2205-PW AC/DC

www.avestawelding.com

Covered electrodes

For welding steel such as:

AvestaPolarit	EN	ASTM	SS*	BS*	NF*
2205	1.4462	S32205	2377	318S13	Z3 CND 22-05 Az

* Obsolete national standards, replaced by EN 10088.

Characteristics

AVESTA 2205-PW AC/DC has a rutile-acid coating which provides very good weldability when working with both positive pole DC and AC. The electrode is characterised by its good position welding and re-ignition properties, which make it particularly suitable for site welding, e.g. pipe lines.

AVESTA 2205-PW is primarily designed for welding the duplex grade AvestaPolarit 2205 and similar steel grades, but it can also be used for welding SAF 2304™ type of steels.

AVESTA 2205-PW provides a ferritic-austenitic weldment that combines many of the good properties of both ferritic and austenitic stainless steels. Due to the high content of both Cr and Mo a very good resistance to general and pitting corrosion is obtained. The duplex microstructure gives a high tensile strength and hereby also an excellent resistance to stress corrosion cracking.

AVESTA 2205-PW is "over-alloyed" with respect to nickel, to ensure the right ferrite balance in the weld metal.

Welding directions

AvestaPolarit 2205 should be welded in the same manner as an ordinary austenitic stainless steel, i.e. high current should be avoided and the material should be allowed to cool to below 150°C between successive passes.

However, duplex steels are somewhat more difficult to weld compared to austenitic steels such as 316L, mainly with respect to fluidity and penetration into the parent metals.

To utilise the good properties of a duplex steel it is of the utmost importance to obtain a good ferrite content in the weld. This is best achieved by welding with sufficient root gap (2-2.5 mm), which also ensures good penetration, by using the right amount of filler metal and by welding with a controlled heat input (0.5-2.5 kJ/mm).

Duplex steels have remarkably lower thermal expansion than for example 304 and 316 type steels. The deformation and extension during welding is therefore somewhat lower

Weld deposit data at maximum welding current

Diam. mm	Length mm	N	B	H	T	Metal recovery, approx. %
2.00	250	0.63	182	0.71	28	107
2.5	300	0.66	95	0.99	38	106
3.25	350	0.62	42	1.65	52	115
4.0	350	0.65	28	2.43	52	115
5.0	350	0.67	18	3.30	61	115

Packaging data

Diam. mm	Length mm	Weight/ capsule, kg	Approx. No. of electrodes/ capsule	Weight/ carton, kg
2.00	250	1.60	180	9.60
2.5	300	1.90	115	11.40
3.25	350	4.10	122	12.30
4.0	350	4.54	83	13.62
5.0	350	4.90	59	14.70

Standard designations

EN 1600 E 22 9 3 N L R
AWS A5.4 E 2209-17

Typical analysis % (All weld metal)

C	Si	Mn	Cr	Ni	Mo	N
0.02	0.8	0.8	23.0	9.5	3.0	0.17

Ferrite 30 FN (WRC-92)

Mechanical properties	Typical values (IIW)	Min. values EN 1600
Yield strength, $Rp_{0,2}$	640 N/mm²	450 N/mm²
Tensile strength, R_m	825 N/mm²	550 N/mm²
Elongation, A_5	33 %	20 %
Impact strength, KV		
+20°C	55 J	
-40°C	40 J	
Hardness approx.	240 Brinell	

Welding data

DC+ or AC	Diam., mm	Current, A
	2.0	35– 60
	2.5	50– 80
	3.25	70–110
	4.0	100–160
	5.0	160–220

Interpass temperature: Max. 150°C.

Heat input: Max. 0.5–2.5 kJ/mm.

Heat treatment: Generally none. In special cases quench annealing at 1100–1150°C.

Structure: Austenite with approx. 30 % ferrite.

Scaling temperature: Approx. 850°C (air)

Corrosion resistance: Very good resistance to pitting and stress corrosion cracking in chloride containing environments

Approvals: CWB, DNV, TÜV

Welding positions

∅ 2.0–3.25 ∅ 4.0 ∅ 5.0