

Welding consumables for pipe steels

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Stick electrodes

Product name	C	Si	Mn	Ni	Mo
BÖHLER FOX CEL	0.12	0.14	0.50		
BÖHLER FOX CEL+	0.17	0.15	0.60		
BÖHLER FOX CEL 70-P	0.15	0.10	0.45	0.17	
BÖHLER FOX CEL 75	0.14	0.14	0.70		
BÖHLER FOX CEL Mo	0.10	0.14	0.40		0.50
BÖHLER FOX CEL 80-P	0.15	0.15	0.70	0.80	
BÖHLER FOX CEL 85	0.14	0.15	0.75	0.70	
BÖHLER FOX CEL 90	0.17	0.15	0.90	0.80	
BÖHLER FOX BVD 85	0.05	0.40	1.10	0.90	
BÖHLER FOX BVD 90	0.05	0.30	1.20	2.20	
BÖHLER FOX BVD 100	0.07	0.40	1.20	2.30	
BÖHLER FOX BVD 120	0.07	0.40	1.85	2.25	0.35
BÖHLER FOX EV PIPE	0.06	0.60	0.90		
BÖHLER FOX EV 60 PIPE	0.07	0.60	1.20	0.90	
BÖHLER FOX EV 70 PIPE	0.06	0.50	1.70	2.20	0.30

GTAW rods

Product name	C	Si	Mn	Ni	Mo
BÖHLER NiMo1-IG	0.08	0.60	1.80	0.90	0.30

Solid wires

Product name	C	Si	Mn	Ni	Mo	Ti	S	P
Pipeshield X65	0.05	0.75	1.55			+		
Pipeshield X70	0.07	0.95	1.65				≤ 0.015	≤ 0.020
Pipeshield X80	0.65	0.69	1.55	0.90		+	≤ 0.015	≤ 0.020
Pipeshield X90	0.08	0.60	1.80	0.90	0.30			

SAW wire/flux combinations

Product name	C	Si	Mn	Ni	Mo	Ti	S	P
Union S 2 Si - UV 310 P	0.08	0.40	1.20					
Union S 3 Si - UV 309 P	0.06	0.45	1.50					
Union S 3 Si - UV 310 P	0.05	0.30	1.50					
Union S 2 Mo - UV 309 P	0.07	0.30	1.15		0.50			
Union S 2 Mo - UV 310 P	0.07	0.25	1.15		0.50			
Union S 4 Mo - UV 310 P	0.07	0.20	1.55		0.45			
Union S 3 TiB - UV 309 P	0.05	0.40	1.30			0.02	≤ 0.010	≤ 0.015
Union S 3 TiB - UV 310 P	0.05	0.30	1.30			0.02	≤ 0.010	≤ 0.015
Union S 3 MoTiB - UV 309 P	0.05	0.40	1.30		0.50	0.02	≤ 0.015	≤ 0.015
Union S 3 MoTiB - UV 310 P	0.05	0.30	1.30		0.50	0.02	≤ 0.015	≤ 0.015
Union S 3 MoTiB - UV 419 TT-W	0.05	0.35	1.30		0.50	0.02		
Union S 2 NiMo 1 - UV 419 TT-W	0.08	0.20	1.30	0.95	0.25			
BÖHLER SUBARC T60 - UV 419 TT-W	0.06	0.40	1.70	0.90	0.16			
Union S 3 NiMo 1 - UV 419 TT-W	0.08	0.25	1.60	0.90	0.50			

Flux cored wires

Product name	C	Si	Mn	Ni	Mo	Al
BÖHLER Pipeshield 71 T8-FD	0.05	0.14	1.10	0.70		0.80
BÖHLER Pipeshield 71.1 T8-FD	0.05	0.14	1.10	0.95		0.80
BÖHLER Pipeshield 81 T8-FD	0.05	0.15	1.40	1.95		0.80
BÖHLER PIPESHIELD 91 T8-FD	0.04	0.30	2.00	3.20		0.70
BÖHLER Ti 70 Pipe T-FD	0.05	0.30	1.60	1.00		
BÖHLER Ti 70 Pipe T-FD-N	0.05	0.35	1.60	0.85	0.25	
BÖHLER Ti 80 Pipe T-FD	0.07	0.30	1.70	2.50		

BÖHLER FOX CEL

Stick electrode, mild steel, cellulose coated, pipeline welding

Classifications

EN ISO 2560-A
E 38 3 C 2 1

AWS A5.1 / SFA-5.1
E6010

Characteristics and typical fields of application

Cellulose electrode for vertical-down welding of large diameter pipelines; suitable for root runs (vertical down and vertical up), hot passes, filler and cover layers. Especially recommended for root run welding. Highly economical compared with vertical-up welding. Apart from its excellent welding and gap bridging characteristics FOX CEL offers a weld deposit with outstanding impact strength values and thus offers the benefit of still more safety in field welding of pipelines. BÖHLER FOX CEL can be used in sour gas applications (HIC-Test acc. NACE TM-02-84). Test values for SSC-test are available too.

Base materials

S235JR, S275JR, S235J2G3, S275J2G3, S355J2G3, P235GH, P265GH, P355T1, P235T2-P355T2, L210NB - L415NB, L290MB - L415MB, P235G1TH, P255G1TH

Root pass up to L555NB, L555MB

API Spec. 5 L: A, B, X 42, X 46, X 52, X 56, Root pass up to X 80

Typical analysis of all-weld metal

	C	Si	Mn
wt.-%	0.12	0.14	0.5

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J			
				20°C	0°C	-20°C	-30°C
u	450 (≥ 380)	550 (470 – 600)	26 (≥ 22)	100	90	70	55 (≥ 47)
u untreated, as welded							

Operating data



Polarity	DC +/-, Minuspol für Wurzel
Electrode identification	FOX CEL 6010 E 38 2 C
Redrying	not allowed

Dimension mm	Current A
2.5 × 250	50 – 90
2.5 × 300	50 – 90
3.2 × 350	80 – 130
4.0 × 350	120 – 180
5.0 × 350	160 – 210

Approvals

TÜV (01281), DNV GL, CE

Classifications

EN ISO 2560-A
E 38 2 C 2 1

AWS A5.1 / SFA-5.1
E6010

Characteristics and typical fields of application

Cellulose electrode for vertical-down welding of large diameter pipelines.

Especially recommended for root pass welding on D.C. positive polarity in the vertical down and vertical up welding positions.

Apart from its good welding and gap bridging characteristics Böhler FOX CEL+ provides a powerful arc that deposits well penetrated, smooth root passes with high travel speeds as well as high safety against the formation of piping or hollow bead and undercut. BÖHLER FOX CEL+ can be used in sour gas applications (HIC-Test acc. to NACE TM-02-84). Test values for SSC-test are available too.

Base materials

S235JR, S275JR, S235J2G3, S275J2G3, S355J2G3, P235GH, P265GH, P355T1, P235T2-P355T2, L210NB - L415NB, L290MB - L415MB, P235G1TH, P255G1TH

Root pass up to L555NB, L555MB

API Spec. 5 L: A, B, X 42, X 46, X 52, X 56, Root pass up to X 80

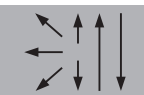
Typical analysis of all-weld metal

wt.-%	C	Si	Mn
	0.17	0.15	0.6

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J			
				20°C	0°C	-20°C	-30°C
u	430 (≥ 380)	520 (470 - 600)	26 (≥ 22)	105	95	60 (≥ 47)	50 (≥ 27)
u untreated, as welded							

Operating data



Polarity	DC (+/-)
Electrode identification	FOX CEL+ 6010 E 38 2 C
Redrying	not allowed

Dimension mm	Current A
2.5 × 300	50 – 90
3.2 × 350	80 – 130
4.0 × 350	120 – 180

Approvals

TÜV (19380.), CE

BÖHLER FOX CEL 70-P

Stick electrode, low-alloyed, cellulose coated, pipeline welding

SMAW

Classifications

EN ISO 2560-A
E 42 3 C 2 5

AWS A5.5 / SFA-5.5
E7010-P1

Characteristics and typical fields of application

Cellulose electrode for vertical-down welding of high strength large diameter pipelines. Especially recommended for hot passes, filler and cover layers. Highly economical compared with conventional vertical-up welding. The BÖHLER FOX CEL 70-P provides a more intensive arc and a more fluid weld metal as compared to the well-known BÖHLER FOX CEL 75.

BÖHLER FOX CEL 70-P can be used in sour gas applications (HIC-Test acc. to NACE TM-02-84). Test values for SSC-test are available too.

Base materials

S235JR, S275JR, S235J2G3, S275J2G3, S355J2G3, P235GH, P265GH, L210-L415NB, L290MB-L415MB, L450MB, P355T1, P235T2-P355T2, P235G1TH, P255G1TH

API Spec. 5L: Grade A, B, X42, X 46, X52, X56, X60, X65, root pass up to X80

Typical analysis of all-weld metal

wt.-%	C	Si	Mn	Ni
	0.15	0.10	0.45	0.17

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J		
				20°C	-20°C	-30°C
u u untreated, as welded	460 (≥ 420)	560 (500 – 640)	23 (≥ 22)	100	80	65 (≥ 47)

Operating data



Polarity	DC+/-, Minuspol für Wurzel
Electrode identification	FOX CEL 70-P 7010-P1 E 42 3 C
Redrying	not allowed

Dimension mm	Current A
3.2 × 350	60 – 130
4.0 × 350	100 – 180
4.8 × 350	130 – 200
5.0 × 350	140 – 210

Approvals

TÜV (11180), CE

Classifications

EN ISO 2560-A
E 42 3 C 2 5

AWS A5.5 / SFA-5.5
E7010-P1

Characteristics and typical fields of application

Cellulose electrode for vertical-down welding of large diameter pipelines.

Especially recommended for hot passes, filler and cover layers. Highly economical compared with conventional vertical-up welding.

The penetrating arc characteristics and the low slag formation allow good bead control and ensure best performance even with the larger diameter electrodes and high amperages.

The weld metal has excellent impact values and welding is easy also under difficult weather conditions.

BÖHLER FOX CEL 75 can be used in sour gas applications (HIC-Test acc. NACE TM-02-84). Test values for SSC-test are available too.

Base materials

S235JR, S275JR, S235J2G3, S275J2G3, S355J2G3, P235GH, P265GH, L210-L415NB, L290MB – L415MB, P355T1, P235T2 - P355T2, P235G1TH, P255G1TH root pass up to L480MB
API Spec. 5 L: Grade A, B, X42, X 46, X 52, X 56, X 60, Root pass up to X 70

Typical analysis of all-weld metal

wt.-%	C	Si	Mn
	0.14	0.14	0.7

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J			
				20°C	0°C	-20°C	-30°C
u u untreated, as welded	460 (≥ 420)	550 (500 – 640)	23 (≥ 22)	100	95	65	60 (≥ 47)

Operating data



Polarity	DC+/-, Minuspol für Wurzel
Electrode identification	FOX CEL 75 7010-P1 E 42 3 C
Redrying	not allowed

Dimension mm	Current A
3.2 × 350	80 – 130
4.0 × 350	120 – 180
5.0 × 350	160 – 210

Approvals

CE

BÖHLER FOX CEL Mo

Stick electrode, low-alloyed, cellulose coated, pipeline welding

Classifications

EN ISO 2560-A
E 42 3 Mo C 2 5

AWS A5.5 / SFA-5.5
E7010-A1

Characteristics and typical fields of application

Mo-alloyed cellulose coated electrode for vertical-down welding of high strength large diameter pipelines. Highly economical compared with conventional vertical-up welding. Especially recommended for hot passes, filler and cover layers.

Excellent weld-metal toughness, easy welding, with an intensive arc and a deep penetration in order to ensure sound joint welds with good X-ray quality.

BÖHLER FOX CEL Mo can be used in sour gas applications (HIC-Test acc. NACE TM-02-84). Test values for SSC-test are available too.

Base materials

S235JR, S275JR, S235J2G3, S275J2G3, S355J2G3, P235GH, P265GH, L210 - L415NB, L290MB-L415MB, P355T1, P235T2 - P355T2, P235G1TH, P255G1TH

Root pass up to L555MB

API Spec. 5 L: Grade A, B, X 42, X 46, X 52, X 56, X 60

Root pass up to X 80

Typical analysis of all-weld metal

	C	Si	Mn	Mo
wt.-%	0.1	0.14	0.4	0.5

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J				
				20°C	0°C	-20°C	-30°C	-40°C
u	480 (≥ 420)	550 (500-640)	23 (≥ 20)	100	95	85	50 (≥ 47)	42
u untreated, as welded								

Operating data



Polarity	DC +/-, Minuspol für Wurzel
Electrode identification	FOX CEL Mo 7010-A1 E 42 3 Mo C
Redrying	not allowed

Dimension mm	Current A
3.2 × 350	80 – 130
4.0 × 350	120 – 180
5.0 × 350	160 – 210

Approvals

TÜV (01325.), ABS, CE



BÖHLER FOX CEL 80-P

Stick electrode, low-alloyed, cellulose coated, pipeline welding

SMAW

Classifications

EN ISO 2560-A
E 46 3 1Ni C 2 5

AWS A5.5 / SFA-5.5
E8010-P1
E8010-G

Characteristics and typical fields of application

Cellulose electrode for vertical-down welding of high strength, large diameter pipelines. Highly economical compared with conventional vertical-up welding. Especially recommended for hot pass, filler and cover layers. The BÖHLER FOX CEL 80-P provides a more intensive arc and a more fluid weld metal as compared to the well-known BÖHLER FOX CEL 85.

BÖHLER FOX CEL 80-P can also be used in sour gas applications (HIC-Test acc. to NACE TM-02-84). Test values for SSC-test are available too.

Base materials

L415NB - L485NB, L415MB - L485MB

API Spec. 5 L: X 56, X 60, X 65, X 70

Typical analysis of all-weld metal

wt.-%	C	Si	Mn	Ni
	0.15	0.15	0.7	0.8

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J		
				20°C	-20°C	-30°C
u	490 (≥ 460)	580 (550 – 680)	23 (≥ 20)	90	80	60 (≥ 47)
u untreated, as welded						

Operating data



Polarity	DC+
Electrode identification	FOX CEL 80-P 8010-P1 E 46 3 1Ni C
Redrying	not allowed

Dimension mm	Current A
3.2 × 350	60 – 130
4.0 × 350	100 – 180
4.8 × 350	130 – 200
5.0 × 350	140 – 210

Approvals

TÜV (11181.), CE

BÖHLER FOX CEL 85

Stick electrode, low-alloyed, cellulose coated, pipeline welding

Classifications

EN ISO 2560-A
E 46 4 1Ni C 2 5

AWS A5.5 / SFA-5.5
E8010-P1

Characteristics and typical fields of application

Cellulose electrode for vertical-down welding of high strength large diameter pipelines. Highly economical compared with conventional vertical-up welding.

Especially recommended for hot passes, filler and cover layers.

BÖHLER FOX CEL 85 is one of the most popular cellulosic electrode which meets all the exacting demands of the field welding of cross country pipelines extremely well. Welding is easy also at difficult weather conditions. It ensures highest joint weld quality down to temperatures of -40°C .

BÖHLER FOX CEL 85 can be used in sour gas applications (HIC-Test acc. NACE TM-02-84). Test values for SSC-test are available too.

Base materials

L415NB - L485NB, L415MB - L485MB

API Spec. 5 L: X 56, X 60, X 65, X 70

Typical analysis of all-weld metal

wt.-%	C	Si	Mn	Ni
	0.14	0.15	0.75	0.7

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R_e MPa	Tensile strength R_m MPa	Elongation A ($L_0=5d_0$) %	Impact values ISO-V KV J			
				20°C	0°C	-20°C	-40°C
u	490 (≥ 460)	580 (550 – 680)	23 (≥ 20)	110	105	100	70 (≥ 47)
u untreated, as welded							

Operating data



Polarity	DC+
Electrode identification	FOX CEL 85 8010-P1 E 46 4 1Ni C
Redrying	not allowed

Dimension mm	Current A
3.2 × 350	80 – 130
4.0 × 350	120 – 180
5.0 × 350	160 – 210
5.5 × 350	200 – 260

Approvals

TÜV (01361.), ABS, CE



BÖHLER FOX CEL 90

Stick electrode, low-alloyed, cellulose coated, pipeline welding

SMAW

Classifications

EN ISO 2560-A
E 50 3 1Ni C 2 5

AWS A5.5 / SFA-5.5
E9010-P1
E9010-G

Characteristics and typical fields of application

Cellulose-coated electrode for vertical-down welding of high strength large diameter pipelines. Highly economical compared with conventional vertical-up welding. Especially recommended for hot passes, filler and cover layers. The special design of the coating and the core wire guarantees the highest metallurgical quality and soundness of the weld metal deposit with excellent mechanical properties. The electrode allows good weld pool visibility, and easy manipulation, as well as high safety margins against porosity and slag inclusions. BÖHLER FOX CEL 90 can be used in sour gas applications (HIC-Test acc. to NACE TM-02-84). Test values for SSC-test are available too.

Base materials

L450MB, L485MB
API Spec. 5 L: X 65, X 70, X 80

Typical analysis of all-weld metal

wt.-%	C	Si	Mn	Ni
	0.17	0.15	0.9	0.8

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J				
				20°C	0°C	-20°C	-30°C	-40°C
u	560 (≥ 530)	650 (620 – 720)	21 (≥ 18)	100	90	75	65 (≥ 47)	40
u untreated, as welded								

Operating data



Polarity	DC (+)
Electrode identification	FOX CEL 90 9010-P1 E 50 3 1Ni C
Redrying	not allowed

Dimension mm	Current A
4.0 × 350	120 – 180
5.0 × 350	160 – 210

Approvals

TÜV (01324.), CE

BÖHLER FOX BVD 85

Basic vertical down stick electrode, low-alloyed, pipeline welding

Classifications

EN ISO 2560-A
E 46 5 1Ni B 4 5 H5

AWS A5.5 / SFA-5.5
E8045-P2 H4 R
E8018-G H4 R

Characteristics and typical fields of application

Basic coated electrodes for vertical-down welds of large diameter pipelines and for structural work. Suitable for filler and cover pass welding in pipeline construction. Deposit is extremely crack resistant, and features high toughness and a very low hydrogen content. Deposition rate is 80-100% higher than for vertical up welding. The weld deposit of BÖHLER FOX BVD 85 shows an ideal combination between high strength and cryogenic toughness down to -50°C . Special design and development work has enabled this electrode to provide exceptional striking characteristics and the avoidance of start porosity. Due to this and the good welding characteristics this special basic electrode offers easy handling even under field conditions.

Böhler FOX BVD 85 can be used in sour gas applications (HIC-Test acc. to NACE TM-02-84). Test values for SSC-test are available too.

Base materials

S235J2G3 - S355J2G3, L290NB - L450NB, L290MB - L450MB, P235GH - P295GH

API Spec. 5 L: A, B, X 42, X46, X 52, X 56, X 60, X 65, (X70)

Typical analysis of all-weld metal

	C	Si	Mn	Ni
wt.-%	0.05	0.4	1.1	0.9

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R_e MPa	Tensile strength R_m MPa	Elongation A ($L_0=5d_0$) %	Impact values ISO-V KV J				
				20°C	-20°C	-30°C	-40°C	-50°C
u	500 (≥ 460)	560 (550 – 680)	27 (≥ 20)	170	140	120	100	65 (≥ 47)
u untreated, as welded								

Operating data



Polarity DC (+)

Electrode identification FOX BVD 85 8045-P2 E 46 5 1Ni B

Redrying if necessary: 300 – 350 °C / min. 2 h

Dimension mm

3.2 × 350 110 – 160

4.0 × 350 180 – 210

4.5 × 350 200 – 240

Recommended interpass temperature $> 80^{\circ}\text{C}$

Approvals

TÜV (03531.), CE

Classifications

EN ISO 18275-A

E 55 5 Z2Ni B 4 5 H5

AWS A5.5 / SFA-5.5

E9018-G H4 R

E9045-P2 H4 R (mod.)

Characteristics and typical fields of application

Basic coated electrode for vertical-down welds of large diameter pipelines and for structural work. Suitable for filler and cover pass welding in pipeline construction. Deposit is extremely crack resistant, and features high toughness and a very low hydrogen content. Special design and development work has enabled this electrode to provide exceptional striking characteristics and the avoidance of start porosity. Due to this and the good welding characteristics this special basic electrode offers easy handling even under field conditions. Deposition rate is 80 – 100% higher than for vertical up welding.

Base materials

L485MB, L555MB

API Spec. 5 L: X70, X80

Typical analysis of all-weld metal

wt.-%	C	Si	Mn	Ni
	0.05	0.3	1.2	2.2

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J				
				20°C	-20°C	-30°C	-40°C	-50°C
u	580 (≥ 550)	650 (620 – 780)	27 (≥ 18)	170	130	110	90	70 (≥ 47)
u untreated, as welded								

Operating data



Polarity	DC (+)
Electrode identification	FOX BVD 90 9018-G E 55 5 Z 2Ni B
Redrying	if necessary: 300 – 350 °C / min. 2 h

Dimension mm	Current A
2.5 x 350	80 - 110
3.2 x 350	110 – 160
4.0 x 350	180 – 210
4.5 x 350	200 – 240

Recommended interpass temperature > 90°C

Approvals

TÜV (03402.), GAZPROM, CE

BÖHLER FOX BVD 100

Basic vertical down stick electrode, low-alloyed, pipeline welding

Classifications

EN ISO 18275-A
E 62 5 Z2Ni B 4 5

AWS A5.5 / SFA-5.5
E10018-G
E10045-P2 (mod.)

Characteristics and typical fields of application

Basic coated electrodes for vertical-down welds of large diameter pipelines and for structural work. Suitable for filler and cover pass welding in pipeline construction. Deposit is extremely crack resistant, and features high toughness and a very low hydrogen content. Special design and development work has enabled this electrode to provide exceptional striking characteristics and the avoidance of start. Due to this and the good welding characteristics this special basic electrode offers easy handling even under field conditions. Deposition rate is 80 – 100% higher than for vertical up welding.

Base materials

L555MB
API Spec. 5 L: X80

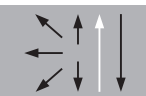
Typical analysis of all-weld metal

wt.-%	C	Si	Mn	Ni
	0.07	0.4	1.2	2.3

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J			
	MPa	MPa	%	20°C	-20°C	-30°C	-50°C
u	640 (≥ 620)	720 (690 – 890)	24 (≥ 18)	150	120	105	60 (≥ 47)
u untreated, as welded							

Operating data



Polarity	DC (+)
Electrode identification	FOX BVD 100 10018-G E 62 5 Z2Ni B
Redrying	if necessary: 300 – 350 °C / min. 2 h

Dimension mm	Current A
3.2 × 350	100 – 160
4.0 × 350	180 – 210
4.5 × 350	200 – 240

Recommended interpass temperature > 100°C

Approvals

TÜV (06333.), CE

Classifications

EN ISO 2560-A
E 42 4 B 1 2

AWS A5.1 / SFA-5.1
E7016-1

Characteristics and typical fields of application

Basic coated electrode, excellent suited for positional welding of root passes using D.C. negative polarity as well as for filler and cover passes of pipes, tubes and plates on D.C. positive polarity, or even AC. It is user friendly and provides a good gap bridging ability together with easy slag removal to ensure minimum grinding. Weld metal toughness is available down to -46°C. BÖHLER FOX EV PIPE offers considerable time savings against AWS E7018 type electrodes when welding root passes due to increased travel speeds. Also the use of dia. 3.2 mm is possible for root passes in case of wall thicknesses of 8 mm and more. BÖHLER FOX EV PIPE can be used in sour gas applications (HIC-Test acc. to NACE TM-02-84). Test values for SSC-test are available too.

Base materials

P235GH, P265GH, P295GH, P235T1, P275T1, P235G2TH, P255G1TH, (S255N-S420N *1)

S255NL1-S420NL1, L290NB-L360NB, L290MB-L415MB, (L450MB-L555MB *2)

API Spec. 5L: A, B, X 42, X46, X52, X56, X60, (X65-X80 *2)

ASTM: A53 Gr. A-B, A106 Gr. A-C, A179, A192, A210 Gr. A-1

*1) stress relieved up to S380N / S380NL1

*2) only for root pass

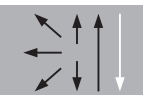
Typical analysis of all-weld metal

wt.-%	C	Si	Mn
	0.06	0.60	0.9

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J			
				20°C	-20°C	-40°C	-45°C
u	470 (≥ 420)	560 (500 – 640)	29 (≥ 20)	170	120	100 (≥ 47)	65 (≥ 27)
u untreated, as welded							

Operating data



Polarity	DC +/-, Minuspol für Wurzel
Electrode identification	FOX EV PIPE 7016-1 E 42 4 B
Redrying	if necessary: 300 – 350°C, min. 2 h

Dimension mm	Current A
2.0 × 300	30 – 60
2.5 × 300	40 – 90
3.2 × 350	60 – 130
4.0 × 350	110 – 180

Preheated and interpass temperatures as required by the base material. The optimum gap width for root passes is 2 – 3 mm, the root face should be in the range 2 – 2.5 mm. The electrodes are ready for use straight from the hermetically sealed tins.

Approvals

TÜV (07620.), DB (10.014.77), CE, NAKS, GAZPROM

BÖHLER FOX EV 60 PIPE

Stick electrode, low alloyed, basic coated, pipeline welding

Classifications

EN ISO 2560-A
E 50 4 1Ni B 1 2 H5

AWS A5.5 / SFA-5.5
E8016-G H4 R

Characteristics and typical fields of application

Basic coated electrode excellent suited for positional welding for filler and cover passes for pipes, tubes and plates. Good impact properties down to -40°C , low hydrogen content ($\text{HD} < 5 \text{ ml}/100 \text{ g}$), as well as packaging in hermetically sealed tins are further features for the user.

Base materials

EN: S235J2G3 - S355J2G3, L210NB - L450NB, L210MB - L450MB, P235GH - P295GH, E295, E335, S355J2G3, C35-C45, P310GH, S380N - S460N, P380NH-P460NH, S380NL - S460NL, S380NL1 - S460NL2, GE260-GE300

API Spec. 5 L: X 42, X46, X 52, X 56, X 60, X 65

ASTM A516 Gr. 65, A572 Gr. 55, 60, 65, A633 Gr. E, A612, A618 Gr. I, A537 Gr. 1-3

Typical analysis of all-weld metal

wt.-%	C	Si	Mn	Ni
	0.07	0.6	1.2	0.9

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R_e MPa	Tensile strength R_m MPa	Elongation A ($L_0=5d_0$) %	Impact values ISO-V KV J				
				20°C	0°C	-20°C	-40°C	-45°C
u	540 (≥ 500)	620 (560 – 720)	26 (≥ 18)	170	150	140	110 (≥ 47)	60
u untreated, as welded								

Operating data



Polarity	DC (+)	Dimension mm	Current A
Electrode identification	FOX EV 60 PIPE 8016-G E 50 4 1 Ni B	2.5 × 300	40 – 90
Redrying	if necessary 300 – 350°C, min. 2h	3.2 × 350	60 – 130
		4.0 × 350	110 – 180
		5.0 × 450	180 – 230

Preheat and interpass temperatures as required by the base material. The electrodes are ready for use straight from the tins.

Approvals

CE



BÖHLER FOX EV 70 PIPE

Stick electrode, low alloyed, basic coated, pipeline welding

SMAW

Classifications

EN ISO 18275-A

E 55 4 ZMn2NiMo B 1 2 H5

AWS A5.5 / SFA-5.5

E9016-G H4 R

Characteristics and typical fields of application

Basic coated electrode for high strength steels. It is excellent suited for positional welding of filler and cover passes of pipes, tubes and plates on D.C. positive polarity. It is user friendly and provides a good gap bridging ability together with easy slag removal to ensure minimum grinding. Good impact properties down to -40°C, low hydrogen content (HD < 5 ml/100 g).

Base materials

EN: L450MB, L485MB, L555MB

API Spec. 5 L: X65, X70, X80

Typical analysis of all-weld metal

	C	Si	Mn	Ni	Mo
wt.-%	0.06	0.5	1.7	2.2	0.3

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) +20°C	Impact values ISO-V KV J			
				20°C	-20°C	-40°C	-45°C
u	630 (≥ 550)	700 (620 – 780)	20 (≥ 18)	140	90	70 (≥ 47)	60
u untreated, as welded							

Operating data



Polarity	DC (+)
Electrode identification	FOX EV 70 PIPE 9016-G
Redrying	if necessary 300 – 350°C, min. 2h

Dimension mm	Current A
2.5 × 300	40 – 90
3.2 × 350	60 – 130
4.0 × 350	110 – 180

Preheat and interpass temperature as required by the base material. The electrodes are ready for use straight from the hermetically sealed tins.

Approvals

TÜV (12809.), CE

BÖHLER NiMo1-IG



TIG rod, low-alloyed, high strength

Classifications

EN ISO 16834-A

W 55 6 11 Mn3Ni1Mo

AWS A5.28 / SFA-5.28

ER90S-G

Characteristics and typical fields of application

TIG rod for high strength, quenched and tempered fine-grained constructional steels. The wire is suited for joint welding in boiler, pressure vessel, pipeline and crane construction as well as in structural steel engineering. Typical composition of the wire fulfils the NORSOK- regulation requirements for "water injection systems". Due to the micro-alloying concept, NiMo 1-IG rod combines excellent ductility with high strength. Good toughness down to -60°C and low hydrogen contents in the deposit.

Base materials

S460N, S460M, S460NL, S460ML, S460Q-S555Q, S460QL-S550QL, S460QL1-S550QL1, P460N, P460NH, P460NL1, P460NL2, L415NB, L415MB-L555MB, L415QB-L555QB, alform 500 M, 550 M, aldur 500 Q, 500 QL, 500 QL1, aldur 550 Q, 550 QL, 550 QL1, 20MnMoNi4-5, 15NiCuMoNb5- 6-4

ASTM A 572 Gr. 65; A 633 Gr. E; A 738 Gr. A; A 852; API 5 L X60, X65, X70, X80, X60Q, X65Q, X70Q, X80Q

Typical analysis of the wire rod

wt.-%	C	Si	Mn	Ni	Mo
	0.08	0.6	1.8	0.9	0.3

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength $R_{p0.2}$	Tensile strength R_m	Elongation A ($L_0=5d_0$)	Impact values ISO-V KV J		
	MPa	MPa	%	20°C	-40°C	-60°C
u	620 (≥ 550)	700 (≥ 640)	23 (≥ 18)	140	110	≥ 47

Operating data



Polarity DC -

Shielding gas
(EN ISO 14175) I1

Rod marking W Mn3Ni1Mo
ER90S-G

Dimension mm

2.4 x 1000

3.2 x 1000

Preheat, interpass temperature and post weld heat treatment as required by the base metal.

Approvals

Classifications

EN ISO 14341-A
G 46 5 M21 Z3Si1
G 42 4 C1 Z3Si1

AWS A5.18 / SFA-5.18
ER70S-G

Characteristics and typical fields of application

Pipeshield X series of solid wires for GMAW are specifically designed for fully automatic circumferential all position pipe welding. Pipeshield X combine the benefits of engineered wire surfaces and thoroughly controlled chemical compositions leading to good impact values even at low temperatures. Consistent wire geometry supports wire feeding and stable arc performance.

Pipeshield X65 covers pipe steel grades up to API X65 offering good impact toughness at low temperatures down to -40 °C (-50 °F). Often used for root pass welding with higher tensile pipe grades.

Base materials

EN: L290MB – L450MB

API Spec. 5L: X42, X46, X52, X56, X60, X65

Typical analysis of the solid wire

wt.-%	C	Si	Mn	Ti
	0.05	0.75	1.55	+

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _{p0.2}	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J	Shielding gas
	MPa / KSI	MPa / KSI	%	-40 °C	
u1	632 / 91.6	692 / 100.4	29	58 / 43	CO ₂ M21
u2	673 / 97.6	726 / 105.3	30	102 / 75	

u1 untreated, as welded – shielding gas 100% CO₂

u2 untreated, as welded – shielding gas Ar + 15 – 25% CO₂

Operating data



Dimension mm

1.2

Approvals

Pipeshield X70

Solid Wire, mild steel

Classifications

EN ISO 14341-B
G 55A 4 M21 S6
G 55A 2 C1 S6

EN ISO 14341-A
G 46 4 M21 4Si1
G 46 2 C1 4Si1

AWS A5.18 / SFA-5.18
ER70S-6

Characteristics and typical fields of application

Pipeshield X series of solid wires for GMAW are specifically designed for fully automatic circumferential all position pipe welding. Pipeshield X combines the benefits of engineered wire surfaces and thoroughly controlled chemical compositions leading to good impact values even at low temperatures. Consistent wire geometry supports wire feeding and stable arc performance. Pipeshield X70 covers pipe steel grades up to API X70 offering good impact toughness at low temperatures down to -40 °C (-40 °F) and CTOD values at -10 °C (14 °F). Root pass capability up to X80. This product can be used in sour gas applications. (HIC tested acc. to NACE TM-0284).

Base materials

API 5L: Grade B, X42, X52, X56, X60, X65 and X70, EN 10208-2: L245MB – L485MB; L245NB – L415NB and similar steel grades

Typical analysis of the solid wire

wt.-%	C	Si	Mn	S	P
	0.069	0.95	1.65	≤ 0.015	≤ 0.020

Mechanical properties of all-weld metal - typical values (min. values)

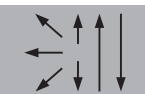
Condition	Yield strength R _{0.2} MPa / KSI	Yield strength R _e MPa / KSI	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J	
				-20°C J / ft*lbt	-40°C J / ft*lbt
u1	485 / 70.3 (460 / 66.7)	595 / 86.3 (570 / 82.7)	25	120 / 88.5 (50 / 36.9)	60 / 44.3
u2	530 / 76.9 (480 / 69.6)	615 / 89.2 (580 / 84.1)	24	140 / 103.3 (75 / 55.3)	115 / 84.8 (60 / 44.3)
u3	650 / 94.3	715 / 103.7	22	170 / 125	145 / 106.9

u1 untreated, as welded – shielding gas 100 % CO₂

u2 untreated, as welded – shielding gas Ar + 15 – 25 % CO₂

u3 untreated, as welded – shielding gas M21, field result, round tensile specimen, longitudinal

Operating data



Dimension mm

1.0
1.2

Approvals

TÜV (19421), CE

Classifications

EN ISO 14341-A
G 50 6 M21 Z3Ni1
G 46 4 C1 Z3Ni1

AWS A5.28 / SFA-5.28
ER80S-G

Characteristics and typical fields of application

Pipeshield X series of solid wires for GMAW are specifically designed for fully automatic circumferential all position pipe welding. Pipeshield X combines the benefits of engineered wire surfaces and thoroughly controlled chemical compositions leading to good impact values even at low temperatures. Consistent wire geometry supports wire feeding and stable arc performance. The 1%Ni-alloyed Pipeshield X80 covers pipe steel grades up to API X80 offering good impact toughness at low temperatures down to -60 °C (-76 °F) and CTOD values at -10 °C (14 °F). Root pass capability up to X100. This product can be used in sour gas applications. (HIC tested acc. to NACE TM-0284).

Base materials

API5L: X42, X52, X56, X60, X65, X70 and X80, EN 10208-2: L290MB – L555MB; L290NB – L415NB and similar steel grades

Typical analysis of the solid wire

wt.-%	C	Si	Mn	Ni	Ti	S	P
	0.065	0.69	1.55	0.9	+	≤ 0.015	≤ 0.020

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _{p0.2} MPa / KSI	Tensile strength R _m MPa / KSI	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J	
				20 °C J / ft*lb	-60 °C J / ft*lb
u1	485 / 68.3	570 / 81.1	25	70 / 51.6	-
u2	500 / 72.5	600 / 24.0	24	125 / 92.2	60 / 44.3
u3	590 / 85.3	670 / 96.7	24.4	-	-
u4	-	608 / 88.2	-	170 / 125	90 / 66

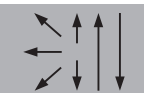
u1 untreated, as welded – shielding gas 100% CO₂

u2 untreated, as welded – shielding gas Ar + 15 – 25% CO₂

u3 untreated, as welded – shielding gas M21, field result, round tensile specimen, longitudinal

u4 untreated, as welded – shielding gas M21, field result, round tensile specimen, transverse

Operating data



Dimension mm

1.0
1.2

Approvals

DNV GL

Pipeshield X90

Solid Wire, low-alloyed, high strength

Classifications

EN ISO 16834-A

G 55 6 M21 Mn3Ni1Mo

G 55 4 C1 Mn3Ni1Mo

AWS A5.28 / SFA-5.28

ER90S-G

Characteristics and typical fields of application

Pipeshield X series of solid wires for GMAW are specifically designed for fully automatic circumferential all position pipe welding. Pipeshield X combine the benefits of engineered wire surfaces and thoroughly controlled chemical compositions leading to good impact values even at low temperatures. Consistent wire geometry supports wire feeding and stable arc performance. Pipeshield X90 covers pipe steel grades up to API X80Q and is designed for welding in all positions. Good cryogenic impact energy down to -60°C and low hydrogen contents in the deposit.

Base materials

S460N, S460M, S460NL, S460ML, S460Q-S555Q, S460QL-S550QL, S460QL1-S550QL1, 460N, P460NH, P460NL1, P460NL2, L415NB, L415MB-L555MB, L415QB-L555QB, 20MnMoNi4-5, 15NiCuMoNb5-6-4;

ASTM A 572 Gr. 65; A 633 Gr. E; A 738 Gr. A; A 852; API 5 L X60, X65, X70, X80, X60Q, X65Q, X70Q, X80Q

Typical analysis of the solid wire

wt.-%	C	Si	Mn	Ni	Mo
	0.08	0.60	1.8	0.9	0.30

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _{0.2} MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J		
				20°C	-40°C	-60°C
u	620 (≥ 550)	700 (≥ 640)	23 (≥ 18)	140	110	≥ 47
u2	590 (≥ 550)	680 (≥ 640)	22 (≥ 18)	120	≥ 47	
u untreated, as welded – shielding gas Ar + 15 – 25% CO ₂						
u2 untreated, as welded – shielding gas 100% CO ₂						

Operating data



Dimension mm

0.9

1.0

1.2

Preheat, interpass temperature and post weld heat treatment as required by the base metal.

Approvals

-

Union S 2 Si - UV 310 P

SAW wire/flux combination, mild steel

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23	AWS A5.17 / SFA-5.17
Multi-run	S 38 2 AB S2Si		F7A2-EM12K
2-run	S 3T 0 AB S2Si	F6TA0G-EM12K	

Characteristics and typical fields of application

Union S 2 Si - UV 310 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination is recommended for two-run welding technique with multi-wire welding processes, with very good welding performance and low failure rate, and is applied in case of low requirements to strength and toughness properties. Also suitable for single wire (DC+), tandem (DC+ and AC).

UV 310 P is an aluminate-basic flux. For information regarding this welding flux see our detailed data sheet.

Base materials

Fine grained structural and line pipe steel grades up to API X 60 and EN 10208-2: L415 MB

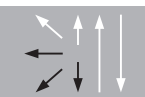
Typical analysis of the weld metal

wt.-%	C	Si	Mn
wire	0.10	0.30	1.10
all-weld metal	0.08	0.40	1.20

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J	
	MPa	MPa	%	-30°C	-20°C
u, DC+	430 (≥ 400)	515 (480-600)	29 (≥ 22)	54 (≥ 27)	80 (≥ 47)
u untreated, as welded, single wire					

Operating data



Polarity DC / AC

Dimension mm

3.2

4.0

The mechanical properties of weld metal by two-run technique are strongly influenced by:

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - o welding parameters (heat input)
 - o wall thickness (2 - resp. 3 dimensional cooling)
 - o preheat / interpass temperature

Approvals

Union S 3 Si - UV 309 P

SAW wire/flux combination, mild steel

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA 5.23	AWS A5.17 / SFA 5.17
Multi-run	S 42 4 AB S3Si	-	F7A5-EH12K
2-run	S 3T 2 AB S3Si	F7TA0G-EH12K	-

Characteristics and typical fields of application

Union S 3 Si - UV 309 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination can be used for 2 - run technique with multi wire welding processes, with very good welding performance.

UV 309 P is an agglomerated, with low hydrogen content. For more details on the flux, see our detailed datasheet of UV 309 P.

Base materials

Fine grained structural and pipe steel grades up to YS = 420 MPa.

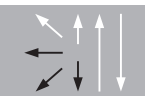
Typical analysis of the weld metal

wt.-%	C	Si	Mn
wire	0.10	0.30	1.65
all-weld metal	0.06	0.45	1.50

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _{p0.2}	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J	
	MPa	MPa	%	-46 °C	-40 °C
u, DC+	450 (≥ 420)	540 (500-640)	29 (≥ 22)	45 (≥ 27)	60 (≥ 47)
u untreated, as welded, single wire					

Operating data



Polarity DC+, AC

Dimension mm

3.0

4.0

4.8

The mechanical properties of weld metal by two-run technique are strongly influenced by:

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - o welding parameters (heat input)
 - o wall thickness (2 - resp. 3 dimensional cooling)
 - o preheat / interpass temperature

Approvals

-



Union S 3 Si - UV 310 P

SAW wire/flux combination, mild steel

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23	AWS A5.17 / SFA-5.17
Multi-run	S 42 4 AB S3Si		F7A6-EH12K
2-run	S 3T 2 AB S3Si	F7TA0G-EH12K	

Characteristics and typical fields of application

Union S 3 Si - UV 310 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination can be used for 2-run and multi-run welding technique with single wire (DC+) and tandem (DC+ and AC) welding processes, with very good welding performance and low failure rate.

UV 310 P is an agglomerated neutral flux, that does not add Manganese, neither Silicon to the weld metal, with very low hydrogen content. For more details on the flux, see our detailed datasheet of UV 310 P.

Base materials

Fine grained structural and pipe steel grades up to YS = 420 MPa.

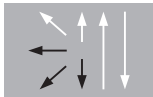
Typical analysis of the weld metal

wt.-%	C	Si	Mn
wire	0.10	0.30	1.65
all-weld metal	0.05	0.30	1.50

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J	
	MPa	MPa	%	-50 °C	-40 °C
u, DC+	450 (≥ 420)	540 (500-640)	29 (≥ 22)	45 (≥ 27)	65 (≥ 47)
u untreated, as welded, single wire					

Operating data



Polarity DC / AC

Dimension mm

2.5
3.0
4.0
4.8

The mechanical properties of weld metal by two-run technique are strongly influenced by:

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - o welding parameters (heat input)
 - o wall thickness (2 - resp. 3 dimensional cooling)
 - o preheat / interpass temperature

Approvals

Union S 2 Mo - UV 309 P



SAW wire/flux combination, low-alloyed

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23
Multi-run	S 46 4 AB S2Mo	F8A4-EA2-A2
2-run	S 4T 4 AB S2Mo	F8TA4G-EA2

Characteristics and typical fields of application

Union S 2 Mo - UV 309 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination is recommended for two-run welding technique with multi-wire welding processes, with very good welding performance and low failure rate, and is applied in case of moderate requirements to strength and toughness properties. Especially recommended for longitudinal pipe manufacturing (pipe mill). Also suitable for single wire (DC+), tandem (DC+ and AC).

UV 309 P is an aluminate-basic flux. For information regarding this welding flux see our detailed data sheet.

Base materials

Fine grained structural and line pipe steel grades up to API X 60, X65 and EN 10208-2: L415,450 MB

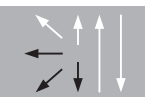
Typical analysis of the weld metal

wt.-%	C	Si	Mn	Mo
wire	0.10	0.15	1.05	0.55
all-weld metal	0.07	0.30	1.15	0.50

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J	
	MPa	MPa	%	-40 °C	-20 °C
u, DC+	≥ 470	550-680	≥ 20	≥ 47	≥ 60
u untreated, as welded, single wire					

Operating data



Polarity DC / AC

Dimension mm

3.0
4.0

The mechanical properties of weld metal by two-run technique are strongly influenced by:

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - o welding parameters (heat input)
 - o wall thickness (2 - resp. 3 dimensional cooling)
 - o preheat / interpass temperature

Approvals

-

Union S 2 Mo - UV 310 P

SAW wire/flux combination, low-alloyed

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23
Multi-run	S 46 4 AB S2Mo	F8A4-EA2-A2
2-run	S 4T 4 AB S2Mo	F8TA4G-EA2

Characteristics and typical fields of application

Union S 2 Mo - UV 310 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination is recommended for two-run welding technique with multi-wire welding processes, with very good welding performance and low failure rate, and is applied in case of moderate requirements to strength and toughness properties. Especially recommended for longitudinal pipe welding (pipe mill). Also suitable for single wire (DC+), tandem (DC+ and AC).

UV 310 P is an aluminate-basic flux. For information regarding this welding flux see our detailed data sheet.

Base materials

Fine grained structural and line pipe steel grades up to API X 60, X65 and EN 10208-2: L415,450 MB

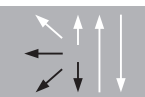
Typical analysis of the weld metal

wt.-%	C	Si	Mn	Mo
wire	0.10	0.15	1.05	0.55
all-weld metal	0.07	0.25	1.15	0.50

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J	
	MPa	MPa	%	-40°C	-20°C
u, DC+	≥ 470	550-680	≥ 20	≥ 47	≥ 60
u untreated, as welded, single wire					

Operating data



Polarity DC / AC

Dimension mm

3.0

4.0

The mechanical properties of weld metal by two-run technique are strongly influenced by::

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - o welding parameters (heat input)
 - o wall thickness (2 - resp. 3 dimensional cooling)
 - o preheat / interpass temperature

Approvals

Union S 4 Mo - UV 310 P



SAW wire/flux combination, low-alloyed

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23
Multi-run	S 46 4 AB S4Mo	F8A4-EA3-A3
2-run	S 4T 4 AB S4Mo	F8TA4G-EA3

Characteristics and typical fields of application

Union S 4 Mo - UV 310 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination is recommended for two-run welding technique with multi-wire welding processes, with very good welding performance and low failure rate, and is applied in case of moderate requirements to strength and toughness properties.

Also suitable for single wire (DC+), tandem (DC+ and AC).

UV 310 P is an aluminate-basic flux. For information regarding this welding flux see our detailed data sheet.

Base materials

Fine grained structural and line pipe steel grades up to API X 60, X65 and EN 10208-2: L415,450 MB

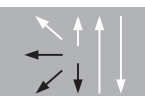
Typical analysis of the weld metal

wt.-%	C	Si	Mn	Mo
wire	0.11	0.10	2.00	0.50
all-weld metal	0.07	0.20	1.55	0.45

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J	
	MPa	MPa	%	-40 °C	-20 °C
u, DC+	≥ 470	550-680	≥ 20	≥ 47	≥ 60
u untreated, as welded, single wire					

Operating data



Polarity DC / AC

Dimension mm

4.0

4.8

The mechanical properties of weld metal by two-run technique are strongly influenced by::

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - o welding parameters (heat input)
 - o wall thickness (2 - resp. 3 dimensional cooling)
 - o preheat / interpass temperature

Approvals

Union S 3 TiB - UV 309 P

SAW wire/flux combination, mild steel

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23
Multi-run	(S 46 Z AB SZ)	(F8AZ-EG-G)
2-run	S 5T 5 AB SZ	F8TA6G-EG

Characteristics and typical fields of application

Union S 3 TiB - UV 309 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination has been designed to achieve optimum toughness properties of weld metal produced by two-run welding technique. This wire-flux combination is not recommended for multi-pass welding. It is especially recommended for longitudinal pipe manufacturing (pipe mill) with typical welding procedures with

- 2-run-technique with high dilution rate (e.g. > 65%)
- combined with other alloyed / non-alloyed wires in multi-wire configuration
- for high CTOD / charpy toughness requirements at -20°C / -50°C
- to limit hardness in weld metal (e.g. X65 for sour service)

UV 309 P is an aluminate-basic flux. For information regarding this welding flux see our detailed data sheet.

Base materials

Fine grained structural and line pipe steel grades : API X60, X65, X70, EN 10208-2: L415 MB, L450 MB, L485 MB.

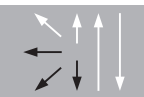
Typical analysis of the weld metal

wt.-%	C	Si	Mn	Mo	B	Ti	S	P
wire	0.07	0.3	1.55	-	0.013	0.15	≤ 0.005	≤ 0.015
all-weld metal	0.05	0.4	1.30	-	0.003	0.02	≤ 0.010	≤ 0.015

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J		
	MPa	MPa	%	-20 °C	0 °C	20 °C
u, DC+	≥ 470	550 - 680	≥ 20	≥ 50	≥ 100	≥ 150
u untreated, as welded, single wire						

Operating data



Polarity DC + / AC

Dimension mm

3.2

4.0

5.0

The mechanical properties of weld metal by two-run technique are strongly influenced by:

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - welding parameters (heat input)
 - wall thickness (2 - resp. 3 dimensional cooling)
 - preheat / interpass temperature

Approvals

Union S 3 TiB - UV 310 P

SAW wire/flux combination, mild steel

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23
Multi-run	(S 46 Z AB SZ)	(F8AZ-EG-G)
2-run	S 5T 5 AB SZ	F8TA6G-EG

Characteristics and typical fields of application

Union S 3 TiB - UV 310 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination has been designed to achieve optimum toughness properties of weld metal produced by two-run welding technique. This wire-flux combination is not recommended for multi-pass welding. It is especially recommended for longitudinal pipe manufacturing (pipe mill) with typical welding procedures with

- 2 run-technique with high dilution rate (e.g. > 65%)
- combined with other alloyed / non-alloyed wires in multi-wire configuration
- for high CTOD / charpy toughness requirements at -20°C / -50°C
- to limit hardness in weld metal (e.g. X65 for sour service)

UV 310 P is an aluminate-basic flux. For information regarding this welding flux see our detailed data sheet.

Base materials

Fine grained structural and line pipe steel grades like API X 60, X 65, X70, and EN 10208-2: L415 MB, L450 MB, L485 MB.

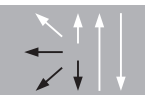
Typical analysis of the weld metal

wt.-%	C	Si	Mn	Mo	B	Ti	S	P
wire	0.07	0.3	1.55	-	0.013	0.15	≤ 0.005	≤ 0.015
all-weld metal	0.05	0.3	1.30	-	0.003	0.02	≤ 0.010	≤ 0.015

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J		
	MPa	MPa	%	-20°C	0°C	20°C
u, DC+	≥ 470	550 - 580	≥ 20	≥ 50	≥ 100	≥ 150
u untreated, as welded, single wire						

Operating data



Polarity DC + / AC

Dimension mm

3.2
4.0
5.0

The mechanical properties of weld metal by two-run technique are strongly influenced by:

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - welding parameters (heat input)
 - wall thickness (2 - resp. 3 dimensional cooling)
 - preheat / interpass temperature

Approvals

Union S 3 MoTiB - UV 309 P

SAW wire/flux combination, low-alloyed

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23
Multi-run	(S 46 Z AB S2MoTiB)	(F8AZ-EA2TiB-G)
2-run	S 5T 5 AB S2MoTiB	F9TA6G-EA2TiB

Characteristics and typical fields of application

Union S 3 MoTiB - UV 309 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination has been designed to achieve optimum toughness properties of weld metal produced by two-run welding technique. This wire-flux combination is not recommended for multi-pass welding. It is especially recommended for longitudinal pipe manufacturing (pipe mill) with typical welding procedures with

- 2-run-technique with high dilution rate (e.g. > 65%)
- combined with other alloyed / non-alloyed wires in multi-wire configuration
- for high CTOD / charpy toughness requirements at -40°C / -60°C
- high strength level of weld (e.g. YS > 580MPa; TS > 680 MPa (API-5L: X60-X80)).

UV 309 P is an aluminate-basic flux. For information regarding this welding flux see our detailed data sheet.

Base materials

Fine grained structural and line pipe steel grades like API X60, X65, X70, X80 and EN 10208-2: L415 MB, L450 MB, L485 MB, L555 MB.

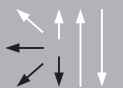
Typical analysis of the weld metal

wt.-%	C	Si	Mn	Mo	B	Ti	S	P
wire	0.07	0.30	1.2	0.55	0.013	0.14		
all-weld metal	0.05	0.40	1.3	0.50	0.003	0.02	≤ 0.015	≤ 0.015

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J		
	MPa	MPa	%	-20 °C	0 °C	20 °C
u, DC+	≥ 500	(570 - 720)	≥ 20	≥ 50	≥ 100	≥ 150
u untreated, as welded, single wire						

Operating data

	Polarity	DC / AC	Dimension mm

The mechanical properties of weld metal by two-run technique are strongly influenced by:

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - o welding parameters (heat input)
 - o wall thickness (2 - resp. 3 dimensional cooling)
 - o preheat / interpass temperature

Approvals

TÜV (10450 : UV 309 P / Union S 3 Mo + 2 x Union S 3 MoTiB)

Union S 3 MoTiB - UV 310 P

SAW wire/flux combination, low-alloyed

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23
Multi-run	(S 46 Z AB S2MoTiB)	(F8AZ-EA2TiB-G)
2-run	S 5T 5 AB S2MoTiB	F9TA6G-EA2TiB

Characteristics and typical fields of application

Union S 3 MoTiB - UV 310 P is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades. This wire-flux combination has been designed to achieve optimum toughness properties of weld metal produced by two-run welding technique. This wire-flux combination is not recommended for multi-pass welding. It is especially recommended for longitudinal pipe manufacturing (pipe mill) with typical welding procedures with

- 2-run-technique with high dilution rate (e.g. > 65%)
- combined with other alloyed / non-alloyed wires in multi-wire configuration
- for high CTOD / charpy toughness requirements at -40°C / -60°C
- high strength level of weld (e.g. YS > 580MPa; TS > 680 MPa (API-5L: X60-X80)).

UV 310 P is an aluminate-basic flux. For information regarding this welding flux see our detailed data sheet.

Base materials

Fine grained structural and line pipe steel grades like API X 60, X 65, X70, X80 and EN 10208-2: L415 MB, L450 MB, L485 MB, L555 MB.

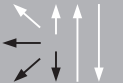
Typical analysis of the weld metal

wt.-%	C	Si	Mn	Mo	B	Ti	S	P
wire	0.07	0.30	1.2	0.55	0.013	0.14		
all-weld metal	0.05	0.30	1.3	0.50	0.003	0.02	≤ 0.015	≤ 0.015

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J		
	MPa	MPa	%	-20°C	0°C	20°C
u, DC+	≥ 500	(570 – 720)	≥ 20	≥ 50	≥ 100	≥ 150
u untreated, as welded, single wire						

Operating data

	Polarity	DC / AC	Dimension mm
			3.0
			4.0

The mechanical properties of weld metal by two-run technique are strongly influenced by:

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time $t_{8/5}$ of the weld cycle, depending on
 - o welding parameters (heat input)
 - o wall thickness (2 - resp. 3 dimensional cooling)
 - o preheat / interpass temperature

Approvals



Union S 3 MoTiB - UV 419 TT-W

SAW wire/flux combination, low-alloyed

Classifications

Type	EN ISO 14171-A	AWS A5.23 / SFA-5.23
Multi-run	(S 46 Z FB S2MoTiB)	(F8AZ-EA2TiB-G)
2-run	S 5T 5 FB S2MoTiB	F9TA6G-EA2TiB

Characteristics and typical fields of application

Union S 3 MoTiB - UV 419 TT-W is a wire-flux combination for submerged-arc welding of unalloyed and low-alloyed steel grades.

This wire-flux combination is not recommended for multi-pass welding ; this wire-flux combination has been designed to achieve very good toughness properties of weld metal produced by two-run or back weld punch through technique (double-joint), with typically

- high dilution rate (e.g. > 50%)
- high heat-input (e.g. > 30 kJ/cm)
- for high CTOD and Charpy toughness requirements at -40°C / -60°C

Base materials

Fine grained structural and line pipe steel grades like API X 60, X 65, X70, X80 and EN 10208-2: L415 MB, L450 MB, L485 MB, L555 MB.

Typical analysis of the weld metal

wt.-%	C	Si	Mn	Mo	B	Ti
wire	0.07	0.30	1.2	0.55	0.013	0.14
all-weld metal	0.05	0.35	1.3	0.50	0.003	0.02

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J		
				-20 °C	0 °C	20 °C
u, DC+	≥ 500	(570 - 720)	≥ 20	≥ 50	≥ 100	≥ 150
u untreated, as-welded						

Operating data

	Polarity	DC / AC	Dimension mm
			3.0
			4.0

The mechanical properties of weld metal by two-run technique are strongly influenced by:

- the high dilution rate (60 up to 70%)
- chemical composition of the base metal
- relative long cooling time t_{8/5} of the weld cycle, depending on
 - o welding parameters (heat input)
 - o wall thickness (2 - resp. 3 dimensional cooling)
 - o preheat / interpass temperature

Approvals

Union S 2 NiMo 1 - UV 419 TT-W



SAW wire/flux combination, low alloyed, high strength

Classifications

EN ISO 14171-A

S 50 6 FB SZ2Ni1Mo

AWS A5.23 / SFA 5.23

F8A8-ENi1-Ni1 - F8P8-ENi1-Ni1

Characteristics and typical fields of application

Union S 2 NiMo 1 - UV 419 TT-W is a wire flux combination It is suitable for single (AC or DC) and tandem (DC and AC or AC and AC) welding. Very good slag detachability also for narrow gap welding. Flux can especially be used for multi-pass butt welding of medium and high tensile steels. Very good impact toughness of weld metal at low temperatures.

UV 419 TT-W is an agglomerated fluoride-basic flux with high basicity and neutral metallurgical behavior. For more information regarding this welding flux see our detailed data sheet.

Base materials

General purpose structural steels, fine grained structural steels, medium and high tensile steels up to 500 MPa minimum yield strength.

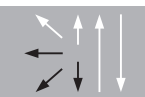
Typical analysis of the weld metal

wt.-%	C	Si	Mn	Ni	Mo	S	P
wire	0.11	0.15	1.10	0.95	0.25	≤ 0.010	≤ 0.010
all-weld metal	0.08	0.20	1.30	0.95	0.25		

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength $R_{p0.2}$ MPa	Tensile strength R_m MPa	Elongation A ($L_0=5d_0$) %	Impact values ISO-V KV J		
				20°C (≥180)	-40°C (≥100)	-60°C (≥70)
u, DC+	530 (≥500)	620 (≥570)	26 (≥22)	150 (≥100)	100 (≥70)	
a1, DC+	490 (≥470)	600 (≥550)	26 (≥22)	160 (≥120)	110 (≥80)	
u untreated, as welded ; a1 = 1 hour 620 °C						

Operating data



Polarity

DC+ (AC)

Dimension mm

2.5

3.2

4.0

Preheating and interpass temperature as required by the base metal.

Approvals



BÖHLER SUBARC T60 - UV 419 TT-W

SAW wire/flux combination, low alloyed, high strength

Classifications

EN ISO 14171-A

S 50 6 FB TZ3Ni1 H5

AWS A5.23 / SFA-5.23

F8A8-ECNi1-Ni1

Characteristics and typical fields of application

BÖHLER SUBARC T60 - UV 419 TT-W is a wire - flux combination submerged arc welding of high-strength, quenched and tempered fine grained structural steels up to MSYS = 500 MPa. The basic-cored wire provides weld metal with good toughness properties at low temperatures (-60°C), a fine bead appearance and good wetting properties, together with good slag detachability and low hydrogen content in the weld metal (< 5 ml/100g acc. to EN ISO 3690) characterize this wire/flux combination. With a Nickel content below 1% this wire-flux combination meets the NACE-requirements and can be used for sour gas applications. The seamless coppered wire is not sensitive to moisture pick up, has a good resistance to deformation (wire feed rollers) and is very easy to straighten to ensure the best current transfer with low contact tip consumption.

UV 419 TT-W is a flux with high basicity index and has been designed to be applied in unlimited thickness for a low level of diffusible hydrogen (to decrease the risk of cold cracking). The flux features a neutral metallurgical behavior.

Base materials

Constructional steels, pipe- and vessel steels, cryogenic fine-grained steels and special grades

S355JR, S355J0, S355J2, S450J0, S355N-S460N, S355NL-S460NL, S355M-S460M, S355ML-S460ML, S460Q, S500Q, S460QL, S500QL, S460QL1, S500QL1, P355GH, P355NH, P420NH, P460NH, P355N-P460N, P355NH-P460NH, P355NL1-P460NL1, P355NL2-P460NL2, L245NB-L415NB, L245MB-L485MB, L360QB-L485QB, aldur 500Q, aldur 500QL, aldur 500QL1

ASTM A 350 Gr. LF2; A 516 Gr. 65, 70; A 572 Gr. 42, 50, 60, 65; A 573 Gr. 70; A 588 Gr. B, C, K; A 633 Gr. A, C, D, E; A 662 Gr. B, C; A 678 Gr. B; A 707 Gr. L2, L3; A 841 Gr. A, B, C; API 5 L X42, X52, X60, X65, X70, X52Q, X60Q, X65Q, X70Q

Typical analysis of the weld metal

wt.-%	C	Si	Mn	Ni	Mo
all-weld metal	0.06	0.4	1.7	0.9	0.16

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _{p0.2}	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J	
	MPa	MPa	%	-60 °C	-40 °C
u, DC+	575 (≥ 500)	650 (610-690)	25 (≥ 20)	90 (≥ 50)	120 (≥ 70)
u untreated, as welded					

Operating data



Polarity DC + (AC)

Dimension mm

2.0

2.4

3.2

4.0

Approvals

Union S 3 NiMo 1 - UV 419 TT-W

SAW wire/flux combination, low-alloyed, high strength

Classifications

EN ISO 26304-A
S 55 6 FB S3Ni1Mo

AWS A5.23 / SFA-5.23
F9A8-EF3-F3 / F9P8-EF3-F3

Characteristics and typical fields of application

Union S 3 NiMo 1 - UV 419 TT-W is a wire flux combination for submerged arc welding non-alloyed and low-alloyed steel grades with high strength. Very good impact toughness of weld metal at low temperatures. Very good slag detachability also for narrow gap welding. It is suitable for single (AC or DC) and tandem (DC and AC) welding. Applications can be found in as welded condition (e.g. off shore) and PWHT condition (pressure vessels).

UV 419 TT-W is an agglomerated fluoride-basic flux with high basicity and neutral metallurgical behaviour. For more information regarding this sub-arc welding flux see our detailed data sheet.

Base materials

Quenched and tempered fine-grained steels

S460N, S460M, S460NL, S460ML, S460Q-S555Q, S460QL-S550QL, S460QL1-S550QL1, P460N, P460NH, P460NL1, P460NL2, 20MnMoNi4-5, 15NiCuMoNb5-6-4, L415NB, L415MB-L555MB, L415QB-L555QB, alform 500 M, aldur 500 Q, 500 QL, 500 QL1, aldur 550 Q, 550 QL, 550 QL1,

ASTM A572 Gr. 65; A633 Gr. E; A738 Gr. A; A852; API 5 L X60 - X80, X60Q, X65Q, X70Q, X80Q

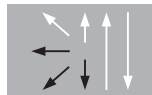
Typical analysis of the weld metal

wt.-%	C	Si	Mn	Ni	Mo
wire	0.12	0.20	1.75	0.95	0.55
all-weld metal	0.08	0.25	1.60	0.90	0.50

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength $R_{p0.2}$	Tensile strength R_m	Elongation A ($L_0=5d_0$)	Impact values ISO-V KV J	
	MPa	MPa	%	-60°C	-40°C
u, DC+	580 (≥ 550)	690 (≥ 640)	24 (≥ 20)	70 (≥ 47)	90
a1, DC+	560 (≥ 550)	670 (≥ 640)	25 (≥ 20)	70 (≥ 47)	90
u untreated, as welded; a1 = 2 hours 560 -620 °C					

Operating data



Polarity DC / AC

Dimension mm

1.6
2.0
2.5
3.0
3.2
4.0

Preheating and interpass temperature: 180 – 220°C

Approvals



BÖHLER Pipeshield 71 T8-FD

Self-shielded flux cored wire mild steel

Classifications

AWS A5.36 / SFA-5.36
E71T8-A4-K6

Characteristics and typical fields of application

Böhler Pipeshield 71 T8-FD self-shielded flux-cored wire, especially developed and recommended for pipe welding in vertical down (5G) position. It is also suitable for welding of unalloyed steel constructions. This wire offers a fast freezing, easy removable slag, excellent welding characteristics, is easy to operate for the welders and this product provides high productivity.

Böhler Pipeshield 71 T8-FD is designed to provide good mechanical properties as well as high impact toughness at low temperatures. Basically outstanding benefits and advantages in vertical down position for (hot pass), fill and cap layers. Due to the fluoride-basic filling the interpass temperature can be arranged similar to that of basic electrodes, we recommend 80 – 200°C.

Böhler self-shielded flux-cored wire provide an easy handling for the welder due to a very tolerant stick out length and loss tendency to porosity also when welding with a longer arc length as a result of higher voltage.

Base materials

Acc. to API 5L:

A, B, X42, X46, X52, X56, X60, (X65, X70)

Typical analysis of the wire

wt.-%	C	Si	Mn	Ni	Al
	0.045	0.14	1.1	0.7	0.8

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J		
				+20°C	-30°C	-40°C
u	435 (≥ 400)	535 (490 – 660)	28 (≥ 22)	200	150	100 (≥ 27)

Operating data



Polarity DC-

Shielding gas
(EN ISO 14175) -

Dimension mm
2.0

Recommended stick out: 10 – 25 mm

Packaging and available sizes

6 kg coils: 1 unit contains 5 packed coils à 6 kg
Hermetically sealed metal can

Approvals

NAKS, GAZPROM

BÖHLER Pipeshield 71.1 T8-FD



Self-shielding flux-cored wire, mild steel

Classifications

AWS A5.36 / SFA-5.36
E71T8-A4-Ni1

Characteristics and typical fields of application

Böhler Pipeshield 71.1 T8-FD self-shielded flux-cored wire, especially developed and recommended for pipe welding in vertical down (5G) position. It is also suitable for welding of unalloyed steel constructions. This wire offers a fast freezing, easy removable slag, excellent welding characteristics, is easy to operate for the welders and this product provides high productivity.

Böhler Pipeshield 71.1 T8-FD is designed to provide good mechanical properties as well as high impact toughness at low temperatures. Basically outstanding benefits and advantages in vertical down position for (hot pass), fill and cap layers. Due to the fluoride-basic filling the interpass temperature can be arranged similar to that of basic electrodes, we recommend 80 – 200°C. Böhler self-shielded flux-cored wire provide an easy handling for the welder due to a very tolerant stick out length and loss tendency to porosity also when welding with a longer arc length as a result of higher voltage.

Base materials

Acc. to API 5L:

A, B, X42, X46, X52, X56, X60, (X65, X70)

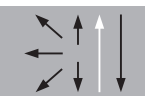
Typical analysis of the wire

wt.-%	C	Si	Mn	Ni	Al
	0.045	0.14	1.1	0.95	0.8

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J		
	MPa	MPa	%	20°C	-30°C	-40°C
u	435 (≥ 400)	535 (490 – 660)	28 (≥ 22)	200	150	120 (≥ 27)

Operating data



Polarity DC–
Shielding gas
(EN ISO 14175) -

Dimension mm
2.0

Recommended stick out: 10 – 25 mm

Packaging and available sizes

6 kg coils: 1 unit contains 5 packed coils à 6 kg Hermetically sealed metal can

Approvals

-



BÖHLER Pipeshield 81 T8-FD

Self-shielded flux-cored wire, low alloyed

Classifications

AWS A5.36 / SFA-5.36

E81T8-A4-Ni2

E81T8-A4-G

Characteristics and typical fields of application

Böhler Pipeshield 81 T8-FD is a self-shielded flux-cored wire and is especially developed for semi-automatic vertical down welding of pipelines. It is also suitable for welding of low alloyed steel constructions. This wire offers a fast freezing, easy removable slag and excellent welding characteristics in all positions. Böhler Pipeshield 81 T8-FD is designed to offer both good mechanical properties and high impact toughness at low temperatures. The outstanding benefits are especially accessible in the vertical down position for (hot pass) filler and cap layers. Due to the fluoride-basic filling the interpass temperature can be arranged similar to that of basic electrodes, we recommend 80 – 200°C.

Böhler self-shielded flux-cored wire provide an easy handling for the welder due to a very tolerant stick out length and loss tendency to porosity also when welding with a longer arc length as a result of higher voltage.

Base materials

Acc. to API 5L:

X65, X70

Typical analysis of the wire

wt.-%	C	Si	Mn	Ni	Al
	0.05	0.15	1.4	1.95	0.8

Mechanical properties of all-weld metal - typical values (min. values)

Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J		
			20°C	-30°C	-40°C
500 (≥ 470)	600 (550 – 690)	25 (≥ 19)	170	120	90 (≥ 27)

Operating data

	Polarity	DC –	Dimension mm
	Shielding gas (EN ISO 14175)	-	2.0

Recommended stick out: 10 – 25 mm

Packaging and available sizes

6 kg coils: 1 unit contains 5 packed coils &grave; 6 kg Hermetically sealed metal can

Approvals

NAKS, GAZPROM

BÖHLER Pipeshield 91 T8-FD



Self-shielded flux-cored wire, low-alloyed

Classifications

AWS A5.36 / SFA-5.36
E91T8-A4-G

Characteristics and typical fields of application

Böhler Pipeshield 91 T8-FD is a self-shielded flux-cored wire especially developed for vertical down welding of filler and cap layers in pipeline applications. It is also suitable for welding of low alloyed steel constructions. The wire offers excellent welding characteristics with high productivity. It has a fast freezing, easily removable slag system.

The weld metal shows excellent mechanical properties and superior impact toughness at low temperatures.

Due to the fluoride-basic filling, the recommended interpass temperature is 80 – 200°C.

Base materials

Acc. to API 5L:
X65, X70, X80

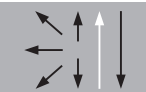
Typical analysis of the wire

	C	Si	Mn	Ni	Al
wt.-%	0.04	0.30	2.0	3.20	0.7

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J		
				20 °C	-10 °C	-40 °C
u u untreated condition	610 (≥ 540)	680 (620 – 760) 680	23 (≥ 17)	155	150	105 (≥ 27)

Operating data



Polarity DC –
Shielding gas (EN ISO 14175) -
Stick-Out 10 – 25 mm

Dimension mm
2.0

Recommended stick out: 10 – 25 mm

Packaging and available sizes

6 kg coils: 1 unit contains 5 packed coils à 6 kg Hermetically sealed metal can

Approvals

CNPC



BÖHLER Ti 70 Pipe T-FD

Flux-cored wire, seamless, for automatic pipeline welding, rutile type

Classifications

EN ISO 18276-A

T 55 5 Mn1Ni P M21 1 H5

AWS A5.36 / SFA-5.36

E91T1-M21A6-K2-H4

Characteristics and typical fields of application

Seamless rutile, Nickel-manganese alloyed, flux-cored wire for single or multilayer welding of carbon, carbon-manganese steels and high strength steels with Ar-CO₂ shielding gas. Main features: excellent weldability in all positions, excellent bead appearance, very low spatter losses, fast freezing and easy to remove slag. The exceptional mechanical properties of this wire even at low temperatures as well as the low content of diffusible hydrogen make it especially suitable for pipeline applications.

Base materials

S355JR, S355J0, S355J2, S450J0, S355N-S460N, S355NL-S460NL, S355M-S460M, S355ML-S460ML, S460Q-S550Q, S460QL-S550QL, P355GH, P355NH, P420NH, P460NH, P355N-P460N, P355NH-P460NH, P355NL1-P460NL1, P355NL2-P460NL2, L360NB-L415NB, L360MB-L555MB, L360QB-L555QB, aldur 500Q-aldur 550Q, aldur 500QL-aldur 550QL

ASTM A 350 Gr. LF2; A 516 Gr. 65, 70; A 572 Gr. 50, 60, 65; A 573 Gr. 70; A 588 Gr. B, C, K; A 633 Gr. C, D, E; A 662 Gr. C; A 678 Gr. B; A 707 Gr. L2, L3; A 792 Gr. 550 Cl. 1; A 841 Gr. A, B, C; A 852; API 5 L X52, X60, X65, X70, X80, X52Q, X60Q, X65Q, X70Q, X80Q

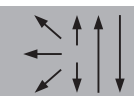
Typical analysis of the wire

wt.-%	Gas	C	Si	Mn	Ni
	M21	0.05	0.30	1.6	1.00

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e	Tensile strength R _m	Elongation A (L ₀ =5d ₀)	Impact values ISO-V KV J	
	MPa	MPa	%	-40°C	-50°C
u	620 (≥ 620)	680 (640-760)	22 (≥ 18)	90	80 (≥ 47)
u untreated, as welded - shielding gas M21					

Operating data



Polarity DC +
Shielding gas (EN ISO 14175) M21

Dimension mm
1.2

Welding with standard GMAW-facilities possible

Approvals

TÜV, CE

BÖHLER Ti 70 Pipe T-FD-N



Flux-cored wire, seamless, for automatic pipeline welding, rutile type

Classifications

EN ISO 18276-A

T55 6 Z P M21 1 H5

AWS A5.36 / SFA A5.36

E91T1-M21A8-G-H4

Characteristics and typical fields of application

Seamless rutile, Nickel-Manganese alloyed flux-cored wire for single- or multilayer welding of carbon, carbon-manganese steels and high strength steels with Ar-CO₂ shielding gas.

Main features: excellent weldability in all positions, excellent bead appearance, very low spatter losses, fast freezing and easy to remove slag. The exceptional mechanical properties of this wire even at low temperatures as well as the low content of diffusible hydrogen make it especially suitable for pipeline applications which have to meet the NACE requirements. This product is CTOD tested at -10°C (14°F). This product can be used in sour gas applications (HIC tested acc. to NACE TM-0284) Test values for SSC are available upon request.

Base materials

S355JR, S355JO, S355J2, S450JO, S355N-S460N, S355NL-S460NL, S355M-S460M, S355ML-S460ML, S460Q-S550Q, S460QL-S550QL, P355GH, P355NH, P420NH, P460NH, P355N-P460N, P355NH-P460NH, P355NL1-P460NL1, P355NL2-P460NL2, L360NB-L415NB, L360MB-L555MB, L360QB-L555QB, aldur 500Q-aldur 550Q, aldur 500QL-aldur 550QL

ASTM A 350 Gr. LF2; A 516 Gr. 65, 70; A 572 Gr. 50, 60, 65; A 573 Gr. 70; A 588 Gr. B, C, K; A 633 Gr. C, D, E; A 662 Gr. C; A 678 Gr. B; A 707 Gr. L2, L3; A 792 Gr. 550 Cl. 1; A 841 Gr. A, B, C; A 852; API 5 L X52, X60, X65, X70, X80, X52Q, X60Q, X65Q, X70Q, X80Q

Typical analysis of the wire

wt.-%	Gas M21	C 0.05	Si 0.35	Mn 1.6	Ni 0.85	Mo 0.25
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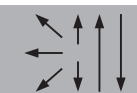
Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _e MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J	
				-40 °C	-60 °C
u	620 (≥ 550)	690 (≥ 640 - 760)	22 (≥ 18)	100	-
s	560	620	24	-	55 (≥ 27)

u untreated, as welded – shielding gas M21

s stress relieved 620°C / 2h - shielding gas M21

Operating data



Polarity DC +

**Shielding gas
(EN ISO 14175)** M21

Dimension mm

1.20

Welding with standard GMAW-facilities possible

Approvals

CE



BÖHLER Ti 80 Pipe T-FD

Flux-cored wire, seamless, for automatic pipeline welding, rutile type

Classifications

EN ISO 18276-A

T 69 4 Z P M21 1 H5

AWS A5.36 / SFA-5.36

E111T1-M21A4-GH4

Characteristics and typical fields of application

Seamless rutile Ni-Mo alloyed flux-cored wire for single or multipass welding of high strength steels with Ar-CO₂ shielding gas. Main features: excellent weldability in all positions, excellent bead appearance, no spatter; fast freezing and easy removable slag. The exceptional mechanical properties of this wire even at the low temperature (-40°C) as well as the low content of diffusible hydrogen make it especially suitable for pipeline applications. Further applications are to be seen in the off-shore industry, ship building and structures built with high strength steels.

Base materials

Pipe steels and fine-grained steels

L485MB, L555MB

API Spec 5L: X70, X80

Typical analysis of the wire

wt.-%	Gas	C	Si	Mn	Ni
	M21	0.07	0.3	1.7	2.5

Mechanical properties of all-weld metal - typical values (min. values)

Condition	Yield strength R _{p0.2} MPa	Tensile strength R _m MPa	Elongation A (L ₀ =5d ₀) %	Impact values ISO-V KV J -40°C
u	≥ 690	770 – 940	≥ 17	≥ 47
u untreated, as welded-shielding gas M21				

Operating data



Polarity	DC +
Redrying	-
Shielding gas (EN ISO 14175)	M21

Dimension mm

1.2

Welding with standard GMAW-facilities possible

Approvals

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