



100% Stainless

**WELDING CONSUMABLES**  
for stainless steel


**Avesta**  
Welding

## Covered electrodes

Electrode designation Avesta Welding	Coating type	Weld metal composition, typical values, %							Typical ferrite <sup>1)</sup>	Standard designations	
		C	Si	Mn	Cr	Ni	Mo	Other		EN	AWS
248 SV	Rutile	0.03	0.5	3.0	16.0	5.5	1.2	N 0.12	–	–	–
308L/MVR-2D	Rutile-acid	0.03	0.7	0.9	20.0	10.0	–	–	10 FN	E 19 9 L R	E308L-17
308L/MVR-3D	Rutile-acid	0.02	0.8	0.6	19.5	10.0	–	–	10 FN	E 19 9 L R	E308L-17
308L/MVR-4D	Rutile-acid	0.02	0.8	0.6	19.5	10.5	–	–	5 FN	E 19 9 L R	E308L-17
308L/MVR-PW	Rutile-acid	0.02	0.8	1.0	19.0	10.0	–	–	5 FN	E 19 9 L R	E308L-17
308L/MVR-VDX	Rutile-acid	0.02	0.7	0.8	19.0	10.0	–	–	5 FN	E 19 9 L R	E308L-17
308L/MVR basic	Basic	0.03	0.4	1.5	20.0	10.0	–	–	5 FN	E 19 9 L B	E308L-15
308/308H AC/DC	Rutile-acid	0.06	0.7	1.1	20.0	10.0	–	–	5 FN	E 19 9 R	E308H-17
308L-LF	Rutile	0.03	0.3	1.8	18.5	10.5	–	–	0 FN	E 19 9 L R	E308L-15
347/MVNb-3D	Rutile-acid	0.02	0.8	0.8	19.5	10.0	–	Nb≥10xC <sup>2)</sup>	8 FN	E 19 9 Nb R	E347-17
347/MVNb basic	Basic	0.06	0.2	1.7	19.5	10.0	–	Nb≥10xC <sup>2)</sup>	5 FN	E 19 9 Nb B	E347-15
316L/SKR-2D	Rutile-acid	0.03	0.8	0.8	18.0	12.0	2.8	–	10 FN	E 19 12 3 L R	E316L-17
316L/SKR-3D	Rutile-acid	0.02	0.8	0.7	18.5	12.0	2.7	–	10 FN	E 19 12 3 L R	E316L-17
316L/SKR-4D	Rutile-acid	0.02	0.8	0.7	18.0	12.0	2.6	–	8 FN	E 19 12 3 L R	E316L-17
316L/SKR-PW	Rutile-acid	0.02	0.8	1.0	18.0	12.0	2.8	–	10 FN	E 19 12 3 L R	E316L-17
316L/SKR-VDX	Rutile-acid	0.02	0.7	0.7	18.5	12.5	2.8	–	5 FN	E 19 12 3 L R	E316L-17
316L/SKR basic	Basic	0.03	0.4	1.7	18.5	12.0	2.8	–	5 FN	E 19 12 3 L B	E316L-15
316/316H AC/DC	Rutile-acid	0.06	0.8	1.0	19.0	12.0	2.8	–	5 FN	E 19 12 2 R	E316H-17
318/SKNb-3D	Rutile-acid	0.02	0.8	0.8	18.5	12.0	2.8	Nb≥10xC <sup>2)</sup>	10 FN	E 19 12 3 Nb R	E318-17
317L/SNR-3D	Rutile-acid	0.02	0.7	0.9	19.0	13.0	3.7	–	10 FN	–	E317L-17
SLR AC/DC	Rutile-acid	0.02	0.8	1.0	18.5	13.5	4.0	–	10 FN	E 19 13 4 N L R	–
LDX 2101-3D	Rutile-acid	0.04	0.8	0.7	23.5	7.0	0.3	N 0.14	45 FN	–	–
2304-3D	Rutile-acid	0.02	0.8	0.8	24.5	9.0	–	N 0.12	30 FN	–	–
2205-2D	Rutile-acid	0.02	0.8	0.7	22.5	9.5	3.0	N 0.15	30 FN	E 22 9 3 N L R	E2209-17
2205-3D	Rutile-acid	0.02	0.8	0.7	23.0	9.5	3.0	N 0.15	30 FN	E 22 9 3 N L R	E2209-17
2205-4D	Rutile-acid	0.02	0.8	0.7	23.0	9.5	3.0	N 0.15	30 FN	E 22 9 3 N L R	E2209-17
2205-PW	Rutile-acid	0.02	0.8	0.8	23.0	9.5	3.0	N 0.17	30 FN	E 22 9 3 N L R	E2209-17
2205 basic	Basic	0.03	0.5	1.2	23.5	9.0	3.0	N 0.16	40 FN	E 22 9 3 N L B	E2209-15
2507/P100-4D	Rutile-acid	0.03	0.8	0.8	25.0	9.3	3.6	N 0.22	30 FN	E 25 9 4 N L R	E2594-17
2507/P100	Rutile	0.03	0.5	1.3	25.5	10.0	3.6	N 0.23	30 FN	E 25 9 4 N L R	E2594-17
254 SFER	Rutile	0.03	0.8	4.5	25.5	22.5	2.4	N 0.16	0 FN	E 25 22 2 N L R	–
316L/SKR Cryo	Rutile-acid	0.03	0.4	2.4	17.5	13.8	2.5	–	0 FN	–	E316L-17
904L AC/DC	Rutile-acid	0.02	0.7	1.2	20.5	25.0	4.5	Cu 1.5	0 FN	E 20 25 5 Cu N L R	E385-17
904L-PW	Rutile-acid	0.02	1.0	1.2	20.0	24.5	4.5	Cu 1.5	0 FN	E 20 25 5 Cu N L R	(E385-17)
383 AC/DC	Rutile-acid	0.02	0.9	0.9	27.0	32.0	3.7	Cu 1.0	0 FN	E 27 31 4 Cu L R	E383-17
P12-R	Basic	0.02	0.4	0.4	21.5	Bal.	9.5	Nb 2 Fe 3	0 FN	ENiCr21MoFeNb	ENiCrMo-12
P625	Basic	0.02	0.5	0.2	21.5	Bal.	9.5	Nb 3.5 Fe 1.5	0 FN	ENiCr22Mo9Nb	ENiCrMo-3
P16	Basic	0.01	0.1	0.2	23.5	Bal.	15.5	–	0 FN	ENiCr23Mo16	ENiCrMo-13
P54	Basic	0.02	0.2	2.6	25.5	25.5	5.0	N 0.35 Cu 0.8	0 FN	–	–
307 AC/DC	Rutile-acid	0.07	0.8	4.0	19.5	10.5	0.8	–	5 FN	E 18 9 Mn Mo R	E307-17
309L-3D	Rutile-acid	0.02	0.8	0.8	23.0	13.0	–	–	15 FN	E 23 12 L R	E309L-17
309L-4D	Rutile-acid	0.02	0.8	1.0	23.5	13.0	–	–	15 FN	E 23 12 L R	E309L-17
309L basic	Basic	0.03	0.2	1.9	24.0	13.0	–	–	15 FN	E 23 12 L B	E309L-15
P5-2D	Rutile-acid	0.03	0.8	1.0	22.0	13.5	2.7	–	20 FN	E 23 12 2 L R	E309MoL-17
P5-3D	Rutile-acid	0.02	0.8	0.8	23.0	13.0	2.5	–	15 FN	E 23 12 2 L R	E309MoL-17
P5-4D	Rutile-acid	0.02	0.7	1.0	23.0	13.0	2.5	–	20 FN	E 23 12 2 L R	E309MoL-17
P5-PW	Rutile-acid	0.02	1.1	1.0	22.5	13.5	2.9	–	20 FN	E 23 12 2 L R	E309MoL-17
P5-VDX	Rutile-acid	0.02	0.9	0.9	22.5	13.5	2.5	–	20 FN	E 23 12 2 L R	E309MoL-17
P5 basic	Basic	0.03	0.2	2.0	22.5	13.0	2.7	–	15 FN	E 23 12 2 L B	E309MoL-15
P7 AC/DC	Rutile-acid	0.09	0.8	0.8	29.0	9.5	–	–	40 FN	E 29 9 R	(E312-17)
P13 basic	Basic	0.03	0.2	2.7	16.5	Bal.	1.4	Nb 1.9 Fe 7.5	0 FN	E Ni Cr 16 Fe12Nb Mo	ENiCrFe-2
P10	Basic	0.03	0.3	7.0	16.0	Bal.	–	Nb 2.2 Fe 5	0 FN	E Ni Cr 15 Fe 6 Mn	ENiCrFe-3
P690	Basic	0.03	0.4	3.0	30.0	Bal.	0.3	Nb 1.5 Fe 9	0 FN	E Ni Cr 30 Fe 9 Nb	ENiCrFe-7
309 AC/DC	Rutile-acid	0.05	0.8	1.0	24.0	13.5	–	–	15 FN	–	E309-17
310-3D	Rutile-acid	0.10	0.5	2.1	26.0	21.0	–	–	0 FN	E 25 20 R	E310-17
253 MA AC/DC	Rutile-acid	0.08	1.5	0.7	22.0	10.5	–	N 0.18 REM	10 FN	–	–
253 MA-NF	Rutile-acid	0.08	0.7	1.0	19.0	10.0	–	N 0.16 REM	0 FN	–	–
353 MA	Basic	0.07	0.7	1.4	27.5	33.0	–	REM	0 FN	–	–


<sup>1)</sup> The ferrite content of pure weld metal. FN 0 – 18 in Schaeffler-DeLong, FN >18 in WRC-92. <sup>2)</sup> Max. 1.0% Nb.

### Avesta 2D electrodes

 high productivity in the flat position

Avesta 2D high-recovery electrodes give a metal recovery of up to 150%. The deposition rate can be as much as 30% better than that of corresponding standard products. Because weld beads are generally considerably longer when using 2D electrodes, there is minimum starting and stopping. This improves both cost efficiency and quality. 2D electrodes can be used for: horizontal-vertical and flat fillet welds; flat butt welds; and, various types of overlay welding. Suitable metal thicknesses are 5 mm upwards.

### Avesta 3D electrodes

 the perfect "all-round" electrodes

Avesta 3D electrodes have been specially developed for flexible welding in all common welding positions. Because 3D electrodes have a very wide parameter box, they have a large working range and can be used for all types of joints. 3D electrodes have extremely good weldability and give a stable arc. Both the slag and the weld pool are easy to control. Suitable metal thicknesses are 3 mm upwards. For thinner materials, Avesta 4D electrodes are recommended.

## Covered electrodes

Electrode designation Avesta Welding	Mechanical properties, typical values						Brinell hardness	Approvals <sup>1)</sup>
	R <sub>po.2</sub> N/mm <sup>2</sup>	R <sub>m</sub> N/mm <sup>2</sup>	A <sub>5</sub> %	Impact strength, KV, J				
				+20°C	Low temp.			
248 SV	510	760	30	115	–	260	–	
308L/MVR-2D	395	550	41	65	55 (–40°C)	210	CE, CWB, TÜV	
308L/MVR-3D	470	570	37	60	55 (–40°C)	200	CE, DB, DNV, TÜV	
308L/MVR-4D	420	520	35	54	38 (–40°C)	210	CE, TÜV	
308L/MVR-PW	430	580	39	60	50 (–40°C)	210	CWB	
308L/MVR-VDX	450	600	35	55	40 (–40°C)	210	CWB	
308L/MVR basic	420	560	38	70	55 (–40°C)	200	CWB, TÜV	
308/308H	450	605	37	55	50 (–40°C)	210	CE, CWB, TÜV	
308L-LF	420	570	39	85	35 (–196°C)	200	–	
347/MVNB-3D	470	620	35	55	45 (–40°C)	225	CE, CWB, DB, DNV, TÜV	
347/MVNB basic	520	680	30	80	60 (–40°C)	255	CE, TÜV	
316L/SKR-2D	420	575	37	55	55 (–40°C)	210	CE, CWB, DNV, TÜV	
316L/SKR-3D	445	590	36	55	55 (–40°C)	210	CE, DB, DNV, TÜV	
316L/SKR-4D	480	590	34	60	55 (–20°C)	210	CE, TÜV	
316L/SKR-PW	455	590	36	60	60 (–40°C)	210	CWB, DB, DNV, TÜV	
316L/SKR-VDX	480	630	30	50	35 (–40°C)	210	CE, CWB, DNV, TÜV	
316L/SKR basic	430	565	34	70	50 (–40°C)	210	CE, TÜV	
316/316H	470	615	35	50	–	210	CE, CWB, TÜV	
318/SKNb-3D	470	605	34	60	50 (–40°C)	220	CE, DB, DNV, TÜV	
317L/SNR-3D	485	615	32	45	–	210	CWB, DNV	
SLR	490	635	31	45	30 (–40°C)	225	CE, TÜV	
LDX 2101-3D	640	800	25	45	28 (–40°C)	260	CE, TÜV	
2304-3D	640	780	23	40	25 (–40°C)	260	CE, TÜV	
2205-2D	640	825	33	55	40 (–40°C)	240	–	
2205-3D	620	810	25	45	35 (–40°C)	240	CE, CWB, DB, GL, LR, RINA, TÜV	
2205-4D	630	820	25	45	35 (–40°C)	240	CE, TÜV	
2205-PW	635	830	25	55	40 (–40°C)	240	CWB, DNV, TÜV,	
2205 basic	645	840	26	100	75 (–40°C)	240	–	
2507/P100-4D	700	880	24	40	30 (–46°C)	250	–	
2507/P100	700	900	26	80	55 (–40°C)	250	–	
254 SFER	440	660	32	55	–	200	–	
316L/SKR Cryo	440	550	37	75	35 (–196°C)	200	–	
904L	400	565	34	70	–	200	CE, DB, TÜV	
904L-PW	400	600	35	70	–	200	–	
383	410	620	33	55	–	200	–	
P12-R	480	730	37	90	70 (–196°C)	220	CE, CWB, TÜV	
P625	480	770	30	60	50 (–40°C)	220	–	
P16	550	780	35	60	40 (–40°C)	220	–	
P54	500	700	20	50	30 (–70°C)	220	–	
307	465	605	35	45	–	200	–	
309L-3D	450	550	35	50	45 (–40°C)	210	CE, CWB, DB, DNV, GL, LR, RINA, TÜV	
309L-4D	460	590	29	50	–	210	CE, TÜV	
309L basic	440	570	30	50	–	210	–	
P5-2D	450	625	30	35	–	220	–	
P5-3D	490	640	30	30	–	220	CE, CWB, DB, DNV, TÜV	
P5-4D	530	660	28	40	–	220	CE, TÜV	
P5-PW	525	660	31	25	–	225	–	
P5-VDX	545	685	30	40	–	225	–	
P5 basic	465	615	30	50	35 (–40°C)	230	TÜV	
P7	620	810	18	25	–	270	–	
P13 basic	420	660	35	125	105 (–196°C)	180	–	
P10	380	630	39	115	80 (–196°C)	180	–	
P690	400	640	35	110	100 (–196°C)	220	–	
309	435	580	30	45	–	210	CWB	
310-3D	430	625	35	80	35 (–196°C)	190	CWB	
253 MA	535	725	37	60	–	215	–	
253 MA-NF	470	630	35	70	–	210	–	
353 MA	385	565	33	85	–	200	–	

<sup>1)</sup> For detailed information, contact Avesta Welding.

## Avesta 4D electrodes



for extreme position welding of sheet and pipes

The weldability of 4D electrodes is extremely good and the arc and weld pool are both stable. The thin coating gives a small weld pool. However, the slag is very compliant and easy to control. A short arc is to be used for welding. The slag is self-releasing and leaves an even, beautiful weld finish.

Several of the rutile-acid electrodes are manufactured with the coating specially adapted for specific purposes:

- PW electrodes, predecessors to our 3D and 4D electrodes, have a rutile-acid coating specially developed for position welding.
- VDX electrodes, predecessors to 4D electrodes, have a rutile-acid coating and are to be used for the vertical-down welding of joints that have no gaps, e.g. lap welds.

## Solid wires

Wire type and designation Avesta Welding				Weld metal composition, typical values							Typical ferrite <sup>1)</sup>	Standard designations	
												EN ISO 14343/ EN ISO 18274	AWS A5.9/ AWS A5.14
MIG	TIG	SAW	C	Si	Mn	Cr	Ni	Mo	Other				
248 SV	X	X		0.02	0.35	1.3	16.0	5.5	1.0	–	10 FN	–	–
308L-Si/MVR-Si	X	X		0.02	0.85	1.8	20.0	10.5	–	–	11 FN	19 9 L Si	ER308LSi
308L/MVR	X	X	X	0.02	0.40	1.7	20.0	10.0	–	–	8 FN	19 9 L	ER308L
308H	X	X	X	0.05	0.40	1.8	20.0	9.0	–	–	10 FN	19 9 H	ER308H
347-Si/MVNb-Si	X	X		0.05	0.85	1.2	19.5	10.0	–	Nb>12xC	10 FN	19 9 Nb Si	ER347Si
347/MVNb		X	X	0.04	0.40	1.3	19.5	9.5	–	Nb>12xC	6 FN	19 9 Nb	ER347
316L-Si/SKR-Si	X	X		0.02	0.85	1.7	18.5	12.0	2.6	–	9 FN	19 12 3 L Si	ER316LSi
316L/SKR	X	X	X	0.02	0.40	1.7	18.5	12.0	2.6	–	8 FN	19 12 3 L	ER316L
318-Si/SKNb-Si	X	X		0.04	0.85	1.3	19.0	12.0	2.6	Nb>12xC	10 FN	19 12 3 Nb Si	–
318/SKNb		X	X	0.04	0.40	1.3	19.0	12.0	2.6	Nb>12xC	8 FN	19 12 3 Nb	ER318
317L/SNR	X	X	X	0.02	0.40	1.7	19.0	13.5	3.5		9 FN	18 13 4 L	ER317
LDX 2101	X	X	X	0.02	0.50	0.5	23.0	7.5	<0.3	N 0.14	40 FN	–	–
2304	X	X	X	0.02	0.50	0.5	23.0	7.5	<0.3	N 0.14	40 FN	–	–
2205	X	X	X	0.02	0.50	1.6	23.0	8.5	3.1	N 0.17	50 FN	22 9 3 N L	ER2209
2507/P100	X	X	X	0.02	0.35	0.4	25.0	9.5	4.0	N 0.25	50 FN	25 9 4 N L	ER2594
254 SFER		X		0.01	0.1	4.5	25.0	22.0	2.1	N 0.13	0 FN	25 22 2 N L	–
904L	X	X	X	0.01	0.35	1.7	20.0	25.5	4.5	Cu 1.5	0 FN	20 25 5 Cu L	ER385
P12	X	X	X	0.01	0.10	0.1	22.0	65	9.0	Nb 3.6 Fe<1	0 FN	NiCr22Mo9Nb	ERNiCrMo-3
P12-0 <sup>Nb</sup>	X	X	X	0.01	0.10	0.1	22.0	65	9.0	Nb<0.1 Fe<1	0 FN	NiCr22Mo9	ERNiCrMo-20
P16	X	X	X	0.01	0.10	0.2	25.0	60	15.0	Nb<0.1 Fe<1	0 FN	NiCr25Mo16	ERNiCrMo-13
P54	X	X		0.02	0.20	5.1	26.0	22.0	5.5	N 0.35 Cu 0.9	0 FN	–	–
307-Si	X	X		0.09	0.80	7.0	19.0	8.0	–	–	0 FN	18 8 Mn	–
309L-Si	X	X		0.02	0.80	1.8	23.5	13.5	–	–	13 FN	23 13 L Si	ER309LSi
309L		X	X	0.02	0.40	1.8	23.5	14.0	–	–	11 FN	23 13 L	ER309L
P5	X	X	X	0.02	0.35	1.5	21.5	15.0	2.7	–	9 FN	23 12 2 L	(ER309L <sub>Mo</sub> ) <sup>2)</sup>
P7	X	X	X	0.11	0.45	1.9	30.0	9.5	–	–	60 FN	29 9	ER312
P10	X	X		0.03	0.10	2.9	20.0	73	–	Nb 2.5 Fe <2	0 FN	NiCr20Mn3Nb	ERNiCr-3
310	X	X		0.12	0.35	1.6	25.5	21.0	–	–	0 FN	25 20	ER310
253 MA	X	X	X	0.07	1.60	0.6	21.0	10.0	–	N 0.15 REM	10 FN	–	–
353 MA	X	X		0.05	0.85	1.6	27.5	35.0	–	N 0.15 REM	0 FN	–	–

<sup>1)</sup> The ferrite content of pure weld metal. FN 0 – 18 in Schaeffler-DeLong, FN >18 in WRC-92. <sup>2)</sup> Cr lower and Ni higher than standard.

### Avesta MIG

high productivity when welding thin materials in all positions

MIG/MAG is a rapid method for fully and semi-automatic welding. Depending on the arc's characteristics, welding can be carried out in all positions. Because the weld metal has low oxide and slag levels, its mechanical properties are very good. This is particularly true of impact strength. Suitable metal thicknesses are 2 – 10 mm.

### Avesta TIG

beautiful finishes and exceptional impact strength

Good TIG welds look superb. The weld metal also has the best mechanical properties – impact strength at low temperatures is particularly impressive. For this reason, TIG welding is often used for low-temperature applications. The heat input in TIG welding is normally low. Thus, there is the least possible impact on the parent metal. As the arc and weld pool are highly controllable, TIG is very suitable for the all-position single-sided welding of pipes and other components. Suitable metal thicknesses are 0.3 – 3 mm. TIG is also used for welding root beads. Subsequent welding is then with a method that has a higher productivity.

## Solid wires

Wire	Mechanical properties, typical values (MIG wire)						Approvals <sup>1)</sup>		
	R <sub>p0.2</sub> N/mm <sup>2</sup>	R <sub>m</sub> N/mm <sup>2</sup>	A <sub>5</sub> %	Impact strength KV, J		Brinell hardness	MIG	TIG	SAW / Flux combination
248 SV	460	840	23	80	–	260	–	–	–
308L-Si/MVR-Si	420	600	36	110	60 (–196°C)	200	CE, DB, DNV, TÜV	CE, DB, DNV, TÜV	–
308L/MVR	390	5890	38	110	50 (–196°C)	200	CE, DNV, TÜV	CE, DNV, TÜV	CE (805, 807) DNV (805, 807) TÜV (801, 805, 807)
308H	400	610	37	95	–	210	CE, TÜV	–	–
347-Si/MVNB-Si	430	620	36	100	90 (–40°C)	210	CE, DB, TÜV	CE, TÜV	–
347/MVNB <sup>2)</sup>	450	640	34	60	–	220	CE, TÜV	CE, TÜV	CE (801, 807) TÜV (801, 807)
316L-Si/SKR-Si	400	600	36	440	50 (–196°C)	210	CE, DB, DNV, GL, TÜV	CE, DB, DNV, TÜV	–
316L/SKR	390	580	38	100	50 (–196°C)	210	CE, DNV, TÜV	CE, DNV, GL, TÜV	CE (801, 805, 807) TÜV (801, 805, 807)
318-Si/SKNb-Si	420	600	33	85	85 (–40°C)	220	CE, DB, TÜV	CE, DB, TÜV	–
318/SKNb <sup>2)</sup>	490	660	30	50	–	220	CE, TÜV	CE, DB, TÜV	CE (801, 807) TÜV (801, 807)
317L/SNR	420	630	31	85	–	200	–	–	–
LDX 2101	520	710	30	150	110 (–40°C)	240	TÜV	CE, TÜV	CE (805), TÜV (805)
2304	520	710	30	150	110 (–40°C)	240	–	CE, TÜV	CE (805), TÜV (805)
2205	550	770	30	150	110 (–40°C)	230	CE, DB, DNV, GL, TÜV	CE, DB, DNV, GL, TÜV	CE (805, 807), DNV (805) LR (805), RINA (805) TÜV (805, 807)
2507/P100	570	830	29	140	–	280	–	CE, TÜV	CE (805, 807), DNV (805) RINA (805) TÜV (805, 807)
254 SFER <sup>3)</sup>	440	650	35	180	130 (–196°C)	200	–	–	–
904L	340	570	38	130	100 (–196°C)	170	CE, DB, TÜV	CE, DB, TÜV	CE (805), TÜV (805)
P12	480	750	42	170	150 (–40°C)	220	CE, TÜV	CE, TÜV	–
P12-0 <sup>Nb</sup>	380	630	36	240	220 (–70°C)	210	–	–	–
P16	470	700	33	120	–	220	CE, TÜV	CE, TÜV	–
P54	480	750	35	90	–	220	–	–	–
307-Si	470	710	42	120	110 (–40°C)	220	CE, DB, DNV, TÜV	CE, DB, TÜV	–
309L-Si	400	600	32	110	–	200	CE, DB, GL, TÜV	CE, DB, TÜV	–
309L <sup>2)</sup>	410	580	36	70	–	–	DNV	TÜV	DNV (805)
P5	390	610	31	75	60 (–40°C)	210	CE, DB, DNV, TÜV	CE, DB, DNV, TÜV	DNV (801, 805)
P7	560	750	25	40	–	240	–	–	DNV (805)
P10	410	660	33	–	–	200	CE, TÜV	CE	–
310	360	570	35	120	–	210	–	–	–
253 MA	440	680	38	130	–	210	–	–	–
353 MA	320	590	43	160	–	200	–	–	–

<sup>1)</sup> For detailed information, contact Avesta Welding. <sup>2)</sup> Welded with SAW wire. <sup>3)</sup> Welded with TIG wire.

## Avesta SAW

high productivity when welding thick materials in the flat position

When welding in the flat position, SAW has a deposition rate of up to 8 kg per hours. This is the highest achieved by any conventional method. The weld metal has beautiful, even surfaces. An agglomerated flux (Avesta 801, 805 or 807) is used in submerged arc welding. Because heat input is relatively high, thin materials may be deformed. Suitable metal thicknesses are 10 mm upwards. Some caution must also be exercised when welding fully austenitic steels.

## Avesta fluxes for SAW

### Flux 801

A chromium-compensated neutral flux for welding standard steels such as EN 1.4307 / ASTM 304L and 1.4432 / 316L.

### Flux 805

A chromium-compensated flux with high basicity. Used for welding austenitic and duplex stainless steels as well as nickel base alloys.

### Flux 807


A flux that is not chromium-compensated, but which has high basicity. Used for welding EN 1.4307 / ASTM 304L and 1.4432 / 316L when there is a requirement that ferrite content must not exceed FN 8.

## Flux cored wires

FCW designation Avesta Welding	Weld metal composition, typical values. %							Typical ferrite <sup>1)</sup>	Standard designations	
	C	Si	Mn	Cr	Ni	Mo	Other		EN ISO 17633	AWS A5.22
FCW-2D 308L/MVR	0.03	0.7	1.5	19.8	10.2	–	–	8 FN	T 19 9 L R M/C 3	E308LT0-4/-1
FCW-3D 308L/MVR	0.03	0.7	1.7	19.0	10.0	–	–	9 FN	T 19 9 L P M/C 2	E308LT1-4/-1
308L/MVR-PW	0.03	0.7	1.6	19.2	10.2	–	–	6 FN	T 19 9 L P M/C 1	E308LT1-4/-1
FCW-2D 308H	0.06	0.4	1.5	19.0	9.5	–	–	5 FN	–	E308HT0-4/-1
FCW-2D 347/MVNB	0.03	0.7	1.4	19.0	10.4	–	Nb >8xC	7 FN	T 19 9 Nb R M/C 3	E347T0-4/-1
347/MVNB-PW	0.03	0.4	1.6	19.0	10.5	–	Nb >8xC	7 FN	T 19 9 Nb P M/C 1	E347T1-4/-1
FCW-2D 316L/SKR	0.03	0.7	1.5	19.0	12.0	2.7	–	11 FN	T 19 12 3 L R M/C 3	E316LT0-4/-1
FCW-3D 316L/SKR	0.03	0.7	1.2	18.5	13.0	2.7	–	10 FN	T 19 12 3 L P M/C 2	E316LT1-4/-1
316L/SKR-PW	0.03	0.7	1.5	18.0	12.5	2.7	–	7 FN	T 19 12 3 L P M/C 1	E316LT1-4/-1
FCW-2D 317L/SNR	0.03	0.7	1.3	18.5	13.3	3.4	–	6 FN	–	E317LT0-4/-1
FCW-2D LDX 2101	0.03	0.7	0.8	24.0	9.0	0.2	N 0.14	30 FN	–	–
LDX 2101-PW	0.03	0.7	0.9	24.0	9.0	0.4	N 0.13	30 FN	–	–
FCW-2D 2304	0.03	0.7	0.8	24.0	9.0	0.7	N 0.14	30 FN	–	–
2304-PW	0.03	0.7	0.8	24.0	9.0	0.7	N 0.14	40 FN	–	–
FCW-2D 2205	0.03	0.7	0.8	22.7	9.0	3.2	N 0.13	40 FN	T 22 9 3 N L R M/C 3	E2209T0-4/-1
2205-PW	0.03	0.8	0.9	22.7	9.0	3.2	N 0.13	40 FN	T 22 9 3 N L P M/C 1	E2209T1-4/-1
FCW-3D P12	0.02	0.5	0.2	21.5	Bal.	3.3	< Fe 1.0	0 FN	–	ENiCrMo3T1-4
FCW-2D 309L	0.03	0.7	1.4	22.8	12.5	–	–	18 FN	T 23 12 L R M/C 3	E309LT0-4/-1
FCW-3D 309L	0.03	0.7	1.4	23.5	13.0	–	–	18 FN	T 23 12 L P M/C 2	E309LT1-4/-1
309L-PW	0.03	0.6	1.5	23.0	12.8	–	–	18 FN	T 23 12 L P M/C 1	E309LT1-4/-1
FCW-2D P5	0.03	0.6	1.4	22.7	12.3	2.7	–	25 FN	T 23 12 2 L R M/C 3	E309LMoT0-4/-1
FCW-3D P5	0.03	0.7	1.4	23.5	13.0	2.4	–	25 FN	T 23 12 2 L P M/C 2	E309LMoT1-4/-1
P5-PW	0.03	0.4	1.4	23.0	12.8	2.5	–	25 FN	T 23 12 2 L P M/C 1	E309LMoT1-4/-1


<sup>1)</sup> The ferrite content of pure weld metal. FN 0 – 18 in Schaeffler-DeLong, FN >18 in WRC-92.

### Avesta FCW-2D

 excellent slag removal, superb finishes and high deposition rates

FCW-2D has been specially developed for rapid, cost-efficient welding in the horizontal, horizontal-vertical and vertical-down positions. FCW-2D is particularly recommended for: horizontal-vertical and flat fillet welds; flat butt welds; and various types of overlay welding. Suitable metal thicknesses are 2.5 mm upwards.

### Avesta FCW-3D

 maximum flexibility, flat and vertical welding from a single wire.

FCW-3D is an all-round wire with exceptionally good weldability in all positions (even flat). Its wide parameter box ensures smooth transitions between various welding positions. Suitable metal thicknesses are 5 mm upwards.

### Avesta FCW-PW

PW – high productivity, excellent quality and outstanding weldability in all positions

FCW-PW has been especially developed for positional welding. The slag solidifies at a high temperature and with a short solidification range. Thus, even in overhead welding, the slag shapes and keeps the weld bead in place.

FCW-PW welds with a very stable arc and an easily controlled weld pool. This allows the welder to “read” the weld pool and make adjustments accordingly.

Because FCW-PW is optimised for positional welding, it should not be chosen for downhand welding.

## Flux cored wires

FCW	Mechanical properties, typical values					Hardness Brinell	Approvals <sup>1)</sup>
	R <sub>p0.2</sub> N/mm <sup>2</sup>	R <sub>m</sub> N/mm <sup>2</sup>	A <sub>5</sub> %	Impact strength, KV, J			
				+20°C	Low temp.		
FCW-2D 308L/MVR	380	560	40	60	35 (-196°C)	200	CE, CWB, DB, TÜV
FCW-3D 308L/MVR	390	570	39	60		200	CE, CWB, DB, TÜV
308L/MVR-PW	390	570	39	60		200	CWB, DB, TÜV
FCW-2D 308H	390	580	41	90	50 (-70°C)	210	-
FCW-2D 347/MVNB	420	600	35	75		220	CE, TÜV
347/MVNB-PW	410	580	34	70		220	TÜV
FCW-2D 316L/SKR	400	560	38	55	35 (-120°C)	210	CE, CWB, DB, DNV, GL, TÜV
FCW-3D 316L/SKR	400	560	37	60	55 (-40°C)	210	CE, CWB, DB, TÜV
316L/SKR-PW	400	560	37	60	55 (-40°C)	210	CE, CWB, DB, DNV, TÜV
FCW-2D 317L/SNR	420	570	32	50	45 (-60°C)	210	-
FCW-2D LDX 2101	580	760	25	63	45 (-40°C)	240	CE, TÜV
LDX 2101-PW	575	765	30	70	50 (-196°C)	240	TÜV
FCW-2D 2304	580	760	25	50	40 (-20°C)	240	TÜV
2304-PW	580	760	25	70	50 (-40°C)	240	TÜV
FCW-2D 2205	600	800	27	60	40 (-40°C)	240	CE, CWB, DNV, GL, RINA, TÜV
2205-PW	600	800	27	80	55 (-40°C)	240	CE, CWB, DNV, GL, RINA, TÜV
P12	460	750	40	75	60 (-40°C) 45 (-196°C)	220	-
FCW-2D 309L	400	540	35	60	45 (-60°C)	210	CE, CWB, DB, DNV, GL, RINA, TÜV
FCW-3D 309L	390	550	35	55		210	CE, CWB, DB, TÜV
309L-PW	390	550	35	55		210	CWB, DB, GL, RINA, TÜV
FCW-2D P5	500	700	30	55		220	CE, DB, DNV, GL, TÜV
FCW-3D P5	470	660	29	50	46 (-10°C)	220	CE, CWB, DB, TÜV
P5-PW	500	700	30	55		220	-

<sup>1)</sup> For detailed information, contact Avesta Welding.

## Avesta Finishing Chemicals

Used for	Product no.	Avesta name	Consistency	Colour	Strenght	Characteristics
Maintenance cleaning	401	Classic Cleaner	Liquid	Clear	Strong	Acidic precleaner and all-round. Hydrocarbons and Fe decontamination. Restores and brightens stainless steel surfaces.
	402	BrightOne	Liquid	Clear	Very strong	Very strong acidic cleaner. Hydrocarbons and Fe decontamination. Restores and brightens stainless steel surfaces. Semi-pickling.
Post Weld Treatment	101	Classic Pickling Paste	Thick paste	White	Medium	Very good adhesion to difficult surfaces. Overhead application. Reduced risk of overpickling.
	120	GreenOne Paste <sup>1)</sup>	Paste	Green	Light	NOx Free. Non-toxic. Bright and sensitive surfaces. Easy application and rinse off.
	130	BlueOne Paste <sup>1)</sup>	Paste	Blue	Medium	Virtually NOx Free. All-rounder. Economic. Easy application and rinse off.
	140	RedOne Paste <sup>1)</sup>	Paste	Red	Very strong	Less NOx. Higher alloyed steel grades. Fast. Easy application and rinse off.
	122	Classic Pickling Gel	Very thick gel	Clear	Strong	All-rounder.
Surface Treatment	204	Classic Pickling Spray	Spray gel (thick)	Clear	Very strong	Good adhesion. Gives a matt finish.
	240	RedOne Spray <sup>1)</sup>	Spray gel	Red	Strong	All-rounder. Easy application and rinse off.
	302	Bath Pickling 302	Liquid	Clear	Very strong to light depending on dilution	For pickling baths with all grades.
	630	FinishOne <sup>1)</sup>	Liquid	Clear	Strong	Accelerated cleaning and passivation. Reduced smut. Disinfection. NOx reducer.
	601	Passivating Agent 601	Liquid	Clear	Light	Decontaminant (Hydrocarbons and Fe) with passivation.

<sup>1)</sup> Avesta BAT products.

### Best available techniques

In order to create a safer work environment, ISO 14000 and EC directive 96/61 require the use of environmental management systems and best available techniques (BAT).

As part of its BAT initiatives, Avesta Finishing Chemicals has developed a unique range of pickling products. By considerably reducing nitrous fumes during pickling and passivating, these have positive impact on safety and the environment.

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**Avesta**  
Welding

*Member of the Böhler Welding Group*