

## Creep resistant basic electrode

### Classification

AWS A5.5-96 : E9016-B9 H4  
EN 1599-97 : E CrMo91 B 32 H5

### General description

Basic, very low hydrogen all position electrode  $H_{DM} < 5\text{ml}/100\text{g}$   
For welding creep and hydrogen resistant 9% Cr-1% Mo steels  
maximum service temperature 650°C  
Developed for power plants and the petrochemical industry  
Only available in vacuum sealed Sahara ReadyPack® (SRP)

### Welding positions



ISO/ASME PA/1G PB/2F PC/2G PF/3G up PE/4G PF/5G up

### Current type

AC / DC electr. + / -

### Approvals

TÜV

+

### Chemical composition (w%), typical, all weld metal

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	$H_{DM}$
0.09	0.6	0.2	0.010	0.010	9.0	0.6	1.0	0.04	0.2	0.04	3 ml/100 g

### Mechanical properties, all weld metal (for creep data see overleaf)

	Condition	0.2% Proof strength (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Elongation (%)	Impact ISO-V(J) +20°C
Required: AWS A5.5-96	SR1)	min. 530	min. 620	min. 17	not required
EN 1599-97	SR2)	min. 415	min. 585	min. 17	min. 47
Typical values	SR3)	650	800	20	50

Stress relieve: SR1) = 740±14°C/1h, SR2) = 750-770°C/2h, SR3) = 750-754°C/2h

### Packaging, available sizes and identification

	Diameter (mm)	2.5	3.2	4.0	5.0
	Length (mm)	350	350	350	450
Unit: SRP	Pieces / unit (nominal)	69	50	28	
	Net weight/unit (kg)	1.4	1.8	1.5	

### Identification

Imprint: 9016-B9/SL9Cr(P91)

Tip colour: dark green

SL®9Cr(P91): rev. EN 15

## Materials to be welded

Steel	Code	Type	Code	Type
Creep and hydrogen resistant steels	EN 10222-2 ASTM	X10CrMoV 9-1	ASME	SA 182-F91
		A199 Grade T91		
		A200 Grade T91		
		A213 Grade T91		
		A335 Grade P91		
		A336 Grade F91		
			SA 213-T91	
			SA 335-P91	
			SA 336-F91	
			SA 369-FP91	
			SA 387-Grade 91	

## Calculation data

Sizes Diam. x length (mm)	Current range (A)	Current type	Arc time - per electrode at max. current - (s)*	Energy E(kJ)	Dep.rate - H(kg/h)	Weight/ 1000 pcs. (kg)	Electrodes/ kg weldmetal B	kg Electrodes/ kg weldmetal 1/N
2.5 x 350	60 - 90	DC+	57	88	0.7	19.3	92	1.78
3.2 x 350	85 - 140	DC+	65	172	1.0	34.8	59	2.04
4.0 x 350	130 - 175	DC+	66	263	1.5	50.8	36	1.81

\* stub end 35mm

## Welding parameters, optimum fill passes

Welding position: Diameter (mm)	PA/1G Current (A)	PB/2F	PC/2G	PF/3G up	PE/4G	PF/5G up
2.5	80	80	75	70	70	70
3.2	130	130	125	120	120	120
4.0	140	140	135	135	135	135

## Remarks

Recommended preheat and interpass temperature: 250 - 300°C

Recommended stress relieve temperature range: 750 - 780°C (time depends on material thickness)