OP 121TTW

OERLIKON

SAW Fluxes
SAW Basic and Semi-basic Fluxes

OP 121TTW is a fully basic agglomerated submerged-arc welding flux that is is recommended for applications requiring an extremely low concentration of phosphorus and sulphur in the weld metal, especially for high tensile steels and for joints requiring high toughness at sub-zero temperatures and resistance to ageing. OP 121TTW can also be used for the welding of structural and fine grained low alloy steels requiring high integrity welds with low temperature impact and CTOD fracture toughness properties. The flux is widely used for the welding of thick section components in the offshore, nuclear and pressure vessel industries. The flux exhibits a low hydrogen content in the as manufactured condition and gives a high resistance to moisture pick up during exposure under workshop conditions. The flux promotes a very stable arc characteristic during use with excellent slag detachment. The weld is of a uniform even profile with regular fine ripple formation and smooth toe blending. OP 121TTW flux is suitable for use with DC+ or AC and is ideal for single wire, twin wire, tandem arc [DC+/AC] and other multi-arc systems using up to 1000A with single wire welding. Grain size according to EN-ISO 14174: 2-20.

Classification		
	EN ISO	14174: SA FB 1 55 AC H5
OE-S1 CrMo2	AWS	A5.23: F8P2-EB3-B3
OE-S2 CrMo1	AWS	A5.23: F8P4-EB2R-B2
OE-S2 Mo	AWS	A5.23: F8A4-F8P4-EA2-A2
OE-S2 Ni2	AWS	A5.23: F7A10-F7P10-ENi2-Ni2
OE-S2 Ni3	AWS	A5.23: F8A15-F7P15-ENi3-Ni3
OE-S2	AWS	A5.17: F7A6-F6P8-EM12K
OE-SD3	AWS	A5.17: F7A8-F7P8-EH12K
OE-SD3 1Ni ¼Mo	AWS	A5.23: F8A10-F8P10-ENi5-Ni5
OE-SD3 1Ni ½Mo	AWS	A5.23: F9A8-F9P8-EF3-F3
OE-SD3 2NiCrMo	AWS	A5.23: F11A8-F11P5-EG-G

	Approvals	Grade
OE-S2 Mo	RINA	4YM
OE-S2 Ni2	RINA	5YM, 5YDM
OE-S2 CrMo1	TÜV	●
OE-SD3	GL	6Y42M H5
OE-SD3 1Ni ¼Mo	LRS	5Y50M H5
OE-SD3 2NiCrMo	LRS	5Y69M

Flux Main Components	
CaO + MgO	40 %
CaF2	25 %
Al2O3 + MnO	20 %
SiO2 + TiO2	15 %

Boniszewski Basicity 3.1

Chemical analysis (Typical values in %)

		C	Mn	Si	Cr	Ni	Mo
All weld metal	OE-S1 CrMo2	0.08	0.6	0.3	2.2	-	1
All weld metal	OE-S2 CrMo1	0.07	0.9	0.3	1.1	-	0.5
All weld metal	OE-S2 Mo	0.07	0.9	0.2	-	-	0.5
All weld metal	OE-S2 Ni2	0.07	0.9	0.3	-	2.3	-
All weld metal	OE-S2 Ni3	0.06	0.9	0.2	-	3.3	0.15
All weld metal	OE-S2	0.07	0.9	0.2	-	-	-
All weld metal	OE-SD3	0.07	1.6	0.3	-	-	-
All weld metal	OE-SD3 1Ni ¼Mo	0.07	1.3	0.3	-	0.9	0.2
All weld metal	OE-SD3 1Ni ½Mo	0.07	1.5	0.3	-	0.95	0.5
All weld metal	OE-SD3 2NiCrMo	0.07	1.4	0.4	0.6	2.2	0.5

All-weld metal Mechanical Properties

	Heat Treatment	Yield Strength (MPa)	Tensile Strength (MPa)	Elongation
OE-S1 CrMo2	720°Cx8h	≥ 450	550-650	≥ 22
OE-S1 CrMo2	940°C/air+740°C	≥ 400	520-620	≥ 22
OE-S2 CrMo1	680°Cx2h	≥ 380	530-630	≥ 24
OE-S2 CrMo1	920°C/air+710°C	≥ 310	430-530	≥ 30
OE-S2 Mo	As Welded	≥ 470	550-680	≥ 24
OE-S2 Ni2	As Welded	≥ 450	550-600	≥ 24
OE-S2 Ni2	600°Cx2h	≥430	500-600	≥ 26
OE-S2 Ni3	As Welded	≥ 480	560-660	≥ 25
OE-S2 Ni3	600°C 2 hr	≥ 430	500-610	≥ 26
OE-S2	As Welded	≥ 360	450-550	≥ 25
OE-SD3	As Welded	≥ 460	530-630	≥ 25
OE-SD3 1Ni ¼Mo	As Welded	≥ 500	560-680	≥ 22
OE-SD3 1Ni ¼Mo	600°Cx2h	≥ 470	550-660	≥ 24
OE-SD3 1Ni ½Mo	As Welded	≥ 550	650-750	≥ 20
OE-SD3 1Ni ½Mo	600°Cx2h	≥ 540	630-730	≥ 22
OE-SD3 2NiCrMo	As Welded	≥ 720	760-900	≥ 18
OE-SD3 2NiCrMo	580°Cx2h	≥ 600	700-850	≥ 19

All-weld metal Mechanical Properties - CV

	Heat Treatment	Impact Energy (J)				
		-20 °C	-40 °C	-60 °C	-80 °C	-101 °C
OE-S1 CrMo2	720°Cx8h	≥ 80				
OE-S1 CrMo2	940°C/air+740°C	≥ 80				
OE-S2 CrMo1	680°Cx2h	≥ 160				
OE-S2 CrMo1	920°C/air+710°C	≥ 160				
OE-S2 Mo	As Welded	≥ 100	≥ 50			
OE-S2 Ni2	As Welded	≥ 120	≥ 100	≥ 70	≥ 50	
OE-S2 Ni2	600°Cx2h	≥ 140	≥ 130	≥ 100	≥ 80	
OE-S2 Ni3	As Welded	≥ 140	≥ 130	≥ 100	≥ 80	≥ 40
OE-S2 Ni3	600°C 2 hr	≥ 140	≥ 120	≥ 90	≥ 70	≥ 30
OE-S2	As Welded	≥ 100	≥ 50			
OE-SD3	As Welded	≥ 140	≥ 100	≥ 70		
OE-SD3 1Ni ¼Mo	As Welded		≥ 145	≥ 70		
OE-SD3 1Ni ¼Mo	600°Cx2h		≥ 160	≥ 70		
OE-SD3 1Ni ½Mo	As Welded	≥ 90	≥ 70	≥ 47		
OE-SD3 1Ni ½Mo	600°Cx2h	≥ 120	≥ 90	≥ 70		
OE-SD3 2NiCrMo	As Welded			≥ 69		
OE-SD3 2NiCrMo	580°Cx2h		≥ 47			

Typical applications

	Materials
OE-S2 CrMo1	ASME: A199 and A200 grade T11, A213 Grades T11, T12 EN: 13CrMo4-5, 13CrMoSi5-5
OE-S2 Ni3	ASME: ASTM A333 Grade 3, ASTM A334 Grade 3; A352LC3; ASTM A203 D,E EN: 12Ni14, S(P)275-S(P)460
OE-S2 Ni2	EN: 11MnNi5-3, 15NiMn5-3
OE-S1 CrMo2	ASME: A387 Gr.22, Cl 1 and 2, A 182 Gr.F 22, A 336 Gr.F22 EN: 10CrMo9-10, 12CrMo9-10
OE-S2 Mo	ASME: X 60, X 65, ASTM A355 Gr. P1; A182M Gr. F1 EN: 16Mo3, S(P)355-S(P)460, L245-L450
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: S(P)235-S(P)355; L245-L360
OE-SD3	ASME: A516 all gradesEN: S(P)235-S(P)460
OE-SD3 1Ni ¼Mo	ASTM A131 AH40, DH40, EH40; API 5L X65, X70 EN: S(P)275-S(P)460; S500; L245-L485
OE-SD3 1Ni ½Mo	ASME: X70, X80, N-A-XTRA 55, HY80, QIN EN: S(P)420-S(P)500; L245-L485; 20MnMoNi5-5, 15NiCuMoNb5
OE-SD3 2NiCrMo	ASME: Q1N, HY80, HY100; USS T1, T1A and T1B; RQT 601, RQT 701 EN: S620-S690; P690; L415-L555

Redrying
350°C , 2-4 hrs

Current Conditions
AC; DC+

Packaging data

Packaging Type	PE	DRYBAG
Weight (kg)	25	25
-	W000280050	W000280051