

## OK Flux 10.93

Basic, agglomerated flux for butt welding of stainless steels. A suitable flux for welding of high alloyed CrNi-steels like e.g. duplex stainless steel. The low Si addition during welding provides good mechanical properties in the weld metal.

<b>Classifications</b>	EN ISO 14174 : S A AF 2 56 54 DC
<b>Approvals</b>	CE : EN 13479 DB : 51.039.10 NAKS/HAKC : RD 03-613-03

<b>Slag Type</b>	Fluoride basic CaF <sub>2</sub> -Al <sub>2</sub> O <sub>3</sub> -SiO <sub>2</sub>
<b>Alloy Transfer</b>	Non alloying
<b>Density</b>	nom: 1.0 kg/dm <sup>3</sup>
<b>Basicity Index</b>	nom: 1.9

### Flux Consumption

Volts	kg Flux / kg Wire DC+
34 V	0.8 kg
30 V	0.6 kg
26 V	0.5 kg
38 V	1.0 kg

Dimensions	Amps	Travel Speed
4.0 mm	580 A	33 m/h

### Classifications

Wire	SFA/AWS - EN ISO	AWS - As Welded
OK Autrod 16.10	A5.9:ER308L	
OK Autrod 16.11	A5.9:ER347	
OK Autrod 16.30	A5.9:ER316L	
OK Autrod 16.38	14343-A:S 20 16 3 Mn L	
OK Autrod 16.53	A5.9:ER309L	
OK Autrod 16.97	14343-A:S 18 8 Mn	
OK Autrod 2209	A5.9:ER2209/ 14343-A:S 22 9 3 N L	
OK Autrod 2307	14343-A:S 23 7 N L	
OK Autrod 2509	A5.9:ER2594/ 14343-A:S 25 9 4 N L	A5.39: F120A8-ER2594/2594
OK Autrod 2509	A5.9:ER2594/ 14343-A:S 25 9 4 N L	
OK Autrod 308H	A5.9:ER308H/ 14343-A:S 19 9 H	
OK Autrod 308L	A5.9:ER308L/ 14343-A:S 19 9 L	A5.39: F80A32-ER308L/308L
OK Autrod 308L	A5.9:ER308L/ 14343-A:S 19 9 L	
OK Autrod 309L	A5.9:ER309L/ 14343-A:S 23 12 L	
OK Autrod 309MoL	A5.9:ER309LMo (mod)/ 14343-A:S 23 12 2 L	A5.39: F85A4-ER309LMo (mod)/309LMo (mod)
OK Autrod 309MoL	A5.9:ER309LMo (mod)/ 14343-A:S 23 12 2 L	
OK Autrod 310MoL	14343-A:S 25 22 2 N L	
OK Autrod 312	A5.9:ER312/ 14343-A:S 29 9	
OK Autrod 316H	A5.9:ER316H/ 14343-A:S 19 12 3 H	
OK Autrod 316L	A5.9:ER316L/ 14343-A:S 19 12 3 L	
OK Autrod 316LMn	A5.9:ER316LMn/ 14343-A:S 20 16 3 Mn N L	
OK Autrod 317L	A5.9:ER317L/ 14343-A:S 18 15 3 L	
OK Autrod 318	A5.9:ER318/ 14343-A:S 19 12 3 Nb	
OK Autrod 347	A5.9:ER347/ 14343-A:S 19 9 Nb	A5.39: F90A15-ER347/347

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### Classifications

Wire	SFA/AWS - EN ISO	AWS - As Welded
OK Autrod 347	A5.9:ER347/ 14343-A:S 19 9 Nb	
OK Autrod 385	A5.9:ER385/ 14343-A:S 20 25 5 Cu L	
OK Autrod 410NiMo	14343-A:S 13 4	
OK Autrod NiCrMo-3	A5.14:ERNiCrMo-3/ 18274:S Ni 6625 (NiCr22Mo9Nb)	A5.39: F100A32-ERNiCrMo-3/NiCrMo-3
OK Autrod NiCrMo-3	A5.14:ERNiCrMo-3/ 18274:S Ni 6625 (NiCr22Mo9Nb)	
OK Autrod NiCrMo-4	A5.14:ERNiCrMo-4/ 18274:S Ni 6276 (NiCr15Mo16Fe6W4)	

### Approvals

Wire	VdTÜV	CE	DB	ABS	DNV	DNV-GL	LR	BV	ClassNK	GL	RINA
OK Autrod 16.97	-	-	-	-	•	•	-	-	-	-	-
OK Autrod 2209	•	•	-	•	•	•	•	•	•	•	•
OK Autrod 2509	•	•	-	-	-	-	-	-	-	-	-
OK Autrod 308L	•	•	•	•	•	•	-	•	-	-	-
OK Autrod 308L LF	•	•	-	-	-	-	-	-	-	-	-
OK Autrod 309L	•	•	-	•	•	•	•	-	-	-	-
OK Autrod 316L	•	•	•	•	•	-	-	-	-	-	-
OK Autrod 318	•	•	•	-	-	-	-	-	-	-	-
OK Autrod 347	•	•	•	-	-	-	-	-	-	-	-
OK Autrod 385	•	-	-	-	-	-	-	-	-	-	-

### Typical Mechanical Properties

Wire	Condition	Yield Strength	Tensile Strength	Elongation	Charpy V-Notch
OK Autrod 16.10	As Welded DC+	410 MPa	570 MPa	38 %	80 J @ -60 °C 60 J @ -110 °C 45 J @ -196 °C
OK Autrod 16.11	As Welded DC+	420 MPa	590 MPa	36 %	60 J @ -60 °C 45 J @ -110 °C 30 J @ -196 °C
OK Autrod 16.30	As Welded DC+	400 MPa	530 MPa	35 %	70 J @ -60 °C 65 J @ -110 °C 40 J @ -196 °C
OK Autrod 16.38	As Welded DC+	410 MPa	600 MPa	44 %	70 J @ -60 °C 60 J @ -110 °C 40 J @ -196 °C
OK Autrod 16.53	As Welded DC+	430 MPa	570 MPa	35 %	65 J @ -60 °C 55 J @ -110 °C 35 J @ -196 °C
OK Autrod 16.97	As Welded DC+	400 MPa	600 MPa	45 %	60 J @ -20 °C
OK Autrod 2209	As Welded DC+	630 MPa	780 MPa	30 %	140 J @ 20 °C 125 J @ -20 °C 110 J @ -40 °C 80 J @ -60 °C
OK Autrod 2209	As Welded	630 MPa	780 MPa	30 %	140 J @ 20 °C 125 J @ -20 °C 110 J @ -40 °C 80 J @ -60 °C 28 J @ -110 °C

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### Typical Mechanical Properties

Wire	Condition	Yield Strength	Tensile Strength	Elongation	Charpy V-Notch
OK Autrod 2307	As Welded DC+	560 MPa	730 MPa	32 %	140 J @ 20 °C 125 J @ -20 °C 90 J @ -40 °C 60 J @ -60 °C
OK Autrod 2509	As Welded DC+	640 MPa	840 MPa	28 %	85 J @ 20 °C 60 J @ -40 °C
OK Autrod 2509	As Welded DC+	670 MPa	870 MPa	24 %	65 J @ 20 °C 40 J @ -60 °C
OK Autrod 308L	As Welded dia 2.4mm, travel speed 56cm/min 400A DC+ 28V	400 MPa	570 MPa	40 %	100 J @ 20 °C 75 J @ -40 °C 65 J @ -60 °C 55 J @ -110 °C 47 J @ -196 °C
OK Autrod 308L	As Welded DC+	400 MPa	560 MPa	38 %	100 J @ 20 °C 75 J @ -40 °C 65 J @ -60 °C 55 J @ -110 °C 40 J @ -196 °C
OK Autrod 308L	As Welded dia 4.0 mm 500A DC+ 30V	400 MPa	560 MPa	38 %	100 J @ 20 °C 75 J @ -40 °C 65 J @ -60 °C 55 J @ -110 °C 35 J @ -196 °C
OK Autrod 308L LF	As Welded Dia 2.4 mm 45 cm/min 400A DC+ 28V	400 MPa	550 MPa	40 %	40 J @ -196 °C
OK Autrod 309L	As Welded DC+	430 MPa	570 MPa	33 %	90 J @ 20 °C 70 J @ -60 °C 60 J @ -110 °C 35 J @ -196 °C
OK Autrod 309MoL	As Welded DC+	430 MPa	610 MPa	31 %	50 J @ 20 °C 35 J @ -40 °C
OK Autrod 309MoL	As Welded DC+	400 MPa	600 MPa	38 %	120 J @ 20 °C
OK Autrod 310MoL	As Welded DC+	335 MPa	575 MPa	42 %	120 J @ 20 °C
OK Autrod 316H	As Welded AWS 475A; 30V; H.I 2.0 kJ /mm DC+	410 MPa	550 MPa	40 %	85 J @ 20 °C 75 J @ 0 °C
OK Autrod 316L	As Welded DC+	390 MPa	565 MPa	42 %	100 J @ 20 °C 95 J @ -40 °C 90 J @ -60 °C 75 J @ -110 °C 40 J @ -196 °C
OK Autrod 316LMn	As Welded 420A, 30V, 30m/h DC+	410 MPa	600 MPa	OK Autrod 316LMn OK Autrod 316LMn OK Autrod 316LMn OK Autrod 316LMn OK Autrod 316LMn OK Autrod 316LMn	70 J @ -60 °C 60 J @ -110 °C 40 J @ -196 °C 70 J @ -60 °C 60 J @ -110 °C 40 J @ -196 °C
OK Autrod 317L	As Welded DC+	440 MPa	615 MPa	28 %	80 J @ 20 °C 50 J @ -60 °C

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### Typical Mechanical Properties

Wire	Condition	Yield Strength	Tensile Strength	Elongation	Charpy V-Notch
OK Autrod 318	As Welded DC+	440 MPa	600 MPa	OK Autrod 318 OK Autrod 318 OK Autrod 318 OK Autrod 318 OK Autrod 318	100 J @ 20 °C 90 J @ -60 °C 40 J @ -110 °C 100 J @ 20 °C 90 J @ -60 °C 40 J @ -110 °C
OK Autrod 347	As Welded 420A DC+ Feed speed: 30m/h 27V	455 MPa	635 MPa	36 %	105 J @ 20 °C 85 J @ -60 °C 60 J @ -110 °C 30 J @ -196 °C
OK Autrod 347	As Welded DC+	455 MPa	635 MPa	36 %	90 J @ 20 °C 85 J @ -60 °C 38 J @ -110 °C 25 J @ -196 °C
OK Autrod 385	As Welded DC+	310 MPa	530 MPa	35 %	80 J @ 20 °C
OK Autrod 410NiMo	Stress Relieved DC+, 500A, 30V Stress relieved 580°C, 4h	785 MPa	860 MPa	18 %	55 J @ 0 °C 50 J @ -20 °C
OK Autrod 410NiMo	As Welded DC+, 450A, 28V	900 MPa	1000 MPa	15.5 %	30 J @ 0 °C 30 J @ -20 °C
OK Autrod 410NiMo	Stress Relieved DC+, 450A, 28V Stress relieved 600°C, 2h	770 MPa	850 MPa	19 %	55 J @ 0 °C 55 J @ -20 °C
OK Autrod NiCrMo-3	As Welded DC+	450 MPa	710 MPa	45 %	90 J @ -60 °C 80 J @ -196 °C 80 J @ -196 °C
OK Autrod NiCrMo-4	As Welded HI 1.6-1.8 kJ/mm DC+	450 MPa	700 MPa	45 %	100 J @ -60 °C 80 J @ -196 °C

### Typical Weld Metal Analysis %

C	Mn	Si	S	P	Ni	Cr	Mo	V	Cu
<b>OK Autrod 16.10</b>									
0.02	1.40	0.60	-	-	8.60	18.80	-	-	-
<b>OK Autrod 16.11 DC+, As welded</b>									
0.05	1.20	0.55	0.015	0.025	8.50	18.30	0.10	-	0.15
<b>OK Autrod 16.30 DC+, As welded</b>									
0.02	1.40	0.50	0.015	0.025	10.60	17.50	2.00	-	0.10
<b>OK Autrod 16.53 DC+, As welded</b>									
0.02	1.40	0.50	0.015	0.025	11.60	22.10	0.10	-	0.10
<b>OK Autrod 16.97</b>									
0.06	6.3	1.2	0.01	0.02	8.0	18.0	0.1	-	0.1
<b>OK Autrod 2209 Current: DC+, 420A, 27V</b>									
0.02	1.3	0.5	0.01	0.02	9.0	22.5	3.1	-	0.1
<b>OK Autrod 2509 Current: DC+, 350A, 28V, 48cm/min</b>									
0.02	0.4	0.5	0.01	0.02	9.5	24.6	3.5	-	0.2
<b>OK Autrod 308H DC+</b>									
0.05	1.5	0.6	0.01	0.02	9.9	19.9	0.1	-	0.1
<b>OK Autrod 308L DC+, As welded</b>									
0.02	1.6	0.5	0.01	0.02	10.0	19.5	0.2	-	0.1
<b>OK Autrod 309L Current: DC+, 420 A, 27 V</b>									

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### Typical Weld Metal Analysis %

C	Mn	Si	S	P	Ni	Cr	Mo	V	Cu
0.02	1.3	0.5	0.01	0.02	12.5	23.0	0.2	-	0.2
<b>OK Autrod 309MoL DC+, 380 A, 28 V, 50cm/min</b>									
0.02	1.2	0.5	0.02	0.02	14.5	20.8	2.8	-	0.1
<b>OK Autrod 312 Current: DC+, 420A, 27V</b>									
0.1	1.5	0.5	-	-	9.5	29.0	0.1	-	0.1
<b>OK Autrod 316H DC+</b>									
0.04	1.5	0.6	0.01	0.02	11.2	18.4	2.1	-	0.1
<b>OK Autrod 316L</b>									
0.02	1.4	0.5	0.01	0.02	12.5	18.0	2.6	-	0.1
<b>OK Autrod 316LMn</b>									
0.02	5.4	0.7	0.01	0.01	15.5	20.0	2.5	-	0.2
<b>OK Autrod 317L Current: DC+, 420 A, 27 V</b>									
0.02	1.5	0.5	0.01	0.02	13.5	18.5	3.2	-	0.1
<b>OK Autrod 318 Current: DC+, 440A, 30V</b>									
0.035	1.2	0.5	0.01	0.02	12.0	18.5	2.6	-	0.2
<b>OK Autrod 347 Current: DC+, 420A, 27V, welding speed 48cm/min</b>									
0.035	1.1	0.5	0.01	0.02	9.6	19.2	0.1	-	0.2
<b>OK Autrod 385 Current: DC+, 420A, 27V</b>									
0.02	1.5	0.5	0.01	0.01	25.0	19.0	4.0	-	1.5
<b>OK Autrod 410NiMo DC+, 450A, 28V</b>									
0.02	0.4	0.5	0.01	0.02	4.1	11.7	0.51	-	0.10
<b>OK Autrod NiCrMo-3 Current: DC+, 400A, 28V, travel speed: 25 m/h.</b>									
0.02	0.2	0.4	0.005	0.015	-	22	9	-	0.1
<b>OK Autrod NiCrMo-4 DC+</b>									
0.01	0.4	0.20	-	-	Bal	15.1	15.6	0.1	-

### Typical Weld Metal Analysis %

N	Nb	Co	FN WRC-92	W	Fe	Nb+Ta
<b>OK Autrod 16.10</b>						
-	-	-	-	-	-	-
<b>OK Autrod 16.11 DC+, As welded</b>						
-	0.50	-	-	-	-	-
<b>OK Autrod 16.30 DC+, As welded</b>						
-	-	-	-	-	-	-
<b>OK Autrod 16.53 DC+, As welded</b>						
-	-	-	-	-	-	-
<b>OK Autrod 16.97</b>						
-	-	-	-	-	-	-
<b>OK Autrod 2209 Current: DC+, 420A, 27V</b>						
0.17	-	-	45	-	-	-
<b>OK Autrod 2509 Current: DC+, 350A, 28V, 48cm/min</b>						
0.20	-	-	58	<0.002	-	-
<b>OK Autrod 308H DC+</b>						
-	-	-	-	-	-	-
<b>OK Autrod 308L DC+, As welded</b>						
0.06	-	-	9	-	-	-
<b>OK Autrod 309L Current: DC+, 420 A, 27 V</b>						

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### Typical Weld Metal Analysis %

N	Nb	Co	FN WRC-92	W	Fe	Nb+Ta
-	-	-	-	-	-	-
<b>OK Autrod 309MoL DC+, 380 A, 28 V, 50cm/min</b>						
-	-	-	-	-	-	-
<b>OK Autrod 312 Current: DC+, 420A, 27V</b>						
-	-	-	-	-	-	-
<b>OK Autrod 316H DC+</b>						
-	-	-	-	-	-	-
<b>OK Autrod 316L</b>						
-	-	-	8	-	-	-
<b>OK Autrod 316LMn</b>						
0.13	-	-	-	-	-	-
<b>OK Autrod 317L Current: DC+, 420 A, 27 V</b>						
-	-	-	-	-	-	-
<b>OK Autrod 318 Current: DC+, 440A, 30V</b>						
-	0.3	-	9	-	-	-
<b>OK Autrod 347 Current: DC+, 420A, 27V, welding speed 48cm/min</b>						
-	0.5	-	8	-	-	-
<b>OK Autrod 385 Current: DC+, 420A, 27V</b>						
0.02	-	-	-	-	-	-
<b>OK Autrod 410NiMo DC+, 450A, 28V</b>						
-	-	-	-	-	-	-
<b>OK Autrod NiCrMo-3 Current: DC+, 400A, 28V, travel speed: 25 m/h.</b>						
-	-	-	-	-	5	3
<b>OK Autrod NiCrMo-4 DC+</b>						
-	-	0.1	-	3.6	6.8	-