

Welding flux for stainless steels and nickel-base alloys

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Avesta Flux 801

SAW flux, agglomerated, magnesium silicate

Classifications

EN ISO 14174

S A GS 2 DC

Characteristics and typical fields of application

Avesta Flux 801 is an agglomerated magnesium silicate flux for submerged arc welding with stainless steel wires. It can be applied for general purpose applications (joining and cladding). The flux provides chromium support to compensate chromium loss when welding. The weld metal for this reason typically has the same or somewhat higher chromium content than the wire itself. Recommended for joining (and cladding) with standard stabilized and unstabilized stainless steel grades. The flux provides very good welding properties / easy slag removal and gives a very nice bead appearance.

Flux properties

Polarity	DC
Basicity index (Boniszewski)	1.0
Grain size (EN ISO 14174)	3 – 16 (0.3 – 1.6 mm)
Apparent density	1.0 kg/dm ³
Redrying	300°C – 350°C for 2 – 10 h

Composition of sub-arc welding flux

wt. %	Al ₂ O ₃	CaO + CaF ₂	MgO + SiO ₂
	15	12	60

Typical wires to combine

Name	EN ISO	Class	AWS / SFA	Class
Thermanit JE-308L	14343-A	S 19 9 L	A5.9 / -5.9	ER308L
Thermanit GE-316L	14343-A	S 19 12 3 L	A5.9 / -5.9	ER316L
Thermanit A	14343-A	S 19 12 3 Nb	A5.9 / -5.9	ER318
Thermanit 25/14 E-309L	14343-A	S 23 12 L	A5.9 / -5.9	ER309L

Packaging

Type	Weight
PE bag	25 kg

Marathon 213

SAW flux, fused, calcium silicate

Classifications

EN ISO 14174

S F CS 2 DC

Characteristics and typical fields of application

Marathon 213 is a fused calcium silicate flux for submerged arc welding of standard stabilized and unstabilized CrNi(Mo) stainless steel grades. It is mostly applied for its very nice bead appearance without any slag residues. The flux can be applied in multi-pass and single pass welding procedures and for cladding. It provides a high degree of purity in the weld metal. The flux does not compensate chromium loss. The flux is not hygroscopic.

Flux properties

Polarity	DC+, Tandem AC/DC+
Basicity index (Boniszewski)	1.3
Grain size (EN ISO 14174)	1 – 16 (0.1 – 1.6 mm)
Apparent density	1.5 kg/dm ³
Redrying	Mostly not necessary, however it can be redried at 100 – 150°C

Composition of sub-arc welding flux

wt. %	SiO ₂ +TiO ₂	CaO+MgO	Al ₂ O ₃ +MnO	CaF ₂
	30	35	5	20

Typical wires to combine

Name	EN ISO	Class	AWS / SFA	Class
Thermanit JE-308L	14343-A	S 19 9 L	A5.9 / -5.9	ER308L
Thermanit GE-316L	14343-A	S 19 12 3 L	A5.9 / -5.9	ER316L
Thermanit H-347	14343-A	S 19 9 Nb	A5.9 / -5.9	ER347
Thermanit A	14343-A	S 19 12 3 Nb	A5.9 / -5.9	ER318
Thermanit 25/14 E-309L	14343-A	S 23 12 L	A5.9 / -5.9	ER309L

Packaging

Type	Weight
PE bag	25 kg

SAW flux, agglomerated, aluminate fluoride-basic, Cr-compensating

Classifications

EN ISO 14174

S A AF 2 DC

Characteristics and typical fields of application

Avesta Flux 805 is an agglomerated aluminate-fluoride-basic flux for submerged arc welding with stabilized and unstabilized stainless steel wires. It is primarily designed for welding (and cladding) with high-alloyed austenitic and duplex stainless fillers, but also standard CrNi, CrNiMo and nickel-base alloys can be welded with excellent results.

Avesta Flux 805 provides chromium support to compensate chromium loss when welding. The weld metal for this reason typically has the same or somewhat higher chromium content than the wire itself. Especially suitable for applications where high impact toughness values and high pitting corrosion resistance are required. The flux provides very good welding properties and easy slag removal. Thin fluid slag provides for very nice fillet welds and bead appearance.

Flux properties

Polarity	DC
Basicity index (Boniszewski)	2.0
Grain size (EN ISO 14174)	3–14 (0.3–1.4 mm); also available as 3–16 (0.3–1.6 mm)
Apparent density	1.0 kg/dm ³
Redrying	2 h at 300 – 350°C

Composition of sub-arc welding flux

	CaF ₂	Al ₂ O ₃	SiO ₂
wt. %	48	36	9

Typical wires to combine

Name	EN ISO	Class	AWS / SFA	Class
Avesta 248 SV	14343-A	S 16 5 1	A5.9 / -5.9	EG
Avesta LDX 2101	14343-A	S Z 23 7 N L	A5.9 / -5.9	ER2307
Thermanit JE-308L	14343-A	S 19 9 L	A5.9 / -5.9	ER308L
Thermanit GE-316L	14343-A	S 19 12 3 L	A5.9 / -5.9	ER316L
Avesta 317L/SNR	14343-A	S 19 13 4 L	A5.9 / -5.9	ER317L
Thermanit H-347	14343-A	S 19 9 Nb	A5.9 / -5.9	ER347
Thermanit A	14343-A	S 19 12 3 Nb	A5.9 / -5.9	ER318
Thermanit 25/14 E-309L	14343-A	S 23 12 L	A5.9 / -5.9	ER309L
Avesta P5	14343-A	S 23 12 2 L	A5.9 / -5.9	ER309LMo (mod.)
Avesta 2304	14343-A	S 23 7 N L	A5.9 / -5.9	ER2307
Avesta 2205	14343-A	S 22 9 3 N L	A5.9 / -5.9	ER2209
Avesta 2507/P100 ^{CuW}	14343-A	S 25 9 4 N L	A5.9 / -5.9	ER2594
Avesta P7	14343-A	S 29 9	A5.9 / -5.9	ER312
Avesta 253 MA	14343-A	S Z 21 10 N	A5.9 / -5.9	EG

Packaging

Type	Weight
Dry System	25 kg
PE bag	25 kg

Marathon 431



SAW flux, agglomerated, fluoride-basic

Classifications

EN ISO 14174

S A FB 2 DC

Characteristics and typical fields of application

Marathon 431 is a fluoride-basic agglomerated flux for submerged arc welding of stabilized and unstabilized standard CrNi(Mo) and duplex stainless steel grades. The flux can be applied in multi-pass and single pass welding procedures. Thin fluid slag for very nice fillet welds. The weld seams become smooth and finely rippled without any slag residues. Marathon 431 provides a high degree of purity in the weld metal ensuring good mechanical properties with good corrosion resistance. The flux does not compensate chromium loss. This flux has also been available on the market as "BÖHLER BB 202" and "Avesta Flux 807".

Flux properties

Polarity	DC+
Basicity index (Boniszewski)	2.2
Grain size (EN ISO 14174)	3 – 16 (0.3 – 1.6 mm) ; 4 – 14 (0.4 – 1.4 mm)
Apparent density	1.0 kg/dm ³
Redrying	300 – 350°C for 2 h

Composition of sub-arc welding flux

wt. %	CaF ₂	Al ₂ O ₃	SiO ₂
	50	38	10

Typical wires to combine

Name	EN ISO	Class	AWS / SFA	Class
Thermanit JE-308L	14343-A	S 19 9 L	A5.9 / -5.9	ER308L
BÖHLER EAS 2-UP (LF)	14343-A	S 19 9 L	A5.9 / -5.9	ER308L
Thermanit GE-316L	14343-A	S 19 12 3 L	A5.9 / -5.9	ER316L
Thermanit H-347	14343-A	S 19 9 Nb	A5.9 / -5.9	ER347
Thermanit A	14343-A	S 19 12 3 Nb	A5.9 / -5.9	ER318
Thermanit 22/09	14343-A	S 22 9 3 N L	A5.9 / -5.9	ER2209
Thermanit 25/09 CuT	14343-A	S 25 9 4 N L	A5.9 / -5.9	ER2594
Thermanit 20/10	14343-A	S 20 10 3	A5.9 / -5.9	ER308Mo (mod.)
Thermanit 25/14 E-309L	14343-A	S 23 12 L	A5.9 / -5.9	ER309L

Packaging

Type	Weight
Dry System	25 kg
Metal bucket	30 kg
PE bag	25 kg



BÖHLER BB 203

SAW flux, agglomerated, fluoride-basic

Classifications

EN ISO 14174

S A FB 2 DC

Characteristics and typical fields of application

BÖHLER BB 203 is an agglomerated fluoride-basic flux for submerged arc welding with stainless steel wires. It is recommended for joining soft-martensitic CrNi-steels; joining and (cladding) of unstabilized stainless austenitic CrNi(Mo)-steels as well as fully austenitic stainless CrNiMo-steels. Especially suitable for thick walled components with high restraint and where a low amount of diffusible hydrogen is essential. The flux has a high basicity-index and provides a high purity in the weld metal resulting in good mechanical properties. BÖHLER BB 203 does not contain Cr supporting elements. Besides good slag detachability, the flux allows for good fillet weld appearance. The slag has a little higher viscosity as compared to Marathon 431, which can be preferred for straighter weld beads.

Flux properties

Polarity	DC
Basicity index (Boniszewski)	2.5
Grain size (EN ISO 14174)	3 – 16 (0.3 – 1.6 mm); 2 – 12 (0.2 – 1.2 mm)
Apparent density	1.0 kg/dm ³
Redrying	300°C – 350°C for 2 – 10 h

Composition of sub-arc welding flux

wt. %	SiO ₂ +TiO ₂	CaO+MgO	CaF ₂	Al ₂ O ₃
	20	26	32	18

Typical wires to combine

Name	EN ISO	Class	AWS / SFA	Class
BÖHLER CN 13/4-UP	14343-A	S 13 4	A5.9 / -5.9	ER410NiMo (mod.)
BÖHLER SKWAM-UP	14343-A	S Z 17 Mo H	A5.9 / -5.9	ER430 (mod.)
Thermanit JE-308L	14343-A	S 19 9 L	A5.9 / -5.9	ER308L
BÖHLER EAS 2-UP (LF)	14343-A	S 19 9 L	A5.9 / -5.9	ER308L
Thermanit GE-316L	14343-A	S 19 12 3 L	A5.9 / -5.9	ER316L
BÖHLER A 7 CN-UP	14343-A	S 18 8 Mn	A5.9 / -5.9	ER307 (mod.)
Thermanit 25/14 E-309L	14343-A	S 23 12 L	A5.9 / -5.9	ER309L
BÖHLER ASN 5-UP	14343-A	S Z 18 16 5 N L	A5.9 / -5.9	ER317L (mod.)
BÖHLER AM 500-UP	14343-A	S Z 25 23 3 Mn N L	A5.9 / -5.9	EG

Packaging

Type	Weight
Dry System	25 kg
Metal bucket	30 kg

Marathon 444



SAW flux, agglomerated, fluoride-basic

Classifications

EN ISO 14174

S A FB 2 AC

Characteristics and typical fields of application

Marathon 444 is a highly basic agglomerated welding flux, designed for welding and cladding of nickel-base NiCr(Mo)-alloys. Highly resistant to hot cracking by suppressing weld metal silicon absorption. The flux does not compensate chromium loss. Basic slag characteristics resulting excellent mechanical properties. Widely used in highly corrosive environments, high-temperature applications as well as in low temperature sections down to -196°C .

Flux properties

Polarity	DC+ / AC
Basicity index (Boniszewski)	2.9
Grain size (EN ISO 14174)	3 – 16 (0.3 – 1.6 mm)
Apparent density	1.0 kg/dm ³
Redrying	300 – 350°C for 2 – 10 h

Composition of sub-arc welding flux

	SiO ₂ +TiO ₂	CaO+MgO	Al ₂ O ₃ +MnO	CaF ₂
wt. %	7	40	30	20

Typical wires to combine

Name	EN ISO	Class	AWS / SFA	Class
Thermanit Nicro 82	18274	S Ni 6082 (NiCr20Mn3Nb)	A5.14 / -5.14	ERNiCr-3
Thermanit 625	18274	S Ni 6625 (NiCr22Mo9Nb)	A5.14 / -5.14	ERNiCrMo-3
Thermanit Nimo C 276	18274	S Ni 6276 (NiCr15Mo16Fe6W4)	A5.14 / -5.14	ERNiCrMo-4

Packaging

Type	Weight
Metal bucket	30 kg
PE bag	25 kg

Classifications

EN ISO 14174

SA FB 2 AC

Characteristics and typical fields of application

Marathon 104 is an agglomerated fluoride-basic flux for submerged arc welding of stainless / heat resistant steel grades and Ni-base alloys. This flux is – above all – recommended for highest demands on crack resistance and the mechanical properties of the weld metal, especially with heavy wall thickness.

Combined with stainless wire grades, Marathon 104 and it provides a high degree of purity in the weld metal, with good mechanical properties and good corrosion resistance. The flux does not compensate chromium loss. Its metallurgical behavior in regard of carbon, silicon and manganese is neutral.

Good slag detachability and nice bead appearance. The weld metal is characterized by good mechanical properties and high resistance to hot cracking and is recommended for the highest demanding applications, e.g. creep resistant (Thermanit ATS), non-magnetic and cryogenic applications. Especially recommended for LNG applications with Thermanit Nimo C 276 and Thermanit 625.

Flux properties

Polarity	DC+ / AC
Basicity index (Boniszewski)	2.9
Grain size (EN ISO 14174)	1 – 20 (0.1 – 2.0 mm)
Apparent density	1.0 kg/dm ³
Redrying	300 – 350°C for 2 – 10 h

Composition of sub-arc welding flux

wt. %	SiO ₂ +TiO ₂	CaO+MgO	Al ₂ O ₃ +MnO	CaF ₂
	15	36	20	25

Typical wires to combine

Name	EN ISO	Class	AWS / SFA	Class
Thermanit 13/04	14343-A	S 13 4	A5.9 / -5.9	ER410NiMo (mod.)
Thermanit 17/15 TT	14343-A	S G Z 17 15 Mn W		
Thermanit 20/16 SM	14343-A	S Z 22 17 8 4 N L	A5.9 / -5.9	EG
Thermanit 25/22 H	14343-A	S 25 22 2 N L	A5.9 / -5.9	ER310 (mod.)
Thermanit 20/25 Cu	14343-A	S 20 25 5 Cu L	A5.9 / -5.9	ER385
BÖHLER AM 500-UP	14343-A	S Z 25 23 3 Mn N L	A5.9 / -5.9	EG
Thermanit ATS 4	14343-A	S 19 9 H	A5.9 / -5.9	ER19-10H
Thermanit D	14343-A	S 22 12 H	A5.9 / -5.9	ER309 (mod.)
Thermanit Nicro 82	18274	S Ni 6082 (NiCr20Mn3Nb)	A5.14 / -5.14	ERNiCr-3
Thermanit 625	18274	S Ni 6625 (NiCr22Mo9Nb)	A5.14 / -5.14	ERNiCrMo-3
Thermanit Nimo C 276	18274	S Ni 6276 (NiCr15Mo16Fe6W4)	A5.14 / -5.14	ERNiCrMo-4

Packaging

Type	Weight
Dry System	25 kg
Metal bucket	30 kg

Marathon 504



SAW flux, agglomerated, aluminate-basic

Classifications

EN ISO 14174

S A BA 2 AC

Characteristics and typical fields of application

Marathon 504 is an agglomerated flux for submerged arc welding. Recommended for surfacing applications (and joining) especially with Ni-base wire types. The flux does not compensate chromium loss. Neutral metallurgical behavior resulting in good mechanical properties and high resistance to hot cracking. Provides excellent slag detachability and nice bead appearance under direct or alternating current. Especially in weld overlay.

Flux properties

Polarity	DC+ / AC
Basicity index (Boniszewski)	1.0
Grain size (EN ISO 14174)	3 – 16 (0.3 – 1.6 mm)
Apparent density	1.0 kg/dm ³
Redrying	250 – 300°C for 2 – 10 h

Composition of sub-arc welding flux

	SiO ₂ +TiO ₂	CaO+MgO	Al ₂ O ₃ +MnO	CaF ₂
wt. %	9	12	52	22

Typical wires to combine

Name	EN ISO	Class	AWS / SFA	Class
Thermanit Nicro 82	18274	S Ni 6082 (NiCr20Mn3Nb)	A5.14 / -5.14	ERNiCr-3
Thermanit 625	18274	S Ni 6625 (NiCr22Mo9Nb)	A5.14 / -5.14	ERNiCrMo-3
Thermanit Nimo C 276	18274	S Ni 6276 (NiCr15Mo16Fe6W4)	A5.14 / -5.14	ERNiCrMo-4
Thermanit 617	18274	S Ni 6617 (NiCr22Co12Mo9)	A5.14 / -5.14	ERNiCrCoMo-1

Packaging

Type	Weight
Metal bucket	30 kg
PE bag	25 kg