AVESTA 3D ELECTRODES
easy and versatile in all welding positions

Welder-friendly, all-round electrode

Prefabrication welding in workshops, on-site welding, overlay welding and repair welding are just some of the uses of covered electrodes. Adding a further dimension to this great flexibility in the welding of stainless steels, Avesta 3D electrodes can be used in the flat, vertical-up and overhead positions.

Avesta 3D

Avesta's 3D range of covered electrodes has been specially developed for flexible welding in all positions except vertical-down.

Because 3D electrodes have a very wide parameter box, they have a large working range. They have extremely good weldability and give a stable arc. Both the slag and the weld pool are easy to control. A short arc is to be used for welding. The slag is self-releasing and leaves an even, beautiful weld finish.

Suitable metal thicknesses are 3 mm upwards. For thinner materials, Avesta 4D electrodes are recommended.

There are Avesta 3D electrodes for welding: austenitic stainless steels (with or without molybdenum); duplex stainless steels; and, stainless steels to carbon steels.

Avesta 3D electrodes can be used for, amongst other things, prefabrication welding in workshops, on-site welding and repair welding in, for example, the pulp, paper and chemical industries (storage tanks, process vessels, etc.).

As they place severe demands on filler metal performance, single-sided root beads are one of the specialities of the 3D range. The arc, weld pool and slag are all highly controllable. Consequently, Avesta 3D ensures top-class root beads every time.

Avesta Welding

10704EN-GB, Avesta 2007

Weld metal composition

Avesta 3D electrode	Chemical composition, typical values, % C	Si	Mn	Cr	Ni	Mo	Other	Typical ferrite*
308L/MVR	0.02	0.8	0.6	19.5	10.1	–	–	8
347/MVNb	0.02	0.8	0.8	19.5	10.0	–	Nb≥10xC	10
316L/SKR	0.02	0.8	0.7	18.5	12.0	2.7	Nb	8
2205	0.02	0.8	0.7	23.0	9.5	3.0	N 0.15	30
309L	0.02	0.8	0.8	23.0	13.0	–	–	15
P5	0.02	0.8	0.8	22.5	13.5	2.5	–	20

* The ferrite content of pure weld metal. FN 0-18 as per Schaeffler-DeLong, FN >18 as per WRC-92.

Standard designations

Avesta 3D electrode	EN 1600	AWS A5.4
308L/MVR	E 19 9 L R	E308L-17
347/MVNb	E 19 9 Nb R	E347-17
316L/SKR	E 19 12 3 L R	E316L-17
2205	E 22 9 3 N L R	E2209-17
309L	E 23 12 L R	E309L-17
P5	E 23 12 2 L R	E309MoL-17

Mechanical properties, typical values

Avesta 3D electrode	$R_{p0,2}$ N/mm^2	R_m N/mm^2	A_5 %	Impact strength, KV, J +20°C	Low temp.	Brinell hardness
308L/MVR	440	570	37	60	55 (–40°C)	200
347/MVNb	470	620	35	55	45 (–40°C)	225
316L/SKR	445	590	36	54	52 (–40°C)	210
2205	620	810	25	45	40 (–20°C)	240
309L	450	550	35	50	45 (–40°C)	210
P5	490	640	30	30	–	220

Approvals

Avesta 3D electrode	TÜV	DNV
308L/MVR	x	x
347/MVNb	x	x
316L/SKR	x	x
2205	x	
309L	x	x
P5	x	x

Choice of filler metals

EN	ASTM	Outokumpu steel designation	Recommended Avesta 3D electrode
1.4301	304	4301	308L/MVR
1.4307	304L	4307	
1.4311	304LN	4311	
1.4541	321	4541	347/MVNb
1.4550	347	–	
1.4436	316	4436	316L/SKR
1.4432	316L	4432	
1.4429	316LN	4429	
1.4571	316Ti	4571	
1.4462	S32205	2205	2205
Joints between molybdenum free stainless steels and carbon or low-alloy steels. Overlay welding of carbon or low-alloy steels.			309L
Joints between molybdenum alloyed stainless steels and carbon or low-alloy steels. Overlay welding of carbon or low-alloy steels.			P5

Dimensions and packaging data

Avesta 3D electrode	Diameter and length, mm 1.60	2.00	2.50	3.25	4.00	5.00
308L/MVR	250	300	350	350	450	450
347/MVNb	250	300	350	350	450	450
316L/SKR	250	300	350	350	450	450
2205	–	300	350	350	450	450
309L	–	300	300	350	450	450
P5	–	300	300	350	450	450

Avesta Welding's covered electrodes are delivered in moisture-proof, plastic capsules packed in cartons. The electrodes can also be supplied vacuum-packed.

Welding recommendations

Avesta 3D electrode	Diameter mm	Flat (PA) Current, A	Vertical-up (PF) Current, A
308L/MVR 347/MVNb 316L/SKR 2205 309L P5	1.6	25– 45	25–35
	2.0	30– 55	30–45
	2.5	45– 70	45–55
	3.25	60–110	70–90
	4.00	90–150	
	5.00	150–200	

Welding current can be either DC+ or AC. However, DC+ always gives the best weldability. A short arc is to be used for welding. Use a slight weaving motion in the flat position. Increase this in vertical-up welding. Because the arc is stable throughout the entire working range, these electrodes are extremely versatile.

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