



Overview of ESAB stainless steel welding consumables

MMA ELECTRODES, MIG WIRES & TIG RODS, CORED WIRES,
SAW FLUXES & WIRES, FLUXES FOR STRIP CLADDING



STRENGTH THROUGH COOPERATION

MMA/SMAW electrodes

ESAB	Coating	Classifications	Typical all weld metal composition, wt%									Typical ferrite
designation	type	EN/ISO	AWS	C	Si	Mn	Cr	Ni	Mo	N	Other	WRC-92 FN
OK 61.20	Acid rutile	E 19 9 L R 1 1	E308L-16	0.026	0.7	0.7	19.2	9.6	-	0.10		3 - 10
OK 61.25	Basic	E 19 9 H B 2 2	E308H-15	0.06	0.3	1.7	18.8	9.8	-	0.05		
OK 61.30	Acid rutile	E 19 9 L R 1 2	E308L-17	0.03	0.9	0.7	19.3	10.0	-	0.09		3 - 10
OK 61.35	Basic	E 19 9 L B 2 2	E308L-15	0.04	0.3	1.6	19.5	9.8	-	0.05		4 - 8
OK 61.35 Cryo	Basic	E 19 9 L B 2 2	E308L-15	0.04	0.3	1.6	18.7	10.5	-	0.05		2 - 4
OK 61.50	Acid rutile	E 19 9 H R 1 2	E308H-17	0.05	0.7	0.7	19.8	10.0	-	0.10		3 - 8
OK 61.80	Acid rutile	E 19 9 Nb R 1 2	E347-17	0.03	0.7	0.6	19.5	10.0	-	0.09	Nb: 0.29	6 - 12
OK 61.81	Rutile	E 19 9 Nb R 3 2	E347-16	0.06	0.7	1.7	20.2	9.7	-	0.08	Nb: 0.72	6 - 12
OK 61.85	Basic	E 19 9 Nb B 2 2	E347-15	0.04	0.4	1.7	19.5	10.2	-	0.07	Nb: 0.61	6 - 12
OK 61.86	Acid rutile	E 19 9 Nb R 1 2	E347-17	< 0.03	0.8	0.7	19.0	10.4	-	0.09	Nb: 0.50	3 - 8
OK 62.53	Rutile			0.07	1.6	0.6	23.1	10.4	0.12	0.16		8 - 12
OK 63.20	Acid rutile	E 19 12 3 L R 1 2	E316L-16	0.02	0.7	0.7	18.4	11.5	2.8	0.11		3 - 10
OK 63.30	Acid rutile	E 19 12 3 L R 1 2	E316L-17	0.02	0.8	0.6	18.1	11.0	2.7	0.10		3 - 10
OK 63.34	Acid rutile	E 19 12 3 L R 1 1	E316L-16	0.02	0.8	0.8	18.7	11.8	2.8	0.13		3 - 8
OK 63.35	Basic	E 19 12 3 L B 2 2	E316L-15	0.04	0.4	1.6	18.3	12.6	2.7	0.06		3 - 8
OK 63.41	Acid rutile	E 19 12 3 L R 5 3	E316L-26	0.03	0.8	0.7	18.2	12.5	2.8	0.09		3 - 8
OK 63.80	Acid rutile	E 19 12 3 Nb R 3 2	E318-17	0.02	0.8	0.6	18.2	11.5	2.9	0.08	Nb: 0.31	6 - 12
OK 63.85	Basic	E 19 12 3 Nb B 4 2	E318-15	0.04	0.5	1.6	17.9	13.0	2.7	0.06	Nb: 0.55	5 - 10
OK 64.30	Acid rutile	E 19 13 4 N L R 3 2	E317L-17	0.02	0.7	0.7	18.4	13.1	3.6	0.08		5 - 10
OK 67.13	Basic rutile	E 25 20 R 1 2	E310-16	0.12	0.5	1.9	25.6	20.5	-	-		0
OK 67.15	Basic	E 25 20 B 2 2	E310-16	0.10	0.4	2.0	25.7	20.0	-	-		0
OK 67.20	Acid rutile	E 23 12 2 L R 1 1	(E309LMo-16)	0.02	1.1	0.8	22.9	13.1	2.9	0.13		12 - 20
OK 67.43	Rutile basic	E 18 8 MN B 1 2	(E307-16)	0.08	0.8	5.4	18.4	9.1	-	-		0
OK 67.45	Basic	E 18 8 MN B 4 2	(E307-15)	0.09	0.3	6.3	18.8	9.1	-	-		0
OK 67.50	Acid rutile	E 22 9 3 N L R 3 2	E2209-17	0.03	0.8	0.8	23.2	8.8	3.2	0.16		35 - 50
OK 67.52	Zircon basic	E 18 8 Mn B 8 3	(E307-25)	0.09	0.9	7.0	17.7	8.5	-	-		< 3
OK 67.53	Rutile	E 22 9 3 N L R 1 2	(E2209-16)	0.03	1.0	0.7	23.7	9.3	3.4	0.16		25 - 40
OK 67.55	Basic	E 22 9 3 N L B 2 2	E2209-15	0.04	0.7	1.0	23.2	9.1	3.2	0.15		35 - 50
OK 67.56	Acid rutile	E Z 23 7 N L R		0.03	0.9	0.7	23.7	6.9	0.4	0.15		35 - 65
OK 67.60	Acid rutile	E 23 12 L R 3 2	E309L-17	0.03	0.8	0.9	23.7	12.4	-	0.09		10 - 22
OK 67.62	Rutile	E Z 23 12 R 7 3	E309-26	0.04	0.8	0.6	23.9	12.7	-	0.09		12 - 22
OK 67.70	Acid rutile	E 23 12 2 L R 3 2	E309LMo-17	0.02	0.8	0.6	22.5	13.4	2.8	0.08		12 - 22
OK 67.71	Acid rutile	E 23 12 2 L R 5 3	E309LMo-26	0.04	0.9	0.9	22.9	13.3	2.6	0.08		12 - 22
OK 67.75	Basic	E 23 12 L B 4 2	E309L-15	0.04	0.3	0.2	23.5	12.9	-	0.06		12 - 22
OK 68.15	Lime basic	E 13 B 4 2	E410-15	0.04	0.4	0.3	12.9	-	-	-		
OK 68.17	Rutile basic	E 13 4 R 3 2	E410NiMo-16	0.02	0.4	0.6	12.0	4.6	0.6	-		
OK 68.25	Basic	E 13 4 B 4 2	E410NiMo-15	0.04	0.4	0.6	12.2	4.5	0.6	-		
OK 68.37	Basic			0.05	0.16	1.1	16.0	5.1	0.4	-		
OK 68.53	Basic rutile	E 25 9 4 N L R 3 2	E2594-16	0.03	0.6	0.7	25.2	10.3	4.0	0.25		35 - 50
OK 68.55	Basic	E 25 9 4 N L B 4 2	E2594-15	0.04	0.6	0.9	25.2	10.4	4.3	0.24		35 - 50
OK 68.81	Acid rutile	E 29 9 R 3 2	E312-17	0.13	0.7	0.9	28.9	10.2	-	0.08		35 - 65
OK 68.82	Acid rutile	E 29 9 R 1 2	(E312-17)	0.13	1.1	0.6	29.1	9.9	-	0.08		35 - 65
OK 69.25	Basic	E 20 16 3 Mn N L B 4 2	E316LMn-15	0.04	0.5	6.5	19.0	16.0	3.0	0.15		< 0.5
OK 69.33	Basic rutile	E 20 25 5 Cu N L R 3 2	E385-16	0.03	0.5	1.0	20.5	25.5	4.8	0.08	Cu: 1.7	0
OK 310Mo-L	Rutile basic	E 25 22 2 N L R 1 2	(E310Mo-16)	0.038	0.4	4.4	24.2	21.7	2.4	0.14		0

* PWHT 750°C/1h

** PWHT 600°C/1h + 600°C/8h

*** PWHT 600°C/8h

**** PWHT 600°C/3h

Typical mechanical properties (AW)			Impact toughness		Lateral expansion	Approvals
Rp0.2	Rm	A4/A5	CVN (J)			
N/mm ²	N/mm ²	%	RT	Low temp.	(mm)	
430	560	A5: 45	70	38 (-60°C)		CE, Seproz, VdTÜV
430	600	A4: 45	95			Seproz
430	580	A5: 45	70	49 (-60°C)		ABS, CE, CWB, DB, DNV, Seproz, VdTÜV
460	580	A4: 45		70 (-120°C) 40 (-196°C)		Seproz, VdTÜV
450	590	A4: 43		50 (-196°C)	> 0.38mm@-196°C	VdTÜV
430	600	A4: 45	60			Seproz
480	620	A5: 40	60	40 (-60°C)		CE, GL, Seproz, VdTÜV
560	700	A4: 31	60			CE, DNV, Seproz
500	620	A5: 40	100	70 (-60°C)		Seproz, VdTÜV
520	660	A5: 35	55			Seproz
550	730	A5: 35	60			Seproz
480	590	A5: 41	56	46 (-60°C)		CE, CWB, Seproz, VdTÜV
460	570	A5: 40	60	43 (-60°C)		ABS, BV, CE, CWB, DB, DNV, GL, LR, Seproz, VdTÜV
440	600	A4: 40	65	38 (-120°C)		CWB, Seproz, VdTÜV
430	560	A4: 40	95	60 (-120°C) 35 (-196°C)	> 0.38mm@-120°C	ABS, CE, Seproz, VdTÜV
470	570	A5: 35	60	52 (-60°C)		CE, DNV, LR, Seproz, VdTÜV
507	614	A5: 38	55	41 (-60°C)		CE, Seproz, VdTÜV
490	614	A4: 35	65	45 (-120°C)		Seproz, VdTÜV
480	600	A5: 30	45			Seproz, VdTÜV
430	600	A5: 35	90			Seproz
410	590	A5: 35	100			CE, DB, Seproz, VdTÜV
480	640	A5: 35	60			Seproz
440	630	A5: 35	80			CE, DB, Seproz, VdTÜV
470	605	A5: 35	85	50 (-60°C)		ABS, CE, Seproz, VdTÜV
691	857	A5: 25	50	41 (-30°C)		ABS, BV, CE, CWB, DNV, GL, RINA, Seproz, VdTÜV
420	630	A4: 45	70			Seproz
660	840	A5: 25	56	37 (-30°C)		CE, DNV, Seproz, VdTÜV
650	800	A5: 28	100	65 (-60°C)		DNV, Seproz, VdTÜV
609	754	A5: 26	47	38 (-30°C)		CE
470	580	A5: 32	50			CE, CWB, GL, Seproz, VdTÜV
440	560	A5: 36	60			BV, DNV, GL, LR, Seproz, VdTÜV
510	610	A5: 32	50			ABS, BV, CE, CWB, DB, DNV, LR, RINA, Seproz, VdTÜV
500	620	A5: 35	55			DNV, Seproz, VdTÜV
470	600	A4: 35	75	55 (-80°C)		ABS, DNV, LR, Seproz, VdTÜV
370*	520*	A4: 25*				Seproz
650**	870**	A5: 17**	45**			Seproz
680***	900***	A5: 17***	65***			Seproz
710****	950****	A5: 14****				Seproz
700	850	A5: 30	50	40 (-40°C)		CE, DNV, Seproz, VdTÜV
700	900	A5: 28	90	55 (-40°C)		DNV, Seproz
610	790	A5: 22	30			Seproz
500	750	A4: 25	40			Seproz
450	650	A5: 35	90	50 (-196°C)		RINA, Seproz
410	590	A4: 35	80	70 (-140°C)		CE, Sepros, VdTÜV
442	623	A5: 34	80	45 (-140°C)		Shamprogetti, Stamicarbon

MIG/GMAW wires

ESAB Designation	Classifications		Typical wire composition (wt%)									
	EN/ISO	AWS	C	Si	Mn	Cr	Ni	Mo	Nb	Cu	N	
OK Autrod 308L	G 19 9 L	ER308L	0.02	0.4	1.8	20.0	10.0	0.20	-	0.15	0.05	
OK Autrod 308LSi	G 19 9 LSi	ER308LSi	0.01	0.9	1.8	19.9	10.5	0.15	-	0.10	0.05	
OK Autrod 308H	G 19 9 H	ER308H	0.05	0.5	1.7	20	10	0.15	-	0.1	0.04	
OK Autrod 347Si	G 19 9 NbSi	ER347Si	0.04	Si	1.3	19.5	9.8	0.15	0.60	0.10	0.05	
OK Autrod 316L	G 19 12 3 L	ER316L	0.01	0.4	1.7	18.5	12.2	2.70	-	0.10	0.04	
OK Autrod 316LSi	G 19 12 3 LSi	ER316LSi	0.01	0.9	1.8	18.4	12.2	2.60	-	0.12	0.05	
OK Autrod 318Si	G 19 12 3 NbSi		0.05	0.8	1.7	18.8	11.9	2.60	0.50	0.10	0.05	
OK Autrod 317L	G 18 15 3 L	ER317L	0.01	0.4	1.7	19.0	13.4	3.60	-	0.05	0.05	
OK Autrod 309LSi	G 23 12 LSi	ER309LSi	0.02	0.9	1.7	23.4	13.5	0.15	-	0.12	0.05	
OK Autrod 309Si	G 22 12 H	ER309Si	0.08	0.9	1.8	23.3	12.7	0.20	-	0.15	0.05	
OK Autrod 309L	G 23 12 L	ER309L	0.01	0.4	1.7	23.5	13.4	0.10	-	0.08	0.05	
OK Autrod 309MoL	G 23 12 2 L		0.01	0.4	1.4	21.4	15.0	2.70	-	0.12	0.05	
OK Autrod 385	G 20 25 5 CuL	ER385	0.01	0.4	1.7	20.0	25.0	4.40	-	1.40	0.04	
OK Autrod 310	G 25 20	ER310	0.11	0.4	1.7	25.9	20.8	0.10	-	0.05	0.04	
OK Autrod 312	G 29 9	ER312	0.10	0.4	1.8	30.3	9.3	0.20	-	0.14	0.04	
OK Autrod 16.38	G 20 16 3 MnL		0.01	0.4	6.9	19.9	16.3	3.10	-	0.08	0.18	
OK Autrod 16.95	G 18 8 Mn	(ER307)	0.08	0.9	7.0	18.7	8.1	0.20	-	0.10	0.04	
OK Autrod 430LNb	G 18 L Nb		0.01	0.5	0.5	18.5	0.2	0.06	0.45	0.10	0.01	
OK Autrod 430LNbTi	G Z 18LNbTi		0.01	0.5	0.5	18.5	0.2	0.03	0.45	0.10	0.01	
OK Autrod 430Ti	G Z 17 Ti		0.07	0.9	0.5	17.6	0.3	0.05	-	0.10	-	
OK Autrod 410NiMo	G 13 4		0.02	0.4	0.7	12.4	4.2	0.5	-	0.1	-	
OK Autrod 409Nb		ER409Nb	0.03	0.7	0.5	11.3	0.3	0.10	0.5	0.02	-	
OK Autrod 2307	Not Applicable	Not Applicable	0.01	0.5	1.6	23.0	8.6	3.20	-	0.10	0.16	
OK Autrod 2209	G 22 9 3 NL	ER2209	0.01	0.5	1.6	23.0	8.6	3.20	-	0.10	0.16	
OK Autrod 2509	G 25 9 4 NL	ER2594	0.01	0.4	0.4	25.1	9.5	3.90	-	0.10	0.25	
OK Autrod 19.81	S Ni 6059 (NiCr23Mo16)	ERNiCrMo-13	<0.01	<0.1	0.2	22.5	60.8	15.4				
OK Autrod 19.82	S Ni 6625 (NiCr22Mo9Nb)	ERNiCrMo-3	0.01	0.1	0.03	22.0	64.8	8.7	3.7	0.005		
OK Autrod 19.83	S Ni 6276 (NiCr15Mo16Fe6W4)	ERNiCrMo-4	0.01	0.1	0.485	15.8	58.05	15.9		0.015		
OK Autrod 19.85	S Ni 6082 (NiCr20Mn3Nb)	ERNiCr-3	0.01	<0.1	2.9	20.7	72.5		2.4	0.010		
OK Autrod 19.92	S Ni 2061 (NiTi3)	ERNi-1	0.01	0.2	0.3		96					
OK Autrod 19.93	S Ni 4060 (NiCu30Mn3Ti)	ERNiCu-7	0.03	0.3	3		64		0.1	28		

*PWHT 780°C/0,5h

**PWHT 600°C/8h

***PWHT 850°C/2h

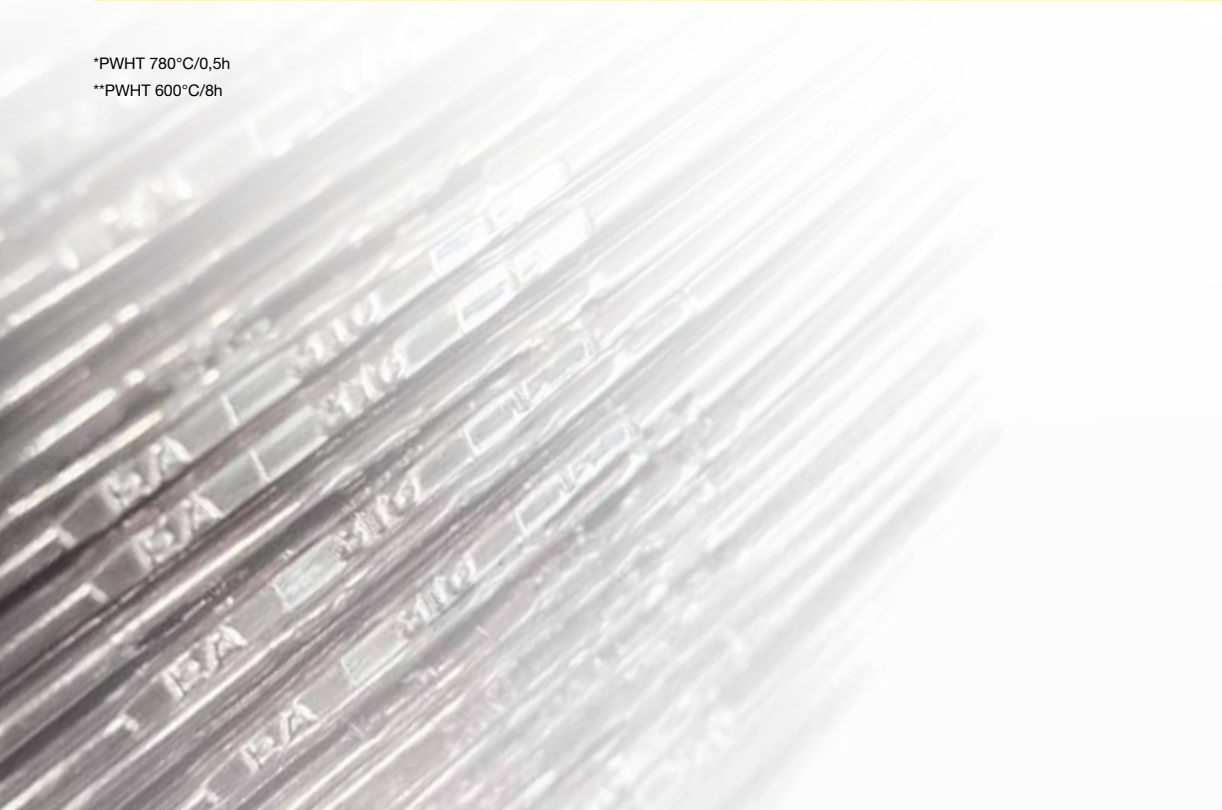
Others	Typical ferrite	Mechanical properties (AW)			Impact toughness CVN (J)		Approvals
	FN	Rp0.2	Rm	A4/A5	RT	Low Temp.	
-	10	450	620	36	110	90 (-60°C), 60 (-196°C)	
-	7	370	620	36	110	90 (-60°C), 60 (-196°C)	CE, CWB, DB, DNV, VdTÜV
-	-	>350	>550	>30	-	-	
-	10	440	640	37	110	80 (-60°C)	CE, DB, VdTÜV
-	10	440	620	37	120	95 (-60°C), 55 (-196°C)	
-	10	440	620	37	120	95 (-60°C), 55 (-196°C)	CE, CWB, DB, DNV, VdTÜV
-	10	460	615	35	100	70 (-60°C)	CE, DB, VdTÜV
-	10	390	600	45	135	55 (-196°C)	
Ti: 0.004	10	440	600	41	160	130 (-60°C), 90 (-110°C)	CE, CWB, DB, VdTÜV
-	10	440	620	36	100	80 (-60°C), 60 (-110°C)	
Ti: 0.001	20	440	600	41	160	130 (-60°C), 90 (-110°C)	CE
-	12	400	600	31	110	65 (-60°C)	VdTÜV
-	-	340	540	37	120	-	VdTÜV
-	-	390	590	43	175	60 (-196°C)	
-	80	610	770	20	50	-	
-	-	400	600	40	-	90 (-60°C), 70 (-110°C), 40 (-196°C)	RINA, VdTÜV
-	-	450	640	41	130	56 (-60°C)	CE, DB, VdTÜV
-	-	275	420	26	-	-	
Ti: 0.20	-	-	-	-	-	-	
Ti: 0.40	-	380*	580*	28*	-	-	
-	-	600**	840**	17**	-	80 (-10°C)	
-	-	>250***	>450***	>15***	-	-	
-	40	560	730	32	160	60 (-60°C)	
-	40	600	765	28	100	85 (-20°C), 60 (-60°C)	DNV, GL, VdTÜV
-	50	670	850	30	150	115 (-40°C)	
Fe: 0.5	-	500	750	40	-	120 (-110°C)	VdTÜV
Fe: 0.3	-	550	780	40	-	110 (-196°C)	UDT, VdTÜV
Fe: 5.6; W: 3.7	-	-	-	-	-	-	
Fe: 0.7; Ti: 0.35	-	400	650	40	150	-	VdTÜV
Ti: 3.1; Al: 0.2	-	200	410	25	130	-	VdTÜV
Ti: 2; Fe: 2	-	-	-	-	-	-	VdTÜV

TIG/GTAW rods

ESAB Designation	Classifications		Typical wire composition (wt%)									
	EN/ISO	AWS	C	Si	Mn	Cr	Ni	Mo	Nb	Cu	N	
OK Tigrod 308L	W 19 9 L	ER308L	0.02	0.4	1.8	20.0	10.0	0.20	-	0.15	0.05	
OK Tigrod 308LSi	W 19 9 LSi	ER308LSi	0.01	0.9	1.8	19.9	10.5	0.15	0.60	0.10	0.05	
OK Tigrod 308H	W 19 9 H	ER308H	0.05	0.5	1.7	20.0	10.0	0.15	-	0.10	0.04	
OK Tigrod 347Si	W 19 9 NbSi	ER347Si	0.04	0.8	1.3	19.5	9.8	0.15	0.60	0.10	0.05	
OK Tigrod 347	W 19 9 Nb	ER347	0.04	0.4	1.4	19.3	9.5	0.10	0.50	0.05	0.04	
OK Tigrod 316L	W 19 12 3 L	ER316L	0.01	0.4	1.7	18.5	12.2	2.70	-	0.10	0.04	
OK Tigrod 316H	W 19 12 3 H	ER316H	0.05	0.4	1.7	19.3	12.0	2.60	-	0.15	0.04	
OK Tigrod 316LSi	W 19 12 3 LSi	ER316LSi	0.01	0.9	1.8	18.4	12.2	2.60	-	0.12	0.05	
OK Tigrod 318Si	W 19 12 3 NbSi		0.05	0.8	1.7	18.8	11.9	2.60	0.50	0.10	0.05	
OK Tigrod 317L	W 18 15 3 L	ER317L	0.01	0.4	1.7	19.0	13.4	3.60	-	0.05	0.05	
OK Tigrod 309LSi	W 23 12 LSi	ER309LSi	0.02	0.9	1.7	23.4	13.5	0.15	-	0.12	0.05	
OK Tigrod 309L	W 23 12 L	ER309L	0.01	0.4	1.7	23.5	13.4	0.10	-	0.08	0.05	
OK Tigrod 309MoL	W 23 12 2 L		0.01	0.4	1.4	21.4	15.0	2.70	-	0.12	0.05	
OK Tigrod 385	W 20 25 5 CuL	ER385	0.01	0.4	1.7	20.0	25.0	4.40	-	1.40	0.04	
OK Tigrod 310	W 25 20	ER310	0.11	0.4	1.7	25.9	20.8	0.10	-	0.05	0.04	
OK Tigrod 312	W 29 9	ER312	0.10	0.4	1.8	30.3	9.3	0.20	-	0.14	0.04	
OK Tigrod 16.95	W 18 8 Mn	(ER307)	0.08	0.9	7.0	18.7	8.1	0.20	-	0.10	0.04	
OK Tigrod 430Ti	W Z 17 Ti		0.07	0.9	0.5	17.6	0.3	0.05	-	0.10	-	
OK Tigrod 410NiMo	W 13 4		0.02	0.4	0.7	12.4	4.2	0.50	-	0.10	-	
OK Tigrod 2307	W 23 7 NL		0.01	0.5	1.6	23.0	8.6	3.20	-	0.10	0.16	
OK Tigrod 2209	W 22 9 3 NL	ER2209	0.01	0.5	1.6	23.0	8.6	3.20	-	0.10	0.16	
OK Tigrod 2509	W 25 9 4 NL	ER2594	0.01	0.4	0.4	25.1	9.5	3.90	-	0.10	0.25	
OK Tigrod 19.81	S Ni 6059 (NiCr23Mo16)	ERNiCrMo-13	<0.01	<0.1	0.2	22.5	60.8	15.4				
OK Tigrod 19.82	S Ni 6625 (NiCr22Mo9Nb)	ERNiCrMo-3	0.01	0.1	0.03	22.0	64.8	8.7	3.7	0.005		
OK Tigrod 19.83	S Ni 6276 (NiCr15Mo16Fe6W4)	ERNiCrMo-4	0.01	0.1	0.485	15.8	58.05	15.9		0.015		
OK Tigrod 19.85	S Ni 6082 (NiCr20Mn3Nb)	ERNiCr-3	0.01	<0.1	2.9	20.7	72.5		2.4	0.010		
OK Tigrod 19.92	S Ni 2061 (NITi3)	ERNi-1	0.01	0.2	0.3		96					
OK Tigrod 19.93	S Ni 4060 (NiCu30Mn3Ti)	ERNiCu-7	0.03	0.3	3		64		0.1	28		

*PWHT 780°C/0,5h

**PWHT 600°C/8h



Others	Typical ferrite	Mechanical properties (AW)			Impact toughness CVN (J)		Approvals
	FN	Rp0.2	Rm	A4/A5	RT	Low Temp.	
-	10	450	645	36	170	135 (-80°C), 90 (-196°C)	CE, CWB, DNV, VdTÜV
-	10	370	620	36	110	90 (-60°C), 60 (-196°C)	CE, DB, DNV, VdTÜV
-	7	>350	>550	>30		-	
-	10	440	640	35	90	75(-60°C)	VdTÜV
-	10	510	655	35	130	-	
-	10	470	650	32	175	150 (-60°C), 120 (-110°C), 75 (-196°C)	CE, CWB, DNV, VdTÜV
-	7	>350	>550	>25		-	
-	10	480	630	33	175	150 (-110°C), 110 (-196°C)	CE, DB, DNV, GL, VdTÜV
-	10	460	615	35	40	70 (-60°C)	CE, DB, VdTÜV
-	10	390	600	45	135	55 (-196°C)	
-	10	475	635	32	150	150 (-60°C), 130 (-110°C)	CE, VdTÜV
-	20	430	590	40	160	130 (-60°C), 90 (-110°C)	CE, CWB, VdTÜV
-	12	400	600	40	140	65 (-60°C)	DNV
-	-	340	540	37	120	-	VdTÜV
-	-	390	590	43	175	60 (-196°C)	
-	80	610	770	20	50	-	
-	-	450	640	41	130	56 (-60°C)	CE, DB, VdTÜV
Ti: 0.40	-	>300*	>450*	>15*		-	
-	-	600**	800**	17**		-	
-	40	560	730	32	160	60 (-60°C)	
-	40	600	765	28	100	85 (-20°C), 60 (-60°C)	VdTÜV
-	50	670	850	30	150	115 (-40°C)	VdTÜV
Fe: 0.5		500	800	45		120 (-110°C)	VdTÜV
Fe: 0.3		550	780	40		130 (-196°C)	UDT, VdTÜV
Fe: 5.6; W: 3.7							
Fe: 0.7; Ti: 0.35		400	650	40	150		VdTÜV, UDT
Ti: 3.1; Al: 0.2		200	410	25	130		VdTÜV, UDT
Ti: 2; Fe: 2							VdTÜV, UDT

FCAW wires

ESAB		Classification		Typical all weld metal composition, wt%							Typical mechanical properties (AW)			
designation	Type	EN/ISO	AWS	C	Si	Mn	Cr	Ni	Mo	N	Rp0.2	Rm	A4/ A5	Approvals
											N/mm ²	N/mm ²	%	
Shield-Bright 308L X-tra	Downhand rutile	T 19 9 L R C/M 3	E308LT0-1 / T0-4	0.02	0.9	1.4	19.6	9.9	0.1		410	580	40	ABS, DNV, KR, LR, VdTÜV
Shield-Bright 309L X-tra	Downhand rutile	T 23 12 L R C/M 3	E309LT0-1 / T0-4	0.03	0.8	0.7	24.5	12.5	0.1		480	600	35	ABS, DNV, KR, LR, VdTÜV
Shield-Bright 309LMo X-tra	Downhand rutile	T 23 12 3 L R C/M 3	E309LMoT0-1 / T0-4	0.03	0.8	1.6	23.5	13.5	2.5		480	620	30	
Shield-Bright 316L X-tra	Downhand rutile	T 19 12 3 L R C/M 3	E316LT0-1 / T0-4	0.03	0.6	1.7	18.5	12.0	2.7		450	580	36	ABS, CWB, DNV, KR, LR, VdTÜV
OK Tubrod 14.37	Downhand rutile	T 22 9 3 N L R C/M 3	EC2209T0-1 / T0-4	0.03	0.7	0.9	22.6	8.9	3.1	0.13	633	768	31	
Shield-Bright 2307	Downhand rutile	T 23 7 N L P M21 2	EN ISO 17633-A	0.03	0.7	0.8	23.7	8.4		0.12	626	774	33	
Shield-Bright 308L	All-positional rutile	T 19 9 L P C/M 2	E308LT1-1 / T1-4	0.03	0.9	1.2	19.0	10.0	0.1		410	580	44	ABS, CWB, VdTÜV
Shield-Bright 309L	All-positional rutile	T 23 12 L P C/M 2	E309LT1-1 / T1-4	0.03	0.9	1.3	24.0	12.5	0.1		480	600	35	ABS, CWB, GL, RINA, VdTÜV
Shield-Bright 316L	All-positional rutile	T 19 12 3 L P C/M 2	E316LT1-1 / T1-4	0.03	0.6	1.3	18.5	12.0	2.7		450	580	40	ABS, CWB, VdTÜV
OK Tubrod 14.27	All-positional rutile	T 22 9 3 N L P C/M 2	E2209T1-1 / T1-4	0.03	0.9	1.0	22.6	9.0	3.0	0.15	637	828	26	ABS, DNV, GL, LR, RINA, VdTÜV
OK Tubrod 14.28	All-positional rutile	na	E2553T1-G	0.03	0.6	0.9	25.2	9.2	3.9	0.25	650	820	18	
OK Tubrod 15.30	Metal cored	T 19 9 L M M 2		0.02	0.7	1.3	18.8	9.8	0.1		340	550	45	CE, DB, VdTÜV
OK Tubrod 15.31	Metal cored	T 19 12 3 L M M 2		0.02	0.7	1.2	17.6	11.6	2.7		416	575	37	CE, DB, VdTÜV
OK Tubrod 15.34	Metal cored	T 18 8 Mn M M 2		0.10	0.7	6.7	18.5	8.7	0.1		410	635	39	CE, DB, VdTÜV

SAW wires, strips & fluxes

Wires for submerged arc welding

ESAB designation	Standard classifications		Typical wire composition, wt%								Typical ferrite WRC-92
	EN/ISO	AWS	C	Si	Mn	Cr	Ni	Mo	N	Other	FN
OK Autrod 308L	S 19 9 L	ER308L	0.02	0.4	1.8	20.0	10.0	0.2	0.05		9
OK Autrod 308H	S 19 9 H	ER308H	0.05	0.5	1.7	21.0	10.0	0.2	0.04		-
OK Autrod 347	S 19 9 Nb	ER347	0.04	0.4	1.7	19.3	10.0	0.1	0.08	Nb=0.8	7
OK Autrod 316L	S 19 12 3 L	ER316L	0.01	0.4	1.7	18.5	12.2	2.7	0.05		8
OK Autrod 317L	S 18 15 3 L	ER317L	0.01	0.4	1.7	19.0	13.5	3.6	0.05		8
OK Autrod 316H	S 19 12 3 H	ER316H	0.05	0.4	1.7	19.3	12.5	2.6	0.04		-
OK Autrod 16.38	S 20 16 3 Mn L	-	0.01	0.4	6.9	19.9	16.5	3.0	0.18		-
OK Autrod 318	S 19 12 3 Nb	ER318	0.04	0.4	1.7	18.5	11.5	2.5	0.08	Nb=0.8	9
OK Autrod 309L	S 23 12 L	ER309L	0.01	0.4	1.7	23.4	13.4	0.1	0.05		9
OK Autrod 309MoL	S 23 12 L	(ER309MoL)	0.01	0.4	1.4	21.4	15.0	2.7	0.05		8
OK Autrod 385	S 20 25 5 Cu L	ER385	0.01	0.4	1.7	20.0	25.0	4.4	0.04	Cu=1.5	-
OK Autrod 310	S 25 20	ER310	0.11	0.4	1.7	25.9	20.8	0.1	0.04		-
OK Autrod 430	-	ER430	0.10	0.4	0.5	16.0	0.3	0.2	0.04		-
OK Autrod 410NiMo	S 13 4	-	0.05	0.3	0.7	12.5	4.5	0.8	-		-
OK Autrod 420	-	ER420	0.3	0.3	0.5	13.0	0.3	0.3	-		-
OK Autrod 2209	S 22 9 3 N L	ER2209	0.01	0.5	1.6	23.0	8.6	3.2	0.16		45
OK Autrod 310MoL	S 25 22 2 N L	(ER310MoL)	0.01	0.1	4.5	25.0	21.9	2.0	0.14		-
OK Autrod 2509	S 25 9 4 N L	-	0.01	0.4	0.4	25.0	9.5	3.9	0.25		40
OK Autrod 16.97	S 18 8 Mn	(ER307)	0.07	0.5	6.5	18.5	8.2	0.1			-
OK Autrod 19.81	S Ni6059 (NiCr23Mo16)	ERNiCrMo-13	0.01	0.1	0.2	23.0	Bal.	16.0		Al=0.3, Fe=1.0	-
OK Autrod 19.82	S Ni6625 (NiCr22Mo9Nb)	ERNiCrMo-3	0.05	0.2	0.2	22.0	Bal.	9.0		Nb=3.5, Fe=1.0	-
OK Autrod 19.83	S Ni 6276 (NiCr15Mo16Fe6W4)	ERNiCrMo-4	0.01	0.05	0.8	15.5	Bal.	15.5		W=4.0, Co=2.0, Fe ≤5.0	-
OK Autrod 19.85	S Ni6082 (NiCr20Mn3Nb)	ERNiCr-3	0.05	0.3	3.0	20.0	Bal.	0.1		Nb=2.6, Fe=1.0	-

Strips for submerged arc strip cladding and electroslag strip cladding

ESAB designation	Standard classifications		Typical strip composition, wt%								WRC-92
	EN/ISO	AWS	C	Si	Mn	Cr	Ni	Mo	N	Other	FN
OK Band 308L	B 19 9 L	EQ308L	0.015	0.3	1.8	20.0	10.5		0.06		12
OK Band 347	B 19 9 Nb	EQ347	0.02	0.4	1.8	19.5	10.0		0.06	Nb=0.5	11
OK Band 316L	B 19 12 3 L	EQ316L	0.02	0.4	1.8	18.5	13.0	2.9	0.06		8
OK Band 2209	B 22 9 3 N L	EQ2209	0.02	0.5	1.6	23.0	9.0	3.2	0.16		50
OK Band 309L	B 23 12 L	EQ309L	0.015	0.4	1.8	23.5	13.5		0.06		13
OK Band 309Lnb	B 23 12 L Nb		0.02	0.3	2.1	24.0	12.5		0.06	Nb=0.8	22
OK Band 309L ESW	B 22 11 L		0.015	0.2	1.8	21.0	11.5		0.06		11
OK Band 309Lnb ESW	B 22 12 L Nb		0.015	0.2	1.8	21.0	11.0		0.06	Nb=0.6	15
OK Band 309Lmo ESW	(B 21 13 3 L)		0.015	0.2	1.8	20.5	13.5	2.9	0.06		13
OK Band 430	B 17		0.04	0.4	0.7	17.0			0.06		-
OK Band NiCr3	B Ni6082 (NiCr20Mn3Nb)	ERNiCr-3	< 0.1	0.2	3.0	20.0	≥67.0		0.05	Nb=2.5, Fe ≤3.0	-
OK Band NiCrMo3	B Ni6625 (NiCr22Mo9Nb)	ERNiCrMo-3	< 0.1	0.1	0.3	22.0	≥58.0	9.0	0.05	Nb=4.0, Fe ≤2.0	-
OK Band NiCrMo13	B Ni 6059 (NiCr23Mo16)	ERNiCrMo-13	< 0.1	0.1	0.5	23.0	≥56.0	15.5		Fe ≤1.5	-
OK Band NiCu7	B Ni 4060 (NiCu30Mn3Ti)	ERNiCu-7	< 0.1	1.0	3.0		≥67.0			Cu=29, Ti=2, Fe=max 2	-

Fluxes for submerged arc welding

Designation	EN/ISO	Description
OK Flux 10.16	SA AF 2 DC	For submerged arc strip cladding and joining with Ni-base materials.
OK Flux 10.90	SA AF 2 CrNi DC	For SAW joining with Ni-base materials. Excellent for 9% Ni LNG application.
OK Flux 10.92	SA CS 2 Cr DC	For strip cladding and butt and fillet welding of stainless steels.
OK Flux 10.93	SA AF 2 DC	Standard ESAB flux for SAW joining of stainless steels.
OK Flux 10.94	SA AF 2 Cr DC	For SAW welding for applications that require higher ferrite content.
OK Flux 10.95	SA AF 2 Ni DC	For SAW welding for applications that require lower ferrite content max. 3-5%.
OK Flux 10.95U	SA AF 2 Ni DC	For SAW welding for applications that require lower ferrite content max. 3-8%.

Fluxes for submerged arc strip cladding and electroslag strip cladding

Designation	EN/ISO	Description
SASC		
OK Flux 10.03	SA CS 2 Cr DC	For strip cladding with ferritic e.g. 430 alloys strips.
OK Flux 10.05	SA Z 2 DC	Standard flux for strip cladding with austenitic strips.
OK Flux 10.06	SA CS 2 CrNiMo DC	For cladding with 309L strip (0.5x90 mm) giving 316L material in one layer.
OK Flux 10.06F	SA CS 2 CrNiMo DC	For cladding with 309L strip (0.5x60 mm) giving 316L material in one layer.
OK Flux 10.07	SA CS 2 NiMo DC	For cladding with 17Cr-strip producing 14Cr 4Ni 1Mo overlay.
OK Flux 10.16	SA AF 2 DC	For submerged arc strip cladding or joining with Ni-base materials.
OK Flux 10.17	SA AF 2 DC	New flux for submerged strip cladding with Ni-based strips.
OK Flux 10.18	SA CS 2 DC	For strip cladding with Monel type of strips primarily with NiCu7-strip.
OK Flux 10.92	SA CS 2 Cr DC	For strip cladding and butt and fillet welding of stainless steels.
ESSC		
OK Flux 10.10	(-SA FB 2 DC)	Standard ES cladding flux for austenitic stainless strips. Suitable for ferritic strips also.
OK Flux 10.11	(-SA FB 2 DC)	For ES high speed cladding with stainless and Ni-base strips.
OK Flux 10.14	(-SA FB 2 DC)	For very high speed ES cladding with austenitic stainless strips.
OK Flux 10.26		For ES cladding with 316L strip giving 316L material in one layer.
OK Flux 10.27		For ES cladding with 309Lmo ESW strip giving 317L material in one layer.

Consumable selection by parent material

EN Standard	Designation	No.	AISI (UNS)	Covered electrodes for MMA welding	Solid wires for MIG/MAG welding
FERRITIC					
EN 10088-1	X2CrNi12	1.4003	S41050	OK 61.20, OK 61.30, OK 61.35	OK Autrod 308L, OK Autrod 308LSi
EN 10088-1	X6Cr13	1.4000	403	OK 61.20, OK 61.30, OK 61.35	OK Autrod 308L, OK Autrod 308LSi
EN 10088-1	X6Cr17	1.4016	430	OK 61.20, OK 61.30, OK 61.35	OK Autrod 308L, 308LSi, 430Ti, 430LNb, 430 LNbTi
EN 10088-1	X2CrMoTi18-2	1.4521	S44400	OK 61.20, OK 61.30, OK 61.35	OK Autrod 308L, OK Autrod 308LSi
EN 10088-1	-	1.4762	446	OK 67.15	OK Autrod 310
AUSTENITIC					
EN 10088-1	X2CrNi18-9	1.4307	304L	OK 61.20, OK 61.30, OK 61.34, OK 61.35, OK 61.35 Cryo	OK Autrod 308L, OK Autrod 308LSi
EN 10088-1	X10CrNi18-8	1.4310	301	OK 61.20, OK 61.30, OK 61.34, OK 61.35, OK 61.35 Cryo	OK Autrod 308L, OK Autrod 308LSi
EN 10088-1	X2CrNiN18-10	1.4311	304LN	OK 61.20, OK 61.30, OK 61.34, OK 61.35, OK 61.35 Cryo	OK Autrod 308L, OK Autrod 308LSi
EN 10088-1	X5CrNi18-10	1.4301	304	OK 61.20, OK 61.30, OK 61.34, OK 61.35, OK 61.35 Cryo	OK Autrod 308L, OK Autrod 308LSi
EN 10088-1	X8CrNiS18-9	1.4305	303	OK 68.81	OK Autrod 312
EN 10088-1	X6CrNiTi18-10	1.4541	321	OK 61.80, OK 61.81, OK 61.85, OK 61.86	OK Autrod 347Si
EN 10088-1	X6CrNiNb18-10	1.4550	347	OK 61.80, OK 61.81, OK 61.85, OK 61.86	OK Autrod 347Si
EN 10088-1	X3CrNiMo17-13-3	1.4436	316	OK 63.20, OK 63.30, OK 63.34, OK 63.35, OK 63.41	OK Autrod 316L, OK Autrod 316LSi
EN 10088-1	X5CrNiMo17-12-2	1.4401	316	OK 63.20, OK 63.30, OK 63.34, OK 63.35, OK 63.41	OK Autrod 316L, OK Autrod 316LSi
EN 10088-1	X2CrNiMo17-12-2	1.4404	316L	OK 63.20, OK 63.30, OK 63.34, OK 63.35, OK 63.41	OK Autrod 316L, OK Autrod 316LSi
EN 10088-1	X2CrNiMo18-14-3	1.4435	316L	OK 63.20, OK 63.30, OK 63.34, OK 63.35, OK 63.41	OK Autrod 316L, OK Autrod 316LSi
EN 10088-1	X2CrNiMoN17-13-3	1.4429	S31653	OK 63.20, OK 63.30, OK 63.34, OK 63.35, OK 63.41	OK Autrod 316L, OK Autrod 316LSi
EN 10088-1	X6CrNiMoTi17-12-2	1.4571	316Ti	OK 63.80, OK 63.85	OK Autrod 318Si
EN 10088-1	X6CrNiMoNb17-12-2	1.4580	316Nb	OK 63.80, OK 63.85	OK Autrod 318Si
EN 10088-1	X12CrMnNiN17-7-5	1.4372	201	OK 67.43, OK 67.45, OK 67.52	OK Autrod 16.95
EN 10088-1	X2CrNiMo18-14-3	1.4435	S31603	OK 69.25	
EN 10088-1	X1CrNiMoN25-22-2	1.4466	310MoLN	OK 310Mo-L	OK Autrod 310
EN 10088-1	X1NiCrMoCu25-20-5	1.4539	N08904	OK 69.33	OK Autrod 385, OK Autrod 19.82
EN 10088-1	X2CrNiMo18-15-4	1.4438	S31703	OK 64.30	OK Autrod 385, OK Autrod 19.82
EN 10088-1	X1CrNiMoCuN20-18-7	1.4547	S31254	OK 92.45	OK Autrod 19.82
EN 10088-1	X1NiCrMoCu31-27-4	1.4563	N08028	OK 92.45	OK Autrod 19.81
EN 10088-1	-	1.4562	S32654	OK 92.59	OK Autrod 19.81
HEAT RESISTANT AUSTENITIC					
EN 10095	X15CrNi23-13	1.4833	309S	OK 67.70, OK 67.75	OK Autrod 309LSi, OK Autrod 309MoL
EN 10095	X8CrNi25-21	1.4845	310S24	OK 67.13, OK 67.15	OK Autrod 310
EN 10095	X9CrNiSiN21-11-2	1.4835	S30815	OK 62.53	
AUSTENITIC-FERRITIC					
EN 10088-1	-	1.4162	S32101	OK 67.56	OK Autrod 2307
EN 10088-1	X2CrNiN23-4	1.4362	S32304	OK 67.56	OK Autrod 2307
EN 10088-1	X2CrNiMoN22-5-3	1.4462	S31803	OK 67.50, OK 67.53, OK 67.55	OK Autrod 2209
EN 10088-1	X2CrNiMoN25-7-4	1.4410	S32750	OK 68.53, OK 68.55	OK Autrod 2509
EN 10088-1	X2CrNiMoCuWN25-7-4	1.4501	S32760	OK 68.53, OK 68.55	OK Autrod 2509

Wires for TIG welding	Tubular cored wires for MIG/MAG	Wires for SA welding
OK Tigrod 308L, OK Tigrod 308LSi	Shield-Bright 308L, Shield-Bright 308L X-tra, OK Tubrod 15.30	OK Autrod 308L
OK Tigrod 308L, OK Tigrod 308LSi	Shield-Bright 308L, Shield-Bright 308L X-tra, OK Tubrod 15.30	OK Autrod 308L
OK Tigrod 308L, OK Tigrod 308LSi, OK Tigrod 430Ti	Shield-Bright 308L, Shield-Bright 308L X-tra, OK Tubrod 15.30	OK Autrod 308L
OK Tigrod 308L, OK Tigrod 308LSi	Shield-Bright 308L, Shield-Bright 308L X-tra, OK Tubrod 15.30	OK Autrod 308L
OK Tigrod 310		OK Autrod 310
OK Tigrod 308L, OK Tigrod 308LSi	Shield-Bright 308L, Shield-Bright 308L X-tra, OK Tubrod 15.30	OK Autrod 308L
OK Tigrod 308L, OK Tigrod 308LSi	Shield-Bright 308L, Shield-Bright 308L X-tra, OK Tubrod 15.30	OK Autrod 308L
OK Tigrod 308L, OK Tigrod 308LSi	Shield-Bright 308L, Shield-Bright 308L X-tra, OK Tubrod 15.30	OK Autrod 308L
OK Tigrod 308L, OK Tigrod 308LSi	Shield-Bright 308L, Shield-Bright 308L X-tra, OK Tubrod 15.30	OK Autrod 308L
OK Tigrod 312		OK Autrod 312
OK Tigrod 347Si	Shield-Bright 347, Shield-Bright 347 X-tra	OK Autrod 347
OK Tigrod 347Si	Shield-Bright 347, Shield-Bright 347 X-tra	OK Autrod 347
OK Tigrod 316L, OK Tigrod 316LSi	Shield-Bright 316L, Shield-Bright 316L X-tra, OK Tubrod 15.31	OK Autrod 316L
OK Tigrod 316L, OK Tigrod 316LSi	Shield-Bright 316L, Shield-Bright 316L X-tra, OK Tubrod 15.31	OK Autrod 316L
OK Tigrod 316L, OK Tigrod 316LSi	Shield-Bright 316L, Shield-Bright 316L X-tra, OK Tubrod 15.31	OK Autrod 316L
OK Tigrod 316L, OK Tigrod 316LSi	Shield-Bright 316L, Shield-Bright 316L X-tra, OK Tubrod 15.31	OK Autrod 316L
OK Tigrod 316L, OK Tigrod 316LSi	Shield-Bright 316L, Shield-Bright 316L X-tra, OK Tubrod 15.31	OK Autrod 316L
OK Tigrod 318Si		OK Autrod 318
OK Tigrod 318Si		OK Autrod 318
OK Tigrod 16.95		OK Autrod 16.97
OK Tigrod 310		OK Autrod 310MoL
OK Tigrod 385, OK Tigrod 19.82		OK Autrod 385, OK Autrod 19.82
OK Tigrod 385, OK Tigrod 19.82	Shield-Bright 317L, Shield-Bright 317L X-tra	OK Autrod 385, OK Autrod 19.82
OK Tigrod 19.82		OK Autrod 19.82
OK Tigrod 19.81		OK Autrod 19.81
OK Tigrod 19.81		OK Autrod 19.81
OK Tigrod 309LSi, OK Tigrod 309MoL	Shield-Bright 309L, Shield-Bright 309L X-tra	OK Autrod 309L
OK Tigrod 310		OK Autrod 310
OK Tigrod 2307	Shield-Bright 2307	
OK Tigrod 2307	Shield-Bright 2307	OK Autrod 2307
OK Tigrod 2209	OK Tubrod 14.27, OK Tubrod 14.37	OK Autrod 2209
OK Tigrod 2509	OK Tubrod 14.28	OK Autrod 2509
OK Tigrod 2509	OK Tubrod 14.28	OK Autrod 2509

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