450	250 - 310	14920	6.0 / 40	6



1G/PA



2F/PB



# AS DT-165



## Iron Powder Coated Electrode for Mild Steels

### Applications and Materials to be Welded

It is used for the welding of medium carbon and mild steels. AS DT-165 is an ideal electrode particularly used for welding vertical-horizontal fillets. Weld metal goes well up the vertical plate giving a good transition to the base metal without undercutting, even at high currents.

Machinery fabrication and ship building where smooth weld beads are required; boiler and pressure vessel manufacturing; automotive bodies and steel and bridge constructions are among some application areas where AS DT-165 is extensively used as it brings high efficiency in terms of welding cost.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52* C 10 - C 22	S185, S235, S275, S355 C10 - C22
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 420	S255N - S420N P255NH - P420NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 X42, X46, X52, X60 (API 5LX)	L210 - L360NB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII, HIII	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D*, E* AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52*	GE200, GE240, GE260

(\*) It is recommended to use a basic coated electrode in the root pass.

# AS DT-180



## Iron Powder Coated Electrode for Mild Steels

### Classification

EN ISO 2560-A : E 46 0 RR 74  
AWS A5.1 : E7024

### General Description

AS DT-180 is a heavily coated, high efficiency rutile iron powder electrode. It gives a metal recovery of about 180 % due to high iron powder content in its coating. It is particularly suitable for GRAVITY WELDING of thick plates. It gives smooth weld bead appearance with a soft arc. The slag is easy to remove. As the electrode length is 700 mm, it enables uninterrupted welding with large and long welding beads.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn
0.08	0.45	0.90

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 500 N/mm<sup>2</sup>  
Tensile Strength : 560 N/mm<sup>2</sup>  
Elongation (L=5d) : 25 %  
Impact (ISO-V) : 60 J (0°C)

### Approvals

CE, GOST, SEPRO, TSE

ABS	BV	DNV	LRS	TL
2	2	2	2m	2

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 70 V ; DC (-)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]
4.00	700	180 - 230	16900	10.1 / 60
5.00	700	240 - 270	25530	10.2 / 40



1G/PA



2F/PB

# AS DT-180



## Iron Powder Coated Electrode for Mild Steels

### Applications and Materials to be Welded

It is used for the welding of mild steels having a maximum tensile strength of 440 N/mm<sup>2</sup> and for ordinary ship's plate of A- and D-quality. AS DT-180 is an ideal electrode particularly used for fillet and butt joints in flat and horizontal positions. Machinery fabrication and ship building where smooth weld beads are required; boiler and pressure vessel manufacturing; automotive bodies and steel and bridge constructions are among some application areas where AS DT-180 is extensively used. It brings high efficiency as it is a very fast electrode with a very high deposition rate.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52* C 10 - C 22	S185, S235, S275, S355 C10 - C22
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 420	S255N - S420N P255NH - P420NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 X42, X46, X52, X60 (API 5LX)	L210 - L360NB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 H1, H11, H111	P295GH, P355GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D*, E* AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52*	GE200, GE240, GE260

(\* ) It is recommended to use a basic coated electrode in the root pass.



# AS DA-708

## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 2560-A : E 42 2 Z B 42  
AWS A5.1 : E8018-G

### General Description

AS DA-708 is a heavily coated, Ni-Cu alloyed basic electrode. It gives a weld metal that has an excellent corrosion resistance to sea water and to flue gases. Weld metal has good mechanical properties. AS DA-708 welds with a quite, stable arc giving very little spatter.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Ni	Cu
0.05	0.30	1.00	0.60	0.45

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 470 N/mm<sup>2</sup>  
Tensile Strength : 570 N/mm<sup>2</sup>  
Elongation (L=5d) : 28 %  
Impact (ISO-V) : 120 J (-20°C)

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 115	2320	4.6 / 200	5
3.25	350	100 - 140	3700	5.0 / 135	5
4.00	450	150 - 190	7040	5.6 / 80	6



1G/PA

2F/PB

2G/PC

4G/PE

3G/PF

# AS DA-708



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

The electrode can be used in all positions for the welding of all types of joints. AS DA-708 is particularly designed for welding the shell platings of ships where the protective paint coating wears severely. Ship steels of A-, D- and E- quality and slow corrosion steels (due to its copper content) of the CORTEN-A and CORTEN-B type are among other application areas. It can be used in the welding of parts that work under dynamic loads at elevated temperatures; in all construction applications including bridges, boiler and pressure vessels, and shipbuilding. AS DA-708 can also be used in the root pass.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 44, St 44-2, St 44-3, St 52-3 St 50-2, St 60-2, St 70-2	S275, S355 E295, E335, E360
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 420 TStE 255 - TStE 420 EStE 255 - EStE 355	S255N - S420N P255NH - P420NH S255NL - S420NL / P275NL1 - P355NL1 S255NL1 - S315NL1 / P275NL2 - P355NL2
<b>Pipe Materials</b>	StE 210-7 - StE 360-7	L245NB - L360NB
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 5 HI, HII, HIII	P295GH, P310GH P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, D, E	-
<b>Weather Resisting Steels</b>	St 52-3 Cu3	S355 J2G3Cu S235 J0W, S235 J2W, S355 J0W S355 J2W, S355 K2G1W





# AS DA-710

## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 2560-A : E 46 6 2 Ni B 42  
AWS A5.1 : E8018-C1

### General Description

AS DA-710 is a heavily coated, Ni alloyed basic electrode. It is particularly useful for the welding of fine-grained steels and low alloy steels which have high impact resistance at low temperatures down to  $-60^{\circ}\text{C}$ . It is used for the welding of joints which need to have high toughness values at low temperatures. It gives a weld metal that has an excellent corrosion resistance to sea water and to sulphuric acid fumes. It has about 120 % metal recovery.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Ni	P	S
0.06	0.30	0.90	2.40	< 0.02	< 0.02

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 500 N/mm<sup>2</sup>  
Tensile Strength : 600 N/mm<sup>2</sup>  
Elongation (L=5d) : 28 %  
Impact (ISO-V) : 150 J ( $-20^{\circ}\text{C}$ )  
110 J ( $-60^{\circ}\text{C}$ )

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 115	2500	5.0 / 200	5
3.25	350	100 - 140	3740	5.1 / 135	5
4.00	450	140 - 190	7510	6.8 / 90	6



1G/PA

2F/PB

2G/PC

4G/PE

3G/PF

# AS DA-710



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

AS DA-710 is particularly designed for the welding of high strength low alloyed steels. It is suitable for the root pass and welding of pipelines and storage tanks that are frequently used in the chemical industry and cold storage areas.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 52-3 St 60-2, St 70-2	S355 E335, E360
<b>Fine Grained Steels</b>	StE 255 - StE 500 WStE 255 - WStE 500 TStE 255 - TStE 500 EStE 255 - EStE 500 -	S255N - S500N P255NH - P500NH S255NL - S500NL / P275NL1 - P460NL1 S255NL1 - S500NL1 / P275NL2 - P460NL2 S355NH - S460NH
<b>Pipe Materials</b>	X52, X56, X60, X65 (API 5LX)	-
<b>Low Temperature Steels</b>	14 Ni 6, 16 Ni 14 TTSt 35 N, TTSt 45 N, TTSt 35 V, TTSt 45 V 10 Ni 14, 12 Ni 9, 14NiMn6 -	- - 12 Ni 14, X12 Ni 5, 15 NiMn 6 11 MnNi 5 3, 13 MnNi 6 3
<b>Cast Steels</b>	GS-52, GS-60	GE260, GE300



**Liability:** All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes:** Consult information on Welding Safety Sheet, available upon request.

# AS DA-715



## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 2560-A : E 50 6 1 Ni B 42 H5  
AWS A5.1 : E8018-C3 H4

### General Description

AS DA-715 is a thick coated basic electrode. The weld metal contains 1 % Ni. It is particularly used for the welding of fine-grained steels and steels which maintain their toughness at low temperatures down to -60°C. Weldability is very good at all positions except vertical down. The weld metal diffusible hydrogen level is below 5 ml/100 g. Recovery is 120 %.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Ni	P	S
0.05	0.35	1.30	1.00	< 0.02	< 0.02

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 540 N/mm<sup>2</sup>  
Tensile Strength : 620 N/mm<sup>2</sup>  
Elongation (L=5d) : 27 %  
Impact (ISO-V) : 80 J (-50°C)  
60 J (-60°C)

### Approvals

TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 115	2380	4.8 / 200	5
3.25	350	100 - 150	3700	5.0 / 135	5
4.00	450	140 - 190	7300	6.6 / 90	6
5.00	450	180 - 240	10850	6.1 / 56	6



1G/PA

2F/PB

2G/PC

4G/PE

3G/PF



# AS DA-715



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

It is especially suitable for high strength low alloy steels used at low temperatures and at weld joints which require high impact strength. It is used at root and other passes for chemical industry, cold air warehouses, pressure and boiler vessels, piping/tubing and offshore platforms.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 44, St 44-2, St 44-3, St 52-3	S275, S355
<b>Fine Grained Steels</b>	StE 255 - StE 500 WStE 255 - WStE 500 TStE 255 - TStE 500 EStE 255 - EStE 355	S255N - S500N P255NH - P500NH S255NL - S500NL / P275NL1 - P460NL1 S255NL1 - S500NL1 / P275NL2 - P460NL2
<b>Pipe Materials</b>	X42, X46, X52, X56, X60, X65 (API 5LX) -	- L290GA - L360GA
<b>Boiler and Pressure Vessel Steels</b>	H1, H11, H111 17 Mn 4, 19 Mn 5	P235GH, P265GH, P285NH P295GH, P310GH
<b>Ship Plates</b>	A, D, E AH32 - EH36	- -
<b>Low Temperature Steels</b>	TTSt 35 N, TTSt 35 V, 15 MnNi 6 3 -	- 11 MnNi 5 3, 13 MnNi 6 3



# AS DA-717



## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 18275 : E 55 6 1NiMo B 42  
AWS A5.5 : E9018-G

### General Description

DA-717 is a basic electrode. It is used for the welding fine-grained and high strength steels with a yield strength min. 600 N/mm<sup>2</sup>. It gives a weld metal that has a high toughness value and resistant to cracking at low temperatures down to -60°C. It has 120 % metal recovery.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Ni	Mo
0.04	0.30	1.00	1.10	0.35

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 600 N/mm <sup>2</sup>
Tensile Strength	: 650 N/mm <sup>2</sup>
Elongation (L=5d)	: 23 %
Impact (ISO-V)	: 160 J (-30°C)
	70 J (-60°C)



### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 120	2320	4.6 / 200	5
3.25	350	110 - 140	3710	5.0 / 135	5
4.00	450	140 - 190	7470	6.7 / 90	6



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS DA-717



## Coated Electrode for High Strength Low Alloyed Steels

### Materials to be Welded

	<u>DIN</u>	<u>EN</u>
<b>Fine Grained Steels</b>	StE 420 - StE 500 WStE 420 - WStE 500 TStE 420 - TStE 500	S420N - S500N P420NH - P500NH S420NL - S500NL / P275NL1 - P460NL1
<b>Pipe Materials</b>	X60, X65, X70, X75, X80 (API 5LX)	-



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# AS DA-731



## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 3580 : E Mo R 22  
AWS A5.5 : E8013-G

### General Description

AS DA-731 is a rutile coated electrode. It gives a Mo alloyed weld metal that is used in the welding of boiler and pressure vessels operating under high temperatures.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Mo
0.08	0.30	0.70	0.50

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 500 N/mm <sup>2</sup>
Tensile Strength	: 600 N/mm <sup>2</sup>
Elongation (L=5d)	: 24 %
Impact (ISO-V)	: 50 J (+20°C)

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	75 - 110	2020	4.2 / 210	5
3.25	350	100 - 140	3380	5.1 / 150	5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS DA-731



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

AS DA-731 is used for the welding of low alloyed and pressure vessel steels with a tensile strength up to 540 N/mm<sup>2</sup>. It is ideal for the welding of boiler and pressure vessel steels and pipe connections that operate under temperatures up to 525°C. AS DA-735, a basic coated electrode, should be preferred in multipass applications of thick sectioned or rigidly restrained mass structures.

	DIN	EN
<b>Fine Grained Steels</b>	StE 255 - StE 500	S255N - S500N
<b>Boiler and</b>	WStE 255 - WStE 500	P255NH - P420NH
<b>Pipe Materials</b>	StE 320-7 - StE 415-7 StE 360-7 TM - StE 415-7 TM X52, X56, X60 (API 5LX)	L320 - L415NB L360MB - L415MB -
<b>Boiler and</b>	HI, HII, HIII	P235GH, P265GH, P285NH
<b>Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 5, 15 Mo 3 16 Mo 5	P295GH, P310GH, 16 Mo 3 -
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Cast Steels</b>	GS-45 GS-22 Mo 4 GS-C 25	GE240 G20Mo5 GP240GH

**BOLTSANDTOOLS**



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# AS DA-735

## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 3580 : E Mo B 22  
AWS A5.5 : E7018-A1

### General Description

AS DA-735 is a basic coated electrode. It gives a Mo alloyed weld metal that is used in the welding of boiler and pressure vessels operating under high temperatures. Ductile weld metal has a particular creep resistance. It is ideal in multipass applications that is required in the welding of thick and rigidly restrained mass structures. It gives high quality weld beads with good mechanical properties.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Mo
0.08	0.30	0.80	0.50

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 510 N/mm<sup>2</sup>  
Tensile Strength : 620 N/mm<sup>2</sup>  
Elongation (L=5d) : 24 %  
Impact (ISO-V) : 150 J (+20°C)

### Approvals

GOST, SEPRO, TSE

TL

1

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 110	2490	5.0 / 200	5
3.25	350	110 - 140	3840	5.2 / 135	5
4.00	450	150 - 190	7330	5.9 / 80	6



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS DA-735



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

AS DA-735 is used for the welding of 15 Mo 3 grade steels operating under temperatures up to 550°C. It is also ideal for the welding of fine grained steels (up to St E480-7 TM). It is ideal for the welding of boiler and pressure vessel steels and pipe connections that operate under temperatures up to 525°C.

The stable arc enables proper welding in the root pass and in difficult positions.

	<u>DIN</u>	<u>EN</u>
<b>Fine Grained Steels</b>	StE 255 - StE 500 WStE 255 - WStE 500	S255N - S500N P255NH - P500NH
<b>Pipe Materials</b>	StE 320-7 - StE 415-7 StE 360-7 TM - StE 415-7 TM X52, X56, X60, X65 (API 5LX)	L320 - L415NB L360MB - L415MB -
<b>Boiler and Pressure Vessel Steels</b>	HI, HII, HIII 17 Mn 4, 19 Mn 5, 15 Mo 3 - 16 Mo 5	P235GH, P265GH, P285NH P295GH, P310GH, 16 Mo 3 P355GH -
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Cast Steels</b>	GS-45, GS-52, GS-60 GS-22 Mo 4 GS-C 25	GE240 - GE300 G20Mo5 GP240GH
<b>Steels Resistant to Aging</b>	17 MnMoV 6 4, 15 NiCuMoNb 5 -	- 20 MnMoNi 4 5

# AS DA-737



## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 3580 : E Mo B 22  
AWS A5.5 : E 9018-D1

### General Description

AS DA-737 is a basic coated, AC/DC electrode for the welding of high tensile strength steels. It gives a weld metal that has good notch toughness down to  $-60^{\circ}\text{C}$ . Grain boundary cracking risk is very low.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Mo
0.06	0.40	1.30	0.40

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 580 N/mm <sup>2</sup>
Tensile Strength	: 660 N/mm <sup>2</sup>
Elongation (L=5d)	: 24 %
Impact (ISO-V)	: 170 J (+20°C)
	50 J (-50°C)
	40 J (-60°C)

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	110 - 140	3790	4.6 / 120	5
4.00	450	150 - 190	7300	5.8 / 80	6
5.00	450	190 - 250	10500	6.3 / 60	6



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF



# AS DA-737



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

Due to the weld metal's good notch toughness properties down to  $-60^{\circ}\text{C}$ , it is used for welding unalloyed and low alloyed steel structures exposing to low temperatures like LPG holders. Welding of low alloyed high tensile steels when preheating cannot be applied and enclosed joint welding and cladding of rails when a hardness of about 250 HV is required are among its application areas.

	<u>DIN</u>	<u>EN</u>
<b>General Structural Steels</b>	St 50-2, St 60-2, St 70-2	E295, E335, E360
<b>Fine Grained Steels</b>	StE 380 - StE 500 WStE 380 - WStE 500	S380N - S500N P380NH - P500NH
<b>Pipe Materials</b>	X42, X46, X52, X56, X60, X65 (API 5LX)	-
<b>Low Temperature Steels</b>	TTSt 35 N, TTSt 35 V	-



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# AS DA-753

## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 18275 : E 69 5 Mn 2 NiCrMo BT 42  
AWS A5.5 : E11018-G

### General Description

AS DA-753 is a basic coated electrode. It is used for the welding of fine-grained, heat treatable high strength steels with a yield strength up to 760 N/mm<sup>2</sup>. It can also be used in the welding of fine grained structural steels having a yield strength value greater than 760 N/mm<sup>2</sup>. It gives a weld metal that has a high toughness value and resistant to cracking at low temperatures down to -50°C.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni	Mo
0.05	0.40	1.50	0.35	1.80	0.45

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 700 N/mm<sup>2</sup>  
Tensile Strength : 800 N/mm<sup>2</sup>  
Elongation (L=5d) : 20 %  
Impact (ISO-V) : 115 J (+20°C)  
85 J (-20°C)  
70 J (-40°C)  
55 J (-50°C)  
40 J (-60°C)

### Approvals

GOST, SEPRO, TSE

TL

1

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	75 - 110	2290	4.6 / 200	5
3.25	350	100 - 145	3800	5.1 / 135	5
4.00	450	130 - 190	7390	5.9 / 80	6
5.00	450	180 - 250	11550	6.9 / 60	6



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS DA-753



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

It is used for welding fine grained, low alloyed high strength structural steels at room temperature or with moderate preheat. It is used in the welding of steel structures, boiler and pressure vessels, and for construction of heavy machinery. It is particularly used in the root pass of high strength steels (790 N/mm<sup>2</sup>).

- 1) If possible, each joint should be welded continuously, except electrode change and slag removal.
- 2) In multi-pass welding applications, interpass temperature should be maintained at 100-150°C.
- 3) Use only dry electrodes.

	DIN	EN
<b>Fine Grained Steels</b>	StE 500	S500N
	WStE 500	P500NH
	TStE 500	P500NL
	15 NiCrMo 10 6, 16 NiCrMo 12 6	–
	11 NiMnCrMo 5 5, 17 MnCrMo 3 3	–
	12 MnNiMo 5 5, 11 NiMoV 5 3	–
	TStE 620 V - TStE 690 V	S620QL - S690QL
<b>Pipe Materials</b>	X70, X75 (API 5LX)	–
<b>Heat Treated Fine Grained Structural Steels</b>	N-A-XTRA 56, N-A-XTRA 63, N-A-XTRA 70 T1, T1A, T1B, HSB 77 V,	S550QL1, S620QL1, S690QL1 –



# AS DA-771



## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 3580 : (E CrMo 1 R 12)  
AWS A5.5 : (E8013-B2)

### General Description

AS DA-771 is a rutile coated electrode. It gives a Cr-Mo alloyed weld metal that is used in the welding of creep resistant pressure vessels and pipe steels operating under high temperatures. AS DA-771 is especially used for 13 CrMo 44 type steels that are frequently used in operating temperatures up to 570°C. It gives a root pass free of porosity with a minimum amount of spatter.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Mo
0.06	0.30	0.80	1.20	0.40

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 520 N/mm <sup>2</sup>
Tensile Strength	: 600 N/mm <sup>2</sup>
Elongation (L=5d)	: 22 %
Impact (ISO-V)	: 60 J (+20°C)

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (-)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	70 - 95	2200	3.3 / 150	5
3.25	350	100 - 140	3050	4.1 / 135	5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS DA-771



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

AS DA-771 is used for the welding of vapor pipes and boiler and pressure vessels that are manufactured from Cr-Mo steels. AS DA-774, a basic coated electrode, should be preferred in the multi-pass welding of thick sectioned and rigidly restrained mass structures.

	<u>DIN</u>	<u>EN</u>	<u>Werkstoff Nr.</u>
<b>Heat Resistant Steels</b>	15 CrMo 5	–	1.7205
	–	25CrMo4	1.7218
	–	42CrMo4 *	1.7225
	24 CrMo 5	–	1.7258
	13 CrMo 4 4	13CrMo4-5	1.7335
	22 CrMo 4 4	–	1.7350
	16 CrMoV 4	–	1.7728
<b>Cast Steels</b>	GS-25 CrMo 4	G25CrMo4	1.7218
	GS-22 CrMo 5 4	G22CrMo5-4	1.7354
	GS-17 CrMo 5 5	G17CrMo5-5	1.7357

(\* ) Mechanical properties should be considered.



# AS DA-774



## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 3580 : E CrMo 1 B 12  
AWS A5.5 : E8018-B2

### General Description

AS DA-774 is a basic coated electrode. It gives a Cr-Mo alloyed weld metal that is used in the welding of creep resistant pressure vessels and pipe steels operating under high temperatures. AS DA-774 is especially used for 13 CrMo 44 type steels that are frequently used in operating temperatures up to 570°C. It gives a root pass free of porosity with a minimum amount of spatter. It is recommended to use the electrode in DC (+).

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Mo
0.06	0.50	0.80	1.20	0.50

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 540 N/mm <sup>2</sup>
Tensile Strength	: 620 N/mm <sup>2</sup>
Elongation (L=5d)	: 22 %
Impact (ISO-V)	: 90 J (+20°C)

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 70 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 100	2030	3.9 / 190	5
3.25	350	90 - 140	3270	4.7 / 145	5
4.00	450	130 - 190	6420	6.1 / 95	6
5.00	450	150 - 240	10000	6.5 / 65	6



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS DA-774



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

AS DA-774 is used for the welding of vapor pipes and boiler and pressure vessels that are manufactured from Cr-Mo steels. It can also be used in welding similarly alloyed cementation steels, heat treatable steels and cast steels. It is an ideal electrode in the multi-pass welding of thick sectioned and rigidly restrained mass structures.

	<u>DIN</u>	<u>EN</u>	<u>Werkstoff Nr.</u>
<b>Heat Resistant Steels</b>	15 CrMo 3	–	1.7205
	–	25CrMo4	1.7218
	–	42CrMo4 *	1.7225
	24 CrMo 5	–	1.7258
	15 CrMo 5	–	1.7262
	13 CrMo 4 4	13CrMo4-5	1.7335
	16 CrMo 4 4	–	1.7337
	22 CrMo 4 4	–	1.7350
	13 CrMoV 4 2	–	1.7709
	16 CrMoV 4	–	1.7728
<b>Cast Steels</b>	GS-25 CrMo 4	G25CrMo4	1.7218
	GS-22 CrMo 5	G22CrMo5	1.7252
	GS-22 CrMo 5 4	G22CrMo5-4	1.7354
	GS-17 CrMo 5 5	G17CrMo5-5	1.7357
<b>Cementation Steels</b>	15 Cr 3	–	1.7015
	–	16MnCr5	1.7131
	–	20MnCr5	1.7147

(\*) Mechanical properties should be considered.



# AS DA-777



## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 3580 : E CrMo 2 B 22  
AWS A5.5 : E9018-B3

### General Description

AS DA-777 is a basic coated electrode for joining and welding of heat and creep resistant steels containing 2.2% Cr + 1% Mo that are exposed to operating temperatures up to 600°C. The weld metal has a high resistance to cracking. AS DA-777 runs with a quite, stable arc giving a minimum amount of spatter and smooth weld beads. It is recommended to use the electrode in DC (+).

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Mo
0.05	0.40	0.80	2.40	1.10

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 560 N/mm <sup>2</sup>
Tensile Strength	: 650 N/mm <sup>2</sup>
Elongation (L=5d)	: 22 %
Impact (ISO-V)	: 80 J (+20°C)

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 110	2160	4.3 / 200	5
3.25	350	90 - 140	3420	4.8 / 140	5
4.00	450	130 - 190	6450	6.4 / 100	6
5.00	450	150 - 240	10000	6.0 / 60	6



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF



# AS DA-777



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

Power plant constructions; flange pipes used in petrochemical plants; forged cast parts, vapor production plants, preheaters and heaters, boiler and pressure vessels and pipe connections are among some application areas where AS DA-777 is used. It can also be used in welding similarly alloyed cementation steels, heat treatable steels and cast steels. Part should be preheated before welding to avoid the cracking risk and operating temperature during welding should not exceed 300°C.

	<u>DIN</u>	<u>EN</u>	<u>Werkstoff Nr.</u>
<b>Heat Resistant Steels</b>	26 CrMo 7	–	1.7259
	24 CrMo 10	–	1.7273
	10 CrMo 11	–	1.7276
	16 CrMo 9 3	–	1.7281
	12 CrMo 9 10	–	1.7375
	–	10 CrMo 9-10	1.7380
	10 CrSiMoV 7	–	1.8075
<b>Cast Steels</b>	GS-18 CrMo 9 10	G17 CrMo 9-10	1.7379

**BOLCO**



# AS DA-778



## Coated Electrode for High Strength Low Alloyed Steels

### Classification

EN ISO 3580 : E CrMo 5 B 42  
AWS A5.5 : E8018-B6

### General Description

AS DA-778 is a basic coated electrode particularly used for the welding of steels containing 5 % Cr and 0.5 % Mo. The weld metal has a crack resistance to operating temperatures up to 550°C. Since it is a low hydrogen electrode, the weld metal has a high creep resistance. It has about 110 % metal recovery. It is recommended to use the electrode in DC (+).

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Mo
0.05	0.50	0.70	5	0.50

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 400 N/mm <sup>2</sup>
Tensile Strength	: 580 N/mm <sup>2</sup>
Elongation (L=5d)	: 22 %
Impact (ISO-V)	: 80 J (+20°C)

### Approvals

GOST, SEPRO, TSE

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	75 - 100	2300	4.6 / 200	5
3.25	350	90 - 140	3640	4.9 / 135	5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS DA-778



## Coated Electrode for High Strength Low Alloyed Steels

### Applications and Materials to be Welded

Power plant constructions; flange pipes used in petrochemical plants; forged cast parts, vapor production plants, preheaters and heaters, boiler and pressure vessels and pipe connections are among some application areas where AS DA-778 is used. It can also be used in welding similarly alloyed cementation steels, heat treatable steels and cast steels.

Part should be preheated to 300°C before welding and operating temperature during welding should not exceed 350°C.

	<u>DIN</u>	<u>EN</u>	<u>Werkstoff Nr.</u>
<b>Heat Resistant Steels</b>	15 CrMo 3	–	1.7205
	25 CrMo 4	–	1.7218
	15 CrMo 5	–	1.7262
	22 CrMo 4 4	–	1.7350
	12 CrMo 19 5	X12 CrMo 5	1.7362
<b>Cast Steels</b>	GS-17 CrMo 5 5	G-17 CrMo 5 5	1.7357
	GS-25 CrMo 4	G-25 CrMo 4	1.7218
	GS-22 CrMo 5	G-22 CrMo 5	1.7252
	GS-22 CrMo 5 4	G-22 CrMo 5 4	1.7354
	GS-12 CrMo 19 5	G-X 12 CrMo 19 5	1.7363
<b>Cementation Steels</b>	15 Cr 3	–	1.7015
	–	16 MnCr 5	1.7131
	–	20 MnCr 5	1.7147



# AS P-307



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 18 9 MnMo B 22  
AWS A5.4 : E307-15

### General Description

AS P-307 is a basic coated electrode. It gives a filler metal of the Cr-Ni-Mo type that is high (4.5 %) in Mn content. Weld beads are highly resistant to impact, wearing and cracking due to heat effects. It gives a fully austenitic, non-magnetic weld metal.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni	Mo
0.10	0.40	4.5	20	10	1.00

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 420 N/mm <sup>2</sup>
Tensile Strength	: 690 N/mm <sup>2</sup>
Elongation (L=5d)	: 35 %
Impact (ISO-V)	: 80 J (+20°C)
Hardness	: 150 HB (as welded)
	: 250 HB (after cold working)

### Approvals

GOST, SEPRO, TSE

### Applications and Materials to be Welded

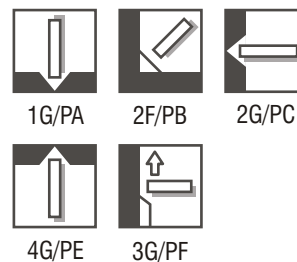
AS P-307 is used for forming a buffer layer for hardfacing and joining of armour steel plates, steel welds that are low hardenable and work-hardening austenitic Mn steels. It can also be used for dissimilar weld joints of C-Mn steels with austenitic and ferritic stainless steels.

There is no need to apply heat treatment to armour steel plates before or after the welding. Interpass temperature during welding should not exceed 120°C.

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	300	80 - 110	2950	2.2 / 75	2.0
4.00	350	120 - 150	4040	2.1 / 50	2.5
5.00	350	150 - 190	6960	3.2 / 45	2.5



# AS P-308L



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 19 9 LR 12      Werkstoff-Nr : 1.4306  
AWS A5.4 : E308L-16

### General Information

AS P-308L is an extra low carbon rutile coated electrode. It gives a filler metal of the Cr-Ni type. Excellent quality smooth weld beads are highly resistant to acids, intergranular corrosion at operating temperatures up to 350°C, and to oxidation up to 800°C. It gives a stable arc and the slag is easy to remove.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni
0.03	0.80	0.70	19	10

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 420 N/mm<sup>2</sup>  
Tensile Strength : 570 N/mm<sup>2</sup>  
Elongation (L=5d) : 45 %  
Impact (ISO-V) : 80 J (+20°C)

### Approvals

CE, GOST, SEPRO, TSE, TÜV

ABS (E308L-16)    BV (308L)    DNV (NV 308L)  
GL (4306)

### Applications and Materials to be Welded

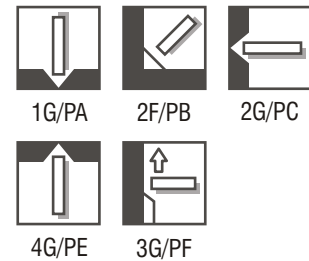
In addition to the welding of steels corresponding to AISI 301, 302, 304, 304L, 308 and 308L; AS P-308 L can also be used in the welding of niobium or titanium stabilized austenitic stainless steels. Welding of vapor and pressure fittings, storage tanks and equipment that are used in milk and other food industries, stainless steel or stainless steel plated steels operating under chemical attack are among its application areas. It is an ideal electrode for the joining of stainless steel parts (having similar chemical composition with the electrode) with steel cast pieces. Up to and including 3.25 mm diameter electrodes can be used in all positions; whereas 4 mm and 5 mm electrodes should be used in the flat position.

	EN 10088-1/-2	EN 10213-4	W. Nr.
<b>Extra Low Carbon Stainless Steels</b> (C < %0.03)	X2 CrNi 19 11	–	1.4306
	X2 CrNiN 18 10	–	1.4311
<b>Medium Carbon Stainless Steels</b> (C > %0.03)	X4 CrNi 18 10	–	1.4301
	X4 CrNi 18 12	–	1.4303
	–	G-X5 CrNi 19 10	1.4308
<b>Stabilized Stainless Steels</b> (Nb/Ti)	X6 CrNiTi 18 10	–	1.4541
	X6 CrNiNb 18 10	–	1.4550
	–	G-X5 CrNiNb 19 10	1.4552

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.00	250	45 - 60	990	1.6 / 160	1.5
2.50	250	60 - 80	1660	1.6 / 40	1.5
3.25	300	75 - 115	3230	2.1 / 65	2.0
4.00	350	115 - 150	5420	2.2 / 40	2.5
5.00	350	140 - 160	8112	2.1 / 25	2.5



**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# AS P-308Mn



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 18 8 Mn B 22  
AWS A5.4 : (E307-15)  
DIN 8555 : E8 - 200 CKZ  
Werkstoff-Nr : 1.4370

### General Description

AS P-308Mn is a basic coated electrode. It gives an austenitic filler metal of the Cr-Ni type that is high (6.0 %) in Mn content. Weld beads are highly resistant to oxidation at operating temperatures up to 850°C and also to acids.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni
0.10	0.50	6	18	9

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 420 N/mm<sup>2</sup>  
Tensile Strength : 640 N/mm<sup>2</sup>  
Elongation (L=5d) : 35 %  
Impact (ISO-V) : 100 J (+20°C)  
75 J (-60°C)  
Hardness : 200 HB (as welded)  
400 HB (after cold working)

### Approvals

CE, GOST, SEPRO, TSE, TÜV

GL (4370)

### Applications and Materials to be Welded

AS P-308Mn can be used for welding hardenable steels (alloyed or unalloyed), Mn steels, armour plates, rail steels, stainless chromium steels, tool steels and steels with poor weldability. Building up of parts operating under impact, high pressure and cavitation; surface build up of water turbine vanes; build up of valve seats and joining and building up of rail switches are among its usage areas. AS P-308 Mn can also be used for forming buffer layer passes before hardfacing applications having a chromium carbide structure.

The lowest possible welding current should be selected to avoid the overheating of the electrode during welding. For hard Mn-steels, weld beads should be forged.

	EN 10088-1/-2	W. Nr.	EN 10088-1/-2	W. Nr.
<b>Heat Resistant Stainless Steels</b>	X6 Cr 13	1.4000	X10 CrAlSi 7	1.4713
	X12 Cr 13	1.4006	X10 CrAlSi 13	1.4724
	X20 Cr 13	1.4021		
	X17 CrNi 16 2	1.4057		

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ]	Export Box Quantity [ pcs/box ]	Box Weight [ kg ]
2.50	250	50 - 80	1590	1.6 / 100	1.5	
3.25	300	80 - 110	3030	2.3 / 75	2.0	
4.00	350	100 - 140	5100	2.3 / 45	2.5	
5.00	350	140 - 160	7060	2.5 / 35	2.5	



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS P-308Mo



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 20 10 3 B 22  
AWS A5.4 : E308 Mo-15  
Werkstoff-Nr : 1.4431

### General Information

AS P-308Mo is a basic coated electrode. It gives a filler metal of the Cr-Ni-Mo type that is high (2.5 %) in Mn content. Weld beads are highly resistant to sudden impact and cracking due to heat effect.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni	Mo
0.05	0.35	2.5	19	10	2.5

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 420 N/mm<sup>2</sup>  
Tensile Strength : 620 N/mm<sup>2</sup>  
Elongation (L=5d) : 38 %  
Impact (ISO-V) : 100 J (+20°C)

### Approvals

GOST, SEPRO, TSE

### Applications

AS P-308Mo is used for forming a buffer layer for hardfacing and joining of armour steel plates, heat treatable steels, different type steels and for steels with poor weldability.

There is no need to apply heat treatment to armour steel plates before or after the welding. Interpass temperature during welding should not exceed 120°C. It is also used to form a buffer layer for stress relief before hardfacing applications.

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	300	80 - 110	2855	2.0 / 70	2.0
4.00	350	110 - 140	5095	2.3 / 45	2.5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

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# AS P-309L



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 23 12 LR 12  
AWS A5.4 : E309L-16  
Werkstoff-Nr : 1.4332

### General Description

AS P-309L is a low carbon rutile coated electrode. It gives a filler metal of the Cr-Ni type. Weld beads are highly resistant to oxidation at operating temperatures up to 1000°C. It can be used in all positions. The weld metal has a high resistance to cracking. Ferrite content is 12 %.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni
0.03	0.80	0.70	23	13

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 460 N/mm<sup>2</sup>  
Tensile Strength : 590 N/mm<sup>2</sup>  
Elongation (L=5d) : 40 %  
Impact (ISO-V) : 70 J (+20°C)  
35 J (-80°C)

### Approvals

CE, GOST, SEPRO, TSE

ABS (E309L-16) BV (309L) DNV (NV 309L)  
GL (4332) RINA (309L)

### Applications and Materials to be Welded

AS P-309L is used for welding of Cr and Cr-Ni alloyed steels that are highly resistant to operating conditions up to 1000°C. It is particularly used for joining stainless steels with low and medium alloyed steels and for root pass applications before welding of surface plated steels. It can also be used for cladding of mild steels and to form a buffer layer for hardfacing before welding with AS P-308L.

AS P-309L is an ideal electrode especially designed for welding pipes, plates and tanks that are used in chemical, petrochemical, food and paper industries; forged and cast pieces and industrial furnaces that are exposed to high temperatures.

	EN 10088-1/-2	W. Nr.
<b>Corrosion Resistant Steels</b>	X2 CrNiN 18 10	1.4311
<b>Stainless Steel Claddings</b>	X2 CrNi 19 11	1.4306
	X4 CrNi 18 10	1.4301

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	250	50 - 80	1580	1.7 / 105	1.5
3.25	300	80 - 120	3100	1.7 / 55	2.0
4.00	350	120 - 150	5490	2.2 / 40	2.5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF



# AS P-309Mo



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 23 12 2 LR 32  
AWS A5.4 : E309MoL-16

### General Description

A high Cr-Ni-Mo alloyed all position rutile-basic electrode.  
It gives high corrosion resistant deposit.  
Weldable on AC and DC (+) polarity.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni	Mo
0.03	0.80	0.80	23	12.5	2.7

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 575 N/mm<sup>2</sup>  
Tensile Strength : 720 N/mm<sup>2</sup>  
Elongation (L=5d) : 30 %  
Impact (ISO-V) : 60 J (+20°C)

GOST, SEPRO

### Approvals

### Applications and Materials to be Welded

Specially developed for welding stainless steel to mild steel and root runs in cladding. It is also suitable for repair welding in dissimilar joints and steels difficult to weld. Maximum plate thickness in butt welds is about 12 mm. Build-up welding on mild or low alloyed steels.

	EN 10088-1/-2	EN 10213-4	W. Nr.
First Layer in CrNiMo Claddings	X2 CrNiMo 17 12 2	-	1.4404
	X2 CrNiMo 18 14 3	-	1.4435
	X2 CrNiMoN 17 11 2	-	1.4406
	X2 CrNiMoN 17 13 3	-	1.4429
	X4 CrNiMo 17 12 2	-	1.4401
	X4 CrNiMo 17 13 3	-	1.4436
	X6 CrNiMoTi 17 12 2	-	1.4571
	X10 CrNiMoTi 17 13 3	-	1.4573
	X6 CrNiMoNb 17 12 2	-	1.4580
			G-X5 CrNiMo 19 11

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	250	60 - 85	1755	1.5 / 90	1.5
3.25	300	90 - 125	3355	2.1 / 63	2.0
4.00	350	125 - 160	5550	2.6 / 45	2.5
5.00	350	150 - 190	8660	2.5 / 29	2.5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

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# AS P-310R



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 25 20 R 12      Werkstoff-Nr : 1.4842  
AWS A5.4 : E310-16

### General Information

AS P-310 R is a rutile coated fully austenitic electrode. It gives a fully austenitic filler metal of the Cr-Ni type. Weld beads are highly resistant to oxidation at operating temperatures up to 1150°C.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni
0.10	0.60	1.70	26	21

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 480 N/mm<sup>2</sup>  
Tensile Strength : 600 N/mm<sup>2</sup>  
Elongation (L=5d) : 35 %  
Impact (ISO-V) : 60 J (+20°C)

### Approvals

GOST, SEPRO, TSE

### Applications and Materials to be Welded

It is an ideal electrode for welding heat resistant stainless steels of the AISI 309 and AISI 310 type. It is used for welding unalloyed steels to stainless steels and to air hardening steels like armour plates. AS P-310 R can be used in the welding of chimneys, boilers and heating plates and also for industrial furnaces operating at high temperatures (that are frequently made from ferritic steels of Cr-Si-Al type).

During the welding of high carbon steels to stainless steels, it gives a weld bead that has a better machinability as compared to beads of electrodes with 18 % Cr and 8 % Ni.

	EN 10088-1/-2	EN 10213-4	W. Nr.
Heat Resistant Cr and Cr-Ni Steels	X10 CrAl 7	–	1.4713
	X10 CrAl 24	–	1.4762
	–	G-X40 CrSi 17	1.4740
	–	G-X25 CrNiSi 18 9	1.4825
	–	G-X40 CrNiSi 22 9	1.4826
	X15 CrNiSi 20 12	–	1.4828
	–	G-X25 CrNiSi 20 14	1.4832
	X15 CrNiSi 25 20	–	1.4841
	X12 CrNi 25 21	–	1.4845
	–	G-X40 CrNiSi 25 20	1.4848

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 70 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.00	250	45 - 60	1036	1.7 / 155	1.5
2.50	250	60 - 80	1650	1.6 / 100	1.5
3.25	300	80 - 120	3280	2.0 / 60	2.0
4.00	350	100 - 140	5740	2.3 / 40	2.5
5.00	350	130 - 160	8810	2.2 / 25	2.5



# AS P-312



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 29 9 R 12  
AWS A5.4 : E312-16  
DIN 8555 : E9-UM-200 CK  
Werkstoff-Nr : 1.4337

### General Description

AS P-312 is a rutile coated electrode. It gives a filler metal of the Cr-Ni type. Due to its high tensile and impact resistance, it is used for the joining and build up welding of steels with a high tendency to cracking. It is especially developed for maintenance and repair welding.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni
0.10	0.90	0.80	29	9

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 600 N/mm<sup>2</sup>  
Tensile Strength : 800 N/mm<sup>2</sup>  
Elongation (L=5d) : 25 %  
Impact (ISO-V) : 50 J (+20°C)  
Hardness : 200 HB (as welded)  
400 HB (after cold working)

### Approvals

GOST, SEPRO, TSE

### Applications and Materials to be Welded

Unalloyed steels, high carbon steels (1.4085 : G-X 70 Cr 29), high alloyed steels, tool steels, spring steels, high speed steels, cast pieces and air hardenable armour steel plates that have poor weldability can be welded with AS P-312.

Joining of unalloyed or low alloyed steels with stainless steels and build up welding of gears and shafts are among its application areas. Generally, there is no preheating requirement before welding. If preheating is necessary, preheating temperature might be less than that required for other electrodes.

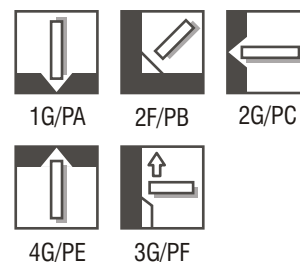
AS P-312 should not be used for the welding of parts that are continuously operating at temperatures exceeding 450°C. Interpass temperature should be controlled in multipass applications.

EN	W. Nr.	EN	W. Nr.
X6 Cr 17	1.4016	X20 Cr 13	1.4021
X7 Cr 14	1.4001	G-X70 Cr 29	1.4085
X15 Cr 13	1.4024		

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	250	55 - 85	1540	1.5 / 95	1.5
3.25	300	80 - 120	3180	1.9 / 60	2.0
4.00	350	110 - 160	5450	2.2 / 40	2.5
5.00	350	150 - 180	9130	2.3 / 25	2.5



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# AS P-316L



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 19 12 3 LR 12  
AWS A5.4 : E316L-16  
Werkstoff-Nr : 1.4404 / 1.4430

### General Information

AS P-316 L is a low carbon rutile coated electrode. It gives a filler metal of the Cr-Ni-Mo type. Excellent quality smooth weld beads are highly resistant to acids and to intergranular corrosion at operating temperatures up to 350°C. It gives a stable arc and the slag is easy to remove.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni	Mo
0.03	0.70	0.80	17	11	2.9

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 490 N/mm<sup>2</sup>  
Tensile Strength : 600 N/mm<sup>2</sup>  
Elongation (L=5d) : 35 %  
Impact (ISO-V) : 60 J ( + 20°C)

### Approvals

CE, GOST, SEPRO, TSE  
ABS (E316L-16) BV (316L) DNV (NV 316L)  
GL (4404) RINA (316L)

### Applications and Materials to be Welded

AS P-316 L can be used in the welding of pipes, tanks and vessels that are used in chemical, paint and paper industries. Cr-Ni-Mo steels, steel cast parts and pipes that are used for acid, gas and vapor transmission can also be welded with this electrode. AS P-316 L can also be used in the build up welding of leakproof surfaces.

	EN 10088-1/-2	EN 10213-4	W. Nr.
<b>Extra Low Carbon Stainless Steels</b> (C < %0.03)	X2 CrNiMo 17 12 2	–	1.4404
	X2 CrNiMo 18 14 3	–	1.4435
	X2 CrNiMoN 17 11 2	–	1.4406
	X2 CrNiMoN 17 13 3	–	1.4429
<b>Medium Carbon Stainless Steels</b> (C > %0.03)	X4 CrNiMo 17 12 2	–	1.4401
	X4 CrNiMo 17 13 3	–	1.4436
	–	G-X5 CrNiMo 19 11	1.4408
<b>Stabilized Stainless Steels</b> (Nb/Ti)	X6 CrNiMoTi 17 12 2	–	1.4571
	X6 CrNiMoNb 17 12 2	–	1.4580
	X6 CrNiNb 18 10	–	1.4550
	–	G-X5 CrNiNb 19 10	1.4552

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.00	250	40 - 60	930	1.6 / 175	1.5
2.50	250	50 - 80	1620	1.6 / 100	1.5
3.25	300	80 - 120	2940	1.9 / 65	2.0
4.00	350	100 - 145	4920	2.0 / 40	2.5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS P-316S



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 19 12 3 R 73  
AWS A5.4 : (E316-16)  
Werkstoff-Nr : 1.4430

### General Description

AS P-316 S is a rutile coated electrode with an unalloyed core. Therefore it can tolerate higher currents than ASP-316 L. It has 160 % metal recovery. It gives a filler metal of the Cr-Ni-Mo type. Excellent quality smooth weld beads are highly resistant to acids and to intergranular corrosion at operating temperatures up to 350°C. It gives a stable arc and the slag is easy to remove.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni	Mo
0.06	0.70	0.60	17	11	2.9

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 440 N/mm<sup>2</sup>  
Tensile Strength : 565 N/mm<sup>2</sup>  
Elongation (L=5d) : 30 %  
Impact (ISO-V) : 70 J (+20°C)

GOST, SEPRO

### Approvals

### Applications and Materials to be Welded

It is an ideal electrode for the welding of austenitic steels and acid resistant steels of the AISI 316 type. It is used for welding mild and low alloyed steels to stainless steels or austenitic manganese steels. It can also be used for stainless cladding of carbon and manganese steels. AS P-316 S can be used in the welding of pipes, tanks and vessels that are used in chemical, paint and paper industries. Cr-Ni-Mo steels, steel cast parts and pipes that are used for acid, gas and vapor transmission can also be welded with this electrode. AS P-316 S can also be used in the build up welding of leakproof surfaces. Electrode diameters up to 3.25 mm can be used in all positions; whereas 4 and 5 mm electrodes should be used in flat and nearly flat position only.

	EN 10088-1/-2	EN 10213-4	W. Nr.
<b>Extra Low Carbon Stainless Steels</b> (C < %0.03)	X2 CrNiMo 17 12 2	–	1.4404
	X2 CrNiMo 18 14 3	–	1.4435
	X2 CrNiMoN 17 11 2	–	1.4406
	X2 CrNiMoN 17 13 3	–	1.4429
<b>Medium Carbon Stainless Steels</b> (C > %0.03)	X4 CrNiMo 17 12 2	–	1.4401
	X4 CrNiMo 17 13 3	–	1.4436
	–	G-X5 CrNiMo 19 11	1.4408

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	80 - 120	3190	1.9 / 60	2.5
3.25	350	100 - 140	5520	1.9 / 35	2.5
4.00	350	110 - 180	8500	2.1 / 25	2.5
5.00	350	200 - 240	12500	1.9 / 15	2.5



1G/PA



2F/PB



2G/PC

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# AS P-318 Süper



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 19 12 3 Nb R 12  
AWS A5.4 : (E318L-16)  
Werkstoff-Nr : 1.4576

### General Description

AS P-318 Super is a low carbon rutile coated electrode. It gives a filler metal of the Cr-Ni-Mo type. AS P-318 Super can also be used in the welding of niobium or titanium stabilized AISI 318 or similar quality stainless steels. Excellent quality smooth weld beads are highly resistant to acids and to intergranular corrosion at operating temperatures up to 350°C. It gives a stable arc and the slag is easy to remove.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni	Mo	Nb
0.04	0.90	0.80	18	12	2.5	0.50

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 500 N/mm<sup>2</sup>  
Tensile Strength : 620 N/mm<sup>2</sup>  
Elongation (L=5d) : 35 %  
Impact (ISO-V) : 65 J (+20°C)

### Approvals

GOST, SEPRO, TSE

### Applications and Materials to be Welded

AS P-318 Süper can be used in the welding of corrosion resistant pipes, tanks and vessels that are made of Cr-Ni-Mo type stainless steel. It is also an ideal electrode for the welding of parts that are used in chemical, food and paint industries for acid, salt, gas, vapor and water transmission.

	EN 10088-1/-2	EN 10213-4	W. Nr. ®
<b>Extra Low Carbon Stainless Steels</b> (C < %0.03)	X2 CrNiMo 17 12 2	–	1.4404
	X2 CrNiMo 18 14 3	–	1.4435
	X2 CrNiMoN 17 11 2	–	1.4406
	X2 CrNiMoN 17 13 3	–	1.4429
<b>Medium Carbon Stainless Steels</b> (C > %0.03)	X4 CrNiMo 17 12 2	–	1.4401
	X4 CrNiMo 17 13 3	–	1.4436
	–	G-X5 CrNiMo 19 11	1.4408
<b>Stabilized Stainless Steels</b> (Nb/Ti)	X6 CrNiMoTi 17 12 2	–	1.4571
	X6 CrNiMoNb 17 12 2	–	1.4580
	X6 CrNiNb 18 10	–	1.4550
	–	G-X5 CrNiNb 19 10	1.4552

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 70 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	250	50 - 80	1570	1.4 / 90	1.5
3.25	300	70 - 120	3140	2.4 / 75	2.0
4.00	350	100 - 150	5870	4.1 / 70	2.5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

# AS P-347



## Coated Electrode for Stainless Steels

### Classification

EN 1600 : E 19 9 Nb R 12  
AWS A5.4 : (E347-16)  
Werkstoff-Nr : 1.4551

### General Description

AS P-347 is a low carbon rutile coated electrode. It gives a niobium stabilized, Cr-Ni type filler metal of AISI 304 or similar quality. It has an excellent strength especially in oxidizing environments like nitric acid. Smooth weld beads are highly resistant to acids and to intergranular corrosion at operating temperatures up to 350°C.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Ni	Nb
0.03	0.90	0.70	19	9.5	0.50

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 520 N/mm<sup>2</sup>  
Tensile Strength : 600 N/mm<sup>2</sup>  
Elongation (L=5d) : 35 %  
Impact (ISO-V) : 55 J (+20°C)

GOST, SEPRO, TSE

### Approvals

### Applications and Materials to be Welded

AS P-347 can be used particularly in the welding of austenitic stainless steels of AISI 321 and 347 type. It can also be used for Cr-Ni steels and for steel cast parts having same or similar analysis results with the electrode. Tanks and vessels that are used in chemical and food industries; parts exposing to the effects of acid, gas and vapor; and water fittings are among some application areas. AS P-308 L can be used for 18 % Cr - 8 % Ni, Nb stabilized steel parts that are working under low operating temperatures.

	EN 10088-1/-2	EN 10213-4	W. Nr.
<b>Stabilized Stainless Steels</b> (Nb/Ti)	X6 CrNiTi 18 10	–	1.4541
	X6 CrNiNb 18 10	–	1.4550
	X8 CrNiTi 18 10	–	1.4878
	–	G-X5 CrNiNb 19 10	1.4552
<b>Non Stabilized Stainless Steels</b>	X2 CrNi 19 11	–	1.4306
	X2 CrNiN 18 10	–	1.4311
	X4 CrNi 18 10	–	1.4301
	–	G-X5 CrNi 19 10	1.4308

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	250	50 - 80	1620	1.5 / 95	1.5
3.25	300	75 - 115	3110	1.9 / 60	2.0
4.00	350	110 - 150	5730	2.6 / 45	2.5
5.00	350	130 - 160	8330	2.5 / 30	2.5



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF

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# AS AISi 5



## Coated Electrode for Aluminium and Its Alloys

### Classification

ISO 18273 : Al 4043A (AISi5(A))  
DIN 1732 : EL-AISi 5  
AWS A5.3 : E4043

### General Description

AS AISi5 is an aluminium electrode with 5 % Si. It is used for joining and repair welding of 5 % Si containing rolled aluminium and cast aluminium parts. It is used on DC positive pole.

### Chemical Composition (w%), Typical, All Weld Metal

Si	Mn	Fe	Mg	Al
4.7 - 5.3	max 0.05	max 0.2	max 0.05	balance

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 80-90 N/mm<sup>2</sup>  
Tensile Strength : 150-160 N/mm<sup>2</sup>  
Elongation (L=5d) : 15 %

### Approvals

GOST, SEPRO

### Applications and Materials to be Welded

It is an ideal electrode particularly used for the welding of 5 % Si containing rolled aluminium parts and for aluminium pipes and plates. It should not be used in the welding of aluminium alloys having high magnesium, copper or zinc content. As the weld pool metal is very fluid, parts should be welded in horizontal position. During welding, electrode should be vertical to the work piece and it should not be oscillated. Arc length should be short.

Preheating to 100-300°C should be applied with respect to the thickness of the part to be welded. The slag should be removed completely after welding, since it is corrosive (the slag might be removed with water as the piece cools).

#### Rolled Aluminium Alloy

DIN 1725-1	W. Nr.	Alloy Nr.
AlMgSi 0.5	3.3206	6060
AlMgSi 0.7	3.3210	6005A
AlMgSi 0.8	3.2316	6181
AlMgSi 1	3.2315	-
AlZn4.5Mg 1	3.4335	-
AlCuMg 1	3.1325	-

#### Cast Aluminium Alloy

DIN 1725-2	W. Nr.	Alloy Nr.
G-AISi 5	3.2341	443.0
G-AISi 6 Cu 4	3.2151	319.0

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Domestic and Export Box Weight [ kg ] Quantity [ pcs/box ]
2.50	350	60 - 90	900	2.0 / 222
3.25	350	80 - 110	1320	2.0 / 152
4.00	350	100 - 140	2040	2.0 / 98



1G/PA

2F/PB



# AS AISi 12



## Coated Electrode for Aluminium and Its Alloys

### Classification

ISO 18273 : Al 4047A (AISi12(A))  
DIN 1732 : EL-AISi 12  
AWS A5.3 : E4047

### General Description

AS AISi12 is an aluminium electrode with 12 % Si. It is particularly used for joining and repair welding of cast aluminium and Si-alloyed aluminium parts. It is also an ideal electrode for the removal of cast defects and for the fill up of cast cavities. It is used only on DC positive pole.

### Chemical Composition (w%), Typical, All Weld Metal

Si	Mn	Fe	Mg	Al
11 - 12	max 0.10	max 0.40	max 0.05	balance

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 70-80 N/mm<sup>2</sup>  
Tensile Strength : 170-180 N/mm<sup>2</sup>  
Elongation (L=5d) : 4 - 6 %

GOST, SEPRO

### Applications and Materials to be Welded

It is an ideal electrode for the welding of 12 % Si containing cast aluminium parts. It should not be used in the welding of aluminium alloys having high magnesium, copper or zinc content.

The special covering removes oxide layer on the surface during welding and enables a stable arc. As the weld pool metal is very fluid, parts should be welded in horizontal position. During welding, electrode should be vertical to the work piece and it should not be oscillated. Arc length should be short. Preheating to 100-300°C should be applied with respect to the thickness of the part to be welded. The slag should be removed completely after welding, since it is corrosive (the slag might be removed with water as the piece cools).

#### Cast Aluminium Alloy



DIN 1725-2	W. Nr.	Alloy Nr.
G-AISi 11	3.2211	-
G-AISi 12	3.2581	A413.0
G-AISi 12 (Cu)	3.3583	-
G-AISi 6 Cu 4	3.2151	319.0
G-AISi 7 Mg	3.2371	356.0
G-AISi 9 Mg	3.2373	359.0

#### Cast Aluminium Alloy

DIN 1725-2	W. Nr.	Alloy Nr.
G-AISi 10 Mg	3.2381	361.0
G-AISi 10 Mg (Cu)	3.2383	-
G-AISi 9 Cu 3	3.2161	-

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Domestic and Export Box Weight [ kg ] Quantity [ pcs/box ]	 1G/PA	 2F/PB
2.50	350	60 - 90	980	2.0 / 227		
3.25	350	80 - 110	1320	2.0 / 152		
4.00	350	100 - 140	1960	2.0 / 102		

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# AS Bronz



## Coated Electrode for Copper and Its Alloys

### Classification

AWS A5.6 : ECuSn-C  
DIN 1733 : EL-CuSn 7  
Werkstoff-Nr : 2.1025

### General Description

AS Bronz is especially designed for the welding of bronze and brass materials. It gives a filler metal of the tin-bronze type. It is possible to weld in all positions except overhead and vertical upwards.

### Chemical Composition (w%), Typical, All Weld Metal

Mn	P	Sn	Cu
0.50	0.10	7	balance

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 160 N/mm<sup>2</sup>  
Tensile Strength : 260 N/mm<sup>2</sup>  
Elongation (L=5d) : 20 %  
Hardness : 90 HB

### Approvals

GOST, SEPRO

### Applications and Materials to be Welded

It is used for the joining and build up welding of copper and its alloys; for the joining of copper and bronze materials with steels and joining of steel casts with cast irons. It is ideal for the copper plating of cast iron and steel parts. If machinability is not considered after welding, it should also be used for the welding of cast iron parts.

It is suitable for the build up welding and joining of machine parts; especially turbine and centrifugal vanes, ship propellers, valve seats, couplings, piston arms and gears. Electrode should be nearly vertical to the work piece and the arc length should be short. To attain the best possible joining, a preheating of 300°C should be applied to copper and bronze parts.

#### Copper-Tin Wrought Alloys

DIN 17662	W. Nr.
CuSn 2	2.1010
CuSn 4	2.1016
CuSn 6	2.1020
CuSn 8	2.1030

#### Copper-Tin Cast Alloys

DIN 1705	W. Nr.
G-CuSn2ZnPb	2.1098
G-CuSn5ZnPb	2.1096
G-CuSn6ZnNi	2.1093

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	90 - 130	3520	2.6 / 75	2.5
4.00	350	130 - 160	5180	2.6 / 50	2.5
5.00	350	160 - 240	6600	2.3 / 35	2.5



1G/PA



2F/PB

# AS Pik-55



## Coated Electrode for Cast Irons

### Classification

EN ISO 1071 : E C NiFe-1 3  
AWS A5.15 : ENiFe-CI  
DIN 8573 : E NiFe1-BG 33

### General Description

AS Pik-55 is a nickel cored electrode. It is used for the welding of all types of cast irons and particularly for the joining of austenitic alloyed cast irons; called Ni-resist. It gives a very stable arc and a negligible amount of slag that can easily be removed. Weld metal can be easily machined and it has the same color with that of the cast iron. It has excellent mechanical properties and it is very resistant to cracking.

### Chemical Composition (w%), Typical, All Weld Metal

C	Fe	Ni
1.00	43	balance

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 320 - 360 N/mm<sup>2</sup>  
Tensile Strength : 430 - 470 N/mm<sup>2</sup>  
Elongation (L=5d) : 10 %  
Hardness : 160 - 200 HB

GOST, SEPRO, TSE

### Applications and Materials to be Welded

AS Pik-55 is particularly used for the joining and build up welding of gray cast iron, nodular cast iron and malleable cast iron parts. It is an ideal electrode for the joining of cast iron pieces to stainless steel or steel parts. On the other hand, it can also be used for filling up cavities in castings, or cavities that might form after machining. It is also an ideal electrode for the welding of parts, exposing to high dynamic forces, that are found in heavy machinery base and body.

When welding cast iron without preheat, the smallest possible electrode diameter and the lowest possible welding current should be selected to limit the width of the heat effected zone that might occur due to excess heating. When welding thick pieces, a preheating to 150-200°C and slow cooling is recommended.

#### Blackheart Malleable Cast Irons

DIN EN 1562	W. Nr.
GTS 35-10	0.8135
GTS 45-06	0.8145
GTS 55-04	0.8155
GTS 65-02	0.8165
GTS 70-02	0.8170

#### Nodular (Spheroid) Cast Irons

DIN EN 1563	W. Nr.
GGG 40	0.7040
GGG 50	0.7050
GGG 60	0.7060
GGG 70	0.7070
GGG 80	0.7080

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	300	45 - 80	1670	1.2 / 70	2.0
3.25	300	60 - 120	2730	1.1 / 40	2.0
4.00	350	90 - 140	4750	2.4 / 50	2.5



1G/PA 2F/PB 2G/PC  
Current Type and Polarity:  
AC min 50 V ; DC (+)

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# AS Pik-65



## Coated Electrode for Cast Irons

### Classification

EN ISO 1071 : E C NiCu-B 3  
AWS A5.15 : ENiCu-B  
DIN 8573 : E NiCu-BG 33

### General Description

AS Pik-65 is a Ni-Cu alloyed monel cored electrode. It is used for the welding of all types of cast irons. It gives a minimum amount of spatter and a very stable arc. The slag is easy to remove. Heat effected zone is very narrow. Porosity free weld metal can be easily machined. Filler metal has the same color with that of the work piece.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Fe	Cu	Ni
0.50	0.40	1.00	3	30	65

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 260 - 280 N/mm<sup>2</sup>  
Tensile Strength : 400 - 420 N/mm<sup>2</sup>  
Elongation (L=5d) : 15 %  
Hardness : 140 - 160 HB

### Approvals

GOST, SEPRO, TSE

### Applications and Materials to be Welded

AS Pik-65 is particularly used for the joining and build up welding of parts made from gray cast iron, nodular cast iron, malleable cast iron and of parts whose analysis is not known. Monel alloy core has 65 % Ni / 30 % Cu. It is an ideal electrode for the joining of cast iron pieces to monel alloys, stainless and ordinary steels. It can also be used for filling up cavities in castings, or cavities that might form after machining.

When welding cast iron without preheat, the smallest possible electrode diameter and the lowest possible welding current should be selected to limit the width of the heat effected zone that might occur due to excess heating. When welding thick pieces, a preheating to 100-200°C and slow cooling is recommended.

#### Gray Cast Irons

DIN EN 1561	W. Nr.
GG 10	0.6010
GG 15	0.6015
GG 20	0.6020
GG 25	0.6025
GG 35	0.6035

#### Blackheart Malleable Cast Irons

DIN EN 1562	W. Nr.
GTS 35-10	0.8135
GTS 45-06	0.8145
GTS 55-04	0.8155
GTS 65-02	0.8165
GTS 70-02	0.8170

#### Nodular (Spheroid) Cast Irons

DIN EN 1563	W. Nr.
GGG 40	0.7040
GGG 50	0.7050
GGG 60	0.7060
GGG 70	0.7070
GGG 80	0.7080

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 50 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	300	65 - 90	1580	1.2 / 75	2.0
3.25	300	85 - 130	2650	1.1 / 45	2.0
4.00	400	110 - 160	5470	2.4 / 65	2.5



1G/PA



2F/PB



2G/PC

# AS Pik-98 Süper



## Coated Electrode for Cast Irons

### Classification

EN ISO 1071 : E Ni-CI 2  
 AWS A5.15 : ENi-CI  
 DIN 8573 : E Ni-BG 22

### General Description

AS Pik-98 Süper is a nickel cored electrode. It enables welding with drop arc metal transfer. It is used for the welding of all types of cast irons. It gives a very stable arc and a negligible amount of slag that can easily be removed. Heat effected zone is very narrow. Porosity free weld metal can be easily machined. It has excellent resistant to cracking.

### Chemical Composition (w%), Typical, All Weld Metal

C	Ni
1	balance

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 300 N/mm <sup>2</sup>
Tensile Strength	: 380 N/mm <sup>2</sup>
Elongation (L=5d)	: 8 - 10 %
Hardness	: 120 - 140 HB

GOST, SEPRO, TSE

### Applications and Materials to be Welded

AS Pik-98 Süper is particularly used for the joining and build up welding of gray cast iron, nodular cast iron and malleable cast iron parts. It is an ideal electrode for the joining of cast iron pieces to monel alloys, stainless and ordinary steels. It can also be used for filling up cavities in castings, or cavities that might form after machining.

When welding cast iron without preheat, the smallest possible electrode diameter should be selected to limit the width of the heat effected zone that might occur due to excess heating. When welding thick pieces, a preheating to 150-300°C and slow cooling is recommended.

#### Gray Cast Irons

DIN EN 1561	W. Nr.
GG 10	0.6010
GG 15	0.6015
GG 20	0.6020
GG 25	0.6025
GG 35	0.6035

#### Blackheart Malleable Cast Irons

DIN EN 1562	W. Nr.
GTS 35-10	0.8135
GTS 45-06	0.8145
GTS 55-04	0.8155

#### Whiteheart Malleable Cast Irons

DIN EN 1562	W. Nr.
GTW 35-04	0.8035
GTW 40-05	0.8040
GTW 45-07	0.8045

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 40 V ; DC (-)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	300	65 - 100	1810	0.6 / 35	2.0
3.25	300	90 - 130	2830	0.7 / 25	2.0
4.00	350	110 - 160	5082	2.8 / 55	2.5



1G/PA



2F/PB



2G/PC



3G/PF

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

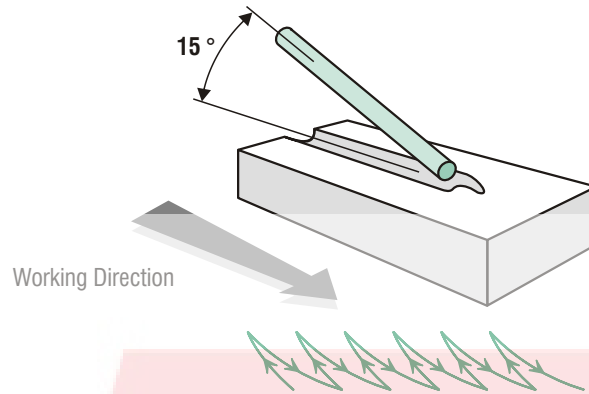


# AS Oluk Açma

## Coated Electrode for Cutting and Gouging

### General Description

AS Oluk Açma is an ideal electrode for gouging in and joint preparation of all types of steel, cast iron and non-ferrous metal. It is a general purpose electrode especially used before repair and maintenance welding applications.



### Approvals

GOST, SEPRO, TSEK

### Applications

The special coating performs several functions:

- 1 - To form a concentrated powerful arc,
- 2 - To form a stable arc and to reduce the fast melting of the electrode,
- 3 - To produce a strong gas jet to blow away the melted material.

The angle between the electrode and the work piece should be 15°.

It is used for beveling, weld preparation of cracks and for gouging of armour steels, air hardenable steels, stainless steels, cast irons, hard metals, work hardenable and difficult to machine materials. The surface is clean and seldom requires further dressing. Metal removal speed depends on the electrode diameter, ampere selected and to the thickness of the piece. It is recommended to work with a quality power source for best results.

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (-) ; AC min 70 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	190 - 220	3560	4.1 / 115	4
4.00	350	220 - 280	5170	4.4 / 85	4
5.00	350	260 - 350	8080	3.6 / 45	4



1G/PA



2F/PB



2G/PC



4G/PE



3G/PG

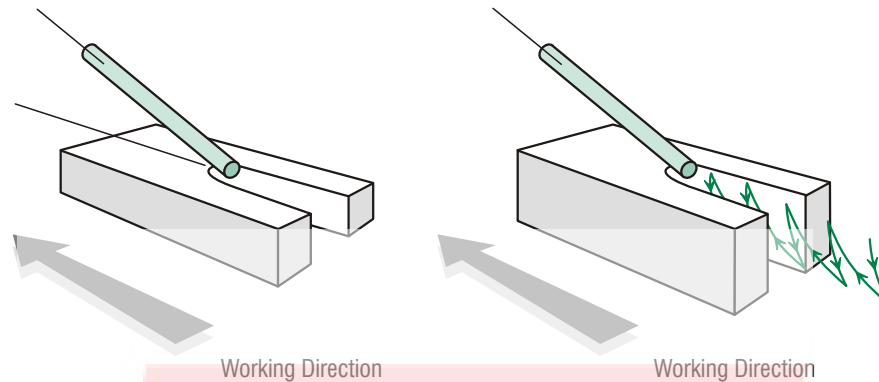
# AS Kesme



## Coated Electrode for Cutting and Gouging

### General Description

AS Kesme is an ideal electrode for cutting and piercing of all types of steel, cast iron and non-ferrous metal. It is a general purpose electrode especially used before and during repair and maintenance welding applications.



### Approvals

GOST, SEPRO, TSEK

### Applications

Due to the physical properties of the coating material, core wire has a higher melting rate than the coating material. Therefore, 3 to 5 mm crater formation occurs at the tip of the electrode. Particularly in cutting and piercing applications, this crater formation enables the operation of the electrode penetrating into the melting piece without short circuit.

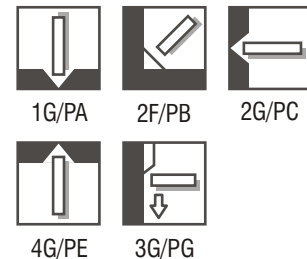
Pieces up to a thickness of 10 mm can be easily cut with this electrode. For thicker pieces (10 mm), electrode should be moved up and down in the direction of material being cut to move away the melted material. In piercing applications, electrode should be perpendicular to the work piece.

It is used for beveling, weld preparation of cracks and for gouging of armour steels, air hardenable steels, stainless steels, cast irons, hard metals, work hardenable and difficult to machine materials. The surface is clean and seldom requires further dressing. Metal removal speed depends on the electrode diameter, ampere selected and to the thickness of the piece. It is recommended to work with a quality power source for best results.

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (-) ; AC min 50 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	450	180 - 210	4750	5.2 / 110	5
3.25	350	180 - 210	3542	4.1 / 115	4
4.00	450	210 - 275	6810	4.8 / 70	5
4.00	350	210 - 275	5196	4.5 / 85	4
5.00	450	250 - 300	9860	5.9 / 60	5
5.00	350	250 - 300	8224	3.7 / 45	4



**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# AS SD-CR 10



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E6-UM-55 R  
EN 14700 : E Fe8

### General Description

AS SD-CR 10 is a basic coated electrode. Wear resistant weld metal has a high toughness value and exhibits a high resistance to cracking at operating conditions with high impact. The highest wear resistance is obtained after three passes. 10 % Cr content increases the wear resistance of the weld metal to the simpler forms of corrosive attack. The weld metal is resistant to softening up to 500°C. It can be machined by grinding.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr
0.70	0.60	0.70	10

### Mechanical Properties, Typical, All Weld Metal

Hardness : 52 - 56 HRC

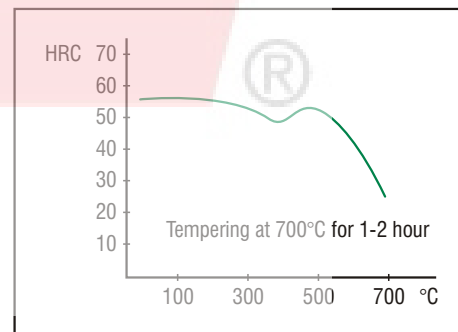
### Approvals

GOST, SEPRO, TSE

### Applications

It is used for hardfacing of alloyed and unalloyed steels. Worn surfaces of crushing tools in the mining industry, conveyor screws, excavator bucket and teeth, excavator and bulldozer blades, mixer parts, screws of cement pumps, and cutting edges of cold worked tool steels can be hardfaced with AS SD-CR 10.

While there is no need to have a buffer layer for unalloyed steels up to St 70; for high alloyed steels, it is recommended to have a buffer layer with AS B-248 or AS B-255, and in special cases with AS P-308Mn or AS P-312.



**Hardening** : in oil or air at 950-1000°C

**Softening** : in furnace at 850°C

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 65 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	110 - 140	4340	4.8 / 110	5
4.00	450	150 - 190	8410	6.3 / 75	6
5.00	450	180 - 240	13460	6.1 / 45	6



1G/PA



2F/PB



2G/PC



# AS SD-CR 13



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E5-UM-45 R  
EN 14700 : E Fe7

### General Description

AS SD-CR 13 is a rutile coated electrode. It gives a corrosion and wear resistant ferritic-martensitic stainless steel weld metal. It is used in hardfacing applications where a hardness of 42-46 HRC is required. The weld metal is resistant to softening up to 500°C.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr
0.10	0.50	0.30	13

### Mechanical Properties, Typical, All Weld Metal

Hardness : 42 - 45 HRC

### Approvals

GOST, SEPRO, TSE

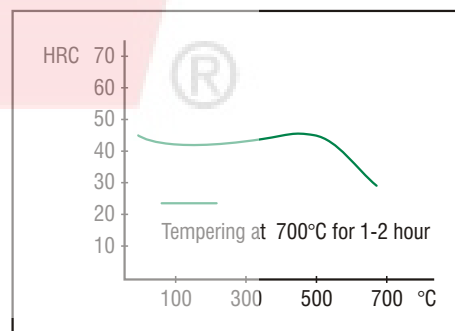
### Applications

It is used for hardfacing of alloyed and unalloyed steels. Worn surfaces of rails and rail surfaces, crane and conveyor wheels, cast steel valve seats, pinions, track rollers and links of earthmoving equipment can be hardfaced with AS SD-CR 13. It can also be used for joining of low carbon steels having 13% Cr.

It is recommended to use AS SD-CR 10 in multipass applications as it is a basic coated electrode. It is also recommended to have a preheating and interpass temperature of minimum 200°C.

**Hardening** : in oil or air at 980-1000°C

**Softening** : in furnace at 780 - 800°C



### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 70 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	110 - 160	4640	4.6 / 100	5
4.00	350	140 - 200	6880	4.5 / 65	5
5.00	350	180 - 240	10600	4.8 / 45	5



1G/PA



2F/PB



2G/PC

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# AS SD-60



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E6-UM-60  
EN 14700 : E Fe4

### General Description

AS SD-60 is a general purpose, rutile coated hardfacing electrode especially designed to use with small transformers having a relatively low open circuit voltage. It is resistant to softening up to 500°C. It gives a high abrasion resistant martensitic type weld metal with a medium toughness. Weld metal can not be machined.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Mo
0.40	0.40	0.50	6	0.60

### Mechanical Properties, Typical, All Weld Metal

Hardness : 57 - 62 HRC

### Approvals

GOST, SEPRO, TSE

### Applications

It is used for hardfacing of alloyed and unalloyed steels. Protective lining of worn surfaces of machines used in mines, bulldozer blades, excavator teeth, crushing jaws, conveyors, agricultural and forestry machines that are exposed to wear can be hardfaced with this electrode.

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : AC min 65 V ; DC (+)

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	60 - 120	2450	1.8 / 75	2
3.25	350	100 - 160	4190	4.4 / 105	5
4.00	450	130 - 190	8040	5.6 / 70	6
5.00	450	170 - 240	12760	5.7 / 45	6



1G/PA



2F/PB

# AS SD-65



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E2-UM-60 Z  
EN 14700 : E Fe4

### General Description

AS SD-65 is a basic coated electrode. It gives a high oxidation resistant (up to 850°C) weld metal that also have a high wear resistance. It is resistant to wears of medium abrasions at high temperatures.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr
0.70	4	0.30	2

### Mechanical Properties, Typical, All Weld Metal

Hardness : 57 - 62 HRC (3 passes, no preheating)  
50 - 60 HRC (3 passes, 300°C preheating)

### Approvals

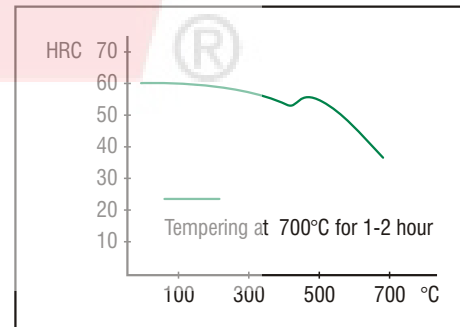
GOST, SEPRO, TSE

### Applications

It is particularly used for repair applications of machine parts that are particularly exposed to wear by stone, coal, sand and soil. Loading machines, band plates, wear plates and parts of grinders can be hardfaced with this electrode. It is recommended to use AS SD-65 in high temperature applications where oxidation resistance is more important than hardness and resistance to tempering like feed screws in furnaces.

**Hardening** : in oil or air at 920 - 980°C

**Softening** : in furnace at 680 - 700°C



### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 70 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	100 - 140	3370	4.7 / 140	5
4.00	450	150 - 180	6660	6.3 / 95	6
5.00	450	180 - 225	9790	6.4 / 65	6



1G/PA



2F/PB

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# AS SD-300



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E1-UM-300  
EN 14700 : E Fe1

### General Description

AS SD-300 is a heavily coated basic electrode particularly used for wear conditions where impact stresses are considered. It gives a weld metal that is resistant to deformations of high rolling forces including metal-to-metal friction. Weld metal is air hardenable and can be machined with carbide cutting tools. Hardness varies with respect to the number of passes and cooling rate. It has about 115 % metal recovery.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr
0.07	0.20	0.60	3.4

### Mechanical Properties, Typical, All Weld Metal

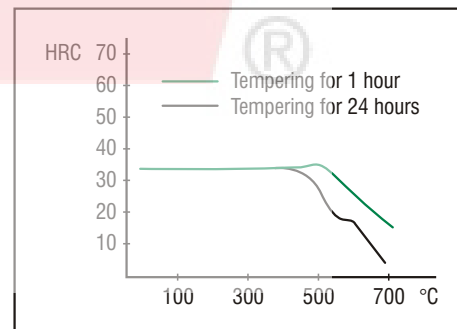
Hardness : 290 - 330 HRC

### Approvals

GOST, SEPRO, TSE

### Applications

It is used for hardfacing of rollers, gears, rail crossings, switch points, brake shoes and crane wheels. Joining of heat treatable steels having a tensile strength of 80 - 90 kg/mm<sup>2</sup> is another application area.



### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 70 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	110 - 140	3340	4.8 / 145	5
4.00	450	150 - 190	6730	6.4 / 95	6
5.00	450	190 - 230	9740	6.3 / 65	6



1G/PA



2F/PB

# AS SD-350



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E1-UM-350  
EN 14700 : E Fe1

### General Description

AS SD-350 is a heavily coated basic electrode particularly used for wear conditions where impact stresses are considered. It gives a weld metal that is resistant to deformations of high rolling forces including metal-to-metal friction. Weld metal is air hardenable and can be machined with carbide cutting tools. Hardness varies with respect to the number of passes and cooling rate. It has about 115 % metal recovery.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr
0.10	0.50	0.70	3.5

### Mechanical Properties, Typical, All Weld Metal

Hardness : 325 - 350 HRC

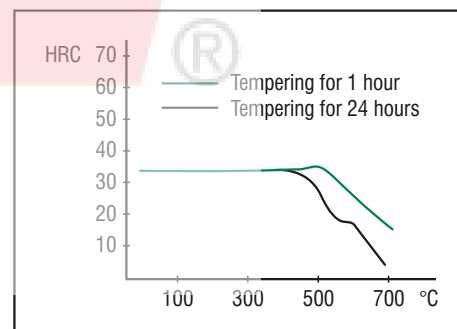
### Approvals

GOST, SEPRO, TSE

GL (\*)

### Applications

It is used for hardfacing of rollers, gears, rail crossings, switch points, brake shoes and crane wheels. Joining of heat treatable steels having a tensile strength of 80-90 kg/mm<sup>2</sup> is another application area.



### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 70 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	110 - 140	3440	5.0 / 145	5
4.00	450	150 - 190	6770	6.4 / 95	6
5.00	450	190 - 240	10080	6.6 / 65	6



1G/PA



2F/PB

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95

# AS SD-HSS



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E4-UM-60 (65) S  
EN 14700 : E Fe4

### General Description

AS SD-HSS is a basic coated electrode. It gives a Mo alloyed, high speed steel type weld metal. Deposited metal retains its toughness properties at high temperatures enabling the formation of high strength welds, particularly during the hardfacing of cutting and punching tools.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Cr	Mo	W	V
0.90	1.20	1.30	4.5	7.5	1.80	1.50

### Mechanical Properties, Typical, All Weld Metal

Hardness : 57 - 60 HRC (as welded)  
65 HRC (after double tempering)

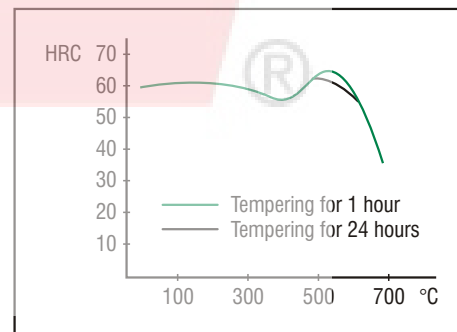
### Approvals

GOST, SEPRO, TSE

### Applications

It is particularly used for hardfacing of cutting and punching tools made of alloyed and unalloyed steels with a hot tool steel structured weld metal. Part that is going to be welded should be preheated to 400-500°C and small beads should be preferred to inhibit overheating.

Machine tools, drilling parts, and tools made of high speed steels are among other application areas.



### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 70 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	70 - 100	2580	2.1 / 80	5
3.25	350	100 - 140	4370	2.2 / 50	5
4.00	350	150 - 185	6680	2.0 / 30	5



1G/PA



2F/PB

# AS SD-MANGAN



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E7-UM-200 K  
EN 14700 : E Fe9  
AWS A5.13 : E FeMn-A

### General Description

AS SD-MANGAN is a basic coated electrode. It gives an austenitic Hadfield Manganese steel type weld metal with 13 % Mn content. 3 % Ni content increases the ductility and impact properties. Soft weld metal has a low resistance to abrasion after the application; but it hardens rapidly when cold worked or subject to gritty abrasion.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Ni
0.70	0.10	14	3

### Mechanical Properties, Typical, All Weld Metal

Hardness : 175 - 200 HB (as welded)  
450 HB (after cold working)

### Approvals

GOST, SEPRO, TSE

### Applications

It is used for the surfacing and reclamation of austenitic 12-14 % Mn-steels and joining of these to mild or medium carbon steels. Teeth used for mineral handling, cone, roll and jaw crushers, crushing and grinding hammers, screens and grid bars and parts exposing to impact can be hardsurfaced with AS SD-MANGAN.

Especially on 12-14 % Mn-steels, it is important to use this electrode before using chromium carbide structured hardfacing electrodes to form a buffer layer as it enables a healthy joining of the subsequent hardsurface to the base metal.

#### Attention !

As % 12-14 Mn containing weld metal has poor corrosion resistance, its properties are similar to carbon steels.

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 70 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	80 - 140	3810	5.3 / 140	5
4.00	450	140 - 180	7440	6.7 / 90	6
5.00	450	180 - 230	11610	6.4 / 55	6



1G/PA



2F/PB



2G/PC

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# AS SD-MANGAN 165



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E7-UM-200 K  
EN 14700 : E Fe9  
AWS A5.13 : E FeMn-A

### General Description

AS SD-MANGAN 165 is a zircon-basic coated electrode. It gives an austenitic Hadfield Manganese steel type weld metal with 13 % Mn content. 3.5 % Ni content increases the ductility and impact properties. Soft weld metal has a low resistance to abrasion after the application; but it hardens rapidly when cold worked or subject to gritty abrasion. It has about 165 % metal recovery.

### Chemical Composition (w%), Typical, All Weld Metal

C	Si	Mn	Ni
0.70	0.10	14	3.5

### Mechanical Properties, Typical, All Weld Metal

Hardness : 175 - 200 HB (as welded)  
450 HB (after cold working)

### Approvals

GOST, SEPRO, TSE

### Applications

It is used for the surfacing and reclamation of austenitic 12-14 % Mn-steels and joining of these to mild or medium carbon steels. Teeth used for mineral handling, cone, roll and jaw crushers, crushing and grinding hammers, screens and grid bars and parts exposing to impact can be hardsurfaced with AS SD-MANGAN 165.

Especially on 12-14 % Mn-steels, it is important to use this electrode before using chromium carbide structured hardfacing electrodes to form a buffer layer as it enables a healthy joining of the subsequent hardsurface to the base metal.

#### Attention!

As % 12-14 Mn containing weld metal has poor corrosion resistance, its properties are similar to carbon steels.

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 70 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
2.50	350	70 - 100	3050	4.6 / 150	5
3.25	350	100 - 150	5350	4.8 / 90	5
4.00	450	150 - 185	10500	5.8 / 55	6
5.00	450	200 - 240	15720	5.5 / 35	6



1G/PA



2F/PB



# AS SD-ABRA Nb



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : (E10-UM-60 GR)  
EN 14700 : E Fe15

### General Description

AS SD-ABRA Nb is a basic coated electrode that is highly resistant to abrasion wear caused by fine or coarse hard minerals. Concentrated Cr and Nb carbides have been finely dispersed in its structure. In corrosive environments, it gives a better resistance to wear caused by fine minerals than hardfaced structures having an ordinary chromium carbide structure.

### Chemical Composition (w%), Typical, All Weld Metal

C	Cr	Nb
3.4	22	10

### Mechanical Properties, Typical, All Weld Metal

Hardness : 55 - 57 HRC  
Carbide hardness : >1500 HV

### Approvals

GOST, SEPPO, TSE

### Applications

Wear plates, dredgers, rock crushers, grinding hammers and rollers can be hardfaced with AS SD-ABRA Nb. It should not be used for more than three passes.

In applications requiring a thick deposit metal, AS P-308Mn or AS P-312 should be used for buffering. It is crucial to have a buffer layer with AS P-308Mn for 12-14 % Mn containing steels before hardfacing applications.

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 65 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	100 - 150	5750	4.6 / 80	5
4.00	350	140 - 200	8930	4.5 / 50	5



1G/PA



2F/PB

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# AS SD-ABRA Cr



## Coated Electrode for Overlay Welding and Hardfacing

### Classification

DIN 8555 : E10-UM-60 G  
EN 14700 : E Fe15  
AWS A5.13 : E FeCr-A1

### General Description

AS SD-ABRA Cr is a basic coated electrode that is highly resistant to abrasion wear caused by coarse hard minerals. It has a highly concentrated chromium carbide in its structure.

### Chemical Composition (w%), Typical, All Weld Metal

C	Cr
4.5	33

### Mechanical Properties, Typical, All Weld Metal

Hardness : 58 - 62 HRC  
Carbide hardness : 1400 - 1500 HV

### Approvals

GOST, SEPRO, TSE

### Applications

Bucket conveyors, extruder screws, dragline buckets, dredgers, scrapers, screw conveyors, press screws, heads in ceramic industry, mixer blades and grinding rollers can be hardfaced with AS SD-ABRA Cr.

It should not be used for more than three passes. Interpass temperature should be 300-500°C.

In applications requiring a thick deposit metal, AS P-308Mn or AS P-312 should be used for buffering. It is crucial to have a buffer layer with AS P-308Mn for 12-14 % Mn containing steels before hardfacing applications.

### Welding Parameters / Packing and Diameter Informations / Welding Positions

Current Type and Polarity : DC (+) ; AC min 65 V

Diameter [ mm ]	Length [ mm ]	Current [ A ]	Electrode Weight [ g/100 pcs ]	Box Weight [ kg ] Quantity [ pcs/box ]	Export Box Box Weight [ kg ]
3.25	350	115 - 160	5760	4.6 / 80	5
4.00	350	120 - 190	9140	4.6 / 50	5



1G/PA



2F/PB

# Askaynak® MIG/MAG Welding Wires



## MIG/MAG Welding Wires

مركز البراغي والعدد  
BTGO  
BOLTS & TOOLS CENTER

# AS MIG SG2



## MIG/MAG Welding Wire for Mild Steels

### Classification

ISO 14341-A : G 42 3 C G3Si1 / G 42 3 M G3Si1  
AWS A5.18 : ER70S-6

### General Description

AS SG2 is a copper coated gas metal arc welding wire in 15 kg spools or 250 kg drums. It is particularly designed for semi-automatic and full-automatic GMAW applications. Working temperature can range between -50 to 450°C.

CO<sub>2</sub> or 80 % Ar- 20 % CO<sub>2</sub> are used for gas shielding.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn
0.08	0.85	1.50
0.06 *	0.55 *	1.10 *

\*) Typical weld metal composition (CO<sub>2</sub> gas shielding)

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 440 N/mm<sup>2</sup>  
Tensile Strength : 540 N/mm<sup>2</sup>  
Elongation (L=5d) : 30 %  
Impact (ISO-V) : 60 J (-30°C)

### Approvals

CE, DB, GOST, NAKS, SEPRO, TSE, TÜV

Shielding gas : CO<sub>2</sub>

ABS	BV	DNV	GL	LRS	RINA	RMRS	TL
3SA,3YSA	3YM	III YMS	3YS	3S 3YS H15	3Y42	3Y	3YMS

Shielding gas : Ar+CO<sub>2</sub>

ABS	DNV	GL	TL
3YSA	III YMS	3YS	3YMS

### Shielding Gases (ISO 14175 / EN 439)

MAG : M21 - Ar + 5-25% CO<sub>2</sub>  
C1 - CO<sub>2</sub> (100%)

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Spool Weight	Drum Weight
MIG/MAG Wire	X	X	X	X	-	-	-	15 kg	250 kg

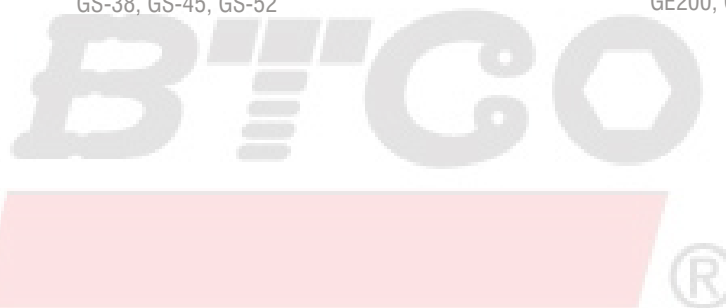
# AS MIG SG2



## MIG/MAG Welding Wire for Mild Steels

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2 C 10 - C 35 ; Ck 10 - Ck 35	S185, S235, S275, S355 P235TR2 - P355T2 E295, E335 C10 - C35
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 355	S255N - S420N P255NH - P355NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII	P295GH, P355GH P235GH, P265GH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260



### Welding Parameters / Welding Positions

Current Type and Polarity : DC (+)

Arc Type	Diameter [ mm ]	Current [ A ]	Voltage [ V ]
Short Arc	0.8	60 - 140	18 - 22
Short Arc	1.0	80 - 175	18 - 24
Short Arc	1.2	120 - 200	18 - 27
Sprey Arc	1.2	150 - 280	25 - 40
Sprey Arc	1.6	225 - 480	28 - 40



1G/PA



2F/PB



2G/PC



4G/PE



3G/PF



3G/PG

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# AS MIG SG3



## MIG/MAG Welding Wire for Mild Steels

### Classification

ISO 14341-A : G 42 3 C G4Si1 / G 42 3 M G4Si1  
AWS A5.18 : ER70S-6

### General Description

AS SG3 is a copper coated gas metal arc welding wire in 15 kg spools or 250 kg drums. It is particularly designed for semi-automatic and full-automatic GMAW applications. Working temperature can range between -50 to 450°C.

CO<sub>2</sub> or 80 % Ar- 20 % CO<sub>2</sub> are used for gas shielding.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn
0.08	1.00	1.70
0.06 *	0.60 *	1.20 *

\*) Typical weld metal composition (CO<sub>2</sub> gas shielding)

### Approvals

DB, GOST, NAKS, SEPRO, TSE, TÜV

BV (3Y) GL (3YS) CO<sub>2</sub> gas shielding  
GL (3YS) Ar+CO<sub>2</sub> gas shielding

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 470 N/mm<sup>2</sup>  
Tensile Strength : 570 N/mm<sup>2</sup>  
Elongation (L=5d) : 25 %  
Impact (ISO-V) : 60 J (-30°C)

### Shielding Gases (ISO 14175 / EN 439)

MAG : M21 - Ar + 5-25% CO<sub>2</sub>  
C1 - CO<sub>2</sub> (100%)

Current Type and Polarity : DC (+)

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 44, St 44-2, St 44-3, St 52, St 52-3 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2, St 70-2 C 10 - C 35 ; Ck 10 - Ck 35	S275, S355 P235TR2 - P355T2 E295, E335, E360 C10 - C35
<b>Fine Grained Steels</b>	StE 255 - StE 460 WStE 255 - WStE 355	S255N - S460N P255NH - P355NH
<b>Pipe Materials</b>	StE 210-7 - StE 415-7 X42, X46, X52, X60 (API 5LX)	L210 - L415NB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII	P295GH, P355GH P235GH, P265GH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Spool Weight	Drum Weight
MIG/MAG Wire	X	X	X	X	-	-	-	15 kg	250 kg

# AS MIG Mo70



## MIG/MAG Welding Wire for High Strength and Low Alloyed Steels

### Classification

EN ISO 21952-A : G MoSi  
ISO 14341-A : G2Mo  
AWS A5.28 : ER70S-A1 (ER80S-G\*)

(\* ) Nearest classification

### General Description

It is a low alloyed GMA welding wire, used for the welding creep resistant 0.5 % Mo steels and fine grained steels. It gives a weld metal that is used in operating temperatures between – 40°C and 500°C. It is used in the welding of steel construction applications, boiler and pressure vessels, gas pipes and turbin rotors.

**Industry:** Ship building, heavy machinery, petro-chemical, power generation, metal fabrication industry.

### Chemical Composition (w%), Wire

C	Si	Mn	Mo	Cr	Cu
0.085 - 0.09	0.60 - 0.70	1.15 - 1.20	0.50	< 0.15	< 0.25

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 530 N/mm<sup>2</sup>  
Tensile Strength : 640 N/mm<sup>2</sup>  
Elongation (L=5d) : 27 %  
Impact (ISO-V) : 150 J (+20°C)  
90 J (-20°C)

### Shielding Gases (ISO 14175 / EN 439)

MIG : M21 - Ar + 5-25% CO<sub>2</sub>  
C1 - CO<sub>2</sub> (100%)  
Current Type and Polarity : DC (+)

### Materials to be Welded

	DIN	EN
<b>Fine Grained Steels</b>	StE 255 - StE 460 ; WStE 255 - WStE 460 -	S255N - S460N ; P255NH - P460NH S275ML ; S355M - S420M
<b>Pipe Materials</b>	StE 320.7 - StE 415.7 StE 360.7 TM - StE 480.7 TM X52, X56, X60, X65 (API 5LX)	L320 - L415NB L360MB - L485MB -
<b>Boiler and Pressure Vessel Steels</b>	15Mo3, 17Mn4, 19Mn6 22Mo4, 20MnMoNi55	16Mo3, P295GH, P310GH -
<b>Elevated Temperature Steels</b>	St 35.8 - St 45.8	P235G1TH - P255G1TH
<b>Cast Steels</b>	GS-45, GS-52, GS-60 -	GE240, GE260, GE300 G20Mo5
<b>Creep Resistant Steels</b>	17MnMoV6-4, 15NiCuMoNb5 -	- 20MnMoNi4-5

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Spool Weight
MIG/MAG Wire	X	X	X	-	-	-	-	15 kg

**Liability :** All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes :** Consult information on Welding Safety Sheet, available upon request.

# AS MIG Mo80



## MIG/MAG Welding Wire for High Strength and Low Alloyed Steels

### Classification

EN ISO 21952-A : G MnMo  
ISO 14341-A : G4Mo  
AWS A5.28 : ER80S-D2

### General Description

It is a low alloyed GMA welding wire, used for the welding low alloyed and high strength steels in operating temperatures up to 550°C. It is used in the welding of creep resistant steels, boiler and pressure vessels, gas pipes. Especially used for low temperature applications that are manufactured from Ni-Cr-Mo steels.

**Industry:** Transportation, bridge, tank and railway fabrication, mining, ship building and petro-chemical industry.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	Cu
0.09	0.70	1.90	< 0.15	< 0.15	0.50	< 0.25

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 570 N/mm<sup>2</sup>  
Tensile Strength : 690 N/mm<sup>2</sup>  
Elongation (L=5d) : 25 %  
Impact (ISO-V) : 120 J (+20°C)  
80 J (-20°C)

### Shielding Gases (ISO 14175 / EN 439)

MIG : M21 - Ar + 5-25% CO<sub>2</sub>  
C1 - CO<sub>2</sub> (100%)

Current Type and Polarity : DC (+)

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 52.3	S355
<b>Fine Grained Steels</b>	StE 255 - StE 460 ; WStE 255 - WStE 460	S255N - S460N ; P255NH - P460NH
<b>Pipe Materials</b>	StE 320.7 - StE 415.7 StE 360.7 TM - StE 480.7 TM X52, X56, X60, X65 (API 5LX)	L320 - L415NB L360MB - L485MB -
<b>Boiler and Pressure Vessel Steels</b>	15Mo3, 17Mn4, 19Mn6 22Mo4, 20MnMoNi55 -	16Mo3, P295GH, P310GH - P355GH
<b>Elevated Temperature Steels</b>	St 35.8 - St 45.8	P235G1TH - P255G1TH
<b>Cast Steels</b>	GS-45, GS-52, GS-60 -	GE240, GE260, GE300 G20Mo5
<b>Creep Resistant Steels</b>	17MnMoV6-4, 15NiCuMoNb5 -	- 20MnMoNi4-5

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Spool Weight
MIG/MAG Wire	X	X	X	-	-	-	-	15 kg



# AS MIG 100SG



## MIG/MAG Welding Wire for High Strength and Low Alloyed Steels

### Classification

EN ISO 16834 : G Mn3NiCrMo  
AWS A5.28 : ER100S-G

### General Description

It is a low alloyed GMA welding wire, used for the welding fine-grained and high strength steels with a yield strength up to 680 N/mm<sup>2</sup>. Especially used for low temperature applications that are manufactured from Ni-Cr-Mo steels.

**Industry:** Bridge, tank and railway fabrication, mining and ship building industry.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	Cu
0.09	0.75	1.60	0.60	0.55	0.25	< 0.25

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 680 N/mm <sup>2</sup>
Tensile Strength	: 770 N/mm <sup>2</sup>
Elongation (L=5d)	: 24 %
Impact (ISO-V)	: 110 J (+20°C) 60 J (-40°C)

### Shielding Gases (ISO 14175 / EN 439)

MIG	: M21 - Ar + 5-25% CO <sub>2</sub>
C1	- CO <sub>2</sub> (100%)
Current Type and Polarity	: DC (+)

### Materials to be Welded

	DIN	EN
<b>Fine Grained Steels</b>	StE 460 - StE 620	S620Q ; P460N
<b>Heat Treated Fine Grained Structural Steels</b>	N-A-XTRA 56, N-A-XTRA 63, N-A-XTRA 70 T1, T1A, T1B	S550QL1, S620QL1, S690QL1 -
<b>Pipe Materials</b>	X60, X65, X70, X80 (API 5LX) -	- L485MB, L555MB

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Spool Weight
MIG/MAG Wire	X	X	X	-	-	-	-	15 kg

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# AS MIG 110SG



## MIG/MAG Welding Wire for High Strength and Low Alloyed Steels

### Classification

EN ISO 16834 : G Mn3Ni1CrMo  
AWS A5.28 : ER110S-G

### General Description

It is a low alloyed GMA welding wire, used for the welding fine-grained and high strength steels with a yield strength up to 690 N/mm<sup>2</sup>. It gives a weld metal that is used in operating temperatures down to -40°C with a high toughness value. Especially used for low temperature applications that are manufactured from Ni-Cr-Mo steels.

**Industry:** Ship building, petro-chemical, construction, crane and bridge fabrication industry.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	V	Cu
0.09	0.60	1.65	1.50	0.30	0.30	0.10	< 0.25

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 770 N/mm<sup>2</sup>  
Tensile Strength : 880 N/mm<sup>2</sup>  
Elongation (L=5d) : 21 %  
Impact (ISO-V) : 180 J (+20°C)  
70 J (-50°C)

### Shielding Gases (ISO 14175 / EN 439)

MIG : M21 - Ar + 5-25% CO<sub>2</sub>  
C1 - CO<sub>2</sub> (100%)  
Current Type and Polarity : DC (+)

### Materials to be Welded

	DIN	EN
<b>Fine Grained Steels</b>	StE 420 - StE 500	S420N ; S500N
	TStE 420	S420NL
	WStE 420 - WStE 500	P420NH - P500NH
	TStE 690 V	S690QL
	-	S690Q
	StE 690.7 TM	L690M
<b>Heat Treated Fine Grained Structural Steels</b>	N-A-XTRA 56, N-A-XTRA 63, N-A-XTRA 70	S550QL1, S620QL1, S690QL1
	T1, T1A, T1B	-
	HSB 77V, Weldox 700, BH70V	-
	HY 90, HY 100, Welten 80, Bisalloy 80	-
<b>Pipe Materials</b>	X65, X70, X80 (API 5LX)	-
	-	L485MB, L555MB

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Spool Weight
MIG/MAG Wire	-	X	X	-	-	-	-	15 kg

# AS MIG CrMo1



## MIG/MAG Welding Wire for High Strength and Low Alloyed Steels

### Classification

EN ISO 21952-A : G CrMo1Si\*  
AWS A5.28 : ER80S-B2

(\* ) Nearest classification

### General Description

It is a low alloyed GMA welding wire, used for the welding high temperature strength Cr-Mo (1.25 % Cr, 0.5 % Mo) steels (boiler and pressure vessels) in operating temperatures up to 550°C. Also It is used in the welding cementation and nitride steels.

**Industry:** Chemical and petro-chemical industry.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	Cu
0.08	0.55	0.60	< 0.20	1.30	0.55	< 0.30

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 510 N/mm <sup>2</sup>
Tensile Strength	: 620 N/mm <sup>2</sup>
Elongation (L=5d)	: 24 %
Impact (ISO-V)	: 120 J (+20°C)
	100 J (-10°C)

### Shielding Gases (ISO 14175 / EN 439)

MIG : M21 - Ar + 5-25% CO<sub>2</sub>  
C1 - CO<sub>2</sub> (100%)

Current Type and Polarity : DC (+)

### Materials to be Welded

	DIN	EN	Wr. Nr.
<b>Creep Resistant Steels</b>	15 CrMo 5	-	1.7205
	25 CrMo 4	-	1.7218
	42 CrMo 4	-	1.7225
	13 CrMo 44	13 CrMo 4-5	1.7335
	22 CrMo 44	-	1.7350
	13 CrMoV 42	-	1.7709
	16 CrMoV 4	-	1.7728
<b>Cast Steels</b>	GS-25 CrMo 4	G25CrMo4	1.7218
	GS-22 CrMo 5 4	G22CrMo5-4	1.7354
	GS-17 CrMo 5 5	G17CrMo5-5	1.7357
<b>Cementation Steels</b>	-	16MnCr5	1.7131

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Spool Weight
MIG/MAG Wire	-	X	X	-	-	-	-	15 kg

**Liability :** All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes :** Consult information on Welding Safety Sheet, available upon request.

# AS MIG CrMo2



## MIG/MAG Welding Wire for High Strength and Low Alloyed Steels

### Classification

EN ISO 21952-A : G CrMo2Si\*  
AWS A5.28 : ER90S-B3

(\*) Nearest classification

### General Description

It is a low alloyed GMA welding wire, used for the welding high temperature strength Cr-Mo (2.25 % Cr, 1.0 % Mo) steels (boiler and pressure vessels) in operating temperatures up to 600°C. It gives a weld metal that is resistant to corrosion and sulphide materials.

**Industry:** Oil industry, thermal plant, chemical and petro-chemical industry.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	Cu
0.08	0.50	0.60	< 0.20	2.40	1.00	< 0.30

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 540 N/mm<sup>2</sup>  
Tensile Strength : 640 N/mm<sup>2</sup>  
Elongation (L=5d) : 22 %  
Impact (ISO-V) : 150 J (+20°C)  
90 J (-10°C)

### Shielding Gases (ISO 14175 / EN 439)

MIG : M21 - Ar + 5-25% CO<sub>2</sub>  
C1 - CO<sub>2</sub> (100%)

Current Type and Polarity : DC (+)

### Materials to be Welded

	DIN	EN	Wr. Nr.
<b>Creep Resistant Steels</b>	–	10CrMo9-10	1.7380
	10 CrSiMoV 7	–	1.8075
	10 CrV 63	–	–
	12 CrSiMo 8	–	–
<b>Cast Steels</b>	GS-25 CrMo 4	G25CrMo4	1.7218
	GS-17 CrMo 5 5	G17CrMo5-5	1.7357
	GS-18 CrMo 9 10	G17CrMo9-10	1.7379

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Spool Weight
MIG/MAG Wire	-	X	X	-	-	-	-	15 kg

# AS MIG COR-Ni



## MIG/MAG Welding Wire for High Strength and Low Alloyed Steels

### Classification

EN ISO 16834 : G Mn3Ni1Cu  
EN 440 : G3 Ni1\*  
AWS A5.28 : ER80S-G

(\* ) Nearest classification

### General Description

It is a low c alloyed GMA welding wire, used for the welding pressure vessels and gas pipes including nickel. It gives a weld metal that has an high mechanical properties against atmospheric environment.

**Industry:** Petro-chemical industry

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cu
0.09	0.60	1.40	0.90	< 0.40

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 530 N/mm<sup>2</sup>  
Tensile Strength : 610 N/mm<sup>2</sup>  
Elongation (L=5d) : 26 %  
Impact (ISO-V) : 120 J (+20°C)  
60 J (-40°C)

### Shielding Gases (ISO 14175 / EN 439)

MIG : M21 - Ar + 5-25% CO<sub>2</sub>  
C1 - CO<sub>2</sub> (100%)

Current Type and Polarity : DC (+)

### Materials to be Welded

	DIN	EN
<b>Fine Grained Steels</b>	StE 255 - StE 380 TStE 255 - TStE 380	S255N ; S420N S255NL - S380NL ; P275NL1 - P355NL1
<b>Weather Resisting Steels</b>	WTSt 37.2 - - - -	S235JRW S355J2G1W, S235J0W, S235J2W S355J01, S355J2W, S355K2G1W Patinax®-F, Patinax®-37 Cor-Ten®-A, Cor-Ten®-B 9CrNiCuP3-2-4
<b>Low Temperature Steels</b>	TTSt35 - -	S225NL 11MnNi5-3 13MnNi6-3

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Spool Weight
MIG/MAG Wire	X	X	X	-	-	-	-	15 kg

**Liability :** All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes :** Consult information on Welding Safety Sheet, available upon request.

# AS TIG SG2



## TIG Rod for Mild Steels

### Classification

TS EN ISO 636-A : W 42 3 W3Si1  
AWS A5.18 : ER70S-6

### General Description

AS TIG SG2 is suitable for GTA welding of un-alloyed structural steels with a tensile strength up to 540 N/mm<sup>2</sup>, ship plates and fine-grained C-Mn steels. It gives high-strength weld metal at working temperatures varying between -50 to 450°C.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn
0.08	0.85	1.50

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 440 N/mm<sup>2</sup>  
Tensile Strength : 540 N/mm<sup>2</sup>  
Elongation (L=5d) : 30 %  
Impact (ISO-V) : 60 J (-30°C)

### Shielding Gases (ISO 14175 / EN 439)

TIG : I1 - Ar (100%)  
Current Type and Polarity : DC (-)

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2 C 10 - C 35 ; Ck 10 - Ck 35	S185, S235, S275, S355 P235TR2 - P355T2 E295, E335 C10 - C35
<b>Fine Grained Steels</b>	StE 255 - StE 420 WStE 255 - WStE 355	S255N - S420N P255NH - P355NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52, X60 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII	P295GH, P355GH P235GH, P265GH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Tube Weight
TIG Rod	-	-	-	X	X	X	X	5 kg

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# AS TIG SG3



## TIG Rod for Mild Steels

### Classification

TS EN ISO 636-A : W 42 3 W4Si1  
AWS A5.18 : ER70S-6

### General Description

AS TIG SG3 is suitable for GTA welding of un-alloyed structural steels with a tensile strength up to 570 N/mm<sup>2</sup>, ship plates and fine-grained C-Mn steels. It gives high-strength weld metal at working temperatures varying between - 50 to 450°C. It contains higher Si and Mn than AS TIG SG2 welding rod.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn
0.08	1.00	1.70

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 470 N/mm<sup>2</sup>  
Tensile Strength : 570 N/mm<sup>2</sup>  
Elongation (L=5d) : 25 %  
Impact (ISO-V) : 60 J (-30°C)

### Shielding Gases (ISO 14175 / EN 439)

TIG : I1 - Ar (100%)  
Current Type and Polarity : DC (-)

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 44, St 44-2, St 44-3, St 52, St 52-3 St 37-4, St 44-4, St 52-4 St 50-2, St 60-2, St 70-2 C 10 - C 35 ; Ck 10 - Ck 35	S275, S355 P235TR2 - P355T2 E295, E335, E360 C10 - C35
<b>Fine Grained Steels</b>	StE 255 - StE 460 WStE 255 - WStE 355	S255N - S460N P255NH - P355NH
<b>Pipe Materials</b>	StE 210-7 - StE 415-7 X42, X46, X52, X60 (API 5LX)	L210 - L415NB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 H1, H11	P295GH, P355GH P235GH, P265GH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D, E AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45, GS-52	GE200, GE240, GE260

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Tube Weight
TIG Rod	-	-	-	-	X	X	X	5 kg

# AS TIG Mo70



## TIG Rod for High Strength and Low Alloyed Steels

### Classification

AWS A5.28 : ER70S-A1 (ER80S-G\*) EN ISO 636-A : W2Mo  
 TS EN ISO 21952-A : W MoSi  
 EN ISO 21952-A : W MoSi

(\*) Nearest classification

### General Description

It is a low alloyed TIG rod, used for the welding creep resistant 0.5 % Mo steels and fine grained steels. It gives a weld metal that is used in operating temperatures between -40°C and 500°C. It is used in the welding of steel construction applications, boiler and pressure vessels, gas pipes and turbin rotors.

**Industry:** Ship building, heavy machinery, petro-chemical, power generation, metal fabrication industry

### Chemical Composition (w%), Wire

C	Si	Mn	Mo	Cr	Cu
0.085 - 0.09	0.60 - 0.70	1.15 - 1.20	0.50	< 0.15	< 0.25

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 530 N/mm<sup>2</sup>  
 Tensile Strength : 640 N/mm<sup>2</sup>  
 Elongation (L=5d) : 27 %  
 Impact (ISO-V) : 150 J (+20°C)  
 90 J (-20°C)

### Shielding Gases (ISO 14175 / EN 439)

TIG : I1 - Ar (100%)  
 Current Type and Polarity : DC (-)

### Materials to be Welded

	DIN	EN
<b>Fine Grained Steels</b>	StE 255 - StE 460 ; WStE 255 - WStE 460 -	S255N - S460N ; P255NH - P460NH S275ML ; S355M - S420M
<b>Pipe Materials</b>	StE 320.7 - StE 415.7 StE 360.7 TM - StE 480.7 TM X52, X56, X60, X65 (API 5LX)	L320 - L415NB L360MB - L485MB -
<b>Boiler and Pressure Vessel Steels</b>	15Mo3, 17Mn4, 19Mn6 22Mo4, 20MnMoNi55	16Mo3, P295GH, P310GH -
<b>Elevated Temperature Steels</b>	St 35.8 - St 45.8	P235G1TH - P255G1TH
<b>Cast Steels</b>	GS-45, GS-52, GS-60 -	GE240, GE260, GE300 G20Mo5
<b>Creep Resistant Steels</b>	17MnMoV6-4, 15NiCuMoNb5 -	- 20MnMoNi4-5

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Tube Weight
TIG Rod	-	-	-	X	X	X	-	5 kg

**Liability :** All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes :** Consult information on Welding Safety Sheet, available upon request.



# AS TIG Mo80



## TIG Rod for High Strength and Low Alloyed Steels

### Classification

AWS A5.28 : ER80S-D2 EN ISO 636-B : W4Mo  
TS EN ISO 21952-A : W MnMo  
EN ISO 21952-A : W MnMo

### General Description

It is a low alloyed TIG rod, used for the welding low alloyed and high strength steels in operating temperatures up to 550°C. It is used in the welding of creep resistant steels, boiler and pressure vessels, gas pipes. Especially used for low temperature applications that are manufactured from Ni-Cr-Mo steels.

**Industry:** Transportation, bridge, tank and railway fabrication, mining, ship building and petro-chemical industry

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	Cu
0.09	0.70	1.90	< 0.15	< 0.15	0.50	< 0.25

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 570 N/mm<sup>2</sup>  
Tensile Strength : 690 N/mm<sup>2</sup>  
Elongation (L=5d) : 25 %  
Impact (ISO-V) : 120 J (+20°C)  
80 J (-20°C)

### Shielding Gases (ISO 14175 / EN 439)

TIG : I1 - Ar (100%)  
Current Type and Polarity : DC (-)

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 52.3	S355
<b>Fine Grained Steels</b>	StE 255 - StE 460 ; WStE 255 - WStE 460	S255N - S460N ; P255NH - P460NH
<b>Pipe Materials</b>	StE 320.7 - StE 415.7 StE 360.7 TM - StE 480.7 TM X52, X56, X60, X65 (API 5LX)	L320 - L415NB L360MB - L485MB -
<b>Boiler and Pressure Vessel Steels</b>	15Mo3, 17Mn4, 19Mn6 22Mo4, 20MnMoNi55 -	16Mo3, P295GH, P310GH - P355GH
<b>Elevated Temperature Steels</b>	St 35.8 - St 45.8	P235G1TH - P255G1TH
<b>Cast Steels</b>	GS-45, GS-52, GS-60 -	GE240, GE260, GE300 G20Mo5
<b>Creep Resistant Steels</b>	17MnMoV6-4, 15NiCuMoNb5 -	- 20MnMoNi4-5

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Tube Weight
TIG Rod	-	-	-	X	X	X	-	5 kg

# AS TIG CrMo1



## TIG Rod for High Strength and Low Alloyed Steels

### Classification

AWS A5.28 : ER80S-B2  
TS EN ISO 21952-A : W CrMo1Si\*  
EN ISO 21952-A : W CrMo1Si\*

(\*): Nearest classification

### General Description

It is a low alloyed TIG rod, used for the welding high temperature strength Cr-Mo (1.25 % Cr, 0.5 % Mo) steels (boiler and pressure vessels) in operating temperatures up to 550°C. Also It is used in the welding cementation and nitride steels.

**Industry:** Chemical and petro-chemical industry

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	Cu
0.08	0.55	0.60	< 0.20	1.30	0.55	< 0.30

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 510 N/mm<sup>2</sup>  
Tensile Strength : 620 N/mm<sup>2</sup>  
Elongation (L=5d) : 24 %  
Impact (ISO-V) : 120 J (+20°C)  
100 J (-10°C)

### Shielding Gases (ISO 14175 / EN 439)

TIG : I1 - Ar (100%)  
Current Type and Polarity : DC (-)

### Materials to be Welded

	DIN	EN	Wr. Nr.®
<b>Creep Resistant Steels</b>	15 CrMo 5	-	1.7205
	25 CrMo 4	-	1.7218
	42 CrMo 4	-	1.7225
	13 CrMo 44	13 CrMo 4-5	1.7335
	22 CrMo 44	-	1.7350
	13 CrMoV 42	-	1.7709
	16 CrMoV 4	-	1.7728
<b>Cast Steels</b>	GS-25 CrMo 4	G25CrMo4	1.7218
	GS-22 CrMo 5 4	G22CrMo5-4	1.7354
	GS-17 CrMo 5 5	G17CrMo5-5	1.7357
<b>Cementation Steels</b>	-	16MnCr5	1.7131

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Tube Weight
TIG Rod	-	-	-	X	X	X	-	5 kg

**Liability:** All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes:** Consult information on Welding Safety Sheet, available upon request.

# AS TIG CrMo2



## TIG Rod for High Strength and Low Alloyed Steels

### Classification

AWS A5.28 : ER90S-B3  
TS EN ISO 21952-A : W CrMo2Si\*  
EN ISO 21952-A : W CrMo2Si\*

(\* ) Nearest classification

### General Description

It is a low alloyed TIG rod, used for the welding high temperature strength Cr-Mo (2.25 % Cr, 1.0 % Mo) steels (boiler and pressure vessels) in operating temperatures up to 600°C. It gives a weld metal that is resistant to corrosion and sulphide materials.

**Industry:** Oil industry, thermal plants, chemical and petro-chemical industry

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	Cu
0.08	0.50	0.60	< 0.20	2.40	1.00	< 0.30

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 540 N/mm<sup>2</sup>  
Tensile Strength : 640 N/mm<sup>2</sup>  
Elongation (L=5d) : 22 %  
Impact (ISO-V) : 150 J (+20°C)  
90 J (-10°C)

### Shielding Gases (ISO 14175 / EN 439)

TIG : I1 - Ar (100%)  
Current Type and Polarity : DC (-)

### Materials to be Welded

	DIN	EN	Wr. Nr.
<b>Creep Resistant Steels</b>	-	10CrMo9-10	1.7380
	10 CrSiMoV 7	-	1.8075
	10 CrV 63	-	-
	12 CrSiMo 8	-	-
<b>Cast Steels</b>	GS-25 CrMo 4	G25CrMo4	1.7218
	GS-17 CrMo 5 5	G17CrMo5-5	1.7357
	GS-18 CrMo 9 10	G17CrMo9-10	1.7379

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Tube Weight
TIG Rod	-	-	-	X	X	X	-	5 kg

# AS TIG CrMo5



## TIG Rod for High Strength and Low Alloyed Steels

### Classification

AWS A5.28 : ER80S-B6  
TS EN ISO 21952-A : W CrMo5Si  
EN ISO 21952-A : W CrMo5Si

### General Description

It is a low alloyed TIG rod, used for the welding high temperature strength Cr-Mo (5 % Cr, 0.5 % Mo) steels (boiler and pressure vessels) in operating temperatures up to 600°C. It gives a weld metal that has creep and hydrogen resistance.

**Industry:** Thermal plants, chemical and petro-chemical industry

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	Cu
0.08	0.45	0.60	< 0.20	5.70	0.60	< 0.25

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 560 N/mm<sup>2</sup>  
Tensile Strength : 660 N/mm<sup>2</sup>  
Elongation (L=5d) : 22 %  
Impact (ISO-V) : 180 J (+20°C)  
50 J (-20°C)

### Shielding Gases (ISO 14175 / EN 439)

TIG : I1 - Ar (100%)  
Current Type and Polarity : DC (-)

### Materials to be Welded

	DIN	EN	Wr. Nr.
<b>Creep Resistant Steels</b>	12 CrMo 19 5	X12CrMo5	1.7362
<b>Cast Steels</b>	GS-12 CrMo 9 5	GX12CrMo5	1.7363

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Tube Weight
TIG Rod	-	-	-	X	X	X	-	5 kg

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# AS TIG CrMo91



## TIG Rod for High Strength and Low Alloyed Steels

### Classification

AWS A5.28 : ER90S-B9  
TS EN ISO 21952-A : W CrMo9 1  
EN ISO 21952-A : W CrMo9 1

### General Description

It is a low alloyed TIG rod used for the welding high temperature strength Cr-Mo (9 % Cr, 1.0 % Mo) steels in operating temperatures up to 650°C. With addition of "V" and "Nb", it gives a weld metal that has corrosion and thermal oxidation resistance. It is also resistant to creep and hydrogen cracking. Especially used for hydrogen fabrication that are manufactured from Cr-Mo-V-Nb steels.

**Industry:** Turbine and vessel fabrication, thermal plants, chemical and petro-chemical industry

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Ni	Cr	Mo	V	Cu	Al	Nb	N
0.09	0.30	0.50	0.50	9.10	0.90	0.20	< 0.25	0.04	0.07	0.05

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 690 N/mm<sup>2</sup>  
Tensile Strength : 780 N/mm<sup>2</sup>  
Elongation (L=5d) : 21 %  
Impact (ISO-V) : 150 J (+20°C)  
30 J (-20°C)

### Shielding Gases (ISO 14175 / EN 439)

TIG : I1 - Ar (100%)  
Current Type and Polarity : DC (-)

### Materials to be Welded

	DIN	EN	Wr. Nr.
Creep Resistant Steels	-	X10CrMoVNb9-1	1.4903
	-	X20CrMoV12-1	1.4922
	X12 CrMo 9 1	-	1.7386

### Packing and Diameter Informations

Diameter	0.8	1.0	1.2	1.6	2.0	2.4	3.2	Tube Weight
TIG Rod	-	-	-	X	X	X	-	5 kg

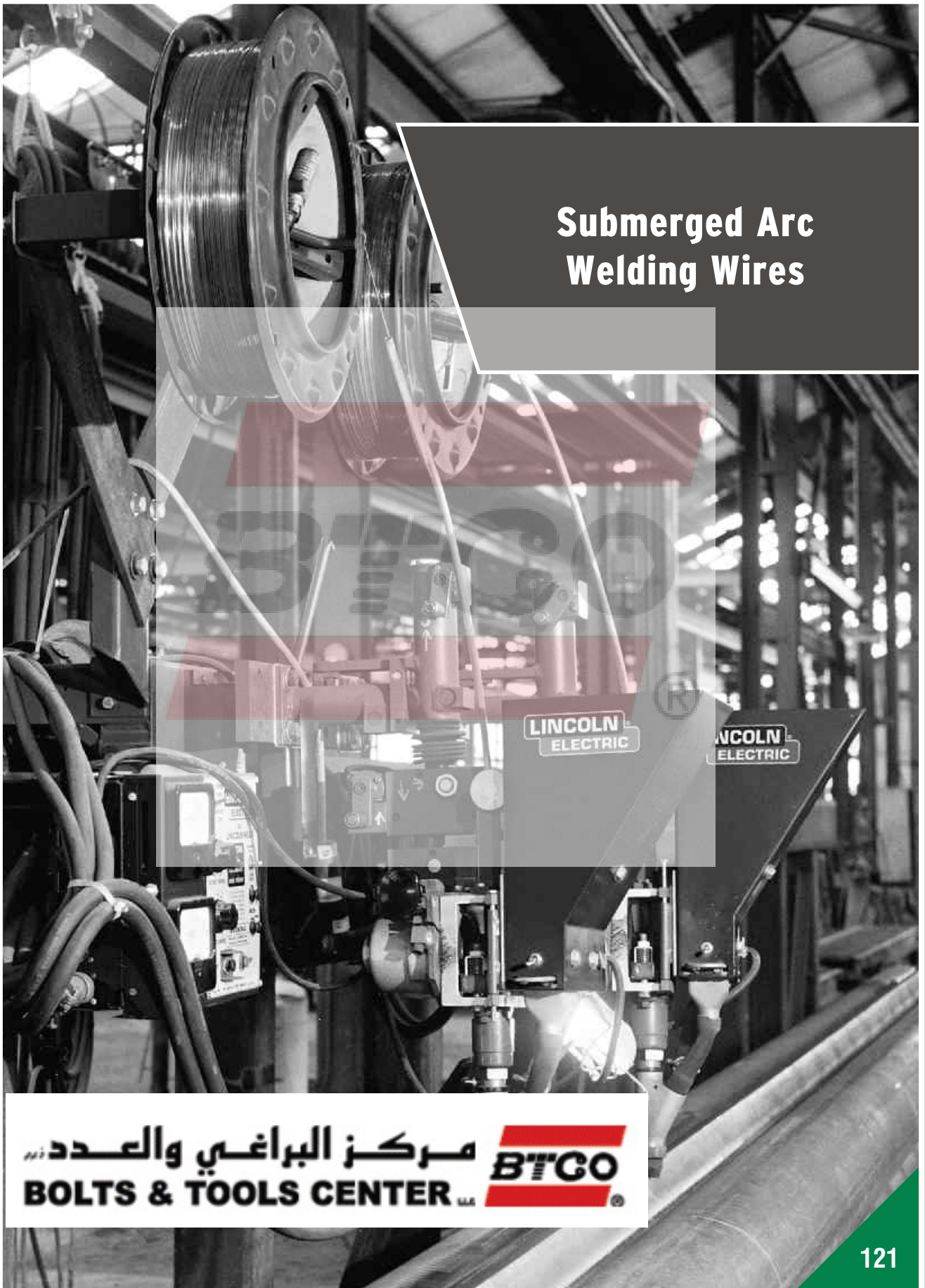
120

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# Askaynak® SA Welding Wires



## Submerged Arc Welding Wires



مركز البراغي والعدد  
BTGO  
BOLTS & TOOLS CENTER

# AS S1



## Submerged Arc Welding Wire for Mild Steels

### Classification

EN ISO 14171 : S1 (L-860 ile S 38 2 AB S1)  
AWS A5.17 : EL12

### General Description

AS S1 (30 kg spool) and ASFİL S1 (320-350 kg drum) are copper coated submerged arc welding wires designed particularly for the welding of mild steels.

### Approvals (with flux LW-860)

CE, GOST, SEPRO, TSE, TÜV

**ABS (3M) BV (A3M) DNV (III M)**  
**GL (3M) LRS (3M) TL (3M)**

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	S	Cu
0.10	0.07	0.50	0.025	< 0.30
0.05 *	0.25 *	1.00 *	0.020 *	< 0.25 *

\*) Typical weld metal composition with flux LincolnWeld 860

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 370 - 400 N/mm <sup>2</sup>	with flux LincolnWeld 860 : Yield Strength : 400 N/mm <sup>2</sup>
Tensile Strength : 440 - 490 N/mm <sup>2</sup>	Tensile Strength : 490 N/mm <sup>2</sup>
	Elongation (L=5d) : 34 %
	Impact (ISO-V) : 50 J (-20°C)

Note : Tensile and Yield Strength values are given in a wide range, as the submerged arc welding flux compositions might vary considerably.

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3	S185, S235, S275, S355
<b>Fine Grained Steels</b>	StE 255 - StE 355 WStE 255 - WStE 355	S255N - S355N P255NH - P355NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII	P295GH, P355GH P235GH, P265GH
<b>Elevated Temp. Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D	-
<b>Cast Steels</b>	GS-38, GS-45	GE200, GE240

### Packing and Diameter Informations

Diameter	2.0	2.4	3.2	4.0	Spool Weight	Drum Weight
Submerged Arc Welding Wire	X	X	X	X	25 kg	350 / 650 kg

# AS S2



## Submerged Arc Welding Wire for Mild Steels

### Classification

EN ISO 14171 : S2 (L-860 ile S 35 2 AB S2)  
AWS A5.17 : EM12

### General Description

AS S2 (30 kg spool) and ASFIL S2 (320-350 kg drum) are copper coated submerged arc welding wires designed particularly for the welding of middle and high strength steels.

### Approvals (with flux LW-860)

CE, GOST, NAKS, SEPRO, TSE, TÜV

**ABS** (3M,3YM) **BV** (A3YM) **DNV** (III YM)  
**GL** (3YM) **LRS** (3M,3YM) **TL** (3YM)  
**RINA** (3Y42)

with flux LW 761 :

TL (3YM)

with flux LW 780 :

ABS (3M,3YM) GL (3YM)

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	S	Cu
0.10	0.07	0.90	0.025	< 0.30
0.05 *	0.25 *	1.20 *	0.020 *	< 0.15 *

(\*) Typical weld metal composition with flux LW 860

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 370 - 440 N/mm <sup>2</sup>	with flux LincolnWeld 860 :	Yield Strength	: 430 N/mm <sup>2</sup>
Tensile Strength	: 450 - 530 N/mm <sup>2</sup>		Tensile Strength	: 490 N/mm <sup>2</sup>
Elongation (L=5d)	: 25 - 30 %		Elongation (L=5d)	: 25 %
			Impact (ISO-V)	: 50 J (-20°C)

Note : Tensile and Yield Strength values are given in a wide range, as the submerged arc welding flux compositions might vary considerably.

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3	S185, S235, S275, S355
<b>Fine Grained Steels</b>	StE 255 - StE 355 WStE 255 - WStE 355	S255N - S355N P255NH - P355NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 H1, H11	P295GH, P355GH P235GH, P265GH
<b>Elevated Temp. Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D	-
<b>Cast Steels</b>	GS-38, GS-45	GE200, GE240

### Packing and Diameter Informations

Diameter	2.0	2.4	3.2	4.0	Spool Weight	Drum Weight
Submerged Arc Welding Wire	X	X	X	X	25 kg	350 / 650 kg

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.



# AS EM12K



## Submerged Arc Welding Wire for Mild Steels

### Classification

EN ISO 14171 : S2 (L-860 ile S 35 2 AB S2)  
AWS A5.17 : EM12K

### General Description

AS EM12K is copper coated submerged arc welding wire designed particularly for welding of mild steels. It contains higher Si than AS S2 submerged arc welding wire.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	S	Cu
0.10	0.13	1.90	0.025	< 0.30
0.05 *	0.30 *	1.20 *	0.020 *	< 0.15 *

\*) Typical weld metal composition with flux LincolnWeld 860

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 370 - 450 N/mm <sup>2</sup>	with flux LincolnWeld 860 :	Yield Strength	: 440 N/mm <sup>2</sup>
Tensile Strength	: 450 - 540 N/mm <sup>2</sup>		Tensile Strength	: 510 N/mm <sup>2</sup>
Elongation (L=5d)	: 25 - 30 %		Elongation (L=5d)	: 25 %
			Impact (ISO-V)	: 50 J (-20°C)

Note : Tensile and Yield Strength values are given in a wide range, as the submerged arc welding flux compositions might vary considerably.

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3	S185, S235, S275, S355
<b>Fine Grained Steels</b>	StE 255 - StE 355 WStE 255 - WStE 355	S255N - S355N P255NH - P355NH
<b>Pipe Materials</b>	StE 210-7 - StE 360-7 StE 290-7 TM - StE 360-7 TM X42, X46, X52 (API 5LX)	L210 - L360NB L290MB - L360MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 HI, HII	P295GH, P355GH P235GH, P265GH
<b>Elevated Temp. Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D AH32 - EH36	- -
<b>Cast Steels</b>	GS-38, GS-45	GE200, GE240

### Packing and Diameter Informations

Diameter	2.0	2.4	3.2	4.0	Spool Weight	Drum Weight
Submerged Arc Welding Wire	X	X	X	X	25 kg	350 / 650 kg

# AS S2Si



## Submerged Arc Welding Wire for Mild Steels

### Classification

EN ISO 14171 : S2 Si (L-761 ile S 46 2 MS S2Si)  
AWS A5.17 : EM12K

### General Description

AS S2 Si is copper coated submerged arc welding wire designed particularly for the welding of middle and high strength steels.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	S
0.07	0.15	1.00	0.025
0.07 *	0.65 *	1.70 *	0.025 *

(\*) Typical weld metal composition with flux LincolnWeld 761

### Approvals (with flux LW-761)

GOST, NAKS, SEPRO

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 370 - 440 N/mm <sup>2</sup>	with flux LincolnWeld 761 : Yield Strength : 430 N/mm <sup>2</sup>
Tensile Strength : 450 - 530 N/mm <sup>2</sup>	Tensile Strength : 560 N/mm <sup>2</sup>
Impact (ISO-V) : 47 J (-20°C)	Impact (ISO-V) : 47 J (-20°C)

Note : Tensile and Yield Strength values are given in a wide range, as the submerged arc welding flux compositions might vary considerably.

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3 St 50.2, St 60.2, St 70.2	S185, S235, S275, S355 E295, E335, E360
<b>Fine Grained Steels</b>	StE 255 - StE 460 WStE 255 - WStE 460	S255N - S460N P255NH - P460NH
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 6 H1, H11, H111 St 37.2, St 44	P295GH, P310GH P235GH, P265GH, P285NH P235S, P265S
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D AH32 - EH36	- -

### Packing and Diameter Informations

Diameter	2.0	2.4	3.2	4.0	Spool Weight	Drum Weight
Submerged Arc Welding Wire	X	X	X	X	25 kg	350 / 650 kg

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# AS S2Mo



## Submerged Arc Welding Wire for Low Alloyed Steels

### Classification

EN ISO 14171 : S2 Mo (L-223 ile S 46 4 AB S2Mo)  
AWS A5.23 : EA2

### General Description

AS S2 Mo is copper coated submerged arc welding wire designed particularly for the welding of high impact resistant steels.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Mo
0.10	0.10	1.00	0.50
0.06 *	0.25 *	1.30 *	0.50 *

(\* ) Typical weld metal composition with flux LW 223

### Approvals (with flux LW-223)

GOST, SEPRO, TSE, TÜV

### Mechanical Properties, Typical, All Weld Metal

Yield Strength : 460 - 600 N/mm <sup>2</sup>	with flux LincolnWeld 223 : Yield Strength : 470 N/mm <sup>2</sup>
Tensile Strength : 550 - 670 N/mm <sup>2</sup>	Tensile Strength : 550 N/mm <sup>2</sup>
Impact (ISO-V) : 50 J (-20°C)	Elongation (L=5d) : 29 %
	Impact (ISO-V) : 55 J (-20°C)

Note : Tensile and Yield Strength values are given in a wide range, as the submerged arc welding flux compositions might vary considerably.

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3	S185, S235, S275, S355
<b>Fine Grained Steels</b>	StE 255 - StE 460 WStE 255 - WStE 460	S255N - S460N P255NH - P460NH
<b>Pipe Materials</b>	StE 320-7 - StE 415-7 StE 290-7 TM - StE 480-7 TM X42, X46, X52, X56, X60, X65, X70, X80 (API 5LX)	L320 - L415NB L290MB - L485MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 5, 15 Mo 3 HI, HII, HIII	P295GH, P310GH, 16 Mo 3 P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH

### Packing and Diameter Informations

Diameter	2.0	2.4	3.2	4.0	Spool Weight	Drum Weight
Submerged Arc Welding Wire	-	-	X	X	25 kg	350 / 650 kg

# AS S3Mo



## Submerged Arc Welding Wire for Low Alloyed Steels

### Classification

EN ISO 14171 : S3Mo (LW-888 tozu ile S 46 5 FB S3Mo)  
AWS A5.23 : EA4

### General Description

AS S3Mo is copper coated and Mo-alloyed submerged arc welding wire designed particularly for welding of high impact resistant steels. It is used for the welding creep resistant and fine grained steels in operating temperatures up to 550 °C.

### Chemical Composition (w%), Typical, Wire

C	Si	Mn	Mo
0.08	0.15	1.40	0.50
0.06 *	0.30 *	1.40 *	0.40 *

(\*) Typical weld metal composition with flux LW 888

### Mechanical Properties, Typical, All Weld Metal

Yield Strength	: 490 N/mm <sup>2</sup>
Tensile Strength	: 590 N/mm <sup>2</sup>
Elongation (L=5d)	: 29 %
Impact (ISO-V)	: 60 J (-40°C)

### Materials to be Welded

	DIN	EN
<b>General Structural Steels</b>	St 33, St 34, St 37, St 44, St 44-2, St 44-3, St 52, St 52-3	S185, S235, S275, S355
<b>Fine Grained Steels</b>	StE 255 - StE 460 WStE 255 - WStE 460	S255N - S460N P255NH - P460NH
<b>Pipe Materials</b>	StE 320-7 - StE 415-7 StE 290-7 TM - StE 480-7 TM X42, X46, X52, X56, X60, X65, X70, X80 (API 5LX)	L320 - L415NB L290MB - L485MB -
<b>Boiler and Pressure Vessel Steels</b>	17 Mn 4, 19 Mn 5, 15 Mo 3 HI, HII, HIII	P295GH, P310GH, 16 Mo 3 P235GH, P265GH, P285NH
<b>Elevated Temperature Steels</b>	St 35-8, St 45-8	P235G1TH - P255G1TH
<b>Ship Plates</b>	A, B, C, D, E	-

### Packing and Diameter Informations

Diameter	2.0	2.4	3.2	4.0	Spool Weight	Drum Weight
Submerged Arc Welding Wire	-	-	X	X	25 kg	350 / 650 kg

**Liability** : All information in this data sheet is based on the best available knowledge, is subject to change without notice and can only be considered as suitable for general guidance. **Fumes** : Consult information on Welding Safety Sheet, available upon request.

# Notes



# GENERAL INFORMATIONS

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# Conversion Tables

## Electrode & Wire Diameter and Length - Deposition Rates - Wire Feeding Rates

### Electrode and Wire Diameter - Electrode Length - Deposition Rates - Wire Feeding Rates

Electrode Diameter		Electrode Length		Wire Feeding Rates		Deposition Rates	
inch	mm	inch	mm	inch/min	m/min	lb/hour	kg/hour
0.024	0.6	10	250	25	0.6	1	0.45
0.030	0.8	12	300	50	1.3	2	0.90
0.035	0.9	13	330	75	1.9	3	1.36
0.039	1.0	14	350	100	2.5	4	1.81
3/64	1.2	18	450	125	3.1	5	2.26
1/16	1.6			150	3.8	6	2.72
5/64	2.0			175	4.4	7	3.17
3/32	2.4			200	5.1	8	3.68
7/64	2.8			225	5.7	9	4.08
1/8	3.2			250	6.3	10	4.53
5/32	4.0			275	6.9	11	4.98
3/16	5.0			300	7.6	12	5.44
1/4	6.0			325	8.2	13	5.89
				350	8.9	14	6.35
				375	9.5	15	6.80
				400	10.2	16	7.25
				425	10.8	17	7.71
				450	11.4	18	8.16
				475	12.0	19	8.61
				500	12.7	20	9.07
				525	13.3	21	9.52
				550	14.0	22	9.97
				575	14.6	23	10.43
				600	15.2	24	10.88
				625	15.8	25	11.33
				650	16.5		
				675	17.1		
				700	17.8		

# Conversion Tables

## Hardness Values

### Hardness Values - 1

Brinell HB (P=30D <sup>2</sup> )	Rockwell		Vickers HV (P=30 kgf)	Tensile Strength N/mm <sup>2</sup>	Tensile Strength kgf/mm <sup>2</sup>
	HRB	HRC			
80	36.4		80	270	28
85	42.4		85	290	30
90	47.4		90	310	32
95	52.0		95	320	33
100	56.4		100	340	35
105	60.0		105	360	37
110	63.4		110	380	39
115	66.4		115	390	40
120	69.4		120	410	42
125	72.0		125	420	43
130	74.4		130	440	45
135	76.4		135	460	47
140	78.4		140	470	48
145	80.4		145	490	50
150	82.2		150	500	51
155	83.8		155	520	53
160	85.4		160	540	55
165	86.8		165	550	56
170	88.2		170	570	58
175	89.6		175	590	60
180	90.8		180	610	62
185	91.8		185	620	63
190	93.0		190	640	65
195	94.0		195	660	67
200	95.0		200	670	68
205	95.8		205	690	70
210	96.6		210	710	72
215	97.6		215	720	73
220	98.2		220	740	75
225	99.0		225	760	77
230		19.2	230	760	78
235		20.2	235	780	80
240		21.2	240	800	82
245		22.1	245	820	84
250		23.0	250	830	85
255		23.8	255	850	87
260		24.6	260	870	89
265		25.4	265	880	90
270		26.2	270	900	92
275		26.9	275	920	94
280		27.6	280	940	96
285		28.3	285	950	97
290		29.0	290	970	99
295		29.6	295	990	101
300		30.3	300	1010	103
310		31.5	310	1040	106
320		32.7	320	1080	110
330		33.8	330	1110	113



# Conversion Tables

## Hardness Values

### Hardness Values - 2

Brinell HB (P=30D <sup>2</sup> )	Rockwell		Vickers HV (P=30 kgf)	Tensile Strength N/mm <sup>2</sup>	Tensile Strength kgf/mm <sup>2</sup>
	HRB	HRC			
340		34.9	340	1150	117
350		36.0	350	1180	120
359		37.0	360	1210	123
368		38.0	370	1240	126
376		38.9	380	1270	129
385		39.8	390	1290	132
392		40.7	400	1320	135
400		41.5	410	1350	138
408		42.4	420	1380	141
415		43.2	430	1410	144
423		44.0	440	1430	146
430		44.8	450	1460	149
		45.5	460		
		46.3	470		
		47.0	480		
		47.7	490		
		48.3	500		
		49.0	510		
		49.7	520		
		50.3	530		
		50.9	540		
		51.5	550		
		52.1	560		
		52.8	570		
		53.3	580		
		53.8	590		
		54.4	600		
		54.9	610		
		55.4	620		
		55.9	630		
		56.4	640		
		56.9	650		
		57.4	660		
		57.9	670		
		58.5	680		
		58.9	690		
		59.3	700		
		60.2	720		
		61.1	740		
		61.9	760		
		62.8	780		
		63.5	800		
		64.3	820		
		65.0	840		
		65.7	860		
		66.3	880		
		66.9	900		
		67.5	920		

# Conversion Tables

## Stress Values

### Stress Values - 1

N/mm <sup>2</sup>	kgf/mm <sup>2</sup>	Psi	N/mm <sup>2</sup>	kgf/mm <sup>2</sup>	Psi
15.4	1.6	2240	756.8	77.2	109760
30.9	3.2	4480	772.2	78.7	112000
46.3	4.7	6720	787.7	80.3	114240
61.8	6.3	8960	803.1	81.9	116480
77.2	7.9	11200	818.5	83.5	118720
92.7	9.5	13440	834.0	85.0	120960
108.1	11.0	15680	849.4	86.6	123200
123.6	12.6	17920	864.9	88.2	125440
139.0	14.2	20160	880.3	89.8	127680
154.4	15.7	22400	895.7	91.3	129920
169.9	17.3	24640	911.2	92.9	132160
185.3	18.9	26880	926.7	94.5	134400
200.8	20.5	29120	942.1	96.1	136640
216.2	22.0	31360	957.5	97.6	138880
231.7	23.6	33600	973.0	99.2	141120
247.1	25.2	35840	988.4	100.8	143360
262.6	26.8	38080	1004	102.4	145600
278.0	28.3	40320	1019	103.9	147840
293.4	29.9	42560	1034	105.5	150080
308.9	31.5	44800	1050	107.1	152320
324.3	33.1	47040	1066	108.7	154560
339.8	34.6	49280	1081	110.2	156800
355.2	36.2	51520	1097	111.8	159040
370.7	37.8	53760	1112	113.4	161280
386.1	39.4	56000	1127	115.0	163520
401.6	40.9	58240	1143	116.5	165760
417.0	42.5	60480	1158	118.1	168000
432.4	44.1	62720	1174	119.7	170240
447.9	45.7	64960	1189	121.3	172480
463.3	47.2	67200	1205	122.8	174720
478.8	48.8	69440	1220	124.4	176960
494.2	50.4	71680	1236	126.0	179200
509.7	52.0	73920	1251	127.6	181440
525.1	53.5	76160	1266	129.1	183680
540.5	55.1	78400	1282	130.7	185920
556.0	56.7	80640	1297	132.3	188160
571.4	58.3	82880	1313	133.9	190400
586.9	59.8	85120	1328	135.4	192640
602.3	61.4	87360	1344	137.0	194880
617.8	63.0	89600	1359	138.6	197120
633.2	64.6	91840	1375	140.2	199360
648.7	66.1	94080	1390	141.7	201600
664.1	67.7	96320	1405	143.3	203840
679.5	69.3	98560	1421	144.9	206080
695.0	70.9	100800	1436	146.5	208320
710.4	72.4	103040	1452	148.0	210560
725.9	74.0	105280	1467	149.6	212800
741.3	75.6	107520	1483	151.2	215040



# EN ISO 2560-A Classification

## Classification of Covered Electrodes for MMA Welding of Non-Alloyed Steels

### Classification of Covered Electrodes According to EN ISO 2560-A

#### MECHANICAL PROPERTIES (min. Yield Strength)

Symbol	Yield Strength (N/mm <sup>2</sup> )	Tensile Strength (N/mm <sup>2</sup> )	Elongation min. (%)
35	min. 355	440 - 570	22
38	min. 380	470 - 600	20
42	min. 420	500 - 640	20
46	min. 460	530 - 680	20
50	min. 500	560 - 720	18

#### TYPE of COVERING

<b>A</b>	Acid
<b>C</b>	Cellulosic
<b>R</b>	Rutile
<b>RR</b>	Rutile (thick)
<b>RC</b>	Rutilo cellulosic
<b>RA</b>	Rutilo acid
<b>RB</b>	Rutilo basic
<b>B</b>	Basic

#### IMPACT PROPERTIES

Symbol	Temperature Required for 47 J Impact Resistance (°C)
Z	no requirement
A	+20
0	0
2	-20
3	-30
4	-40
5	-50
6	-60

#### CURRENT TYPE and RECOVERY

Symbol	Electrode Recovery (%)	Current Type
1	≤ 105	DC / AC
2	≤ 105	DC
3	> 105 ≤ 125	DC / AC
4	> 105 ≤ 125	DC
5	> 125 ≤ 160	DC / AC
6	> 125 ≤ 160	DC
7	> 160	DC / AC
8	> 160	DC

**E 46 3 1Ni B 5 4 H5**

#### CHEMICAL COMPOSITION

Symbol	Mn	Mo	Ni
-	2	-	-
Mo	1.4	0.3 - 0.6	-
MnMo	1.4 - 2	0.3 - 0.6	-
1Ni	1.4	-	0.6 - 1.2
2Ni	1.4	-	1.8 - 2.6
3Ni	1.4	-	2.6 - 3.8
Mn1Ni	1.4 - 2	-	0.6 - 1.2
1NiMo	1.4	0.3 - 0.6	0.6 - 1.2
Z	other		

#### HYDROGEN CONTENT

(max. ml/100 g)	
H5	5
H10	10
H15	15

#### WELDING POSITIONS

1	All positions
2	All positions except vertical down
3	Flat and horizontal-vertical butt/fillet weld
4	Flat butt and fillet weld
5	Vertical down and Flat and horizontal-vertical butt/fillet weld

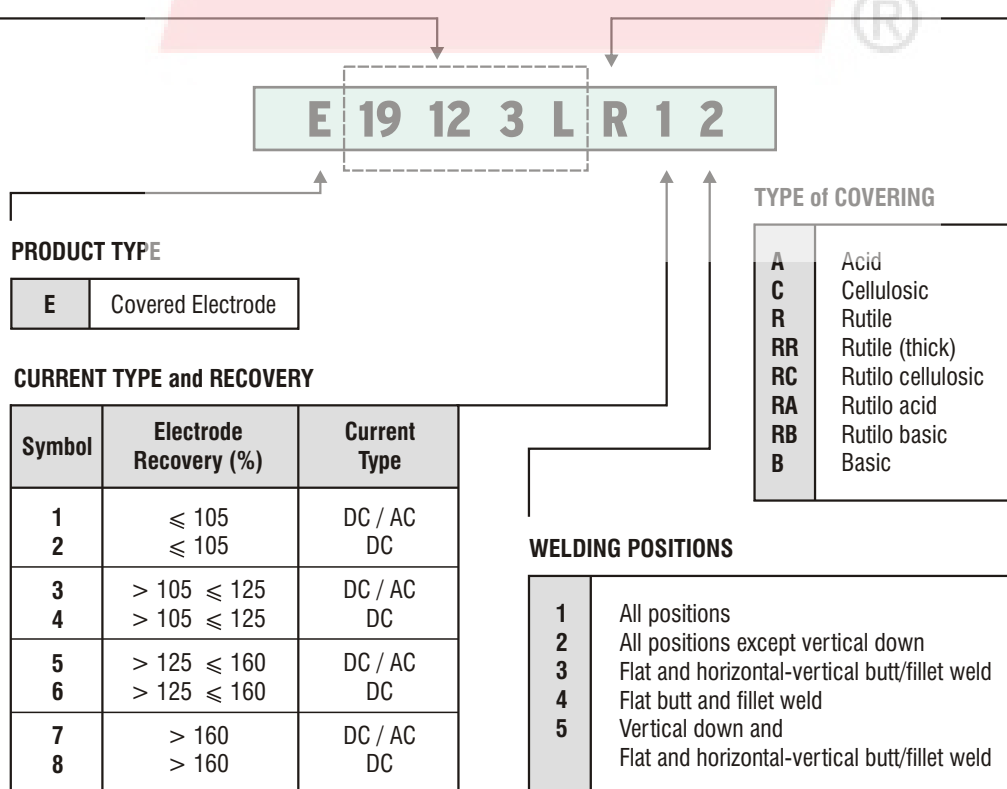
# EN 1600 Classification

## Classification of Covered Electrodes for MMA Welding of Stainless and Steels

### Classification of Covered Electrodes According to EN 1600

#### CHEMICAL COMPOSITION

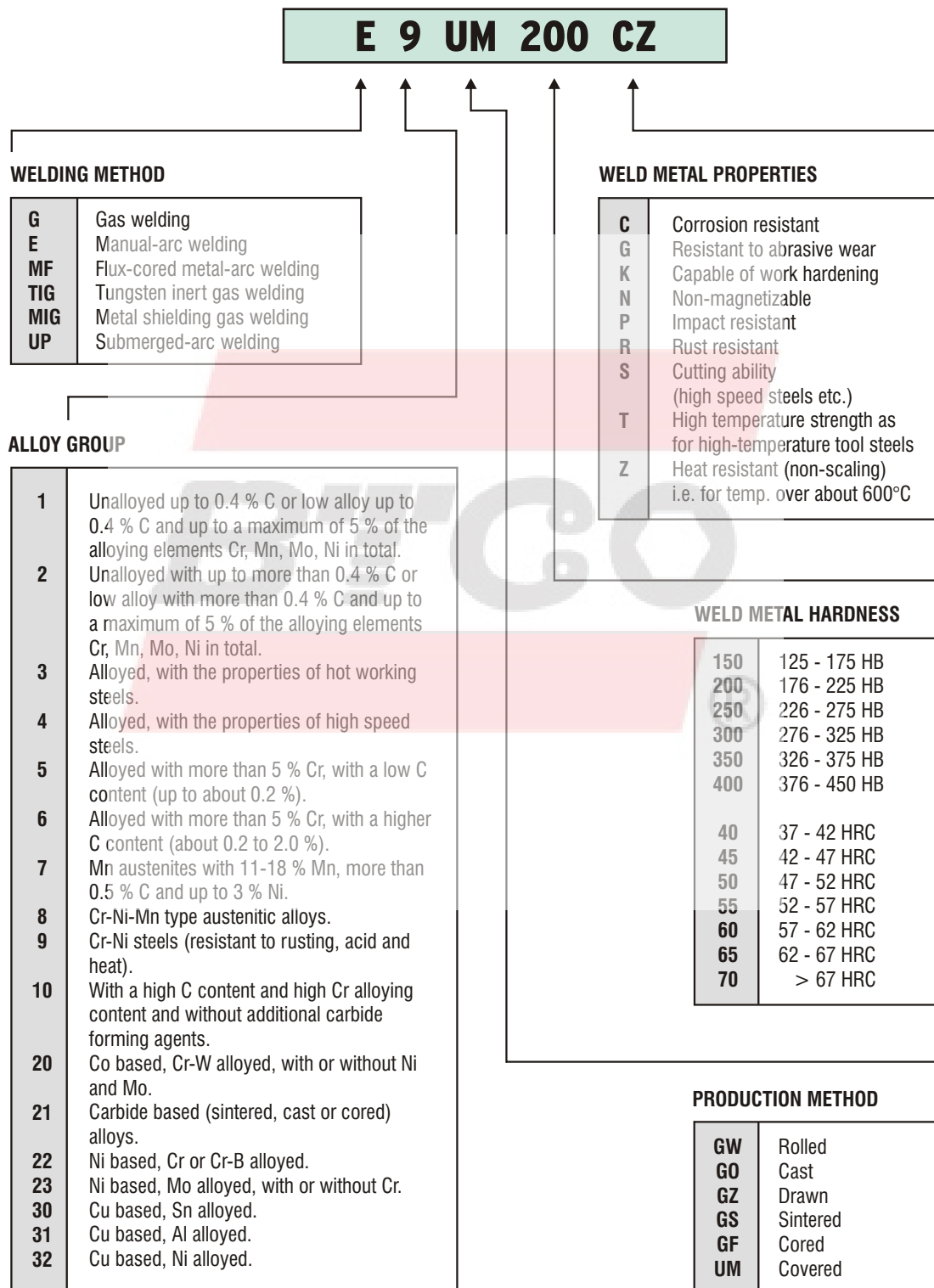
Symbol	C	Mn	Cr	Ni	Mo	Nb	Cu	N	W
13	0.12	1.50	11 - 14	-	-	-	-	-	-
13 4	0.06	1.50	11 - 14	3 - 5	0.40 - 1.00	-	-	-	-
17	0.12	1.50	16 - 18	-	-	-	-	-	-
19 9	0.08	2.00	18 - 21	9 - 11	-	-	-	-	-
19 9 L	0.04	2.00	18 - 21	9 - 11	-	-	-	-	-
19 9 Nb	0.08	2.00	18 - 21	9 - 11	-	Nb	-	-	-
19 12 2	0.08	2.00	17 - 20	10 - 13	2 - 3	-	-	-	-
19 12 3 L	0.04	2.00	17 - 20	10 - 13	2 - 3	-	-	-	-
19 12 3 Nb	0.08	2.00	17 - 20	10 - 13	2 - 3	Nb	-	-	-
19 13 4 N L	0.04	1.00 - 5.00	17 - 20	12 - 15	3 - 4	-	-	0.20	-
22 9 3 N L	0.04	2.50	21 - 24	7 - 10	2 - 4	Nb	1.20	-	-
25 7 2 NL	0.04	2.00	24 - 28	6 - 8	1 - 3	-	-	0.20	-
25 9 3 CuN L	0.04	2.50	24 - 27	7 - 10	2 - 4	-	2.00	0.10 - 0.20	-
25 9 4 N L	0.04	2.50	24 - 27	8 - 10	2 - 4	-	1.20	0.10 - 0.25	-
18 15 3 L	0.04	1.00 - 4.00	16 - 19	14 - 17	2 - 3	-	1.20	-	-
18 16 5 N L	0.04	1.00 - 4.00	17 - 20	15 - 19	3 - 5	-	1.20	0.20	-
20 15 5 CuN L	0.04	1.00 - 4.00	19 - 22	24 - 27	4 - 7	-	1.50	0.20 - 0.30	1.00
20 16 3 MnN L	0.04	5.00 - 8.00	18 - 21	15 - 18	2 - 3	-	1.20	0.20	-
25 22 2 N L	0.04	1.00 - 5.00	24 - 27	20 - 23	2 - 3	-	-	0.20	-
7 31 4 Cu L	0.04	2.00 - 5.00	26 - 29	30 - 33	3 - 4	-	1.20	-	-



# DIN 8555 Classification

## Classification of Covered Electrodes for MMA Welding of Hardfacing Applications

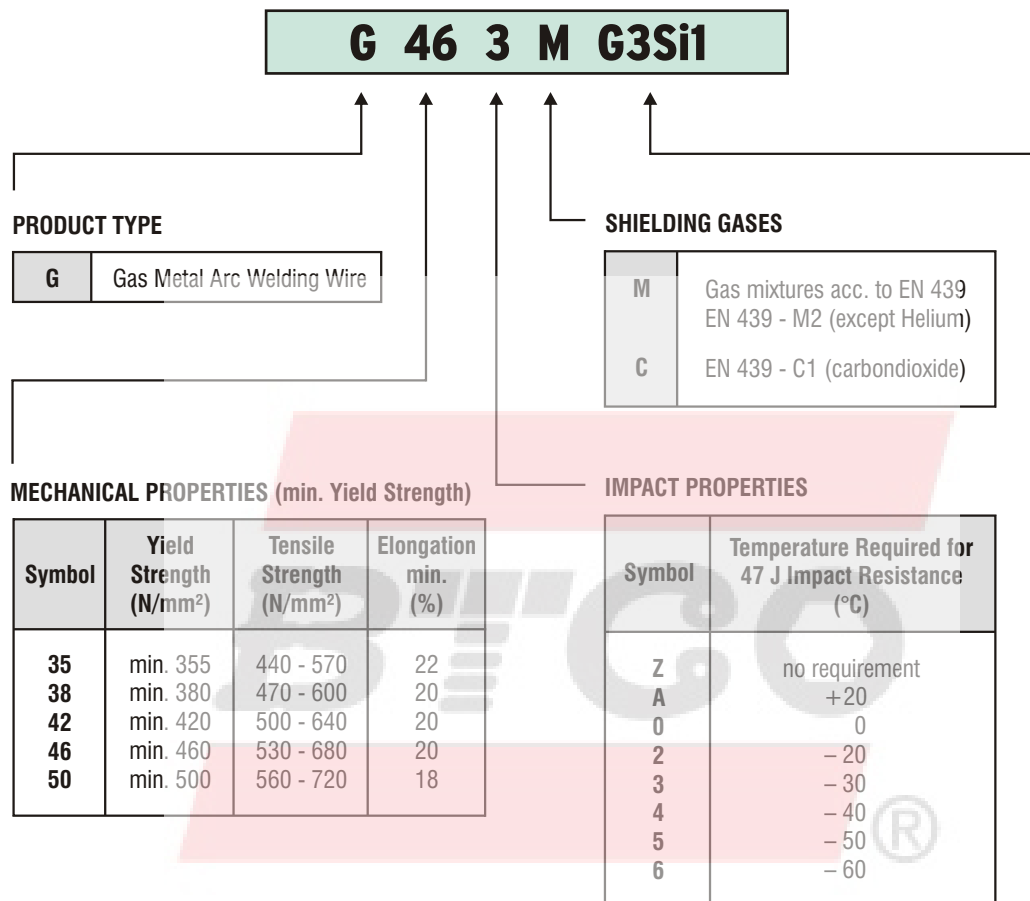
### Classification of Covered Electrodes According to DIN 8555



# ISO 14341-A Classification

## Classification of Solid Wires for GMA Welding of Non-Alloyed Steels

### Classification of Solid Wires According to ISO 14341-A



### CHEMICAL ANALYSIS and CHEMICAL SYMBOLS of the WELDING WIRE (%)

Symbol	C	Si	Mn	P	S	Ni	Mo	Al	Ti + Zr
<b>G0</b>	No specifications are stated for this standard								
<b>G2Si</b>	0.06 - 0.14	0.50 - 0.80	0.90 - 1.30	0.025	0.025	0.15	0.15	0.02	0.15
<b>G3Si1</b>	0.06 - 0.14	0.70 - 1.00	1.30 - 1.60	0.025	0.025	0.15	0.15	0.02	0.15
<b>G4Si1</b>	0.06 - 0.14	0.80 - 1.20	1.60 - 1.90	0.025	0.025	0.15	0.15	0.02	0.15
<b>G3Si2</b>	0.06 - 0.14	1.00 - 1.30	1.30 - 1.60	0.025	0.025	0.15	0.15	0.02	0.15
<b>G2Ti</b>	0.04 - 0.14	0.40 - 0.80	0.90 - 1.40	0.025	0.025	0.15	0.15	0.05 - 0.20	0.05 - 0.25
<b>G3Ni1</b>	0.06 - 0.14	0.50 - 0.90	1.00 - 1.60	0.020	0.020	0.80 - 1.50	0.15	0.02	0.15
<b>G2Ni2</b>	0.06 - 0.14	0.40 - 0.80	0.80 - 1.40	0.020	0.020	2.10 - 2.70	0.15	0.02	0.15
<b>G2Mo</b>	0.08 - 0.12	0.30 - 0.70	0.90 - 1.30	0.020	0.020	0.15	0.40 - 0.60	0.02	0.15
<b>G4Mo</b>	0.06 - 0.14	0.50 - 0.80	1.70 - 2.10	0.025	0.025	0.15	0.40 - 0.60	0.02	0.15
<b>G2Al</b>	0.08 - 0.14	0.30 - 0.50	0.90 - 1.30	0.025	0.025	0.15	0.15	0.35 - 0.75	0.15

Cr < 0.15, Cu < 0.35 and V < 0.03, unless otherwise stated. Sum of other impurity elements should not exceed % 0.35. Single values are maximum numbers.

# EN ISO 14171 Classification

## Classification of Wire/Flux Combinations for SA Welding of Non-Alloyed Steels

### Classification of Solid Wire/Flux Combinations According to EN ISO 14171

**S 46 3 AB S2**

#### PRODUCT TYPE

<b>S</b>	Submerged Arc Welding Wire
----------	----------------------------

#### TYPE of FLUX

<b>MS</b>	Manganese - Silicate
<b>CS</b>	Calcium - Silicate
<b>ZS</b>	Zirkonium - Silicate
<b>RS</b>	Rutile - Silicate
<b>AR</b>	Aluminate - Rutile
<b>AB</b>	Aluminate - Basic
<b>AS</b>	Aluminate - Silicate
<b>AF</b>	Aluminate - Fluorure Basic
<b>FB</b>	Fluorure + Basic
<b>Z</b>	any other type

#### MECHANICAL PROPERTIES (min. Yield Strength) Multi-Run Technique

Symbol	Yield Strength (N/mm <sup>2</sup> )	Tensile Strength (N/mm <sup>2</sup> )	Elongation min. (%)
<b>35</b>	min. 355	440 - 570	22
<b>38</b>	min. 380	470 - 600	20
<b>42</b>	min. 420	500 - 640	20
<b>46</b>	min. 460	530 - 680	20
<b>50</b>	min. 500	560 - 720	18

#### IMPACT PROPERTIES

Symbol	Temperature Required for 47 J Impact Resistance (°C)
<b>Z</b>	no requirement
<b>A</b>	+20
<b>0</b>	0
<b>2</b>	-20
<b>3</b>	-30
<b>4</b>	-40
<b>5</b>	-50
<b>6</b>	-60
<b>7</b>	-70
<b>8</b>	-80

#### CHEMICAL ANALYSIS of the WELDING WIRE (%)

Symbol	Si	Mn	Ni	Mo
<b>S0</b>	Any other agreed composition			
<b>S1</b>	0.15	0.35 - 0.60		
<b>S2</b>	0.15	0.80 - 1.30		
<b>S3</b>	0.15	1.31 - 1.75		
<b>S4</b>	0.15	1.76 - 2.25		
<b>S1Si</b>	0.15 - 0.40	0.35 - 0.60		
<b>S2Si</b>	0.15 - 0.40	0.80 - 1.30		
<b>S2Si2</b>	0.40 - 0.60	0.80 - 1.30		
<b>S3Si</b>	0.15 - 0.40	1.31 - 1.85		
<b>S4Si</b>	0.15 - 0.40	1.86 - 2.25		
<b>S1Mo</b>	0.05 - 0.25	0.35 - 0.60		0.45 - 0.65
<b>S2Mo</b>	0.05 - 0.25	0.80 - 1.30		0.45 - 0.65
<b>S3Mo</b>	0.05 - 0.25	1.31 - 1.75		0.45 - 0.65
<b>S4Mo</b>	0.05 - 0.25	1.76 - 2.25		0.45 - 0.65
<b>S2Ni1</b>	0.05 - 0.25	0.80 - 1.30	0.80 - 1.20	
<b>S2Ni1.5</b>	0.05 - 0.25	0.80 - 1.30	1.21 - 1.80	
<b>S2Ni2</b>	0.05 - 0.25	0.80 - 1.30	1.81 - 2.40	
<b>S2Ni3</b>	0.05 - 0.25	0.80 - 1.30	2.81 - 3.70	
<b>S2Ni1Mo</b>	0.05 - 0.25	0.80 - 1.30	0.80 - 1.20	0.45 - 0.65
<b>S3Ni1.5</b>	0.05 - 0.25	1.31 - 1.70	1.21 - 1.80	
<b>S3Ni1Mo</b>	0.05 - 0.25	1.31 - 1.80	0.80 - 1.20	0.45 - 0.65
<b>S3Ni1.5Mo</b>	0.05 - 0.25	1.20 - 1.80	1.20 - 1.80	0.30 - 0.50

#### MECHANICAL PROPERTIES (min. Yield Strength) Two-Run Technique

Symbol	Yield Strength (N/mm <sup>2</sup> )	Tensile Strength (N/mm <sup>2</sup> )
<b>3T</b>	min. 355	min. 470
<b>4T</b>	min. 420	min. 520
<b>5T</b>	min. 500	min. 600



# Heat Treatment of HSLA Steels

## Heat Treatment of HSLA Steels welded with AS DA-XXX Series Electrodes

### Heat Treatment of High Strength Low Alloyed Steels welded with AS DA-XXX Series Electrodes

The mechanical properties gained by the coated electrodes that are used for welding high strength low alloyed steels and high temperature creep resistant steels varies with respect to the amount of preheating, interpass temperature and heat treatment after welding.

According to EN ISO 2560-A, EN ISO 3580 and EN ISO 18275				
Product Name	Preheating Temperature (°C)	Interpass Temperature (°C) <sup>1</sup>	Postweld Heat Treatment (°C) <sup>2</sup>	Time of Heat Treatment (min)
AS DA-708	-	max. 250	250	12
AS DA-710	-	max. 250	250	12
AS DA-731	max. 200	max. 200	570 - 620	60
AS DA-735	max. 200	max. 200	570 - 620	60
AS DA-737	max. 200	max. 200	570 - 620	60
AS DA-753	-	125 - 175	560 - 600	60
AS DA-771	150 - 250	150 - 250	660 - 700	60
AS DA-774	150 - 250	150 - 250	660 - 700	60
AS DA-777	200 - 300	200 - 300	690 - 750	60
AS DA-778	200 - 300	200 - 300	730 - 760	60

(1) Measured 30-40 mm away from the center of weld bead.

(2) Air-cooling.

According to AWS A5.5 and AWS A5.4			
Product Name	Preheating and Interpass Temperature (°C)	Postweld Heat Treatment (°C) <sup>1</sup>	Time of Heat Treatment (min)
AS DA-710	93 - 107	620 + 14	60
AS DA-735	93 - 107	620 + 14	60
AS DA-737	93 - 107	620 + 14	60
AS DA-753	93 - 107	620 + 14	60
AS DA-771	163 - 191	690 + 14	60
AS DA-774	163 - 191	690 + 14	60
AS DA-777	163 - 191	690 + 14	60
AS DA-778	150 - 260 <sup>b</sup>	840 - 870 <sup>a</sup>	120

(1) Work piece heated at 65-280°C/hour up to heat treating temperature.

Held 1 hour at that temperature. Cooled at max. 190°C/hour.

Furnace leaving at 320 °C.

(a) Cooled at max. 55°C/hour to 595°C at furnace.

Afterwards, air cooling.

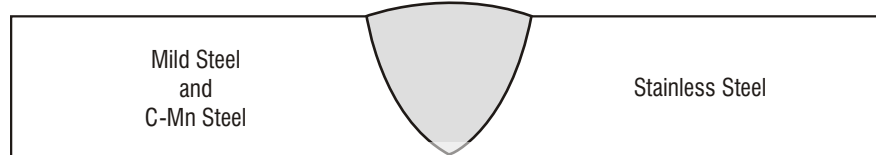
(b) No pre-heating.

# Coated Electrodes for Dissimilar Metal Joints

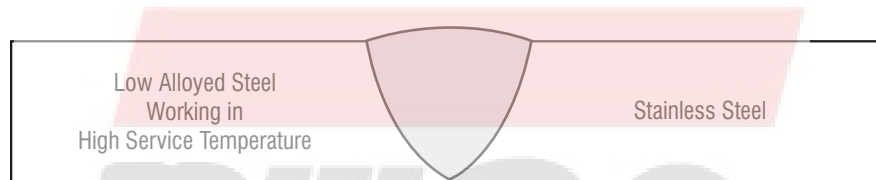
Steels, Stainless Steels, Cast Irons and Copper Alloys

## Electrode Selection for Joining of Dissimilar Metals

AS P-308 Mn / AS P-309 L / AS P-309 Mo / AS P-312  
AS P-316 L  
AS P-310 R

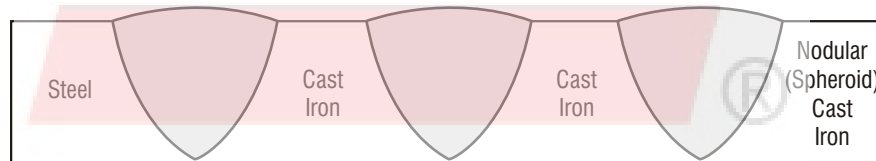


AS P-308 Mn / AS P-310 R / AS P-316 L

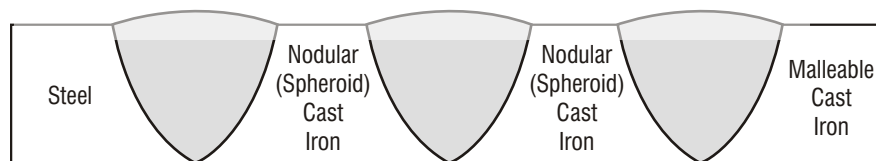


**Attention:** Never use un-alloyed electrodes

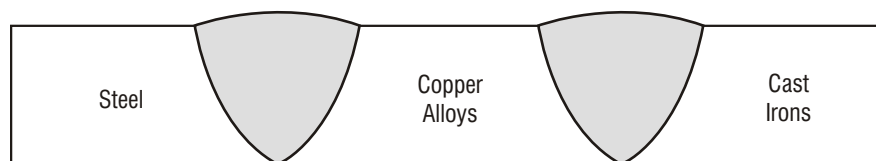
AS PiK-98 Süper / AS PiK-55 / AS PiK-65



AS PiK-55 / AS PiK-65



AS BRONZ



# Calculation of Preheating Temperature

## How to Calculate the Preheating Temperature?

### Calculation of Pre-heating Temperature

$$T_{\text{pre-heat}} (\text{°C}) = 350 \sqrt{[C_{\text{eq}}] - 0.25}$$

$$[C_{\text{eq}}] = [C_c] (1 + 0.005 \times E)$$

$$[C_c] = C + \frac{\text{Mn}}{6} + \frac{\text{Cr} + \text{Mo} + \text{V}}{5} + \frac{\text{Ni} + \text{Cu}}{15}$$

$[C_{\text{eq}}]$  = Chromium equivalent (%)

$[C_c]$  = Carbon equivalent (%)

E = Workpiece thickness (mm)

$T_{\text{pre-heat}}$  = Pre-heating temperature (°C)

#### Example:

Preheating temperature required for 25 CrMo 4 steel of 12 mm thickness.

$$[C_c] = C + \frac{\text{Mn}}{6} + \frac{\text{Cr} + \text{Mo} + \text{V}}{5} + \frac{\text{Ni} + \text{Cu}}{15}$$

$$[C_c] = 0.25 + \frac{0.8}{6} + \frac{1 + 0.25 + 0}{5} + \frac{0 + 0}{15}$$

$$= 0.63$$

$$[C_{\text{eq}}] = [C_c] (1 + 0.005 \times E)$$

$$[C_{\text{eq}}] = [0.63] (1 + 0.005 \times 12)$$

$$= 0.67$$

$$T_{\text{pre-heat}} (\text{°C}) = 350 \sqrt{[C_{\text{eq}}] - 0.25}$$

$$T_{\text{pre-heat}} (\text{°C}) = 350 \sqrt{[0.67] - 0.25}$$

$$= 220 - 230 \text{ °C}$$

# Preheating Temperatures for Steels

## Preheating Temperatures for Steels Most Commonly Used

### Pre-heating Temperatures for Steels Most Commonly Used

Material Group	Material (Wr.) Number	C <sub>eq</sub>	Pre-heating Temperature (°C)
Carbon Steels	1.1141 Ck 15	0.28	no pre-heating
	1.0402 C 22	0.33	no pre-heating
	1.1172 Cq 35	0.48	150 - 200
	1.1186 Ck 40	0.58	200 - 250
	1.1248 Ck 75	0.95	300 - 350
Carbon Steels	1.1165 30 Mn 5	0.63	200 - 250
	1.1167 36 Mn 5	0.69	200 - 250
	1.0912 46 Mn 7	0.78	250 - 300
	1.3401 X 120 Mn 12	-	no pre-heating
Molybdenum Steels	1.5415 15 Mo 3	0.50	200 - 250
	1.5419 22 Mo 4	0.50	200 - 250
Chromium-Molybdenum Steels	1.7218 25 CrMo 4	0.70	250 - 300
	1.7220 34 CrMo 4	0.80	300 - 350
	1.7225 42 CrMo 4	0.90	325 - 350
	1.7360 31 CrMo 12 5	1.25	400 - 450
	1.7362 12 CrMo 19 5	1.45	400 - 450
Nickel-Chromium-Molybdenum Steels	1.6523 21 NiCrMo 2	0.60	200 - 250
	1.6565 40 NiCrMo 6	1.00	300 - 350
	1.6577 22 NiMoCr 47	0.75	250 - 300
	1.6747 30 NiCrMo 16 6	-	350 - 400
Chromium Steels	1.7015 15 Cr 3	0.42	100 - 150
	1.7006 46 Cr 2	0.62	250 - 300
	1.7035 41 Cr 4	0.84	300 - 350
	1.7176 55 Cr3	0.92	350 - 400
	1.3505 100 Cr 6	1.47	500
Nickel-Chromium Steels	1.5713 13 NiCr 6	0.52	200 - 250
	1.5736 36 NiCr 10	0.90	300 - 350
Stainless Steels	1.4301 X6 CrNi 19 10	-	no pre-heating
	1.4571 X6 CrNiMoTi 17 12 2	-	
	1.4845 X6 CrNi 25 20	-	

**Attention !** The preheating temperatures for the steel types mentioned in this table are determined mathematically and are listed to give the user a basic idea. These values might change with respect to the welding process and the dimensions of the welded component.

# Welding Positions - Schaeffler Diagram

## Welding Positions According to ASME and ISO 6947

### Welding Positions



1G/PA

Butt and fillet welding  
in flat/downwards position



4G/PE

Butt and fillet welding  
in overhead position



2F/PB

Fillet welding in  
horizontal/vertical position



3G/PF

Butt and fillet welding  
in vertical upwards position



2G/PC

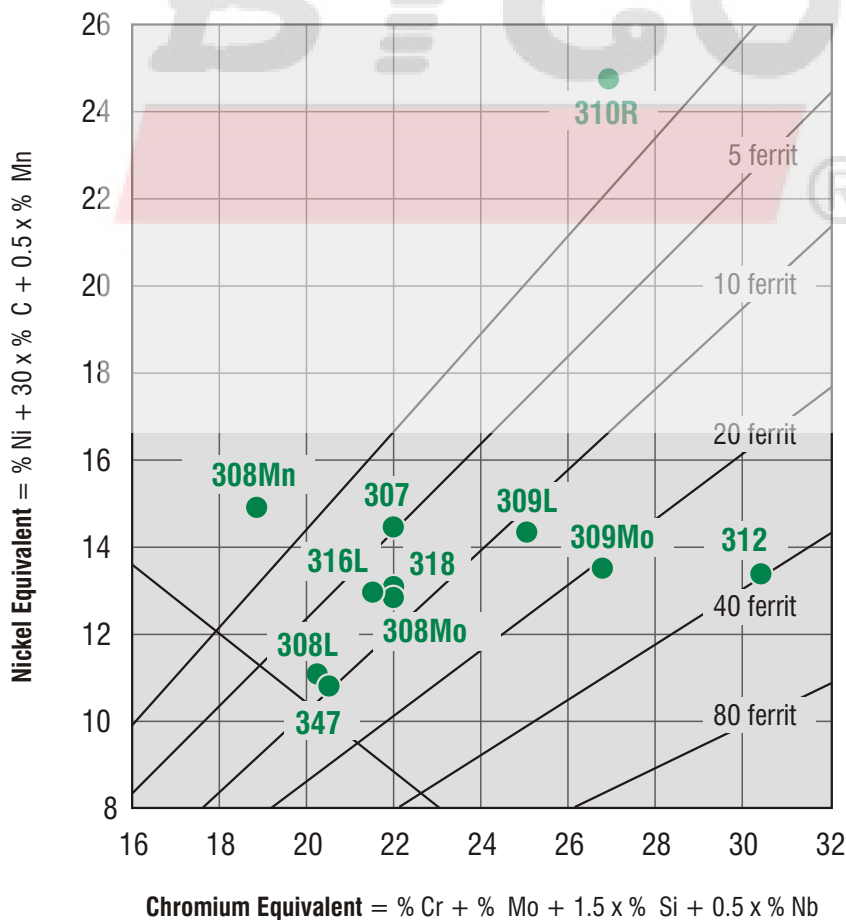
Butt welding  
in horizontal position



3G/PG

Butt and fillet welding in  
vertical downwards position

### Schaeffler Diagram and Askaynak AS P-XXX Electrodes



# Spools and Drum Packaging Informations

## Plastic Spools and Basket Spools - Drums

### Basket Spools and Plastic Spools for Manual and Standard Welding Applications

**D100 Spastic Spool (1 kg)**

D	d1	W
(mm)		
100 ±2	16.5 <sup>+1</sup> <sub>0</sub>	45 <sup>0</sup> <sub>-2</sub>

**D200 Spastic Spool (5 kg)**

D	d1	d2	A	W
(mm)				
200 ±3	50.5 <sup>+2.5</sup> <sub>0</sub>	10 <sup>+1</sup> <sub>0</sub>	44.5 ±0.5	55 <sup>0</sup> <sub>-3</sub>

**D300 Spastic Spool (15 kg)**

D	d1	d2	A	W
(mm)				
300 ±5	50.5 <sup>+2.5</sup> <sub>0</sub>	10 <sup>+1</sup> <sub>0</sub>	44.5 ±0.5	103 <sup>0</sup> <sub>-3</sub>

**KS300 Basket Spool (require no adapter) (15 kg)**

D	d	d1	W
(mm)			
300 ±5	180 ±2	50.5 <sup>+2.5</sup> <sub>0</sub>	100 ±3

**K300 Basket Spool (15 kg)**

D	d	W
(mm)		
300 ±5	180 ±2	100 ±3

**K435 Basket Spool (25 kg)**

D	d	W
(mm)		
435 maks	300 ±5	100 ±3

### Drums for Automatic Welding Applications

**ASFil® Drum (250 kg)**

**250 kg**

D	H
(mm)	
~500 ±20	~800 ±20

**ASFil® Drum (350/650 kg)**

**350 kg**

D	H
(mm)	
~650 ±20	~650 ±20

**ASFil® Drum (350/650 kg)**

**650 kg**

D	H
(mm)	
~650 ±20	~1000 ±20

# Redrying and Storage for Covered Electrodes

## Redrying and Storage of Rutile, Basic and Cellulosic Type Covered Electrodes

### Redrying and Storage of Rutile, Basic and Cellulosic Type Covered Electrodes

#### Manufacturing :

Covered electrodes are manufactured by extruding different materials on a core wire. As binder for the coating materials silicates are used which contain 60 % water. The electrodes are dried at different temperatures depending on kind of the electrode. Acid, rutile and cellulosic type of electrodes are dried up to a moisture content of 0.3-2.0 %. Basic and alloyed types of electrodes are dried; actually baked at higher temperatures up to 500°C and the final moisture content is very low.

#### Humidity of the Coating :

Covered electrodes must be handled carefully. Electrodes and their coverings can be damaged through absorption of moisture. Too high a moisture content in the electrode covering can be dangerous and therefore must be avoided. All the electrodes have a certain moisture content, which varies according to the type. Moisture content of the covering of Askaynak electrodes is controlled strictly before they leave the factory. A limited moisture content is normal and has no effect on weld quality. The moisture limits actually have a large safety margin in moisture content when they leave the factory.

All electrode coverings are hygroscopic and absorb moisture from the air depending on the relative humidity of the air. At higher relative humidity levels; e.g. 90 % the covering of basic electrodes absorbs moisture so quickly that after exposure for one day the electrode cannot be used anymore.

Acid, rutile and cellulosic type of electrodes are not as sensitive as basic electrodes but they will all pick up moisture if left unprotected.

It is not only direct moisture in the air, which can damage the electrodes but also condensation. Specially on high relative humidity levels and at large temperature differences between day and night condensation can occur. The dew wets the packages and this moisture is gradually absorbed by the electrode covering.

Humidity in the coverings of the electrodes can cause severe damage to the weld. It can cause porosity in the welds. Unfortunately porosity is not always visible to the naked eye but radiography reveals at once.

As a source of hydrogen it is the main cause for hydrogen cracking in the welds, which is very dangerous. There is the danger of underbead cracking in the heat affected zone of the parent material.

#### Packing :

Because of the danger of moisture pick-up the packages of the electrodes should be suitable to avoid this danger. Unless stored in appropriate conditions coated electrodes will remain unaffected and provide satisfactory welds.

All of Askaynak covered electrode boxes are tightly wrapped in polyethylen. For sensitive welds tin-can boxes are available. Plastic boxes are used for stainless steel type of electrodes.

#### Storage Conditions: (\*)

The electrodes must be kept in their original packages.

The electrodes should be protected against rain, damp and dew.

The relative humidity level at the storage place should be 40 % and less.

The temperature of the storage should be constant and above 15°C.

The boxes should be kept on shelves or pallets avoiding to contact directly the floor and the walls.

When welding outside loose packets of electrodes should not lie about unprotected on the site.

Electrodes should not be taken out of the store in quantities greater than necessary for daily or two days consumption.

#### Redrying:

##### Rutile Types:

Redrying is not necessary. In case of high moisture redrying at 100-150°C for 1-2 hours is recommended. At lower drying temperatures electrodes should be kept longer.

##### Cellulosic Types:

Cellulosic type of electrodes are not very sensitive to moisture pick-up. Redrying must be made very carefully otherwise the coating can get cracks. In general redrying is not recommended for cellulosic electrodes. In case of a necessity the drying temperature should not exceed 70°C.

##### Basic and Alloyed Electrodes:

If the electrodes are stored in recommended storage conditions (15°C/40% relative humidity) and in original packages there is generally no need for redrying. When the plastic wrappings of basic type of electrodes are opened the electrodes ought to be put into a heating cabinet at about 50°C.

If the boxes are opened and exposed to open air for more than two hours redrying is recommended. Basic and alloyed electrodes are dried for 2-3 hours at 250-400°C. It is not recommended to redry the same electrodes more than three times.

#### (\*)

These storing conditions are necessary for basic type of coverings. In case of rutile and cellulosic type of electrodes the conditions are not as tough as for basic type of coatings.

# Notes





# Notes





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