

Agglomerated Welding Flux BF 6.30

Flux type: Aluminate-Basic

Classification: ISO 14174 – S A AB 1 66 AC H5*

Characteristics:

A semi-basic flux for joint welding of high quality steel pipes for pipeline transportation systems in the petroleum and natural gas industries. Especially recommended for single and multi-wire (up to 5 wires) submerged arc processes in the two-run technique. Very good weld appearance and slag release providing flat welds with low reinforcement and flat weld interfaces free from undercuts. High grain hardness and resistance to abrasion and a low consumption rate with good flux feeding properties

in the transport and recovery system.

As a result of low hydrogen levels (less than 5 ml/100 g in the weld deposits) and oxygen levels of about 350 ppm as well as uniform metallurgical behavior with low silicon and manganese pick-up, constant mechanical properties are obtained even when welding thick-walled tubes in the two-run technique.

Application:

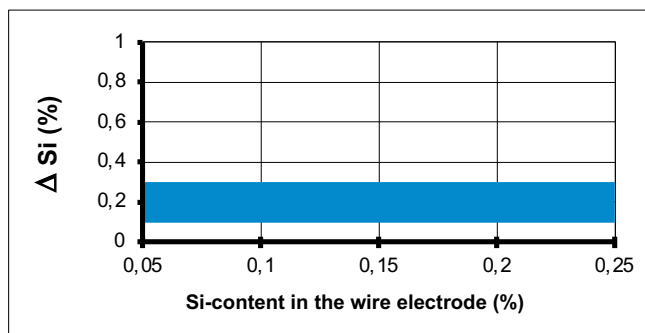
Production of longitudinal and spiral welded steel pipe grades L360 or X52 to L555 or X80 according to ISO 3183/API Spec. 5L.

Characteristic chemical constituents:

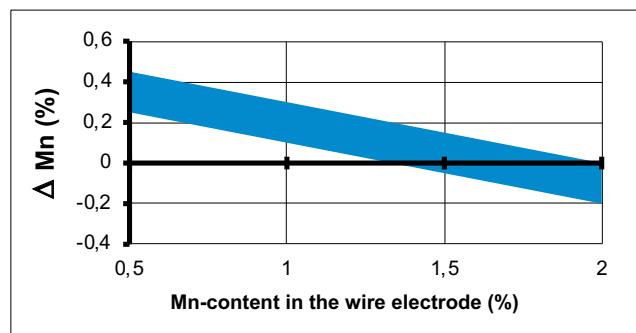
SiO ₂ + TiO ₂	Al ₂ O ₃ + MnO	CaO + MgO	CaF ₂
20 %	35 %	20 %	20 %
Basicity according to Boniszewski: ~1.4			

Metallurgical behaviour acc. to ISO 14174 type of current DC:

Pick-up Silicon



Pick-up/Burn-out Manganese



Flux density: 0.95 kg/dm³ (l)

Grain size acc. to ISO 14174: 2–20 (Tyler 8 × 65)

Current-carrying capacity: 1,000 A (DC or AC) using one wire

* Diffusible hydrogen content H5: determined in deposited metal acc. to the method described in ISO 3690 Type of current DC; redrying conditions 200–250 °C

All-weld metal multiple pass classification of wire-flux combinations:

Wire electrode		Test assembly ISO 15792-1: type 1.3	AWS A5.17M/5.23M	AWS A5.17/5.23
ISO 14171-A	AWS A5.17/.23			
BA-S2	EM12(K)	ISO 14171-A: S 42 3 AB S2	F48A3-EM12(K)	F7A2-EM12(K)
BA-S2Si	EM12K	ISO 14171-A: S 42 3 AB S2Si	F48A3-EM12K	F7A2-EM12K
BA-S3Si	EH12K	ISO 14171-A: S 46 4 AB S3Si	F55A4/F49P4-EH12K	F8A4/F7P4-EH12K
BA-S2Mo	EA2	ISO 14171-A: S 46 3 AB S2Mo	F55A3/P3-EA2-A2	F8A2/P2-EA2-A2
BA-S3Mo	EA4	ISO 14171-A: S 50 3 AB S3Mo	F55A3/P3-EA4-A4	F8A2/P2-EA4-A4
BA-S3NiMo1	EF3	ISO 14171-A: S 50 3 AB S3Ni1Mo	F62A3-EF3-F3	F9A2-EF3-F3
BA-S4MoSi	EA3K	ISO 14341-A: S 50 0 AB G4Mo	F62A2-EA3K-A3	F9A0-EA3K-A3

Two-run classification of wire-flux combinations:

Wire electrode		Two-Run / ISO 15792-2: type 2.5	AWS A5.17M / 5.23M	AWS A5.17 / 5.23
ISO 14171-A	AWS A5.17/.23			
BA-S2	EM12(K)	ISO 14171-A: S 3T 2 AB S2	F43TA2-EM12(K)	F6TA0-EM12(K)
BA-S2Si	EM12K	ISO 14171-A: S 3T 2 AB S2Si	F43TA2-EM12K	F6TA0-EM12K
BA-S3Si	EH12K	ISO 14171-A: S 4T 3 AB S3Si	F49TA3-EH12K	F7TA2-EH12K
BA-S2Mo	EA2	ISO 14171-A: S 5T 3 AB S2Mo	F62TA3-EA2	F9TA2-EA2
BA-S3Mo	EA4	ISO 14171-A: S 5T 3 AB S3Mo	F62TA3-EA4	F9TA2-EA4
BA-S3NiMo1	EF3	ISO 14171-A: S 5T 3 AB S3Ni1Mo	F62TA3-EF3	F9TA2-EF3
BA-S2MoTiB	EA2TiB	ISO 14171-A: S 5T 5 AB S2MoTiB	F62TA5-EA2TiB	F9TA6-EA2TiB
BA-S3MoTiB	EG	ISO 14171-A: S 5T 5 AB SZ	F62TA5-EG	F9TA6-EG

Mechanical Properties of two-run weld metal of pipe steels: (characteristical values)

Wire electrode		YS MPa	UTS MPa	Impact ISO-V (J)					
				RT	± 0 °C +32 °F	-20 °C -4 °F	-30 °C -22 °F	-40 °C -40 °F	-51 °C -60 °F
BA-S2 ¹⁾	EM12	> 400	> 500	> 80	> 50	> 27			
BA-S2Si ¹⁾	EM12K	> 400	> 500	> 80	> 50	> 27			
BA-S3Si ¹⁾	EH12K	> 460	> 560	> 100	> 80	> 70	> 40		
BA-S2Mo ²⁾	EA2	> 560	> 630	> 100	> 90	> 60	> 40		
BA-S3Mo ²⁾	EA4	> 570	> 650	> 110	> 90	> 70	> 50		
BA-S3NiMo1 ²⁾	EF3	> 560	> 650	> 110	> 90	> 70	> 60		
BA-S2MoTiB ³⁾	EA2TiB	> 560	> 630	> 130		> 90	> 80	> 70	> 60
BA-S3MoTiB ³⁾	EG	> 570	> 650	> 130		> 90	> 80	> 70	> 60

¹⁾ Low Si-base material up to X60 acc. to API Spec. 5L

²⁾ Si-deoxidized base material X65 and higher acc. to API Spec. 5L

³⁾ Low temperature toughness: BA-S2MoTiB better suitable for base material with higher Mn-content BA-S3MoTiB for base material with lower Mn-content

Mechanical properties are influenced up to 70 % by dilution of base-material.



Chemical composition of all-weld metal acc. to EN ISO 15792-1 and AWS A5.17/5.23:
(characteristical values in wt. %)

Wire electrode		C	Si	Mn	Mo	Ni	Cr
BA-S2	EM12(K)	0.05–0.08	0.2–0.5	1.0–1.4			
BA-S2Si	EM12K	0.05–0.08	0.3–0.6	1.0–1.4			
BA-S3Si	EH12K	0.05–0.08	0.3–0.6	1.4–1.8			
BA-S2Mo	EA2	0.05–0.08	0.2–0.5	1.1–1.4	0.4–0.6		
BA-S3Mo	EA4	0.05–0.08	0.2–0.5	1.3–1.7	0.4–0.6		
BA-S3NiMo1	EF3	0.05–0.08	0.2–0.5	1.5–1.8	0.4–0.6	0.8–1.0	
BA-S2MoTiB	EA2TiB	0.04–0.07	0.3–0.5	1.0–1.4	0.4–0.6	Ti 0.05	B 0.005
BA-S3MoTiB	EG	0.04–0.07	0.3–0.5	1.2–1.6	0.4–0.6	Ti 0.05	B 0.005
BA-S4MoSi	EA3K	0.05–0.08	0.4–0.8	1.4–1.9	0.4–0.6	Ti 0.05	

Mechanical properties of all-weld metal acc. to EN ISO 15792-1 and AWS A5.17/5.23:
(characteristical values)

Wire electrode		Heat treatment	YS MPa	UTS MPa	Elong. %	Impact ISO-V (J)				
						RT	± 0 °C +32 °F	-20 °C -4 °F	-30 °C -22 °F	-40 °C -40 °F
BA-S2	EM12(K)	AW	>420	>510	>25	>110	>90	>70	>47	
BA-S2Si	EM12K	AW	>420	>510	>25	>110	>90	>70	>47	
BA-S3Si	EH12K	AW	>470	>550	>25	>130	>90	>80		>47
BA-S2Mo	EA2	AW	>490	>580	>23	>120	>80	>70	>47	
BA-S3Mo	EA4	AW	>520	>610	>22	>100	>70	>60	>47	
BA-S3NiMo1	EF3	AW	>580	>680	>20	>120	>80	>70	>47	
		S*	>560	>660	>20	>130	>90	>60	>47	
BA-S4MoSi	EA3K	AW	>540	>630	>20	>80	>47	>27		

Post Weld Heat Treatment: * 620 °C/2 h

Packaging: 25 kg PE-Bags or 500–1,250 kg Big Bags
Storage: Unopened originally packed flux bags can be stored up to one year in dry storage rooms after date of delivery ex factory.

Redrying conditions specific to the flux:
200–250 °C effective flux temperature

