

Electrodes for Creep Resistant Steels





AMA 1087 R3

Standards: EN 1599 E CrMo 9B 42 H10
AWS/ASME SFA - 5.4 E 505-15-H8
AWS/ASME SFA - 5.5 E 8018-B8-H8

Application / Properties: Electrode for welding of boilers, pressure vessels subjected to operating temperatures up to 600°C. Typical applications are: petrochemical process plant, hydro crackers in chemical industries .

Weld metal analysis in %:

C	Mn	Si	Cr	Mo	S	P
0.07	0.85	0.3	9.5	1	<0.02	<0.02

Mechanical Properties of all-weld metal : (single values are typical values)

	Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation 5*d (%)	ISO-V Impact energy (J) + 20 °C
T	620-750	>500	20	80

T: Tempered 1 hrs at 760°C, Air cooling.



Amperage:

2.5 Ø	3.25 Ø	4.0 Ø	5.0 Ø
60-90	90-130	140-180	170-230

Materials:

CrMo Creep resistant in high temperature steels, X12CrMo 49,
X7CrMo 1, GX12CrMo 10

Redrying : required at 300°C to 350°C for 2hrs.



AMA 1181 NC

Standards: AWS/ASME SFA - 5.5 E 7016 - A1- H8
 DIN 8575 EMO B 20+

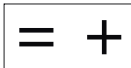
Application / Properties: Basic electrode suitable for boiler tanks subjected to operating temperature up to 500C. It's weld metal contains Molybdenum has a good mechanical properties.

Weld metal analysis in %:

C	Mn	Si	Mo	S	P
0.08	0.9 Max	0.4	0.5	<0.02	<0.02

Mechanical Properties of all-weld metal :
 (single values are typical values)

Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation 5*d (%)	ISO-V Impact energy (j)	
			+ 20 °C	- 20 °C
>390	>510	25	120	60



Amperage:			
2.5 Ø	3.25 Ø	4.0 Ø	5.0Ø
60-90	90-140	140-190	190-250



Material:

Creep resistant, Boiler and Pipe steels-----St 35.8, St 45.8, 17 Mn4
 Casting steels----- GS-11 Mo4
 19 Mn, 15 Mo3
 Pipe steels-----StE 360.7, StE 415.7, StE 385.7
 API steels-----X52,X56,X60

Redrying : required at 300C to 350C for 2hrs.



AMA 1245 N

Standards: DIN 8575 E CrMo 2 B 26
 PrEN 1599 E CrMo 1 B 32 H10
 AWS/ASME SFA - 5.5 E 9018 - B 3 - H8

Application / Properties: Electrode for welding of creep resistant and high-pressure hydrogen resistant steels used in the construction of pressure vessels, boilers and piping subjected to operating temperatures up to +600C. Owing to its double covering (up to 3.25mmØ), the electrode shows a stable and concentrate arc, thus being well suited for root pass and positional welding. Weld are of X-ray quality.
 Preheating, inter-pass temperature and post-weld heat treatment in accordance with base metal to be welded.

Weld metal analysis in %(typical values):

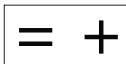
C	Mn	Si	Cr	Mo
0.06	0.80	0.50	2.40	1.00

**Mechanical Properties of all-weld metal :
 (single values are typical values)**

	Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation A5, (%)	ISO-V Impact energy (j) + 20 °C
T	>440	570-670	>22	100
N+T	>350	500-600	>24	140

T : tempered 0.5 h at 700C, air cooling

T+N : normalized + tempered 0.5 h at 920C, air cooling +0.5 h at 750C



Amperage:

2.5 Ø	3.25 Ø	4.0 Ø	5.0 Ø
60-90	90-140	140-190	190-250



Material:

Creep and high-pressure hydrogen resistant steels e.g
 10 CrMo 9 10, 12 CrMo 9 10, 10 CrSiMo V 7, 24 CrMo 10,
 GS-12 CrMo 9 10
 GS-19 CrMo 9 10 as well as similar cementation and heat treatable
 steels with up to 2% Cr.

Redrying : required at 300C to 350C for 2hrs.



AMA 1261 N

Standards: DIN 8575 E Mo B 20+
 PrEN 1599 E Mo B 42 H10
 AWS/ASME SFA - 5.5 E 7018 - A 1 - H8

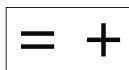
Application / Properties: Electrode for welding of creep resistant and high-pressure hydrogen resistant steels used in the construction of pressure vessels, boilers and piping subjected to operating temperatures up to +550°C. Owing to its double covering (up to 3.25mm Ø), the electrode shows a stable and concentrate arc, thus being well suited for root pass and positional welding. Weld are of X-ray quality. Preheating, inter-pass temperature and post-weld heat treatment in accordance with base metal to be welded.

Weld metal analysis in %(typical values):

C	Mn	Si	Mo
0.06	0.80	0.50	0.50

**Mechanical Properties of all-weld metal :
 (single values are typical values)**

	Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation A5, (%)	ISO-V Impact energy (J) + 20°C
T	>470	520-650	>22	160



T : tempered 1 h at 620°C, air cooling

Amperage:			
2.5 Ø	3.25 Ø	4.0 Ø	5.0 Ø
65-90	90-130	140-180	190-230



Material:

Creep resistant boiler and pip steels e.g.-----St 35.8, St 45.8, 17 Mn4
 19 Mn 5, 15 Mo 3, 16 Mo 5
 Fine grain structural steels----- StE, WStE 255 to 460
 Pipe steels----- StE 360.7, to StE 415.7
 Steels to API standars-----X52 to X60
 Cast steels-----GS-C 25, GS-22 Mo 4

Rebaking : required at 300°C to 350°C for 2hrs.



AMA 1263 N

Standards: DIN 8575 E CrMo 1 B 20+
 PrEN 1599 E CrMo 1 B 42 H10
 AWS/ASME SFA - 5.5 E 8018 - B2 - H8

Application / Properties: Electrode for welding of creep resistant and high-pressure hydrogen resistant steels used in the construction of pressure vessels, boilers and piping subjected to operating temperatures up to +570°C. Owing to its double covering (up to 3.25mm Ø), the electrode shows a stable and concentrate arc, thus being well suited for root pass and positional welding. weld are of X-ray quality.
 Preheating, inter-pass temperature and post-weld heat treatment in accordance with base metal to be welded.

Weld metal analysis in % (typical values):

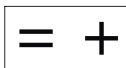
C	Mn	Si	Cr	Mo
0.06	0.80	0.40	1.00	0.50

**Mechanical Properties of all-weld metal :
 (single values are typical values)**

	Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation (5*d) (%)	ISO-V Impact energy (J) + 20°C
T	560-660	>490	>22	120
N+T	450-550	>300	>26	150

T : tempered 0.5 h at 700°C, air cooling

T+N : normalized + tempered 0.5 h at 920°C, air cooling +0.5 h at 700°C



Amperage:			
2.5 Ø	3.25 Ø	4.0 Ø	5.0 Ø
60-85	100-135	140-185	190-230



Material:

Creep resistant boiler and pip steels e.g-----22CrMo44, 24CrMo5, 16CrMo44, 13CrMo44, 15CrMo5
 Cast steels-----GS-17CrMo55, GS-22CrMo54
 Cementation steels-----15Cr3(E C 60), 16MnCr5 (E C 80), 20MnCr5(E C 100)

Rebaking : required at 300C to 350C for 2hrs.



AMA 1262 N2

Standards: DIN 8575 E CrMo 5 B 20+
 PrEN 1599 E Z CrMo 5 B 42 H10
 AWS/ASME SFA - 5.4 E 502 - 15 - H8
 AWS/ASMESFA 5.5 E 8018-B6-H8

Application / Properties: Electrode for welding of boilers, pressure vessels subjected to operating temperature up to 600C. Weld metal matches the the composition of steel grade 12 CrMo 195 featuring equal resistance to high-pressure hydrogen attack, creep resistance and creep rupture strength. Typical application are: petrochemical process plants, Hydro crackers in chemical industries.

Weld metal analysis in %(typical values):

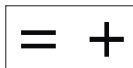
C	Si	Mn	Cr	Mo
0.06	0.30	0.9	5	0.50

**Mechanical Properties of all-weld metal :
(single values are typical values)**

	Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation A5, (%)	ISO-V Impact energy (j) + 20°C
T	>500	600-700	18	100
N+T	>580	>650750	17	120

T : tempered 1 h at 760C, air cooling

T+N : normalized + tempered 0.5 h at 960C, air cooling +2 h at 710C



Amperage:				
2.5 Ø	3.25 Ø	4.0 Ø	5.0Ø	
60-90	85-130	140-180	180-230	



Material:

Creep and high-pressure resistant CrMo- steels----- ASTM A182 Gr.F5,A
 199 Gr.T5, A213Gr.T5, A335 Gr.P5
 A336 C1.F5, A369Gr.FP5, A387 Gr.5, Cl1, Cl2

Rebaking : required at 300C to 350C for 2hrs.



AMA 1379-4VN

Standards: AWS/ASME SFA 5.5 E 8018 - G - H8

Application / Properties: Basic electrode with low carbon weld metal, suitable for resistant and hydrogen resistant steels (boilers, vessels and pipes), up to working temp of 600C. It's weld metal is tough % resistant to work embitterment..

Weld metal analysis in %(typical values):

C	Mn	Si	P	S	Cr	Mo	V
0.05-0.12	<0.9	<0.4	<0.02	<0.02	1-1.5	0.4-0.65	0.1-0.35

Mechanical Properties of all-weld metal :

Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation A4, (%)	ISO-V Impact energy (j) + 20°C
>440	>540	>17	>100

= +

Amperage:		
2.5 Ø	3.25 Ø	4.0 Ø
60-85	100-130	140-180



Material:

Cr Mo V low alloy creep resistant cast steels.

Rebaking : required at 300C to 350C for 2hrs.



AMA 1410 N

Standards: AWS/ASME SFA-5.5

E 80 16 - B2 - H8

Application / Properties: Electrode for welding of creep resistant and high-pressure hydrogen resistant steels used in the construction of pressure vessels, boilers and piping subjected to operating temperatures up to +570°C. Owing to its double covering (up to 3.25mm Ø), the electrode shows a stable and concentrate arc, thus being well suited for root pass and positional welding. Weld are of X-ray quality.

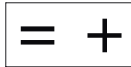
Preheating, inter pass temperature and post-weld heat treatment in accordance with base metal to be welded.

Weld metal analysis in % (typical values):

C	Mn	Si	Cr	Mo	S	P
0.08	0.85	0.3	1	0.5	0.008	0.019

Mechanical Properties of all-weld metal :

Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation A4, (%)	ISO-V Impact energy (J) + 20°C
632	692	30	150



Amperage:			
2.5 Ø	3.25 Ø	4.0 Ø	5.0 Ø
60-85	100-135	140-185	190-230



Material:

Creep resistant boiler and pip steels e.g-----15CrMo5,
16CrMo44, 13CrMo44, 24CrMo5, 22CrMo44
Cast steels-----GS-22 CrMo5, GS-22 CrMo54, GS-25 CrMo4,
Cementation steels-----15 Cr3(E C 60), 16 MnCr5 (E C 80),
20MnCr5 (E C 100)
Similarly alloyed hear treatable steels-----25CrMn4

Rebaking : required at 300C to 350C for 2hrs.



AMA 1419 N

Standards: AWS/ASME SFA - 5.5

E 8018 - B2L - H8

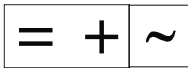
Application / Properties: Basic electrode with low carbon weld metal, suitable for welding creep resistant steels (pressure vessels, boilers and pipes) up to 570C. Heat treatment will be based on the base metal.

Weld metal analysis in %(typical values):

C	Si	Mn	Cr	Mo
<0.5	0.45	0.8	1.1	0.45

Mechanical Properties of all-weld metal :

Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation A4, (%)	ISO-V Impact energy (j) + 20°C	Heat Treatment
≥ 460	≥ 550	22	150	1 hr at 690C



Amperage:

2.5 Ø	3.25 Ø	4.0 Ø	5.0Ø
60-85	100-135	140-185	190-230



Material:

Creep resistant boiler and pip steels e.g-----13CrMo44,
16CrMo44,15CrMo5,24CrMo5, 22CrMo44
Cast steels-----GS-17 CrMo55, GS-22 CrMo54
Cementation steels and heat treatable steels-----20 MnCr5 , 16MnCr5,
16Cr3

Rebaking : required at 300C to 350C for 2hrs.



AMA 1426 N

Standards: AWS/ASME SFA - 5.5

E 9018 - B3L - H8

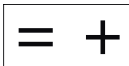
Application / Properties: Basic electrode with low carbon weld metal, suitable for creep resistant and Hydrogen resistant steels (boiler, Vessels and pipes) up to working temp of 600C. It's weld metal is tough & resistant to work embitterment.

Weld metal analysis in %(typical values):

C	Mn	Si	S	P	Cr	Mo
≤0.05	0.7	0.3	≤0.02	≤0.02	2.3	1

Mechanical Properties of all-weld metal :

Yield Strength (N/mm ²)	Tensile Strength (N/mm ²)	Elongation A4, (%)	ISO-V Impact energy (j) + 20°C	Heat Treatment
> 530	> 620	>17	150	1 hr at 690C



Amperage:			
2.5 Ø	3.25 Ø	4.0 Ø	5.0Ø
60-90	85-130	140-180	190-230



Material:

Creep resistant boiler and pipe steels
10CrMo910, CM19CD910, 12CrMo910, A385Gr22, Cl. 1 and 2,
A 182, Cl. 1 and 2, A182 Gr.F22, A336 Gr.F22 and F22a.

Rebaking : required at 300C to 350C for 2hrs.