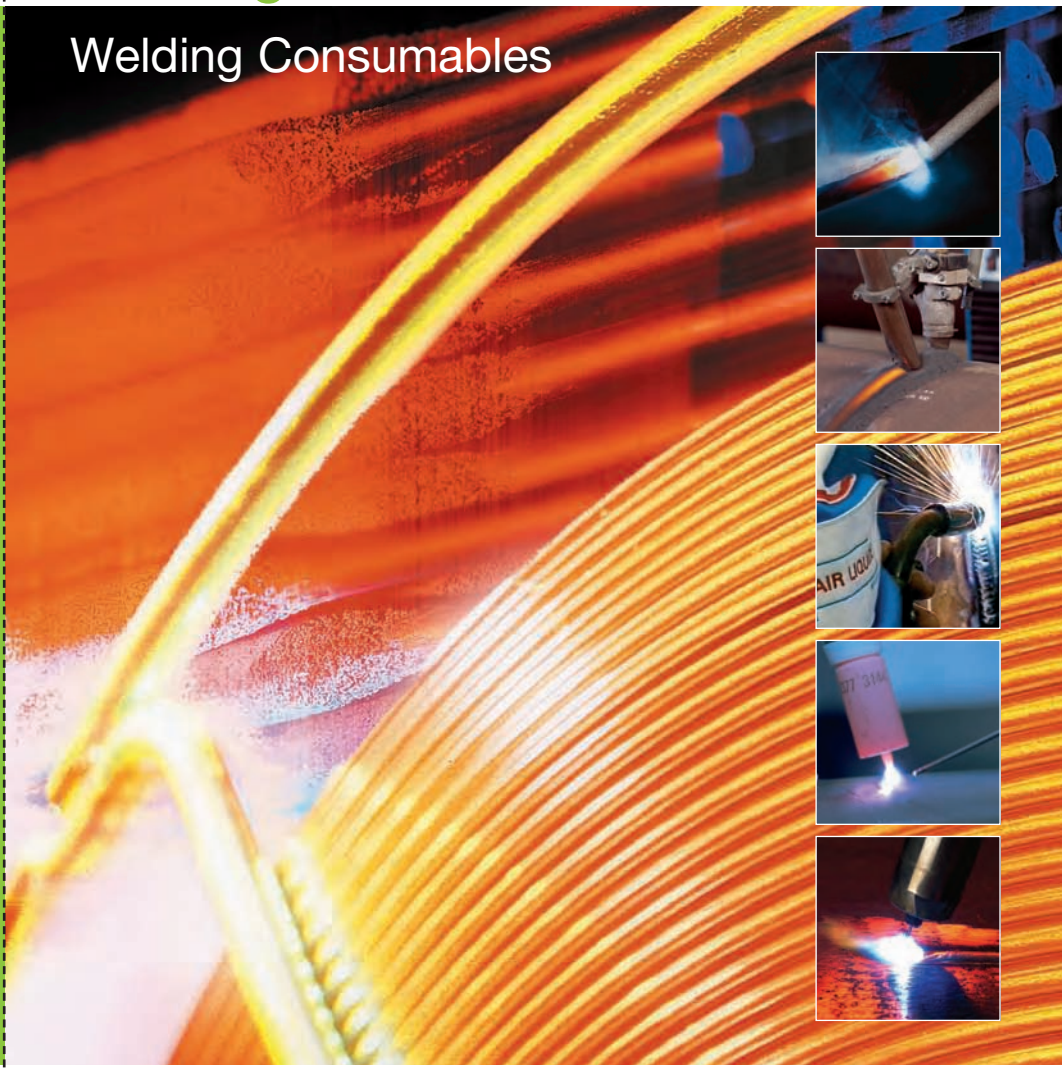
OERLIKON

General Catalogue
Catalogo Generale

Welding Consumables



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AIR LIQUIDE WELDING

CARBOFIL GOLD: Un nuovo standard nei processi di saldatura MAG

CARBOFIL GOLD con nuova tecnologia **Metal Hybrid Coating (MHC)**, è il nuovo filo pieno per la saldatura di acciaio per impieghi strutturali e di carpenteria sviluppato da **Oerlikon** per aumentare la produttività.

La nuova tecnologia **MHC** migliora il processo di saldatura: l'arco elettrico è eccezionalmente stabile con conseguente riduzione degli spruzzi e dei tempi di pulizia del manufatto, **CARBOFIL GOLD** garantisce un ottimo comportamento in termini di accensione e spegnimento dell'arco elettrico e la relativa riduzione dei difetti di ripartenza e fine saldatura.

Il nuovo trattamento superficiale **MHC** migliora lo scorrimento in guaina ed elimina gli effetti di peeling superficiale che causano l'intasamento della guaina e l'usura del tubetto porta corrente con conseguente riduzione dei tempi di manutenzione. **CARBOFIL GOLD** ottimizza le perfomance della postazione di saldatura con un focus preciso sul rapporto costo-produttività soprattutto nelle applicazioni robotizzate.

CARBOFIL GOLD è disponibile con il nuovo sistema di apertura **EASY Opening Box** che garantisce la massima sicurezza e il minor tempo sostituzione.

	ISO 14341-A	AWS A 5.18
CARBOFIL 1 GOLD	G 42 4 M G3Si1	ER70S-6
CARBOFIL 1A GOLD	G 46 4 M G4Si1	

Imballo: 16 kg bobina / 250 – 300 kg fusto

CARBOFIL GOLD con tecnologia MHC aumenta la tua produttività

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ELETTRODI
ELECTRODES

Covered electrodes for metal-arc welding of unalloyed and fine grain structural steels.

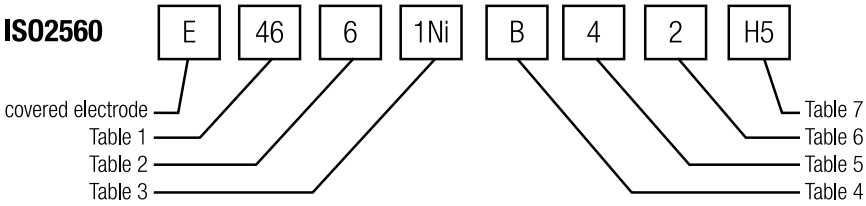


Table 1

Code digits for tensile strength and elongation properties of the weld metal			
Code digit	Minimum yield strength[1] [N/mm²]	Tensile strength [N/mm²]	Minimum elongation[2] [%]
35	*355*	*440–570*	*22*
38	*380*	*470–600*	*20*
42	*420*	*500–640*	*20*
46	*460*	*530–680*	*20*
50	*500*	*560–720*	*18*

[1] For yield strength the lower yield (R_{eL}) shall be used if yielding occurs, otherwise the 0,2% proof strength ($R_{p0,2}$) shall be applied.
[2] Gauge length is equal to five times the test specimen diameter.

Table 2

Symbols for impact energy of all-weld metal	
Symbols	Temperature for minimum average impact energy of 47 J [°C]
Z	no requirements
A	+20
0	0
2	–20
3	–30
4	–40
5	–50
6	–60

Table 3

Symbols for chemical composition of all-weld metal			
Symbols	Chemical composition [1)2)3)] [%]		
	Mn	Mo	Ni
No symbol	2,0	–	–
Mo	1,4	0,3–0,6	–
MnMo	> 1,4–2,0	0,3–0,6	–
1Ni	1,4	–	0,6–1,2
2Ni	1,4	–	1,8–2,6
3Ni	1,4	–	> 2,6–3,8
Mn1Ni	> 1,4–2,0	–	0,6–1,2
1NiMo	1,4	0,3–0,6	0,6–1,2
Z	any other chemical composition agreed upon		

1) If not specified:
Mo<0,2%; Ni<0,3%;Cr<0,2%;
V<0,05%; Nb<0,05; Cu<0,3%.

2) Single values shown in the table are maximum values.

3) The results shall be rounded to the same decimal place as the specified values using the rules of ISO 31-0 : 1992, Appendic B, Rule A.

Table 4

Symbols for type of covering	
A	acid covering
C	cellulosic covering
R	rutile covering
RR	thick rutile covering
RC	rutile-cellulosic covering
RA	rutile-acid covering
RB	rutile-basic covering
B	basic covering

Table 5

Code digit for weld metal recovery and type of current		
Code digit	Weld metal recovery [%]	Type of current 1)
1	≤105	alternating and direct current
2	≤105	direct current
3	>105 ≤125	alternating and direct current
4	>105 ≤125	direct current
5	>125 ≤160	alternating and direct current
6	>125 ≤160	direct current
7	>160	alternating and direct current
8	>160	direct current

1) In order to demonstrate operability on a.c., test shall be carried out with no-load voltage not higher than 65 Volts.

Table 6

Code digits for welding positions	
Code digit	Welding positions
1	all positions
2	all positions, except vertical-down
3	flat butt weld, flat fillet weld, horizontal vertical fillet weld
4	flat butt weld, flat fillet weld
5	vertical down and positions according to digit 3

Table 7

Symbols for hydrogen content of all-weld metal	
Symbols	Hydrogen content ml/100 grams deposited weld metal, max.
H 5	5
H 10	10
H 15	15

Covered electrodes for metal-arc welding of high-strength steels.

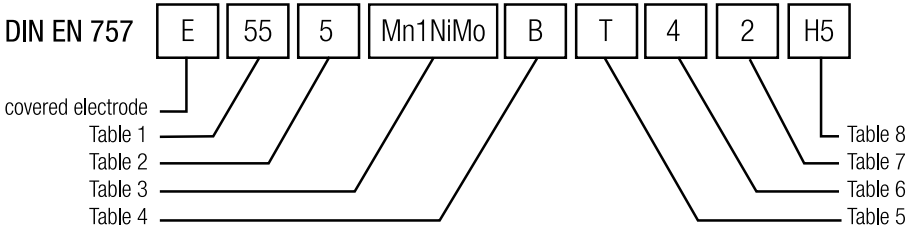


Table 1

Code digits for tensile strength and elongation properties of the weld metal			
Code digit	Minimum yield strength[1] [N/mm²]	Tensile strength [N/mm²]	Minimum elongation[2] [%]
55	550	610–780	18
62	620	690–890	18
69	690	760–960	17
79	790	880–1080	16
89	890	980–1180	15

[1] For yield strength the lower yield (R_{eL}) shall be used if yielding occurs, otherwise the 0,2% proof strength ($R_{p0,2}$) shall be applied.
[2] Gauge length is equal to five times the test specimen diameter.

Table 2

Symbols for impact energy of all-weld metal	
Symbols	Temperature for minimum average impact energy of 47 J [°C]
Z	no requirement
A	20
0	0
2	-20
3	-30
4	-40
5	-50
6	-60
7	-70
8	-80

Table 3

Symbols for chemical composition of all-weld metal				
Symbols	Chemical composition of all-weld metal[1)2)3)] [%] (m/m)			
	Mn	Ni	Cr	Mo
MnMo	1,4–2,0	–	–	0,3–0,6
Mn1Ni	1,4–2,0	0,6–1,2	–	–
1NiMo	1,4	0,6–1,2	–	0,3–0,6
1,5NiMo	1,4	1,2–1,8	–	0,3–0,6
2NiMo	1,4	1,8–2,6	–	0,3–0,6
Mn1NiMo	1,4–2,0	0,6–1,2	–	0,3–0,6
Mn2NiMo	1,4–2,0	1,8–2,6	–	0,3–0,6
Mn2NiCrMo	1,4–2,0	1,8–2,6	0,3–0,6	0,3–0,6
Mn2Ni1CrMo	1,4–2,0	1,8–2,6	0,6–1,0	0,3–0,6
Z	any other chemical composition agreed upon			

1) If not specified: C 0,03%-0,10%, Ni<0,3%, Cr<0,2%, Mo<0,2%, V<0,05%, Nb<0,05%, Cu<0,3%, P<0,025%, S<0,020%.
2) Single values shown in the table are maximum values.
3) The results shall be rounded to the same decimal place as the specified values using the rules of ISO 31-0 : 1992, Appendix B, Rule A.

Table 4

Symbol for type of covering	
Symbol	Meaning
B	these electrodes have a basic covering, other types of covering, see DIN 499

Table 5

Symbol for the stress-relieved condition	
Symbol	Meaning.
T	Properties of the all-weld metal apply to the stress- relieved condition of 1 hr. between 560 °C and 600 °C, then furnace cooling to 300 °C.

Table 6

Code digit for metal recovery and type of current		
Code digit	Metal recovery [%]	Type of current [1]
1	≤105	alternating and direct current
2	≤105	direct current
3	>105 ≤125	alternating and direct current
4	>105 ≤125	direct current
5	>125 ≤160	alternating and direct current
6	>125 ≤160	direct current
7	>160	alternating and direct current
8	>160	direct current

[1]) In order to demonstrate operability on a.c., test shall be carried out with no- load voltage not higher than 65 Volts.

Table 7

Code digits for welding positions	
Code digit	Welding positions
1	all positions
2	all positions, except vertical-down
3	flat butt weld, flat fillet weld, horizontal vertical fillet weld
4	flat butt weld, flat fillet weld
5	vertical-down and positions according to digit 3

Table 8

Symbols for hydrogen content of all-weld metal	
Symbols	Hydrogen content ml/100 grams weld metal max.
H5	5
H10	10

Covered electrodes for metal-arc welding of creep resistant steels.

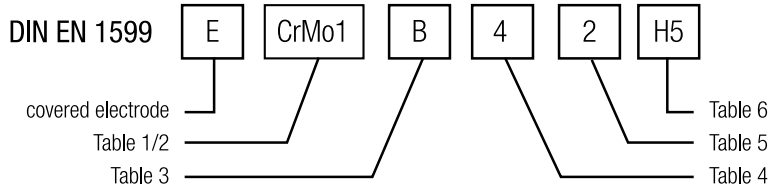


Table 1

Symbols for chemical composition of all-weld metal									
Symbols	Chemical composition of all-weld metal [%] (m/m) [1][2][3]								
	C	Si	Mn	P	S	Cr	Mo	V	Other elements
Mo	0,10	0,80	0,40-1,50[4]	0,030	0,025	--	0,40-0,70	--	--
MoV	0,03-0,12	0,80	0,40-1,50	0,030	0,025	0,30-0,60	0,80-1,20	0,25-0,60	--
CrMo0,5	0,05-0,12	0,80	0,40-1,50	0,030	0,025	0,40-0,65	0,40-0,65	--	--
CrMo1	0,05-0,12	0,80	0,40-1,50[4]	0,030	0,025	0,90-1,40	0,45-0,70	--	--
CrMo1L	0,05	0,80	0,40-1,50[4]	0,030	0,025	0,90-1,40	0,45-0,70	--	--
CrMoV1	0,05-0,15	0,80	0,70-1,50	0,030	0,025	0,90-1,30	0,90-1,30	0,10-0,35	--
CrMo2	0,05-0,12	0,80	0,40-1,30	0,030	0,025	2,0-2,6	0,90-1,30	--	--
CrMo2L	0,05	0,80	0,40-1,30	0,030	0,025	2,0-2,6	0,90-1,30	--	--
CrMo5	0,03-0,12	0,80	0,40-1,50	0,025	0,025	4,0-6,0	0,40-0,70	--	--
CrMo9	0,03-0,12	0,80	0,40-1,30	0,025	0,025	8,0-10,0	0,90-1,20	0,15	Ni 1,0
CrMo91	0,06-0,12	0,60	0,40-1,50	0,025	0,025	8,0-10,5	0,80-1,20	0,15-0,30	Ni 0,40-1,00 Nb 0,03-0,10 N 0,02-0,07
CrMoWV12	0,15-0,22	0,80	0,40-1,30	0,025	0,025	10,-12,0	0,80-1,20	0,20-0,40	Ni 0,8 W 0,40-0,60
Z	any other chemical composition agreed upon								

[1] If not specified: Ni<0,3%, Cu<0,3%, V<0,03%, Nb<0,01%, Cr<0,2%.
[2] Single values shown in the table are maximum values.
[3] The results shall be rounded to the same decimal place as the specified values using the rules of ISO 31-0 : 1992, Appendix B, Rule A.
[4] Mn-contents of 0,4% to 0,9%, are usual for electrodes with rutil covering and Mn-contents of 0,7% to 1,5% for electrodes with basic covering.

Table 2

Symbols for the mechanical properties of all-weld metal								
Symbols	Yield strngth [1] [N/mm²]	Tensile strength R_m [N/mm²]	Elongation[2] A [%]	Impact energy [J] K_v bei +20°C		Weld metal Heat treatment		
				Minimum average value from 3 specimens	Minimum single value[3]	Preheat and interpass temperature [°C]	Heat treatment of the test piece	
							Temperature[4] [°C]	Time in minutes[5]
Mo	355	510	22	47	38	<200	570-620	60
MoV	355	510	18	47	38	200-300	690-730	60
CrMo0,5	355	510	22	47	38	100-200	600-650	60
CrMo1	355	510	20	47	38	150-250	660-700	60
CrMo1L	355	510	20	47	38	150-250	660-700	60
CrMoV1	435	590	15	24	19	200-300	680-730	60
CrMo2	400	500	18	47	38	200-300	690-750	60
CrMo2L	400	500	18	47	38	200-300	690-750	60
CrMo5	400	590	17	47	38	200-300	730-760	60
CrMo9	435	590	18	34	27	200-300	740-780	60
CrMo91	415	585	17	47	38	200-300	750-770	120-180
CrMoWV12	550	690	15	34	27	250-350[6] or 400-500[6]	740-780	120

[1] For yield strength the low yield (R_{eL}). shall be used if yielding occurs, otherwise the 0,2%-proof strength ($R_{p0,2}$) shall be applied.
[2] Gauge length is equal to five times the test specimen diameter.
[3] Only one single value lower than minmum average is permitted.
[4] The test piece shall be cooled in the furnace to 300°C, at a rate not exceeding 200°C/hr.
[5] Tolerance ±10 min.
[6] Immediately after welding the test piece is to be cooled down to 120°C to 100°C and kept at this temperature for at least 1 hr.

Table 3

Symbols for type of covering	
Symbols	Type of covering
R	rutile covered
B	basic covered

Table 4

Code digit for weld metal recovery and type of current		
Code digit	Weld metal recovery [%]	Type of current[1])
1	≤105	alternating and direct current
2	≤105	direct current
3	>105 ≤125	alternating and direct current
4	>105 ≤125	direct current

[1]) In order to demonstrate operability on a.c., test shall be carried out with no-load voltage not higher than 65 volts.

Table 5

Code digits for welding positions	
Code digit	Welding positions
1	all positions
2	all positions, except vertical-down
3	flat butt weld, flat fillet weld, horizontal vertical fillet weld
4	flat butt weld, flat fillet weld
5	vertical down and positions according to digit 3

Table 6

Symbols for hydrogen content of all-weld metal	
Symbols	Hydrogen content ml/100 grams deposited weld metal, max.
H 5	5
H 10	10

Covered electrodes for metal-arc welding of austenitic stainless and heat resisting steels.

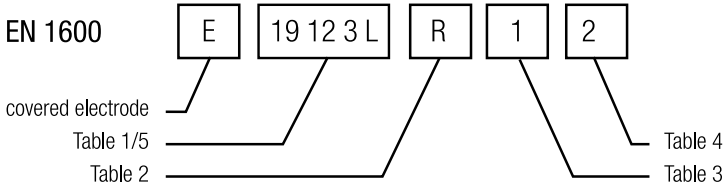


Table 1

Mechanical properties of all-weld metal				
Alloy symbol	Minimum yield strength $R_{p0.2}$ [N/mm²]	Minimum tensile strength R_m [N/mm²]	Minimum elongation[1] A [%]	Heat treatment
13	250	450	15	[2]
13 4	500	750	15	[3]
17	300	450	15	[4]
19 9	350	550	30	none
19 9 L	320	510	30	none
19 9 Nb	350	550	25	none
19 12 2	350	550	25	none
19 12 3 L	320	510	25	none
19 12 3 Nb	350	550	25	none
19 13 4 N L	350	550	25	none
22 9 3 N L	450	550	20	none
25 7 2 N L	500	700	15	none
25 9 3 Cu N L	550	620	18	none
25 9 4 N L	550	620	18	none
18 15 3 L	300	480	25	none
18 16 5 N L	300	480	25	none
20 25 5 Cu N L	320	510	25	none
20 16 3 Mn N L	320	510	25	none
25 22 2 N L	320	510	25	none
27 31 4 Cu L	240	500	25	none
18 8 Mn	350	500	25	none
18 9 MnMo	350	500	25	none
20 10 3	400	620	20	none
23 12 L	320	510	25	none
23 12 Nb	350	550	25	none
23 12 2 L	350	550	25	none
29 9	450	650	15	none
16 8 2	320	510	25	none
19 9 H	350	550	30	none
25 4	400	600	15	none
22 12	350	550	25	none
25 20	350	550	20	none
25 20 H	350	550	10[5]	none
18 36	350	550	10[5]	none

[1] Gauge length is equal to five times the test specimen diameter.
[2] 840°C–870°C for 2 h – furnace-cooling to 600°C, then air-cooling.
[3] 580°C–620°C for 2 h – air-cooling.
[4] 760°C–790°C for 2 h – furnace-cooling to 600°C, then air-cooling.
[5] These electrodes have high carbon in the weld metal for service at high temperatures. Room temperature elomgation has little relevance to such applications.

Table 3

Symbols for type of covering	
Symbols	Type of covering
R	rutile covered
B	basic covered

Table 3

Code digit for weld metal recovery and type of current		
Code digit	Weld metal recovery [%]	Type of current[1])
1	≤105	alternating and direct current
2	≤105	direct current
3	>105 ≤125	alternating and direct current
4	>105 ≤125	direct current
5	>125 ≤160	alternating and direct current
6	>125 ≤160	direct current
7	>160	alternating and direct current
8	>160	direct current

[1]) Maximum a.c. no-load voltage shall be 65 volts.

Table 4

Code digits for welding positions	
Code digit	Welding positions
1	all positions
2	all positions, except vertical-down
3	flat butt weld, flat fillet weld, horizontal vertical fillet weld
4	flat butt weld, flat fillet weld

Table 5

Symbols for chemical composition of all-weld metal									
Alloy symbol	Chemical composition [%] (m/m) [1)2)3)]								
	C	Si	Mn	P[4)]	S[4)]	Cr	Ni[5)]	Mo[5)]	Other elements[5)]
Martensitic/ferritic									
13	0,12	1,0	1,5	0,030	0,025	11,0–14,0	–	–	–
13 4	0,06	1,0	1,5	0,030	0,025	11,0–14,5	3,0–5,0	0,4 to1,0	–
17	0,12	1,0	1,5	0,030	0,025	16,0–18,0	–	–	–
Austenitic									
19 9	0,08	1,2	2,0	0,030	0,025	18,0–21,0	9,0–11,0	–	–
19 9 L	0,04	1,2	2,0	0,030	0,025	18,0–21,0	9,0–11,0	–	–
19 9 Nb	0,08	1,2	2,0	0,030	0,025	18,0–21,0	9,0–11,0	–	Nb[6)]
19 12 2	0,08	1,2	2,0	0,030	0,025	17,0–20,0	10,0–13,0	2,0–3,0	–
19 12 3 L	0,04	1,2	2,0	0,030	0,025	17,0–20,0	10,0–13,0	2,5–3,0	
19 12 3 Nb	0,08	1,2	2,0	0,030	0,025	17,0–20,0	10,0–13,0	2,5–3,0	Nb[6)]
19 13 4 N L[7)]	0,04	1,2	1,0–5,0	0,030	0,025	17,0–20,0	12,0–15,0	3,0–4,5	N 0,20
Austenitic-ferritic. High corrosion resistance									
22 9 3 N L[8)]	0,04	1,2	2,5	0,030	0,025	21,0–24,0	7,5–10,5	2,5–4,0	N 0,08–0,20
25 7 2 N L	0,04	1,2	2,0	0,035	0,025	24,0–28,0	6,0–8,0	1,0–3,0	N 0,20
25 9 3 Cu N L[8)]	0,04	1,2	2,5	0,030	0,025	24,0–27,0	7,5–10,5	2,5–4,0	N 0,10–0,25; Cu 1,5–3,5
25 9 4 N L[8)]	0,04	1,2	2,5	0,030	0,025	24,0–27,0	8,0–10,5	2,5–4,5	N 0,20–0,30; Cu 1,5 ; W 1,0
Fully austenitic. High corrosion resistance									
18 15 3 L[7)]	0,04	1,2	1,0–4,0	0,030	0,025	16,5–19,5	14,0–17,0	2,5–3,5	–
18 16 5 N L[4)]	0,04	1,2	1,0–4,0	0,035	0,025	17,0–20,0	15,5–19,0	3,5–5,0	N 0,20
20 25 5 Cu N L[7)]	0,04	1,2	1,0–4,0	0,030	0,025	19,0–22,0	24,0–27,0	4,0–7,0	Cu 1,0–2,0 N 0,25
20 16 3 Mn N L[7)]	0,04	1,2	5,0–8,0	0,035	0,025	18,0–21,0	15,0–18,0	2,5–3,5	N 0,20
25 22 2 N L[7)]	0,04	1,2	1,0–5,0	0,030	0,025	24,0–27,0	20,0–23,0	2,0–3,0	N 0,20
27 31 4 Cu L[7)]	0,04	1,2	2,5	0,030	0,025	26,0–29,0	30,0–33,0	3,0–4,5	Cu 0,6–1,5
Special grades									
18 8 Mn[7)]	0,20	1,2	4,5–7,5	0,035	0,025	17,0–20,0	7,0–10,0	–	–
18 9 MnMo	0,04–0,14	1,2	3,0–5,0	0,035	0,025	18,0–21,5	9,0–11,0	0,5–1,5	–
20 10 3	0,10	1,2	2,5	0,030	0,025	18,0–21,0	9,0–12,0	1,5–3,5	–
23 12 L	0,04	1,2	2,5	0,030	0,025	22,0–25,0	11,0–14,0	–	–
23 12 Nb	0,10	1,2	2,5	0,030	0,025	22,0–25,0	11,0–14,0	–	Nb[6)]
23 12 2 L	0,04	1,2	2,5	0,030	0,025	22,0–25,0	11,0–14,0	2,0–3,0	–
29 9	0,15	1,2	2,5	0,035	0,025	27,0–31,0	8,0–12,0	–	–
Heat resisting grades									
16 8 2	0,08	1,0	2,5	0,030	0,025	14,5–16,5	7,5–9,5	1,5–2,5	
19 9 H	0,04–0,08	1,2	2,0	0,030	0,025	18,0–21,0	9,0–11,0	–	–
25 4	0,15	1,2	2,5	0,030	0,025	24,0–27,0	4,0–6,0	–	–
22 12	0,15	1,2	2,5	0,030	0,025	20,0–23,0	10,0–13,0	–	–
25 20[7)]	0,06–0,20	1,2	1,0–5,0	0,030	0,025	23,0–27,0	18,0–22,0	–	–
25 20 H[7)]	0,35–0,45	1,2	2,5	0,030	0,025	23,0–27,0	18,0–22,0	–	–
18 36[7)]	0,25	1,2	2,5	0,030	0,025	14,0–18,0	33,0–37,0	–	–

1) Single values in this table are maximum values.
2) Covered electrodes not listed in this table shall be symbolized similarly and prefixed by the letter Z.
3) The results shall be rounded to the same decimal place as the specified values using the rules of ISO 31-0 : 1992, Appendix B, Rule A..
4) The sum of P and S shall not exceed 0,050%, except for 25 7 2 N L / 18 16 5 N L / 20 16 3 Mn N L / 18 8 Mn / 18 9 MnMo / 29 9.
5) If not specified: Mo < 0,75%, Cu < 0,75% und Ni < 0,60%.
6) Nb min. 8 x% C, max. 1,1%; up to 20% of the amount of Nb can be replaced by Ta.
7) The all-weld metal is in most cases fully austenitic and therefore can be susceptible to microfissuring and solidification cracks. The occurence of cracking is reduced by increasing the weld metal manganese level and because of this, the manganese range is extended for a number of the grades.
8) Electrodes under this symbol are usually selected for specific properties and may not be directly interchangeable.

SUPERCORD

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo rutile ad alta velocità di solidificazione della scoria. Saldabile in tutte le posizioni. Adatto soprattutto per la saldatura di giunti irregolari. Buone proprietà meccaniche a sollecitazioni normali. Buona estetica del cordone di saldatura. Indicato per saldature di spessori sottili in verticale discendente, utilizzabile per puntature, salda con bassa tensione a vuoto. Rendimento 100%.

Medium-coated rutile electrode with a fast freezing slag. Universal all-positional electrode which is very easy to weld when used for all kinds of light constructional work, including pipework. Suitable for vertical down welding of thin plates. Operates on low open circuit voltage, recommended for tack welding. Good slag detachability and excellent bead appearance. Efficiency 100%.

Classification	
AWS	A5.1:E 6013
EN	499:E 38 0 R 12
EN ISO	2560-A: E 42 0 R 12

Approvals	Grades
ABS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.65	0.65	≤ 0.030	≤ 0.030	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 420	500 - 640	≥ 20	≥ 47	

Materials

S(P)235 to S(P)355; GP240; GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required.
If necessary: 100-110 °C for 1 hour.

Current condition and welding position

AC; DC-

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	25-60	10,5	6,3
2,5	350	60-100	20,0	11,4
3,3	350	85-140	32,4	19,2
3,3	450	85-140	42,0	24,8
4,0	350	120-190	47,4	27,5
4,0	450	120-190	62,1	35,7
5,0	450	180-240	92,9	57,0

SUPERCORD 42

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo rutile con scoria sufficientemente fluida. Adatto per saldature in piano. I diametri più sottili possono essere impiegati anche per saldature in posizione. Arco dolce senza spruzzi. Buona estetica. Ottime proprietà meccaniche. Rendimento 100%.

Rutile electrode with easily detachable slag. Suitable for welding in the downhand position. Smaller diameters are also suitable for positional welding. Spatter free arc combined with a very smooth bead appearance. Excellent mechanical properties. Efficiency 100%.

Classification	
AWS	A5.1:E 6013
EN	499:E 42 A R 12
EN ISO	2560-A: E 42 A R 12

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.09	0.65	0.40	≤ 0.030	≤ 0.030	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 420	500 - 640	≥ 20	≥ 47	

Materials

S(P)235 to S(P)355; GP240; GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required. If necessary: 100-110 °C for 1 hour.

Current condition and welding position

AC; DC-

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
1,5	250	20-50	5,7	3,1
2,0	300	40-65	10,6	6,5
2,5	300	60-100	17,4	10,3
3,2	450	70-130	43,4	25,8
4,0	450	120-160	60,4	37,1

SUPERCORD 45

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo rutile con spessore di rivestimento medio, indicato per la saldatura in tutte le posizioni eccetto la verticale discendente. Ottima stabilità d'arco anche con saldatrici a bassa tensione a vuoto, ideale per applicazioni di puntatura su lamiere sporche o verniciate. Efficienza 100%.

Medium-coated rutile electrode, suitable for all positional welding, except vertically down. The arc is stable even with welding equipment on low open circuit voltage; particularly suitable for tack welding applications on dirty or primed plate. Efficiency 100%.

Classification	
AWS	A5.1: E6013
EN	499: E 42 0 R 12
EN ISO	2560-A: E 42 0 R 12

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.09	0.65	0.40	≤ 0.030	≤ 0.030	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 0°C	Hardness
As Welded	≥ 420	500 - 640	≥ 20	≥ 47	

Materials

S(P)235 to S(P)355; GP240; GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required.
If necessary: 100-110 °C for 1 hour.

Current condition and welding position

AC; DC-

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
1,5	250	25-50	5,7	3,6
2,0	300	40-70	11,0	6,3
2,5	300	60-90	17,7	10,4
3,2	450	90-130	44,3	26,5

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo rutile per applicazioni generali. La sua eccezionale facilità di utilizzo lo rende idoneo anche a saldatori non qualificati. Facile innesco e reinnesco, idoneo per saldature a tratti e puntature. Deposita un cordone ben raccordato e senza incisioni sul materiale base. Scoria di facile rimozione. Rendimento 100%.

Rutile-coated multi-purpose electrode featuring outstanding welding properties. Exceptional ease of operability makes it suitable for unskilled welders. Easy arc striking and restriking, therefore well-suited for tack-welding. Very smooth and finely-rippled weld beads blending into the base metal without undercutting. Easy slag removal. Efficiency 100%.

Classification	
AWS	A5.1: E6013
EN	499: E 42 0 RR 12
EN ISO	2560-A: E 42 0 RR 12

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.60	0.45	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -10 °C	Hardness
As Welded	≥ 420	500-640	≥ 22	≥ 47	

Materials

S(P)235 to S(P)355; GP240; GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required.
If necessary: 100-110 °C for 1 hour.

Current condition and welding position

AC; DC-

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
1,6	250	30-50	5,9	3,6
2,0	250	50-70	8,9	5,3
2,0	350	50-70	12,8	76,0
2,5	250	65-90	14,0	8,4
2,5	350	65-90	20,1	10,5
3,2	350	100-140	34,5	18,1
3,2	450	100-140	44,4	26,6
4,0	350	130-190	50,3	30,1

OVERCORD

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo per applicazioni generali con rivestimento rutil-cellulosico. Ideale per saldature di strutture metalliche e manutenzione, può essere utilizzato su lamiere zincate, primerizzate, sporche o moderatamente arrugginite. Ideale per la saldatura in verticale discendente, salda in tutte le posizioni con gli stessi parametri di corrente. Cordone di ottimo aspetto e ben raccordato, scoria di facile rimozione. Rendimento 100%.

Rutile-cellulosic coated general-purpose electrode for structural steelwork, workshop and maintenance welding, specially suited for vertical-down welding and tack-welds. Good gap bridging. Can be used on galvanized, primer painted and slightly rusted parts. In assembly welding, this electrode can be used with the same current setting in all positions. Smooth, slightly concave welds blending into base metal without undercut. Slag in most cases self-releasing. Efficiency 100%.

Classification	
AWS	A5.1:E6013
EN	499: E 38 0 RC 11
EN ISO	2560-A: E 38 0 RC 11

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.50	0.30	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 380	470-600	≥ 22	≥ 60	

Materials

S(P)235 to S(P)355; GP240; GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required. If necessary: 100-110 °C for 1 hour.

Current condition and welding position

AC; DC-

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	250	50-60	7,8	3,0
2,5	350	60-85	16,2	10,3
3,2	350	90-130	28,0	17,7
4,0	350	140-180	43,0	27,3
5,0	350	180-240	67,5	42,0

OVERCORD S

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo rutile per applicazioni dove sia richiesta una elevata qualità metallurgica del deposito. Idoneo per applicazioni con requisito di tenacità fino a -20°C. Arco stabile, scoria di facile rimozione.

Rutile coated electrode, used for the welding of large structures and process pipe work in the shipbuilding and construction industries where precise fit-ups are difficult to achieve. OVERCORD S is a high quality electrode designed to give high impact toughness properties at -20 °C. The electrode formulation promotes a forceful arc to ensure sound fusion and is tolerant to variations in welding current, which are important considerations when welding under site conditions.

Classification	
AWS	A5.1: E6013
EN	499: E 38 2 R 12
EN ISO	2560-A: E 38 2 R 12

Approvals	Grades
ABS	
BV	
DNV	
LRS	
MOD	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	0.50	0.20	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 20 °C	Hardness
As Welded	≥ 380	470-600	≥ 22	≥ 47	

Materials

S(P)235 to S(P)355; GP240; GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required. If necessary: 100-110 °C for 1 hour.

Current condition and welding position

DC+; DC-; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-80	9,1	5,5
3,2	350	110-135	21,3	12,8
4,0	450	160-180	47,5	28,5
5,0	450	180-210	70,4	42,2

ETC PH 58S

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo basico con polvere di ferro nel rivestimento. Adatto per la saldatura di acciai al C-Mn e per impieghi di carattere generale in ambito industriale e navale. Elevato tasso di deposito ed ottima qualità radiografica. Buoni valori di tenacità a bassa temperatura. Rendimento 120%.

Classification	
AWS	A5.1: E7018-1 H4
EN	499: E 42 5 B 32 H5
EN ISO	2560-A: E 42 5 B 32 H5

Approvals	Grades
ABS	
BV	
DNV	
GL	
LRS	
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.50	0.40	≤ 0.020	≤ 0.020	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
PWHT 620°C x 1h	≥ 400	490 - 560	≥ 22	≥ 80	
As Welded	≥ 420	510 - 640	≥ 22	≥ 80	

Materials

S(P)235-S(P)420, GP240-GP280
SA 516 gr.60; SA 516 gr.70; SA 106 gr.B

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 3 times max.
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 3 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-90	20,2	10,2
2,5	350	60-90	23,2	13,2
3,2	350	85-140	36,2	24,6
3,2	450	90-140	47,2	29,8
4,0	450	130-170	68,2	44,2
5,0	450	200-250	98,4	63,4

ETC PH 77

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo con polvere di ferro nel rivestimento. Pur mantenendo delle notevoli proprietà meccaniche del deposito, questo elettrodo offre delle eccezionali caratteristiche di saldabilità. Questo fatto lo rende particolarmente indicato nella saldatura in opera, dove si renda indispensabile l'impiego di un elettrodo basico. Viene impiegato per serbatoi in pressione, industria navale, macchine movimento terra, etc. Efficienza 120%.

Classification	
AWS	A5.1: E7018-1 H4R
EN	499: E 42 4 B 32 H5
EN ISO	2560-A: E 42 4 B 32 H5

Approvals	Grades
ABS	
BV	
DNV	
LRS	
RINA	

Analysis of all-weld metal (Typical values in %)

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
PWHT 620°C x 1h	≥ 420	500 - 630	≥ 22	≥ 90	
As Welded	≥ 420	500 - 640	≥ 22	≥ 80	

Materials

S(P)235-S(P)420, GP240-GP280
SA 516 gr.60; SA 516 gr.70; SA 106 gr.B

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 3 times max.
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 3 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	20-50	13,0	7,8
2,5	300	70-100	20,1	12,0
2,5	350	70-100	23,5	27,0
3,2	350	85-140	36,6	23,0
3,2	450	90-145	46,6	29,6
4,0	350	110-180	52,2	35,0
4,0	450	110-180	67,5	42,0
5,0	450	180-240	102,1	63,9

ETC PH 35S

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo basico contenente polvere di ferro nel rivestimento a bassissimo tenore di H2 con rendimento elevato. Buona saldabilità nella saldatura in posizione. Ottime proprietà meccaniche soprattutto a bassa temperatura. Impiegato per serbatoi in pressione, industria navale, metanodotti, macchine movimento terra, costruzioni nucleari, ecc. Ottima qualità radiografica.

General purpose basic coated low hydrogen electrode containing iron powder additions, suitable for positional welding. The weld appearance is excellent and spatter levels minimal. The excellent mechanical properties also make this electrode suitable for critical applications in such industries as offshore, nuclear and pressure vessels as well as the general construction industry. "DRY" version (E7018.1 H4R) available on request. Very good x ray quality. Efficiency 120%.

Classification	
AWS	A5.1: E 7018-1 H4
EN	499: E 42 5 B 32 H5
EN ISO	2560-A: E 42 5 B 32 H5

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	
MMI	
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.075	1.35	0.35	≤ 0.020	≤ 0.015	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
PWHT 620°C x 1h	≥ 400	490 - 560	≥ 22	≥ 100	
As Welded	≥ 420	510 - 640	≥ 22	≥ 100	

Materials

S(P)235-S(P)420, GP240-GP280
SA 516 gr.60; SA 516 gr.70; SA 106 gr.B

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 3 times max.
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 3 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	25-50	13,0	7,8
2,5	300	70-100	20,1	12,1
2,5	350	70-100	23,5	14,1
3,2	450	90-130	49,5	29,8
4,0	450	110-170	70,9	42,6
5,0	450	170-220	106,5	63,9
6,0	450	210-280	150,3	90,1

ETC PH 35S DRY

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo basico contenente polvere di ferro nel rivestimento a bassissimo tenore di Idrogeno ed elevata resistenza al riassorbimento di umidità. Buona saldabilità nella saldatura in posizione. Ottime proprietà meccaniche soprattutto a bassa temperatura. Impiegato per serbatoi in pressione, industria navale, metanodotti, macchine movimento terra, costruzioni nucleari, ecc. Ottima qualità radiografica.

Classification	
AWS	A5.1: E 7018-1 H4 R
EN	499: E 42 5 B 32 H5
EN ISO	2560-A: E 42 5 B 32 H5

Approvals	Grades
ABS	
DNV	
LRS	
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.075	1.35	0.35	≤ 0.020	≤ 0.015	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
PWHT 620°C x 1h	≥ 400	490 - 560	≥ 22	≥ 100	
As Welded	≥ 420	510 - 640	≥ 22	≥ 100	

Materials

S(P)235-S(P)420, GP240-GP280
SA 516 gr.60; SA 516 gr.70; SA 106 gr.B

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 3 times max.
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 3 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	70-100	20,1	12,1
2,5	350	70-100	23,3	14,1
3,2	450	90-130	48,7	29,8
4,0	450	110-170	70,0	42,6
5,0	450	170-220	105,5	63,9

TENAX 55H

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo a rivestimento basico ad elevata percentuale Mn. Ottima saldabilità. Deposita un cordone di saldatura a bassissimo tenore di idrogeno con elevate caratteristiche meccaniche. Facile impiego in posizione. Impiegato per saldatura di acciai ad elevato limite di snervameto ed alta resistenza a trazione; ad es.: Fe52 B-C e D. Asera 52 e 52/B. Krupp UMS55 e 65, etc.

Basic coated electrode with a high Mn content of 1,5% and excellent weldability. Low Hydrogen content of the weld deposit; high mechanical properties and easy positional welding. Suitable for high yield strength steels. Efficiency 120%.

Classification	
AWS	A5.1: E 7018-1 H4
EN	499: E 42 5 B 32 H 5
EN ISO	2560-A: E 42 5 B 32 H5

Approvals	Grades
ABS	
DNV	
LRS	
MMI	
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.50	0.40	≤ 0.020	≤ 0.020	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
As Welded	≥ 420	500 - 640	≥ 22	≥ 80	

Materials

S(P)235-S(P)420, GP240-GP280

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 3 times max.
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 3 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	70-100	20,1	12,0
3,2	450	90-130	49,5	29,7
4,0	450	110-170	70,9	42,5
5,0	450	175-220	106,5	63,9
6,0	450	210-280	150,3	90,1

TENAX 56S

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo a rivestimento basico con ottima saldabilità in tutte le posizioni. Deposita un cordone di saldatura a bassissimo tenore di idrogeno con elevate caratteristiche meccaniche. Particolarmente indicato per la saldatura di off-shore e piattaforme marine. Ottimi risultati di CTOD. Arco molto protetto, ottima qualità radiografica.

TENAX 56S is a basic coated low hydrogen electrode with a very thin coating to improve joint access making the electrode suitable for root pass welding. The principal applications are related to all positional welding of materials to BS 4360-50D or equivalent. The electrode is ideally suited for pipe welding using the vertical-up technique. The main related industries are offshore, petrochemical and power engineering. Efficiency 100%.

Classification	
AWS	A5.1: E 7016-1 H4
EN	499: E 42 5 B 12 H5
EN ISO	2560-A: E 42 5 B 12 H5

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.20	0.50	≤ 0.020	≤ 0.015	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
PWHT 620°C x 1h	≥ 390	500-620	≥ 22	≥ 110	
As Welded	≥ 420	500-640	≥ 22	≥ 110	

Materials

S(P)235-S(P)420, GP240-GP280

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 5 times max

Current condition and welding position

DC+; DC-; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-90	16,7	10,0
2,5	350	60-90	19,6	11,8
3,2	350	80-130	31,2	18,7
3,2	450	80-120	39,8	23,8
4,0	350	125-170	46,1	27,6
4,0	450	125-170	58,4	35,0
5,0	450	170-240	89,1	53,4

ETC PH 56ST

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo con rivestimento basico avente una ottima saldabilità. Il deposito contiene una bassissima percentuale di idrogeno, elevate caratteristiche meccaniche, carico di rottura unitario maggiore di 550 N/mm2. Indicato per la saldatura di acciai con elevato limite di snervamento ed alta resistenza a trazione. Ottima saldabilità anche su tubazioni. Rendimento 120%.

Classification	
AWS	A5.5: E 8018-G H4
EN	2560-A: E 46 4 B 32 H5

Approvals	Grades
ABS	
MMI	
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.70	0.40	≤ 0.020	≤ 0.020	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -46°C	Hardness
PWHT 620°C x 1h	≥ 460	≥ 550	≥ 24	≥ 47	
As Welded	≥ 460	≥ 550	≥ 24	≥ 47	

Materials

S(P)460

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 3 times max.
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 3 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	70-100	20,6	12,3
3,3	450	90-130	49,6	30,1
4,0	450	110-170	70,0	42,3
5,0	450	175-220	105,5	63,9

FLEXAL 60

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo cellulosico idoneo all'esecuzione di saldature circonferenziali su tubazioni. E' utilizzabile per la prima passata di radice, per quelle di riempimento e per la finitura. FLEXAL 60 è inoltre utilizzabile per l'esecuzione della prima passata su tubazioni ad alta resistenza.

Cellulosic coated electrode for welding girth seams of pipelines. It is suitable for welding root passes, fill and cover passes. FLEXAL 60 is also suited for depositing root passes on high-strength pipe steels.

Classification	
AWS	A5.1:E 6010
EN	499: E 38 3 C 21
EN ISO	2560-A: E 38 3 C 21

Approvals	Grades
ABS	
DNV	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.60	0.20	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 30 °C	Hardness
As Welded	≥ 380	470-560	≥ 24	≥ 47	

Materials

L210-L360, X42-X52

Storage and redrying

Do not re-dry

Current condition and welding position

DC+; DC-; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	50-70	16,2	10,3
3,2	350	80-120	26,7	18,0
4,0	350	110-150	40,0	26,4
5,0	350	140-200	60,0	41,8

FLEXAL 70

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo cellulosico idoneo all'esecuzione di saldature circonferenziali su tubazioni, anche in verticale discendente. E' utilizzabile per la prima passata di radice, per quelle di riempimento e per la finitura.

Cellulosic coated electrode for welding girth seams of pipe lines, using the vertical-down technique. It is suitable for welding root passes, fill and cover passes.

Classification	
AWS	A5.5: E 7010-G
EN	499: E 42 2 C 21
EN ISO	2560-A: E 42 2 C 21

Approvals	Grades
ABS	
DNV	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.70	0.20	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 20 °C	Hardness
As Welded	≥ 420	500-640	≥ 24	≥ 47	

Materials

L210-L415, X42-X60

Storage and redrying

Do not re-dry

Current condition and welding position

DC+; DC-; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	50-70	16,2	10,3
3,2	350	80-120	26,7	18,0
4,0	350	110-150	40,0	26,4
5,0	350	140-200	60,0	41,8

FLEXAL 80

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo cellulosico idoneo all'esecuzione di saldature circonferenziali su tubazioni, anche in verticale discendente. E' utilizzabile per la prima passata di radice, per quelle di riempimento e per la finitura.

Cellulosic coated electrode for welding girth seams of pipe lines, using the vertical-down technique. It is suitable for welding root passes, fill and cover passes.

Classification	
AWS	A5.5: E 8010-G
EN	499: E 46 2 1Ni C21
EN ISO	2560-A: E 46 2 1Ni C 21

Approvals	Grades
ABS	
DNV	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.12	0.90	0.25	-	-	-	0.80	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 20 °C	Hardness
As Welded	≥ 460	550-650	≥ 24	≥ 47	

Materials

L360-L450, X52-X65

Storage and redrying

Do not re-dry

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	50-70	15,5	10,2
3,2	350	80-120	25,7	18,4
4,0	350	110-150	39,7	25,9
5,0	350	140-200	61,7	41,7

FLEXAL 90

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo cellulosico idoneo all'esecuzione di saldature circonferenziali su tubazioni, anche in verticale discendente. E' utilizzabile per la prima passata di radice, per quelle di riempimento e per la finitura.

Cellulosic coated electrode for welding girth seams of pipe lines, using the vertical-down technique. It is suitable for welding root passes, fill and cover passes.

Classification	
AWS	A5.5: E 9010-G
EN	499: E 50 2 1Ni C21
EN ISO	2560-A: E 50 2 1Ni C 21

Approvals	Grades
ABS	
DNV	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.12	1	0.25	-	-	-	0.80	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 25 °C	Hardness
As Welded	≥ 500	580-680	≥ 22	≥ 47	

Materials

L450-L555, X65-X80

Storage and redrying

Do not re-dry

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	50-70	15,5	10,2
3,2	350	80-120	25,7	18,4
4,0	350	110-150	39,7	25,9
5,0	350	140-200	61,7	41,7

VERTICORD 80

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo basico a basso contenuto di idrogeno sviluppato per la saldatura in posizione verticale discendente di tubazioni. Il rischio di difetti riconducibili alla presenza di idrogeno è limitata, particolarmente in relazione all'alto limite elastico del materiale base. Il basso tenore di idrogeno consente inoltre di ridurre la temperatura di preriscaldo rispetto agli elettrodi cellulosici. Buona tenacità a -50°C e ottima qualità radiografica. Rendimento 120%.

Low hydrogen electrode designed primarily for the vertical-down welding of circumferential pipe butt joints. The potential risk of hydrogen associated defects is minimised particularly in relation to higher strength line pipe. In addition the low hydrogen weld metal results in reduced preheat levels in comparison with cellulosic electrodes. Good impact toughness to -50°C and good radiographic quality. Efficiency 120%.

Classification	
AWS	A5.5: E 8018 G
EN	499: E 46 4 B 35 H5
EN ISO	2560-A: E 46 4 B 35 H5

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1.50	0.50	≤ 0.020	≤ 0.015	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
As Welded	≥ 460	560-650	≥ 27	≥ 45	

Materials

API 5LX 50-70; L210-L415

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
4,0	350	160-210	49,8	30,0
4,5	350	200-240	62,3	43,9

FERROMATIC 130

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo rutile con rendimento del 130% sviluppato per saldature in piano e d'angolo. Utilizzando il diametro 4,00 è possibile avere cordoni d'angolo con gola da 3mm. Facile innesco e reinnesco. Cordone di bell'aspetto, raccordato e senza incisioni laterali sul materiale base. Assenza di pruzzi e scoria di facile rimozione.

Rutile coated electrode with an efficiency of 130 %, designed for welding butt and fillet seams. Using a 4mm diameter electrode, fillet welds with a throat thickness of 3 mm can be achieved, working at high travel speeds. Easy arc striking and restriking, clean and smooth welds blending into the base metal without undercut. Low spatter loss and easy slag removal.

Classification	
AWS	A5.1: E7024
EN	499: E 42 0 RR 53
EN ISO	2560-A:E 42 0 RR 53

Approvals	Grades
ABS	
BV	
DNV	
LRS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.80	0.40	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 420	510-610	≥ 22	≥ 60	

Materials

S(P)235-S(P)420, GP240-GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required.
If necessary: 100-110 °C for 1 hour.

Current condition and welding position

DC-; DC+; AC

PA PB

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	450	140-160	63,7	38,2
4,0	450	180-230	89,6	53,8
5,0	450	230-280	139,5	82,5

FERROMATIC 160

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo rutile con rendimento 160%. Sviluppato per il riempimento di grossi giunti o per la realizzazione di lunghe saldature d'angolo. Facile innesco e reinnesco. Cordone di bell'aspetto e ben raccordato, senza incisioni laterali sul metallo base. Assenza di spruzzi e scoria di facile rimozione. La bassa fumosità lo rende ideale per la saldatura in ambieti chiusi.

Rutile coated electrode with an efficiency of approx. 160 %. It is designed for butt and fillet welds and is used for economically filling large weld sections and making long fillet welds. Easy arc striking and restriking. It produces very smooth and clean welds, merging into the base metal without undercut. Low spatter loss and easy slag removal, with proper current setting the slag is self releasing. Due to low generation of fumes, ideal for use in confined spaces.

Classification	
AWS	A5.1: E7024
EN	499: E 42 0 RR 73
EN ISO	2560-A: E 42 0 RR 73

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	
RS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.90	0.45	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 420	510-610	≥ 22	≥ 60	

Materials

S(P)235-S(P)420, GP240-GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required.
If necessary: 100-110 °C for 1 hour.

Current condition and welding position

DC-; DC+; AC

PA PB

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	450	140-160	71,1	42,7
4,0	450	180-230	107,8	64,7
5,0	450	260-340	148,1	88,9

FERROMATIC 180

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo rutile con rendimento del 180%. Adatto per lunghe saldature d'angolo e per il riempimento di giunti di grosso spessore. Deposito ben raccordato e privo di incisioni laterali sul metallo base.

Rutile coated electrode with an efficiency of approx. 180 %, used to produce long fillet welds and economically filling thick sections. Relatively low current intensities and short burn-off times.

Classification	
AWS	A5.1: E7024
EN	499: E 42 0 RR 73
EN ISO	2560-A: E 42 0 RR 73

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	
RS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.90	0.40	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 420	510-610	≥ 22	≥ 60	

Materials

S(P)235-S(P)420, GP240-GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required.
If necessary: 100-110 °C for 1 hour.

Current condition and welding position

DC-; DC+; AC

PA PB

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	450	130-160	71,0	42,6
4,0	450	180-230	105,2	63,1
5,0	450	260-310	159,0	95,4

FERROMATIC 200

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo rutile con rendimento del 200%. Ideale per l'esecuzione di lunghe saldature d'angolo e per il riempimento di giunti di grosso spessore. Facile innesco e reinnesco. Deposito ben raccordato, senza incisioni laterali sul metallo base. Assenza di spruzzi e scoria di facile rimozione.

Rutile coated high-efficiency electrode with an efficiency of approx. 200 %. It is designed for butt and fillet welds and is used for economically filling large weld sections and making long fillet welds. Easy arc striking and restriking. It produces very smooth and clean welds, without undercut. Low spatter loss and self-releasing slag.

Classification	
AWS	A5.1: E7024
EN	499: E 42 2 RR 73
EN ISO	2560-A: E 42 2 RR 73

Approvals	Grades
BV	
DNV	
LRS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1.10	0.60	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 20 °C	Hardness
As Welded	≥ 420	510-610	≥ 22	≥ 60	

Materials

S(P)235-S(P)420, GP240-GP280

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required.
If necessary: 100-110 °C for 1 hour.

Current condition and welding position

DC-; DC+; AC

PA PB

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	450	180-230	81,3	48,8
4,0	450	230-280	108,0	64,8
5,0	450	280-320	166,0	99,6

FEBAMATIC 160S

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo basico avente rendimento del 165% usato in particolare per l'esecuzione di giunti d'angolo. Ottima tenacità fino a -40°C. Scoria di facile rimozione. Ottima qualità radiografica.

Basic coated electrode having an efficiency of approx. 165 %, used for welding fillets. Weld metal is very tough and free of cracks. Smooth and clean welds blending into base metal without undercut. Suitable for welding primer painted components. Slag is easily removable. Welds are of X-ray quality

Classification	
AWS	A5.1: E7028
EN	499: E 42 4 B53 H5
EN ISO	2560-A: E 42 4 B 53 H5

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	
RS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1.10	0.60	≤ 0.025	≤ 0.015	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 40 °C	Hardness
As Welded	≥ 420	510-610	≥ 26	≥ 80	

Materials

S(P)235-S(P)420, GP240-GP280

Storage and redrying

Keep dry and avoid condensation.
HD < 5: Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

AC; DC+

PA PB

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
4,0	450	160-220	101,5	60,9
5,0	450	220-320	145,0	87,0

TENAX 76S

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo ideato per la saldatura di acciai corrispondenti alle classificazioni BS 4360 50D e similari. Ottime caratteristiche di tenacità a bassa temperatura e ottimi valori di CTOD test realizzati in condizione As Welded e su lamiere di spessore di circa 50mm. Ottime caratteristiche anche senza trattamento termico. Trova maggior applicazione in offshore, per la saldatura di strutture di primaria importanza dove è assolutamente importante avere un prodotto di sicura affidabilità.

TENAX 76S is well suited for welding BS 4360 50D and similar steel grades used for offshore applications. Good CTOD toughness in the as welded condition for joints in plates up to approx. 50 mm thick. There are many approved welding procedures for the offshore and construction industries for this electrode. Very good toughness is obtained in the as welded condition. This electrode is of major importance for offshore work; enabling higher yield steels to be welded with absolute confidence. Efficiency 120%.

Classification	
AWS	A5.5: E 7018-G
EN	499: E 46 6 1Ni B 32 H5
EN ISO	2560-A: E 46 6 1Ni B 32 H5

Approvals	Grades
ABS	
BV	
DNV	
GL	
LRS	
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.50	0.30	≤ 0.015	≤ 0.010	-	0.80	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
PWHT 620°C x 1h	≥ 390	490 - 560	≥ 22	≥ 110	
As Welded	≥ 460	530 - 680	≥ 22	≥ 90	

Materials

S(P)235 to S(P)360; GP240-GP280

SA 516 gr.60; SA 516 gr.70; SA 106 gr.B; SA333 gr1/6.

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max.
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	80-100	18,3	10,9
2,5	350	80-100	21,4	12,8
3,2	350	100-140	36,6	21,3
3,2	450	100-130	47,1	27,4
4,0	450	120-180	67,4	40,4
5,0	450	180-270	102,0	63,6

OE CRYO 75H

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo basico con deposito legato al nichel. La presenza del nichel migliora i valori di resilienza a basse temperature anche nel caso di saldature in posizione, e dopo trattamento termico. Viene impiegato nella costruzione di serbatoi, contenitori, etc. Come tutti gli elettrodi basici la saldatura va eseguita in arco corto ed a bassa velocità di lavoro. Rendimento pari al 120% circa.

OE CRYO 75H is a low hydrogen Ni alloyed electrode, depositing high toughness weld metal. Used for the construction of tanks, etc. Use a short arc and low travel speed. Efficiency 120%.

Classification	
AWS	A5.5: E 7018-C1L
EN	499: E 42 6 2Ni B 32 H5
EN ISO	2560-A: E 42 6 2Ni B 32 H5

Approvals	Grades
DNV	
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.03	0.50	0.30	≤ 0.015	≤ 0.015	-	2.30	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
PWHT 620°C x 1h	≥ 420	500 - 630	≥ 26	≥ 110	
As Welded	≥ 420	500 - 640	≥ 26	≥ 80	

Materials

12Ni14, S275-S420, P275-P460

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 3 times max.
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 3 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-120	16,8	10,0
3,2	450	100-140	47,0	29,5
4,0	450	120-190	67,4	44,4
5,0	450	180-250	103,1	66,7

OE CRYO 87

Elettrodo per la saldatura di acciai a grano fine, legati al 3.5% di nichel. Impiegato per la saldatura di acciai con temperature di esercizio fino a -101°C. Impiegato nella saldatura di tubi, serbatoi, contenitori, etc. in acciaio del tipo ASTM A203-67, gr. B: A333-67, A334-67, gr. 3: etc.

OE CRYO 87 deposits weld metal containing 3,5% Ni and is suitable for welding fine grain steels. Used for welding steels operating at temperatures down to -101°C. Suitable for welding pipes, tanks, containers. Efficiency 100%.

Classification	
AWS	A5.5: E 7016-C2L
EN	499: E 42 6 3 Ni B 12 H5
EN ISO	2560-A: E 42 6 3Ni B 12 H5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.04	0.50	0.40	≤ 0.020	≤ 0.015	-	3.50	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -101°C	Hardness
PWHT 620°C x 1h	≥ 440	510-640	≥ 25	≥ 60	
As Welded	≥ 420	500-640	≥ 25	≥ 47	

Materials

ASTM A203 gr. B; A333/ A334 gr. 3; 12Ni14

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max
HD ≤ 10: Re-dry at 350-370 °C for 1 hour, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-90	17,8	10,8
3,2	350	90-140	34,9	18,6
4,0	350	120-180	53,5	27,7
5,0	450	190-250	94,9	53,4

OE CRYO 55

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo idoneo per la saldatura di acciai con contenuto di nichel dal 0,5% al 2% utilizzati per impieghi a bassa temperatura. Testato CTOD.

Basic coated electrode for welding of 0,5 % - 2 % nickel steels for use at low temperatures. Excellent mechanical properties of the weld metal in both the as welded and stress relieved conditions. CTOD tested. Vacuum packaging.

Classification	
AWS	A5.5: E8018-C1
EN	499: E 46 6 2Ni B 42
EN ISO	2560-A: E 46 6 2Ni B 42

Approvals	Grades
ABS	
BV	
DNV	
LRS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.05	1	0.40	≤ 0.020	≤ 0.015	-	2.50	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 60 °C	Hardness
As Welded	≥ 460	530-680	≥ 22	≥ 110	

Materials

12Ni14, S275-S460, P275-P460

A333 Gr 7, A203 Gr A,B.

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 2 hours, once only.
HD ≤ 10: Re-dry at 340-360 °C for 2 hours, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	60-90	20,3	12,2
3,2	350	90-130	33,0	20,0
3,2	450	90-130	40,7	24,4
4,0	450	140-210	64,9	38,8
5,0	450	200-240	99,7	59,8

FREEZAL ENi3

OERLIKON

MMA Electrodes
C-Mn and low-alloy steels

Elettrodo basico per la saldatura di acciai al 3,5% di nichel. Ottima tenacità fino a -105°C. Elettrodo utilizzabile in DC+ e AC quando si debbano contrastare fenomeni di soffio magnetico.

Basic coated electrode for welding of steels with 3,5 % Ni with good impact toughness at -105 °C. This electrode operates well on both AC & DC current.

Classification	
AWS	A5.5: E 8018-C2
EN	499: E 46 6 3Ni B 32
EN ISO	2560-A: E 46 6 3Ni B 32

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.05	0.60	0.20	≤ 0.020	≤ 0.015	-	3.30	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 105°C	Hardness
PWHT 620 °C x 1 h	≥ 450	≥ 540	≥ 25	≥ 60	
As Welded	≥ 450	≥ 540	≥ 25	≥ 40	

Materials

12Ni14

A352LC3; ASTM A203 D,E ; A300 D,E ; A333 Gr 3 ; A 334 Gr 3

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	60-90	21,8	13,0
3,2	350	90-130	35,7	21,4
4,0	350	140-170	53,9	32,4
5,0	450	170-210	98,1	58,9

TENCORD 85CP

MMA Electrodes
Weathering steels

Elettrodo basico per la saldatura di acciai resistenti alla corrosione atmosferica, contenenti percentuali relativamente alto di fosforo rame. Idoneo per la saldatura dell'acciaio Cor-Ten A. L'alta resistenza alla corrosione ed alla abrasione atmosferica, e l'alta resistenza meccanica, confrontate a quelle di un acciaio al carbonio normale, rendono il Cor-Ten idoneo alla costruzione di strutture mobili, come autocarri, rimorchi, macchine movimento terra, etc. Esso viene impiegato pure nelle costruzioni edili, poichè la particolare colorazione della superficie fa sì che non vi sia bisogno di vernice. Il deposito ha le stesse caratteristiche dell'acciaio Cor-Ten A. L'elettrodo è stato studiato per essere utilizzato anche con generatori ad inverter.

Low Hydrogen electrode suitable for the welding of steels having high atmospheric corrosion resistance and high contents of P and Cu. Ideal for Cor-Ten A steel applications. Due to its characteristics of high atmospheric corrosion resistance and mechanical properties compared with a C-Mn steel, Cor-Ten is particularly suitable for movable structures, such as lorries, trailers, etc. Cor-Ten is also used in the bridge and construction industries because of the particular colour of its surface which does not require painting. The weld deposit has a very similar appearance to Cor-Ten A steel. Sutable for welding with an inverter generator. Efficiency 115%.

Classification	
AWS	A5.5: E 8018-G
EN	499: E 46 4 Z B 3 2 H10
EN ISO	2560-A: E 46 4 Z B 32 H10

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.05	0.70	0.40	≤ 0.020	≤ 0.020	0.50	0.40	-	-	-	-	0.40

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
PWHT 620°C x 1h	≥ 460	530-680	≥ 20	≥ 47	
As Welded	≥ 460	530-680	≥ 20	≥ 47	

Materials

CORTEN A-B-C; PATINAX; S235J0W; S235J2W; S355J0W; S355J2W; S355K2W

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-90	20,2	12,1
3,2	450	80-140	49,8	31,8
4,0	450	110-180	71,1	46,6
5,0	450	160-240	106,7	64,0

TENAX 88S

OERLIKON

MMA Electrodes
High-strength steels

TENAX 88S è un elettrodo basico debolmente legato sviluppato per la saldatura di acciai ad elevato limite elastico (min. 450/mm2) tipo BS 4360-55 E/F e E 450EMZ, normalmente utilizzati nella costruzione offshore. Il deposito di questo elettrodo garantisce elevati valori di tenacità e ottimi CTOD, sia allo stato come saldato che dopo trattamento termico. Rendimento 100%.

TENAX 88S is a low-alloyed electrode for welding higher yield steels (min. 450N/mm²), BS 4360-55 E/F and E 450 EMZ, used for topside facilities of oil and gas production platforms. This electrode produces high impact and fracture (CTOD) tough weld metal in the as-welded and stress relieved conditions. Excellent operability in all welding positions. This electrode is of major importance for offshore applications and it enables higher yield steels to be welded in all positions. Efficiency 100%.

Classification	
AWS	A5.5: E 8016-G
EN	499: E 50 6 Mn1Ni B 12 H5
EN ISO	2560-A: E 50 6 Mn1Ni B 12 H5

Approvals	Grades
ABS	
DNV	
LRS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.60	0.30	≤ 0.015	≤ 0.015	-	0.80	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
PWHT 620°C x 1h	≥ 460	560-640	≥ 26	≥ 60	
As Welded	≥ 500	560-720	≥ 24	≥ 60	

Materials

S(P)420-S(P)500

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hours, 5 times max.

Current condition and welding position

DC +; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	55-85	19,5	11,7
3,2	450	80-130	39,6	23,7
4,0	450	110-180	59,0	35,4
5,0	450	180-230	91,2	54,7

TENAX 88S HR

MMA Electrodes
High-strength steels

TENAX 88S HR è un elettrodo basico con polvere di ferro nel rivestimento, legato al Mn e Ni, sviluppato per la saldatura di acciai ad elevato limite elastico (min. 450/mm2) tipo BS 4360-55 E/F e E 450 EMZ, normalmente utilizzati nella costruzione offshore. Il deposito di questo elettrodo garantisce elevati valori di tenacità e ottimi valori di CTOD, sia allo stato come saldato che dopo trattamento termico. Rendimento 120%.

TENAX 88S HR iron-powder electrode is a low-alloyed Mn/Ni type developed for welding higher yield steels (min. 450N/mm²), usually BS 4360-55 E/F and E 450EMZ, for topside facilities of production platforms. This electrode deposits high impact and fracture (CTOD) tough weld metal in the as-welded and stress relieved conditions. This electrode is of major importance for offshore applications; enabling higher yield steels to be welded with absolute confidence. Efficiency 120%.

Classification	
AWS	A5.5: E 8018-G
EN	499: E 50 6 Mn1Ni B 32 H5
EN ISO	2560-A: E 50 6 Mn1Ni B 32 H5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.50	0.30	≤ 0.015	≤ 0.015	-	0.80	0.20	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
PWHT 620°C x 1h	≥ 460	560-640	≥ 26	≥ 60	
As Welded	≥ 500	560-720	≥ 24	≥ 60	

Materials

S(P)420-S(P)500

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hours, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-100	19,3	11,7
3,2	450	80-140	47,0	27,4
4,0	450	120-180	67,4	40,4
5,0	450	180-270	103,0	63,6

TENAX 98M

OERLIKON

MMA Electrodes
High-strength steels

Elettrodo basico per la saldatura di acciai debolmente legati aventi carichi di rottura compresi tra 600-700 N/mm2. Deposito di eccezionale tenacità anche a bassa temperatura. Si raccomanda l'impiego ad arco corto. Rendimento tra 110- 120%.

TENAX 98M is a basic coated electrode depositing low hydrogen weld metal with an efficiency of 110-120%. It is generally used for the welding of high strength steels with tensile properties of 600N/mm² min. The main applications are for the welding of root runs and standing fillets in higher strength steels.

Classification	
AWS	A5.5: E 9018-M H4
EN	757: E 55 5 Z B 32 H 5
GOST	9467-75:Э60-06ГН1-6

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1	0.30	≤ 0.020	≤ 0.020	-	1.60	0.20	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -51°C	Hardness
As Welded	≥ 550	610-780	≥ 20	≥ 70	

Materials

S(P)355-S(P)500; A508 Cl.2, A533 Cl.1Gr. B

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hours, 3 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	55-105	16,0	9,6
3,2	350	90-140	36,0	21,6
4,0	350	110-180	53,1	31,8
5,0	450	170-240	110,7	66,4

TENAX 118M

OERLIKON

MMA Electrodes
High-strength steels

Elettrodo basico a basso contenuto di idrogeno saldabile in tutte le posizioni. Rendimento tra 110-120%. Utilizzabile per la saldatura di acciai ad elevato limite elastico con carico di rottura compreso tra 760-870 Mpa, come ad esempio T1 ed HY80. Si consiglia di limitare l'apporto termico.

All-positional low-hydrogen electrode with an efficiency of 110-120% for welding high strength steels having tensile properties of 760-870 N/mm² e.g. T1, HY 80, etc. Use shortest possible arc and low travel speed. The low hydrogen weld metal minimises the risk of cold cracking. Low heat input is reccomended.

Classification	
AWS	A5.5: E 11018-M H4
EN	757: E 69 5 Z B 32 H5
GOST	9467-75:Э70-06ГН2-6

Approvals	Grades
ABS	
DNV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.60	0.30	≤ 0.020	≤ 0.020	-	2	0.30	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
As Welded	≥ 690	760-960	≥ 20	≥ 70	

Materials

T1; HY80; S(P)690; WELDOX 700

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hours, 3 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	55-105	16,6	10,1
3,2	350	90-140	34,3	22,2
4,0	350	110-180	52,7	32,4
5,0	450	170-240	108,1	66,0

TENAX 128M

OERLIKON

MMA Electrodes
High-strength steels

Elettrodo basico per la saldatura di acciai debolmente legati con resistenza alla trazione superiore a 850 N/mm2. Elettrodo con rendimento di circa 110-120%, caratterizzato da un'alta velocità di deposito con ottime qualità del giunto saldato. La composizione chimica ben bilanciata del metallo depositato garantisce delle buone proprietà di resilienza a bassa temperatura. Inoltre, dato il basso contenuto di idrogeno, il rischio di cricche è molto limitato. Si dovrà porre particolare cura durante l'impiego di questi elettrodi affinché l'assorbimento di idrogeno sia ridotto al minimo. La saldatura va eseguita in arco corto ed a bassa velocità di lavoro.

All-positional low-hydrogen electrode with an efficiency of 110-120% for the welding of high strength steels having yield strength up to 850 N/mm². Use shortest possible arc and low travel speed. The low hydrogen weld metal minimises the risk of cold cracking. Low heat input is recommended.

Classification	
AWS	A5.5: E 12018 – M
EN	757: E 79 5 Mn2NiCrMo B 32 H5
GOST	9467-75:Э85-08Г2Н2-6

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.70	0.35	≤ 0.015	≤ 0.015	0.45	1.90	0.40	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -51°C	Hardness
PWHT 580°C x 4 h	≥ 700	790-900	≥ 19	≥ 47	
As Welded	≥ 790	880-1080	≥ 18	≥ 47	

Materials

S890

WELDOX 700; WELDOX 800

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hours, 3 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	55 - 105	16,7	10,1
3,2	350	90 - 140	34,3	22,2
4,0	350	110 - 180	51,7	32,4

TENAX 118-D2

OERLIKON

MMA Electrodes
High-strength steels

Elettrodo basico per la saldatura di acciai ad elevato limite elastico (>600N/mm²) in particolare per AISI 4130. Ottima tenacità a bassa temperatura.

Basic coated electrode for welding high yield strength steels (>600N/mm²) when good impact toughness at low temperatures is required.

Classification	
AWS	A5.5: E10018-D2
EN	757: E 62 4 MnMo B32 H5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.09	1.90	0.50	0.025	0.020	-	-	0.40	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) - 40 °C	Hardness
As Welded	≥ 620	690-890	≥ 22	≥ 50	

Materials

AISI 4130

S(P)500

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

DC+; AC

PA PB PC PE PF2

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	60-90	20,3	12,2
3,2	350	100-130	35,8	21,5
4,0	450	140-190	69,0	41,4

TENAX 140

OERLIKON

MMA Electrodes
High-strength steels

Elettrodo basico per la saldatura di acciai ad elevato limite elastico. L'elevata purezza metallurgica ed il basso livello di idrogeno diffusibile riducono al minimo il rischio di cricche a freddo. Nonostante il metallo d'apporto raggiunga carichi di rottura molto elavati (Snervamento > 950 Mpa), esso si caratterizza anche per una buona tenacità alle basse temperature.

Basic coated electrode producing high-strength and tough welded joints. Weld deposit is of extremely high metallurgical purity and very low hydrogen content. Despite the very high yield strength (Rp0,2 > 950 N/mm² for 3,2 and 4,0 mm), the weld metal has good elongation and Charpy toughness (typically 40-50 J at –40 °C). Welds are of X-ray quality.

Classification	Approvals	Grades
AWS A5.5: ~ E 14018-M-H4		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.30	0.30	≤ 0.010	≤ 0.012	0.70	3.70	1.10	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) - 40 °C	Hardness
As Welded	≥ 950	1000-1100	≥ 15	≥ 27	

Materials

Fine grain steels with YS >900, S960QL

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	65-95	20,0	11,9
3,2	350	90-135	34,1	20,5
4,0	450	140-185	68,2	41,0
5,0	450	180-240	108,6	65,2

CROMOCORD 55

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico per la saldatura di acciai resistenti al creep contenenti 0,5 % Cr - 0,5 % Mo.

Basic coated electrode for welding of creep resistant steels with 0,5 % Cr - 0,5 % Mo.

Classification	
AWS	A5.5: E 8018 B1
EN	1599: E CrMo0,5 B 12 H5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.05	0.70	0.40	≤ 0.025	≤ 0.020	0.50	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 20 °C	Hardness
PWHT 700 °C x 1 h	≥ 355	≥ 510	≥ 20	≥ 80	

Materials

A387 gr. 2

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

DC+; AC

PA PB PC PF PE PF2

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	65-85	20,4	12,2
3,2	350	100-130	34,9	20,9
4,0	450	140-180	63,4	38,0
5,0	450	190-230	94,2	56,5

MOLYCORD Kb

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico per la saldatura di acciai resistenti al creep e ad alto limite elastico, utilizzato per la fabbricazione di apparecchi a pressione, serbatoi e tubazioni, soggette a temperature di esercizio fino a 500°C. Grazie al suo doppio rivestimento (fino al diametro 3,2) questo elettrodo ha un arco stabile e concentrato, rendendolo perfetto per le saldature in posizione. Ottima qualità radiografica. Utilizzare e rispettare preriscaldo, interpass e trattamento termico in accordo al materiale base utilizzato.

Basic coated electrode for welding creep resistant and higher strength steels used in the fabrication of pressure vessels, boilers and pipes, subjected to operating temperatures of up to +500 °C. Due to its double coating (up to 3,2 mm) this electrode has a stable and concentrated arc, making it well-suited for positional welding. Welds are of X-ray quality. Preheating, interpass temperature and post-weld heat treatment depend on the base metal.

Classification	
AWS	A5.5: E7018-A1-H 4
EN	499: E 50 4 Mo B 42 H5
EN	1599: E Mo B 42 H 5

Approvals	Grades
ABS	
DB	
DNV	
RS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1	0.40	-	-	-	-	0.60	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 40 °C	Hardness
PWHT 620 °C x 1 h	≥ 500	560-720	≥ 22	≥ 60	
As Welded	≥ 500	560-720	≥ 22	≥ 60	

Materials

S(P)235-S(P)500, 16Mo3

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 340-360 °C for 2 hours, 5 times max.
HD ≤ 10: Re-dry at 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	65-90	20,8	12,3
3,2	350	90-130	34,8	21,2
4,0	450	140-180	68,5	43,2
5,0	450	190-230	111,9	68,0

OE-KV2L

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo per la saldatura in tutte le posizioni di acciai contenenti circa lo 0.5% Mo. Il basso tenore di carbonio riduce al massimo i rischi di cricche, durante la saldatura, soprattutto durante la prima passata. Consigliato preriscaldo ed interpass di 100-150°C.

OE-KV2 L is a positional basic coated electrode alloyed with a nominal 0.5% Mo. The low carbon content reduces the risk of cracking, mainly during root pass welding. Pre-heat and interpass temperatures of 100-150°C are recommended. Efficiency 100%.

Classification	
AWS	A5.5: E 7015-A1
EN	1599: E Mo B 22 H5
GOST	9467-75:Э09МХ

Approvals	Grades
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.05	0.70	0.35	≤ 0.015	≤ 0.015	-	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
PWHT 620°C x 1h	≥ 420	510 - 610	≥ 24	≥ 47	

Materials

16Mo3; S(P)235-S(P)420

ASTM A355 Gr. P1; A182M Gr. F1

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	19,3	11,5
3,3	350	90-130	34,8	20,8
4,0	350	125-165	49,6	29,7
5,0	450	170-220	98,3	38,3

OE-KV2HR

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo con polvere di ferro nel rivestimento per la saldatura in tutte le posizioni di acciai contenenti circa lo 0.5% Mo. Usato anche per la saldatura di acciai ad alta resistenza; in questo caso si dovranno seguire strettamente le prescrizioni previste per l'acciaio. Buona saldabilità e stabilità d'arco. Ottima qualità radiografica; il metallo depositato presenta un'alta insensibilità alla fessurazione di solidificazione. Sono consigliati saldatura con arco corto, consigliato preriscaldo ed interpass di 100-150°C.

Low hydrogen iron-powder electrode for the all-positional welding of steels containing 0.5% Mo and high tensile steels. Excellent weldability and arc stability. Good X-ray quality and high resistance to solidification cracking. Pre-heat and interpass temperatures between 100-150°C are recommended. Efficiency 120%.

Classification	
AWS	A5.5: E 7018-A1 H4R
EN	1599: E Mo B 32 H5
GOST	9467-75:Э09М

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.78	0.38	≤ 0.015	≤ 0.015	-	-	0.53	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
PWHT 620°C x 1h	≥ 390	510-600	≥ 25	≥ 60	

Materials

16Mo3; S(P)235-S(P)420

ASTM A355 Gr. P1; A182M Gr. F1

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	19,3	11,5
3,2	350	90-130	36,2	20,8
4,0	350	125-165	51,4	29,7
5,0	450	170-220	106,8	70,6

OE-KV3L

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo per la saldatura in tutte le posizioni di acciai debolmente legati con 2.25% Cr 1% Mo. Il basso contenuto di carbonio riduce al massimo il rischio di cricche durante la saldatura. Consigliato preriscaldo ed interpass di 200-250°C.

OE-KV3L is a basic coated low hydrogen MMA electrode for the all positional welding of 2.25% Cr 1% Mo creep resisting steels. The low carbon content reduces the risk of cracking. In order to achieve the desired level of heat affected zone properties it is recommended that preheat and interpass temperatures of between 200-250°C be used. Efficiency 100%.

Classification	
AWS	A5.5: E 8015-B3L
EN	1599: E CrMo2L B 22 H5

Approvals	Grades
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.04	0.73	0.46	≤ 0.020	≤ 0.015	2.25	-	0.90	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
PWHT 700°C x 1h	≥ 460	630-720	≥ 18	≥ 47	

Materials

10CrMo9-10, 12CrMo9-10; A 387 Gr.22, Cl 1and 2, A 182 Gr.F 22, A 336 Gr.F22

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	19,3	11,9
3,2	350	90-130	35,0	21,0
4,0	350	125-165	51,4	30,8
5,0	450	170-220	98,2	56,6
6,0	450	240-290	134,5	80,7

OE-KV3HR

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo per la saldatura in tutte le posizioni di acciai resistenti allo scorrimentoa caldo, contenenti 2.25% Cr, 1.0% Mo. L'eccellente saldabilità e stabilità d'arco. Il deposito è insensibile al fenomeno di fessurazioni di solidificazione. Consigliata la saldatura con arco corto, preriscaldo ed interpass di 200 ÷ 250°C.

All-positional MMA electrode with a basic coating for the welding of creep resisting steels alloyed with 2.25%Cr 1.0%Mo. The chemical composition of the weld metal ensures a low sensitivity to solidification cracking. Preheat and interpass temperatures 200-250°C are recommended. Efficiency 120%, X Factor <15ppm and J Factor <150ppm.

Classification	
AWS	A5.5: E 9018-B3 H4R
EN	1599: E CrMo2 B 3 2 H5
GOST	9467-75:Э09Х2М1

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	0.68	0.28	≤ 0.010	≤ 0.010	2.19	-	0.90	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 30 °C	Hardness
PWHT 700°C x 1h	≥ 530	630-720	≥ 18	≥ 47	
PWHT 690 °C x 17 h/air	≥ 400	550-650	≥ 22	≥ 100	
PWHT 690 °C x 17 h/air +STC	≥ 400	550-650	≥ 22	≥ 70	

Materials

10CrMo9-10, 12CrMo9-10; A 387 Gr.22, Cl 1and 2, A 182 Gr.F 22, A 336 Gr.F22

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	19,7	11,5
3,2	350	90-130	37,5	21,5
4,0	350	125-165	53,0	31,0
5,0	450	170-220	109,7	70,0

OE-KV5L

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo per la saldatura in tutte le posizioni, di acciai resistenti allo scorrimento lamellare, contenenti 1.25% Cr 0.5% Mo. Può essere usato anche per la saldatura dell'acciaio con 0.9% Cr 0.5% Mo. Il basso tenore di carbonio riduce al massimo il rischio di cricche durante la saldatura, soprattutto durante la prima passata.

All-positional electrode (max. 0.05%C) with a basic coating for the welding of creep resistant steels alloyed with 1.25% Cr 0.5% Mo. Also recommended for welding 0.9 Cr 0.5 Mo steel. The chemical composition of the weld metal results in a high resistance to solidification cracking. Efficiency 100%.

Classification	
AWS	A5.5: E 7015-B2L
EN	1599: E CrMo1L B 22 H5

Approvals	Grades
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.04	0.77	0.44	≤ 0.015	≤ 0.015	1.25	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
PWHT 690°C x 1h	≥ 390	520 - 650	≥ 20	≥ 47	

Materials

13CrMo4-5, 13CrMoSi5-5; G17CrMo5-5

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	19,1	11,4
3,2	350	90-130	35,2	21,0
4,0	350	125-165	50,0	30,0
5,0	450	170-220	97,3	58,3
6,0	450	240-290	133,0	106,4

OE-KV5HR

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo per la saldatura in tutte le posizioni di acciai resistenti allo scorrimento lamellare, contenenti 1.25% Cr, 0.5% Mo. Può essere usato anche per la saldatura dell'acciaio con 0.9% Cr 0.5% Mo. L'eccellente saldabilità e stabilità d'arco. Il deposito è insensibile al fenomeno di fessurazioni di solidificazione. Va saldato in arco corto, consigliato preriscaldo ed interpass di 150 ÷ 200°C. Elettrodo con polvere di ferro rendimento pari al 120%.
X Factor <15ppm e J Factor <150ppm.

All-positional electrode with a basic coating alloyed with 1.25% Cr 0.5% Mo for the welding of creep resistant steels.
OE-KV5HR is also recommended for welding 0.9%Cr 0.5%Mo steel. The chemical composition of the weld metal results in a high resistance to solidification cracking. Preheat and interpass temperature 150-200°C are recommended. 120% recovery, X Factor <15ppm and J Factor <150ppm.

Classification	
AWS	A5.5: E 8018-B2 H4R
EN	1599: E CrMo1 B 32 H5
GOST	9467-75:Э09X1M similar

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.80	0.35	≤ 0.010	≤ 0.010	1.28	-	0.45	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
PWHT 690°C x 1h	≥ 460	550 - 690	≥ 20	≥ 47	

A335 Gr P11; 13CrMo4-5; 13CrMoSi5-5

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65 - 95	19,7	12,1
3,3	350	90 - 130	36,1	21,3
4,0	350	125 -165	52,7	30,6
5,0	450	170 - 220	107,0	58,0

CROMOCORD 5L

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico per la saldatura di acciai con 4÷6% di Cr e 0.5% Mo. Il basso contenuto di carbonio riduce al massimo i rischi di cricche e fessurazioni durante la saldatura. Si consiglia un interpass e preriscaldo di 250 ÷ 300°C.

Basic-coated all-positional MMA electrode (max. 0.05%C) for welding creep resisting steels containing 4-6% Cr and 0.45-0.65% Mo, such as 12 Cr Mo 19 5. Applications in the oil industry, include parts for high pressure hydrogenation vessels which must have good resistance against corrosion. Preheat and interpass temperatures 250° to 300°C are recommended. Efficiency 100%.

Classification	
AWS	A5.5: E 8015-B6L
EN	1599: E CrMo5 B 22 H5

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.04	0.70	0.40	≤ 0.015	≤ 0.015	5.70	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 0°C	Hardness
PWHT 740°C x 2h	≥ 460	540-640	≥ 19	≥ 27	

Materials

12CrMo19-5, X12CrMo5; A182 Gr. F5, A199 Gr. T5, A213 Gr.T5, A335 Gr.P5
A 336 Cl. F5, A 369 Gr. FP5, A 387 Gr.5, Cl 1 and 2

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	20,1	12,1
3,2	350	90-130	35,8	22,3
4,0	350	125-165	53,2	31,8
5,0	450	170-220	98,8	59,3

CROMOCORD 5

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico per la saldatura di apparecchi a pressione e tubazioni soggette a temperature di esercizio fino a 600°C. La composizione chimica del deposito è adatta alla saldatura di acciai tipo 12 CrMo 19 5 con resistenza all'attacco da idrogeno ad alta pressione e resistenza a creep. Le applicazione tipiche sono: impianti petrolchimici, reattori per hydrocracking per industria chimica. Fornito in imballo sottovuoto.

Basic coated MMA electrode used for welding boilers, pressure vessels, pipes etc., with operating temperatures of up to +600 °C. The all-weld metal composition matches that of steel grade 12 CrMo 19-5, having equal resistance to high-pressure hydrogen attack, creep resistance and creep rupture strength. Typical applications are: petrochemical process plants, hydrocrackers in chemical industries. Vacuum packaging.

Classification	
AWS	A5.5: E8015-B6-H4
EN	1599: E CrMo 5 B 22 H5

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	0.80	0.30	≤ 0.012	≤ 0.010	5	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
PWHT 740 °C x 1 h/air	≥ 460	600-700	≥ 19	≥ 100	
960°Cx0,5h/air+710°Cx2h	≥ 580	650-750	≥ 17	≥ 120	

Materials

12CrMo19-5, X12CrMo5; A182 Gr. F5, A199 Gr. T5, A213 Gr.T5, A335 Gr.P5
A 336 Cl. F5, A 369 Gr. FP5, A 387 Gr.5, Cl 1 and 2

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	18,9	11,3
3,2	350	90-130	36,5	21,9
4,0	350	125-165	52,4	31,5
5,0	450	170-220	97,2	58,3

CROMOCORD 9

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico per la saldatura in tutte le posizioni, di acciai resistenti allo scorrimento a caldo, legati al 9% di Cr e 1% Mo. Questo tipo di acciaio è impiegato soprattutto nell'industria petrolifera per temperature di esercizio fino a +625°C, ma a pressioni relativamente basse, dove si richieda particolare resistenza alla corrosione in presenza di idrogeno. La saldatura va eseguita in arco corto ed a bassa velocità di lavoro. Consigliato preriscaldo ed interpass di 250-300 °C.

CROMOCORD 9 is a basic coated, low hydrogen MMA electrode developed for the welding of creep resistant steels contain 9% Cr - 1% Mo. During welding preheat and interpass temperature controls between 250 - 300°C are recommended. Efficiency 100%.

Classification	
AWS	A5.5: E 8015-B8
EN	1599: E CrMo9 B 22 H5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	0.68	0.40	≤ 0.015	≤ 0.015	8.30	0.06	0.90	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 750°C x 2h	≥ 460	≥ 590	≥ 20	≥ 47	

Materials

A335 Gr. P9

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	20,3	12,2
3,2	350	90-130	36,4	21,8
4,0	350	125-165	52,2	31,3
5,0	450	170-220	104,0	62,0

CROMOCORD 91

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico per la saldatura di acciai resistenti al creep tipo 9Cr-1Mo-V-Nb-N per temperature di esercizio fino a +620°C. Utilizzabile per forgiati soggetti a trattamento termico di 740°C x 8h e per tubazioni o particolari di basso spessore soggetti a trattamento di distensione a tempi corti (760°C x 2h). Fornito in imballo sottovuoto.

Basic coated MMA electrode for welding high-temperature creep resistant steels of type 9 Cr-1Mo-V-Nb-N with operating temperatures of up to +620 °C. Cromocord 91 is suited for thick-walled cast pieces, which are subjected to tempering 740 °C x 8 h as well as for thin-walled components, e.g. piping which is subjected to a tempering treatment at higher temperatures and shorter times (e.g. 760 °C x 2 h) Weld metal is tested for in-service embrittlement. Vacuum packaging.

Classification	
AWS	A5.5: E9018-B9-H4
EN	1599: E CrMo 9 1 B 42 H5

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.70	0.30	≤ 0.010	≤ 0.010	9	0.40	1	0.05	0.20	0.04	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
PWHT 760 °C x 2 h/furnace	≥ 530	620-850	≥ 17	≥ 75	

Materials

T 91 (ASTM A 213), F 91 (ASTM A 182)
X10CrMoVNb9-1, grade 91 (ASTM A 387), P 91 (ASTM A 335)

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-90	20,9	12,5
3,2	350	85-130	35,6	21,4
4,0	350	130-160	53,0	31,8

CROMOCORD 9M

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico per la saldatura di acciai resistenti a creep del tipo 9 Cr-1Mo-V-Nb con temperature di esercizio fino a 650°C. Utilizzato anche per la saldatura di forgiati di grosso spessore soggetti a rinvenimento a 740°C per 8 ore.

Basic coated MMA electrode for welding high-temperature creep resistant steels of type 9 Cr-1Mo-V-Nb with operating temperatures of up to +650 °C. Cromocord 9M is used for welding thick walled cast steel components, which are subjected to a tempering treatment of 8 hrs. at 740 °C. Weld metal is tested for in-service embrittlement.

Classification	
AWS	A5.5: E9018-B9-H4
EN	1599: ~E Cr Mo 9 B 42 H5

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.09	1	0.20	≤ 0.010	≤ 0.010	9	-	1	0.07	0.22	0.04	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
PWHT 740 °C x 8 h/furnace	≥ 550	640-760	≥ 17	≥ 75	

Materials

T 91 (ASTM A 213), F 91 (ASTM A 182)

X10CrMoVNb9-1, grade 91 (ASTM A 387), P 91 (ASTM A 335)

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-90	19,0	11,0
3,2	350	85-130	38,1	23,0
4,0	450	130-160	76,8	46,0
5,0	450	180-230	118,2	71,0

CROMO E225

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico con bassissimo tenore di idrogeno nel deposito. Sviluppato per la saldatura di acciai resistenti al creep e idonei all'utilizzo in presenza di idrogeno ad elevata pressione utilizzati per la costruzione di serbatoi, reattori e tubazioni con temperature di esercizio fino a +600°C. Il metallo depositato ha buona tenacità e viene testato contro l'infragilimento "in service" attraverso la prova dello Step Cooling (STC). X e J-factor controllati (X max. 15ppm ; J max. 120ppm).
Efficiency 100%.

Basic coated MMA electrode producing an extremely low hydrogen weld metal, designed for welding creep resistant and high-pressure hydrogen resistant steels used in the fabrication of pressure vessels, boilers and pipes, with operating temperatures of up to +600 °C. Weld metal features high toughness properties and is largely insensitive to in-service embrittlement, proven by simulated heat treatment STC = step cooling. Very low X- and J-factor (X max. 15ppm ; J max. 120ppm).
Efficiency 100%.

Classification	
AWS	A-5.5: E9015-B3 H4
EN	1599: E CrMo2 B 22 H5

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.70	0.25	≤ 0.010	≤ 0.010	2.30	-	1.10	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 40 °C	Hardness
PWHT 690 °C x 8 h	≥ 400	550-650	≥ 22	≥ 80	
PWHT 690 °C x 8 h + STC	≥ 400	550-650	≥ 22	≥ 60	

Materials

10CrMo9-10, 12CrMo9-10; A387 Gr.22, Cl 1and 2, A 182 Gr.F 22, A 336 Gr.F22

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, max 3 times.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	350	85-130	33,5	20,0
4,0	450	140-180	60,2	36,0
5,0	450	180-230	94,9	57,0

CROMO E225V

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico per la saldatura di acciai 2.25% Cr, 1.00% Mo 0,2% V per applicazioni dove sia richiesta elevata resistenza al creep in presenza di idrogeno. X e J factor controllati (X Factor<15ppm e J Factor<120ppm). Adatto per la saldatura di acciai tipo: 12 Cr Mo V 910, SA 336 F22V, SA 541 Gr 22v. Rendimento 100%.

Low-hydrogen MMA electrode suitable for the welding of 2.25% Cr, 1.0% Mo, V steels after step cooling applications.
X Factor<15ppm and J Factor<120ppm.
Efficiency 100%.

Classification	
AWS	A5.5: E 9015-G
EN 1599	E Z B 22 H5

Approvals	Grades
ABS	E9015-G

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.09	0.60	0.20	≤ 0.010	≤ 0.010	2.30	-	1	0.012	0.25	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -18°C	Hardness
PWHT 710°C x 8h	≥ 420	620 - 750	≥ 18	≥ 54	

Materials

12 CrMoV9-10; SA 336 F22V; SA 541 Gr 22V

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, max 3 times.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	350	85 - 130	33,7	19,5
4,0	450	130 - 170	61,4	37,8
5,0	450	170 - 220	92,8	58,2

CROMOCORD E223

Elettrodo basico per la saldatura di acciai tipo T/P23 utilizzati per la costruzione di parti soggette ad elevata temperatura e pressione nelle centrali per generazione di energia elettrica. Saldabile in tutte le posizioni eccetto verticale discendente.
X Factor<15ppm and J Factor<120ppm.
Efficiency 100%.

New generation Cr and 1,5%W alloyed basic coated MMA electrode, suitable for the welding of T23 and P23 steels. Excellent weldability in all positions except vertical down. Mainly used in power generation applications.
X Factor<15ppm and J Factor<120ppm.
Efficiency 100%.

Classification	Approvals	Grades
AWS A5.5: E8015-G		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.04	0.50	0.30	≤ 0.015	≤ 0.015	2	0.50	-	-	0.25	-	0.10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
PWHT 740°C x 2h	≥ 460	550-640	≥ 20	≥ 27	

Materials

A335 P23 - A213 T23

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 400-420 °C for 1 hour, once only.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-80	17,7	10,3
3,2	350	65-100	33,0	21,8

CROMOCORD 10M

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico per la saldatura di acciai tipo 10Cr-1Mo-1W-V-Nb resistenti al creep ad elevata temperatura.

Basic coated MMA electrode for welding high-temperature creep resistant steels of type 10Cr-1Mo-1W-V-Nb type. Particularly suited for thick-walled steel castings which are subjected to a tempering treatment of 12 hrs. at 730 °C. Vacuum packaging.

Classification	Approvals	Grades
DIN 8575: ~E CrMoW 10 B 20+		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1	0.25	≤ 0.015	≤ 0.010	9.70	1	1	0.05	0.20	0.05	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
PWHT 730 °C x 12 h/furnace	≥ 550	700-820	≥ 17	≥ 75	

Materials

G X 12 CrMoVWNbN 10 1 1

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 5: Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	350	80-130	38,4	23,0
4,0	450	140-180	76,5	46,0
5,0	450	180-230	116,7	70,0

CROMOCORD N125

OERLIKON

MMA Electrodes
Chromium-Molybdenum steels

Elettrodo basico legato al 1,5 Cr - 1 Mo - 0,25 V per la saldatura di forgiati di identica composizione chimica, con temperature di esercizio di +600°C. Preriscaldo ed Interpass devono essere in accordo a quanto prescritto per il materiale base.

Basic coated electrode of the 1,5 Cr - 1 Mo - 0,25 V type, designed for welding cast steel of identical composition, with operating temperatures of up to +600 °C. Observe specifications for preheating and post-weld heat treatment of the base plates.

Classification	
AWS	A5.5: E 9015-G
EN	1599: E CrMoV 1 B 42 H10

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.12	0.90	0.40	≤ 0.015	≤ 0.010	1.40	-	1	-	0.25	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
PWHT 680 °C x 8 h/air	≥ 450	600-800	≥ 15	≥ 47	

Materials

G17CrMoV5-11

Storage and redrying

Keep dry and avoid condensation.
HD ≤ 10: Re-dry at 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+

PA PB PC PF PE PF2

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	60-90	21,0	12,6
3,2	450	90-130	46,0	27,6
4,0	450	140-180	70,0	42,0
5,0	450	190-230	106,0	63,6

SUPRANOX 308L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo rutile per la saldatura degli acciai inossidabili austenitici al Cr-Ni con basso Carbonio, come anche acciai al solo cromo resistenti alle alte temperature. Non scaglia fino a 800°C. Buona fusione con trasferimento del metallo a goccie fini, superficie del cordone liscia e ben raccordata, facile rimozione della scoria. Facile innesco e reinnesco dell'arco anche a freddo.

Rutile coated MMA electrode for welding austenitic stainless Cr-Ni steels or cast steels, having an extra low carbon content, as well as stainless or heat resisting chromium steels or cast steels. Non-scaling up to +800 °C. Fine metal droplet transfer, good fusion of joint faces, finely rippled bead surface, easily removable slag. Easy arc striking and restriking.

Classification	
AWS	A-5.4: E308L-17
EN	1600: E19 9 L R 12

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.03	0.80	0.90	≤ 0.025	≤ 0.020	19	10	-	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 520	≥ 30	≥ 50	

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)

AISI 304 - 304L - 302

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	35-60	11,0	6,6
2,5	300	45-80	17,4	10,4
3,2	350	70-120	35,8	21,5
4,0	350	100-150	53,0	31,8
5,0	450	130-230	107,1	64,2

SUPRANOX 316L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo rutile per la saldatura degli acciai inossidabili austenitici al Cr-Ni-Mo con basso Carbonio. Buona fusione con trasferimento del metallo a goccie fini, superficie del cordone liscia e ben raccordata, facile rimozione della scoria. Facile innesco e reinnesco dell'arco anche a freddo.

Rutile coated MMA electrode for welding austenitic stainless Cr-Ni-Mo steels or cast steels, having an extra low carbon content. Fine metal droplet transfer, good fusion of joint faces, finely rippled bead surface, easy slag removal, easy arc striking and restriking.

Classification	
AWS	A 5.4: E316L-17
EN	1600: E 19 12 3 L R 12

Approvals	Grades
DB	
GL	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.03	0.80	0.90	≤ 0.025	≤ 0.020	18.50	12	2.70	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 400	≥ 520	≥ 30	≥ 50	

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
1,6	250	20-40	6,3	3,8
2,0	300	35-60	11,3	6,8
2,5	350	45-80	18,0	10,8
3,2	350	70-120	35,8	21,5
4,0	350	100-150	53,4	32,1
5,0	450	130-230	108,3	65,0

SUPRANOX 309L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo rutile per giunzioni di metalli dissimili (acciai austenitici con acciai ferritici) e per placcature austenitiche. Il metallo depositato ha struttura austenitica con circa il 15% di ferrite delta. Utilizzato per il primo strato di placcature su acciai legai o non legati. Buona fusione con trasferimento del metallo a goccie fini, superficie del cordone liscia e ben raccordata, facile rimozione della scoria. Facile innesco e reinnesco dell'arco anche a freddo.

Rutile coated MMA electrode for joining dissimilar steels (austenitic steels to ferritic steels) and for austenitic claddings. Weld metal consists of austenite with approx. 15 % delta-ferrite. Cladding on unalloyed and low-alloy steels is already corrosion resistant in the first layer. Fine metal droplet transfer, good fusion of joint faces, finely rippled bead surface, easy slag removal, good striking and restriking.

Classification	
AWS	A5.4: E309L-17
EN	1600: E 23 12 L R 12

Approvals	Grades
DB	
GL	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.03	0.70	0.90	≤ 0.025	≤ 0.020	24	13	-	-	-	-	12-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 320	≥ 520	≥ 30	≥ 50	

Materials

A312 TP309S; carbon steel to stainless steels joint

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	35-65	11,5	7,0
2,5	300	60-90	18,5	11,1
3,2	350	90-120	37,0	22,2
4,0	350	100-160	54,0	32,4

SUPRANOX 309MoL

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo rutile per giunzioni di metalli dissimili (acciai austenitici con acciai ferritici) e per placcature austenitiche. Il metallo depositato ha struttura austenitica con circa il 15% di ferrite delta. Utilizzato per il primo strato di placcature su acciai legai o non legati. Buona fusione con trasferimento del metallo a goccie fini, superficie del cordone liscia e ben raccordata, facile rimozione della scoria. Facile innesco e reinnesco dell'arco anche a freddo.

Rutile coated MMA electrode for joining dissimilar steels (austenitic steels to ferritic steels) and for austenitic cladding. Weld metal consists of austenite with approx. 15% delta-ferrite. Cladding on unalloyed and low-alloy steels is already corrosion resistant in the first layer. Fine metal droplet transfer, good fusion of joint faces, finely rippled bead surface, easy slag removal, good arc striking and restriking.

Classification	
AWS	A5.4: E309MoL-17
EN	1600: E 23 12 2 L R 12

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.03	0.70	0.90	≤ 0.025	≤ 0.020	22.50	13.50	2.60	-	-	-	12-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 25	≥ 50	

Materials

Cladding of carbon steel and low alloy steel

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	40-60	13,3	8,0
2,5	300	60-90	18,9	11,3
3,2	350	90-120	37,1	22,3
4,0	350	100-160	54,6	32,8

CRISTAL E308L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo rutile a bassa fumosità per la saldatura degli acciai inossidabili austenitici al Cr-Ni. La ridotta emissione di fumi contribuisce a migliorare l'ambiente dove il saldatore è chiamato ad operare. La quantità di fumo nelle vicinanze della postazione di saldatura è considerevolmente al di sotto di quella con elettrodi standard. Ottimo per temperature di esercizio fino a 350°C, non scaglia fino a 800°C. Buona fusione con trasferimento del metallo a goccie fini, superficie del cordone liscia e ben raccordata, facile rimozione della scoria. Facile innesco e reinnesco dell'arco anche a freddo. Fornito in imballo sottovuoto.

Fume reduced, rutile coated MMA electrode for welding austenitic stainless Cr-Ni steels or cast steels. The reduced fume formation contributes to an improved working environment for welders and in workshops. The welding fume deposit in the welding zone and on the work piece is considerably lower than with standard electrodes.
For operating temperatures of up to +350 °C, non-scaling up to +800 °C.Fine metal droplet transfer, good fusion of joint faces, finely rippled bead surface, easy slag removal, excellent arc striking and restriking. Vacuum packaging: no redrying or special storage conditions.

Classification	
AWS	A5.4: E 308L-17
EN	1600: E 19 9 L R 22

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.03	0.80	0.90	≤ 0.025	≤ 0.020	19	10.50	-	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 520	≥ 30	≥ 50	

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)

AISI 304 - 304L - 302

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 250-300 °C for 2 hours, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	70-80	18,6	11,2
3,2	350	110-120	35,2	21,0
4,0	350	125-135	53,3	32,0

CRISTAL E316L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo rutile a bassa fumosità per la saldatura degli acciai inossidabili austenitici al Cr-Ni-Mo. La ridotta emissione di fumi contribuisce a migliorare l'ambiente dove il saldatore è chiamato ad operare. La quantità di fumo nelle vicinanze della postazione di saldatura è considerevolmente al di sotto di quella con elettrodi standard. Ottimo per temperature di esercizio fino a 400°C, non scaglia fino a 800°C. Buona fusione con trasferimento del metallo a goccie fini, superficie del cordone liscia e ben raccordata, facile rimozione della scoria. Facile innesco e reinnesco dell'arco anche a freddo. Fornito in imballo sottovuoto.

Fume reduced, rutile coated MMA electrode for welding austenitic stainless Cr-Ni-Mo steels or cast steels. The reduced fume formation contributes to an improved working environment for welders and in workshops. The welding fume deposited in the welding zone and on the work piece is considerably lower than with standard electrodes.
For operating temperatures of up to +400 °C. Fine metal droplet transfer, good fusion of joint faces, finely rippled bead surface, easy slag removal, excellent arc striking and restriking. Vacuum packed: no redrying or special storage conditions are required.

Classification	
AWS	A5.4: E316L-17
EN	1600: E 19 12 3 L R 22

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	0.80	0.90	≤ 0.025	≤ 0.020	19.10	10.80	2.80	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 450	≥ 520	≥ 30	≥ 50	

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 250-300 °C for 2 hours, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	70-80	18,3	11,0
3,2	350	110-120	34,2	21,0
4,0	350	125-135	53,3	32,0

CRISTAL E309L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo rutile a bassa fumosità per la saldatura di acciai dissimili (acciai austenitici con acciai ferritici) e per il primo strato in placcature austenitiche. La ridotta emissione di fumi contribuisce a migliorare l'ambiente dove il saldatore è chiamato ad operare. La quantità di fumo nelle vicinanze della postazione di saldatura è considerevolmente al di sotto di quella con elettrodi standard. Il deposito di saldatura ha struttura austenitica con circa il 15% di ferrite delta. Utilizzato per il primo strato di placcature su acciai legai o non legati. La temperatura di esercizio per giunti dissimili è fino a 300°C. In caso di temperature più alte usare SUPRANEL 600. Buona fusione con trasferimento del metallo a goccie fini, superficie del cordone liscia e ben raccordata, facile rimozione della scoria. Facile innesco e reinnesco dell'arco anche a freddo. Fornito in imballo sottovuoto.

Fume reduced, rutile coated MMA electrode for joining dissimilar steels (austenitic steels to ferritic steels) and for austenitic cladding. The reduced fume formation contributes to an improved working environment for welders and in workshops. The welding fume deposited in the welding zone and on the work piece is considerably lower than with standard electrodes. Weld metal consists of austenite with approx. 15 % delta-ferrite. Cladding on unalloyed and low-alloy steels is already corrosion resistant in the first layer. Highest operating temperature for joints between dissimilar steels is +300 °C. In case of higher temperatures, use SUPRANEL 600 electrodes. Fine metal droplet transfer, good fusion of joint faces, finely rippled bead surface, easy slag removal, excellent arc striking and restriking.
Vacuum packaging: no redrying or special storage conditions.

Classification	
AWS	A5.4: E 309L-17
EN	1600: E 23 12 L R 22

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.03	0.80	0.90	≤ 0.025	≤ 0.020	23	12.50	-	-	-	-	10-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 320	≥ 520	≥ 30	≥ 50	

Materials

A312 TP309S; carbon steel to stainless steels joint

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 250-300 °C for 2 hours, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	70-80	18,3	11,0
3,2	350	110-120	34,2	20,5
4,0	350	125-135	53,3	32,0

SUPRANOX RS 308L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo semi-basico per la saldatura di acciai inossidabili austenitici contenenti dal 16 al 20% di Cr e dall'8 al 12% di Ni (ad es. AISI 304 e 304L). Deposito con contenuto di carbonio massimo dello 0.04%. Impiegato negli impianti nucleari, alimentari e chimici. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato. Rendimento 100%. Imballato in Gaspack.

Semi-basic MMA electrode suitable for the welding of austenitic steels containing 16-20% Cr and 8-12% Ni (i.e. AISI 304, AISI 304L). The weld deposit has a 0,04% max carbon content. Particularly suitable for nuclear, chemical and associated applications. Excellent weldability with a spatter free arc, self-releasing slag producing a very smooth bead appearance.
Efficiency 100%. Packed in Gaspack system.

Classification	
AWS	A5.4: E 308L-16
EN	1600: E 19 9L R 12
GOST	10052-75: Э04Х20Н9

Approvals	Grades
ABS	
MMI	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.021	0.90	0.80	≤ 0.025	≤ 0.025	19	9.50	-	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 320	≥ 520	≥ 35	≥ 80	

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)

AISI 304 - 304L - 302

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 350-370 °C for 1 hour, 3 times max

Current condition and welding position

AC; DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
1,6	250	20-30	5,8	3,2
2,0	300	30-60	11,2	6,7
2,5	300	50-80	18,7	11,2
3,2	350	60-120	35,0	21,0
4,0	350	100-140	52,8	31,6
5,0	350	130-180	81,6	48,9

SUPRANOX RS 308H

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo semibasico per la saldatura di acciai ad alto tenore di carbonio come AISI 304H o Wr 1.4948. Sviluppato per applicazioni ad elevata temperatura di esercizio (industria petrolchimica e nucleare). Rendimento 100%. Imballato in Gaspack.

Semi-basic MMA electrode for welding type AISI 304H or Wr. 1.4948 steels. Developed for high temperature applications (petrochemical and nuclear industry).
Efficiency 100%. Packed in Gaspack system.

Classification	
AWS	A5.4: E 308H-16
EN	1600: E 19 9 R 12
GOST	10052-75: Э07Х20Н9

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.05	0.90	0.80	≤ 0.030	≤ 0.030	19.50	9.50	-	-	-	-	3-8

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 35	≥ 60	

Materials

AISI 304H; 1.4948 (X6CrNi18-10); 1.4310 (X10CrNi18-8)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 350-370 °C for 1 hour, 3 times max

Current condition and welding position

AC; DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-80	18,7	11,2
3,2	350	60-120	35,0	21,0
4,0	350	100-140	52,8	31,6

SUPRANOX RS 316L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo semi-basico per la saldatura di acciai inossidabili austenitici contenenti 16-20% Cr, 10-14% Ni e 2-3% Mo (AISI 316 e 316 L). Ottima resistenza alla corrosione chimica. Il basso contenuto di carbonio del deposito assicura una saldatura esente da cricche. Eccellente saldabilità con un arco complelamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato. Elettrodo a rivestimento semi-basico per la saldatura e la ricarica di acciai difficilmente saldabili, tipo acciai da corazza, al 13% Mn. Adatto per l'esecuzione di strati intermedi di riporti duri. Le elevate caratteristiche meccaniche e la grande resistenza alla fessurazione, rendono questo elettrodo di impiego universale. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato. Rendimento 100%. Imballato in Gaspack.

Semi-basic MMA electrode suitable for the welding of austenitic stainless steels containing 16-20% Cr, 10-14% Ni and 2-3% Mo (AISI 316 and 316L). Good chemical corrosion resistance. The low carbon content of the weld deposit ensures a high resistance to weld cracking. Excellent weldability with a spatter free arc; self-releasing slag combined with a very smooth bead appearance. Efficiency 100%. Packed in Gaspack system.

Classification	
AWS	A5.4: E 316L-16
EN	1600: E 19 12 3L R12
GOST	10052-75: Э02Х20Н14Г2 М 2Б

Approvals	Grades
ABS	
MMI	
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	0.75	0.70	≤ 0.025	≤ 0.020	19	12	2.20	-	-	-	4-8

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
As Welded	≥ 350	≥ 510	≥ 30	≥ 47	

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 350-370 °C for 1 hour, 3 times max

Current condition and welding position

AC; DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
1,5	250	20-30	5,4	3,2
2,0	300	30-60	11,5	6,9
2,5	300	50-80	18,4	11,3
3,2	350	60-120	35,7	21,4
4,0	350	100-140	52,3	31,3
5,0	350	130-190	84,8	50,8

SUPRANOX RS 347

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo semi-basico per la saldatura degli acciai inossidabili austenitici stabilizzati AISI 321 e AISI 347, solitamente stabilizzati al titanio. La presenza del Nb+Ta nel metallo d'apporto è giustificata dal fatto che il Ti, alla temperatura di fusione del bagno di saldatura, sublimerebbe, compromettendo così l'azione stabilizzante nel deposito. Si ha un miglioramento delle proprietà generali alle alte temperature. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato. Rendimento 100%. Imballato in Gaspack.

Semi-basic MMA electrode suitable for welding stabilized austenitic stainless steels AISI 321 and AISI 347. The Nb+Ta in the weld metal is due to the Ti sublimation at the liquidus temperature of the weld pool. The weld metal mechanical properties are excellent at high temperatures. Excellent weldability with a spatter free arc, self-releasing slag results in a very smooth bead appearance. Efficiency 100%. Packed in Gaspack system.

Classification	
AWS	A5.4: E 347-16
EN	1600: E 19 9Nb R 12
GOST	10052-75: Э08Х20Н10Г 2Б similar

Approvals	Grades
MMI	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.05	0.80	0.60	≤ 0.025	≤ 0.020	19	10	-	0.50	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 48	

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4550 (X6CrNiNb18-10);
AISI 347 - 321

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 350-370 °C for 1 hour, 3 times max.

Current condition and welding position

AC; DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	30-60	11,1	6,6
2,5	300	50-80	18,7	11,2
3,2	350	60-120	35,0	21,0
4,0	350	100-140	52,5	31,5
5,0	350	130-180	82,6	49,5

SUPRANOX RS 309L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo semi-basico per la saldatura di acciai inossidabili. È particolarmente indicato per la saldatura di acciai dissimili. Temperatura di esercizio +1000°C. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato. Rendimento 100%. Imballato in Gaspack

Semi-basic MMA electrode suitable for the welding of stainless steels. Particularly suitable for the welding of dissimilar steels. Service temperature +1000°C. Excellent weldability with a spatter free arc, self-releasing slag combined with a very smooth bead appearance. Efficiency 100%.
Packed in Gaspack system.

Classification	
AWS	A5.4: E 309L-16
EN	1600: E 23 12L R 12
GOST	10052-75: Э10Х25Н13Г2 similar

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	0.75	0.70	≤ 0.025	≤ 0.030	23	12	-	-	-	-	8-13

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
As Welded	≥ 320	≥ 520	≥ 30	≥ 47	

Materials

A312 TP309S; carbon steel to stainless steels joint

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 350-370 °C for 1 hour, 3 times max.

Current condition and welding position

AC; DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	30-50	11,8	7,0
2,5	300	45-70	19,3	11,6
3,2	350	65-120	36,2	21,6
4,0	350	115-140	54,1	32,4
5,0	350	130-180	86,6	52,0

SUPRANOX RS 309Mo

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo rutile per la saldatura di acciai inox. Particolarmnte indicato per la saldatura di acciai dissimili e sottostrati per placcature. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato. Rendimento 100%. Imballato in Gaspack.

Rutile coated MMA electrode suitable for the welding of steels type AISI 309. Also suitable for the welding of dissimilar steels, buffer layers and cladding. Excellent weldability with a spatter free arc, self-releasing slag combined with a very smooth bead appearance. Efficiency 100%. Packed in Gaspack system.

Classification	
AWS	A5.4: E 309Mo-16
EN	1600: E 23 12 2L R 12
GOST	10052-75: Э10Х25Н13Г2 similar

Approvals	Grades
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.021	0.90	0.80	≤ 0.030	≤ 0.030	22.70	12.70	2.50	-	-	-	9-25

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 47	

Materials

Cladding of carbon steel and low alloy steel

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 350-370 °C for 1 hour, 3 times max

Current condition and welding position

AC; DC+

PA PB PC PF PE

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	19,2	11,9
3,2	350	65-120	37,0	22,0
4,0	350	115-140	55,2	33,1
5,0	350	130-180	87,2	52,3

SUPRANOX RS 310

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo semibasico con struttura completamente austenitica per la saldatura di AISI 310 e per leghe resistenti al calore (fino a 1150°C) contenenti 25% Cr e 20% Ni. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato.

Rutile coated MMA electrode depositing fully austenitic weld metal suitable for the welding of AISI 310 and heat resistant alloys (up to 1150° C) containing 25% Cr and 20% Ni.
Excellent weldability with a spatter free arc, self-releasing slag combined with a very smooth bead appearance.
Efficiency 100%. Packed in Gaspack system.

Classification	
AWS	A5.4: E 310-16
EN	1600: E 25 20 R 22

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.09	2.20	1	≤ 0.030	≤ 0.030	25	21	0.40	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 60	

Materials

AISI 310; 1.4845 (X8CrNi25-21); 1.4841 (X15CrNiSi25-21); 1.4828 (X15CrNiSi20-12)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 350-370 °C for 1 hour, 3 times max

Current condition and welding position

AC; DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	18,3	10,9
3,2	350	70-120	34,5	20,7
4,0	350	110-140	53,5	32,1

SUPRANOX 317

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo semi-basico per la saldatura di acciai austenitici contenenti 16-20% Cr, 10-14% Ni e 3-4% Mo (AISI 317). L'uso di tali acciai, e di conseguenza degli elettrodi, è limitato ad applicazioni in severe condizioni di corrosione, in presenza di acido solforico e solforoso e dei loro sali. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilrnente asportabile e cordone dall'aspetto piano e perfettamente raccordato.

Semi-basic MMA electrode suitable for the welding of austenitic stainless steels with 16-20% Cr, 10-14% Ni and 3-4% Mo (AISI 317). The use of these steels is limited to corrosion conditions in the presence of sulphuric and sulphurous acids and their salts. Excellent weldability with a spatter free arc; self-releasing slag combined with a very smooth bead appearance. Efficiency 100%. Packed in Gaspack system.

Classification	
AWS	A5.4: E 317-16
EN	1600: E 19 13 4 NL B 12

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.04	0.90	0.80	≤ 0.030	≤ 0.030	19	13	3.50	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 27	

Materials

1.4434 (X2CrNiMoN18-12-4); 1.4438 (X2CrNiMo18-15-4); 1.4429 (X2CrNiMoN17-13-3)

AISI 317L - 317LN

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 350-370 °C for 1 hour, 3 times max

Current condition and welding position

AC; DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-80	18,7	11,2
3,2	350	70-120	35,8	21,4
4,0	350	110-140	55,1	33,0

SUPRANOX 318

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo semi-basico per la saldatura degli acciai inossidabili austenitici stabilizzati tipo 316Ti. La presenza del Niobio assicura un'azione stabilizzante agli effetti della corrosione intergranulare dovuta alla precipitazione di carburi. Impiegato soprattutto per la saldatura di acciai della stessa composizione chimica. Massima temperatura di esercizio +450°C. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato. Imballati con sistema Gaspack in atmosfera inerte. Rendimento 100%.

Rutile coated MMA electrode for welding stabilized austenitic stainless Cr-Ni-Mo steels and cast steels. For operating temperatures of up to +400 °C. Fine metal droplet transfer, good fusion of joint faces, finely rippled bead surface, easy slag removal, easy arc striking and restriking. Vacuum packaging.

Classification	
AWS	A5.4: E318-16
EN	1600: E 19 12 3 Nb R 12

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.03	0.80	0.90	≤ 0.025	≤ 0.020	18.50	12	2.70	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 50	

Materials

1.4571 (X6CrNiMoTi17-12-2) - 1.4401 (X4CrNiMo17-12-2)
1.4580 (X6CrNiMoNb17-12-2) - 1.4408 (GX5CrNiMo19-11)
1.4581 (GX5CrNiMoNb19-10) - 1.4436 (X4CrNiMo17-13-3)
1.4583 (X10CrNiMoNb18-12)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 300-350 °C for 2 hours, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	35-60	11,4	6,8
2,5	350	45-80	17,9	10,7
3,2	350	70-120	35,2	21,1

SUPRANOX RS 22 9 3L

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo particolarmente adatto per la saldatura di acciai Duplex con 22% Cr 9% di Ni 3% Mo. Ottima resistenza alla corrosione intergranulare. Basso contenuto di Carbonio. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato. Rendimento 100%. Imballato in Gaspack.

Supranox RS 22.9.3L is particularly suitable for the welding of Duplex stainless steels. Excellent resistance to intergranular corrosion, pitting and stress corrosion conditions. Low carbon content. Excellent weldability with a spatter free arc, self-releasing slag combined with a very smooth bead appearance. Efficiency 100%. Packed in Gaspack system.

Classification	
AWS	A5.4: E 2209-16
EN	1600: E 22 9 3 NL R 12

Approvals	Grades
BV	
DNV	
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	0.90	0.90	≤ 0.030	≤ 0.030	22.50	9.50	3	-	-	0.14	30-55

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
As Welded	≥ 450	≥ 690	≥ 20	≥ 27	

Materials

1.4462 (X2CrNiMoN22-5-3)
UNS S31803 - S31500 - S31200 - S32304

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 350-370 °C for 1 hour, 3 times max.

Current condition and welding position

AC; DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	35-70	18,9	11,3
3,2	350	60-120	37,6	22,5
4,0	350	90-140	55,0	33,4
5,0	350	140-210	83,9	50,3

DW 312

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo a rivestimento semi-basico per la saldatura e la ricarica di acciai difficilmente saldabili, tipo acciai da corazza, al 13% Mn. Adatto per l'esecuzione di strati intermedi di riporti duri. Le elevate caratteristiche meccaniche e la grande resistenza alla fessurazione, rendono questo elettrodo di impiego universale. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato.

Rutile coated MMA electrode for joining dissimilar steels and depositing cladding on ferritic steels. The ferritic-austenitic Cr-Ni weld metal contains approximately 50% delta-ferrite and is non-scaling up to 1100 °C. It features high resistance to cracking and is therefore suited to joining difficult-to-weld steels and depositing stress-relaxing buffer layers on crack sensitive base metals. Suitable for welding galvanized steel plates. Fine metal droplet transfer, good fusion of joint faces, finely rippled bead surface, easy slag removal, easy arc striking and restriking.

Classification	
AWS	A5.4: E312-16
EN	1600: ~ E 29 9 R 12

Approvals	Grades
DB	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.10	1	1.10	≤ 0.025	≤ 0.020	29	12	-	-	-	-	50

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 600	≥ 750	≥ 20		≥ 220 HB

Materials

Dissimilar and difficult to weld steels

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	35-60	11,6	7,0
2,5	300	55-85	18,7	11,0
3,2	350	80-120	37,1	22,0
4,0	350	110-150	54,1	32,0
5,0	350	160-220	81,7	49,0

DW RSP

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo semi-basico con deposito austenitico-ferritico di alta resistenza alla criccabilità. Particolarmente indicato per la saldatura di acciai dissimili (ad es. inox con acciaio dolce) dove sia possibile eseguire trattamenti termici prima o dopo saldatura. Non deve essere impiegato come metallo d'apporto resistente alla corrosione. Impiegato come strato intermedio nei riporti duri per assorbire le tensioni tra il metallo base ed il riporto. Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato.

Semi-basic MMA electrode depositing austenitic-ferritic weld metal which is highly resistant to cracking. Particularly suitable for the welding of dissimilar steels (i.e. stainless steel to mild steel) where heat treatments are applicable, both before and after welding. For hardfacing DW RSP may be used as a buffer layer. Excellent weldability with a spatter free arc, self-releasing slag combined with a very smooth bead appearance. Efficiency 100%. Packed in Gaspack system.

Classification	Approvals	Grades
Not		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	0.90	0.80	≤ 0.025	≤ 0.020	19	10	3	-	-	-	5-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 580	680 - 780	≥ 26	≥ 60	

Materials

Dissimilar joints

Storage and redrying

Keep dry and avoid condensation.
If necessary Re-dry at 350-370 °C for 1 hour, 3 times max

Current condition and welding position

AC; DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	30-50	11,5	6,9
2,5	300	45-75	18,9	10,6
3,2	350	60-120	35,8	19,5
4,0	350	90-140	52,3	28,8
5,0	350	130-180	84,8	50,8

BASINOX 307

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo a rivestimento basico, adatto alla saldatura di acciai dissimili, acciai da bonifica acciai al 13% Mn, acciai al Cr, ecc. Il deposito è resistente all'usura e all'ossidazione. Elettrodo con notevoli caratteristiche meccaniche e dall'alta resistenza alla fessurazione.

Basic-coated MMA electrode suitable for the welding of dissimilar steels, quenched and tempered steels 13% Mn and Cr steels. BASINOX 307 is also used for difficult to weld steels. Good corrosion and wear resistance. Excellent mechanical properties and high crack resistance. Efficiency 100%

Classification	
AWS	A5.4: E 307-15
EN	1600: E 18 9 MnMo B 12
GOST	10052-75: Э10Х20Н9Г6С

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.08	4	0.50	≤ 0.030	≤ 0.030	19.50	9.50	1	-	-	-	≤ 5

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 590	≥ 30	≥ 80	

Materials

Armour plate; Dissimilar Steels
X120Mn12 (1.3401)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-75	18,1	10,8
3,2	350	70-120	34,8	21,0
4,0	350	90-120	49,6	29,7
5,0	350	110-115	75,0	45,0

BASINOX 308L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo a rivestimento basico per la saldatura in tutte le posizioni. Ideali per applicazioni su tubazioni. Le caratteristiche dell'arco consentono di avere in prima passata penetrazione al vertice. Rendimento 100%. Imballato in gaspack.

Basic coated MMA electrode for welding austenitic stainless Cr-Ni steels or cast steels, having a low carbon content, as well as stainless or heat resisting chromium steels or cast steels. Well-suited for positional welding. Easy slag release. Vacuum packaging.

Classification	
AWS	A5.4: E308L-15
DIN	8556: E 19 9 L B 20 +
EN	1600: E 19 9 L B 42

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1	0.40	≤ 0.025	≤ 0.025	19	10	-	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 520	≥ 30	≥ 75	

Materials

1.4301 (X4CrNi18-10) - 1.431 (X2CrNiN18-10)
1.4541 (X6CrNiTi18-10)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 280-300 °C for 1 hour, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-75	17,5	10,5
3,2	350	70-110	32,8	19,7
4,0	350	110-150	49,5	29,7

BASINOX 308H

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai tipo AISI 304H o Wr 1.4948. Sviluppato per applicazioni ad elevata temperatura (industria petrolchimica e nucleare).
Rendimento 100%. Imballato in Gaspack.

Basic coated MMA electrode for welding type AISI 304H or Wr. 1.4948 steels. Developed for high temperature applications (petrochemical and nuclear industry).
Efficiency 100%. Packed in Gaspack system.

Classification	
AWS	A5.4: E308H
EN	1600: E 19 9 H B 42

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.05	1	0.40	≤ 0.025	≤ 0.025	19	10	-	-	-	-	3-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 35	≥ 47	

Materials

AISI 304H; 1.4948 (X6CrNi18-10); 1.4310 (X10CrNi18-8)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 280-300 °C for 1 hour, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,0	300	30-55	10,0	6,0
2,5	300	45-70	17,5	10,0
3,2	350	65-120	32,8	19,4
4,0	350	100-140	49,5	30,1
5,0	350	130-170	72,1	43,9

BASINOX 308LT

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai inox austenitici. Basso tenore di carbonio e ottime caratteristiche meccaniche a -196°C.

Low hydrogen MMA electrode suitable for the welding of austenitic stainless steels. Low carbon content and very good mechanical properties at -196°C. Efficiency 100%.

Classification	
AWS	A5.4: E 308L-15
EN	1600: E 19 9L B 12
GOST	10052-75: Э04Х20Н9

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	1.50	0.30	≤ 0.030	≤ 0.030	19	10	-	-	-	-	1-5

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 320	≥ 520	≥ 35	≥ 47	

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)

AISI 304 - 304L - 302

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	15,9	9,5
3,2	350	65-120	32,0	19,2
4,0	350	100-140	47,8	28,6

BASINOX 316L

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo per la saldatura di acciai inossidabili austenitici al Cr-Ni-Mo tipo AISI 316 e 316L. Deposito di ottime proprietà meccaniche e di grande resistenza alla corrosione chimica. Utilizzabile per saldature in posizione. Scoria di facile rimozione. Imballato con sistema Gaspack in atmosfera inerte. Rendimento 100%.

Basic coated MMA electrode for welding austenitic stainless Cr-Ni-Mo steels and cast steels, having a low carbon content. Very good positional welding characteristics. Easy slag release. Vacuum packaging.

Classification	
AWS	A5.4: E316L-15
EN	1600: E 19 12 3 L B 42

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1	0.40	≤ 0.025	≤ 0.020	18.50	11.50	2.70	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 420	≥ 520	≥ 30	≥ 60	

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required
If necessary: 280-300 °C for 1 hour, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-85	16,8	0,0
3,2	350	50-125	33,3	0,0
4,0	350	90-150	47,5	0,0
5,0	350	140-185	0,0	0,0

BASINOX 316LT

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico pcr la saldatura degli acciai inossidabili tipo AISI 316 e 316L. Ottime caratteristiche meccaniche di deposito fino a -196°C.

Low hydrogen MMA electrode suitable for the welding of stainless steels type AISI 316 and 316L. Excellent mechanical properties of the weld deposit to -196°C. Efficiency 100%.

Classification	
AWS	A5.4: E 316L-15
EN	1600: E 19 12 2 B 12

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.45	0.30	≤ 0.030	≤ 0.025	17.80	12.50	2.50	-	-	-	1-5

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 350	≥ 550	≥ 35	≥ 47	

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	16,1	9,6
3,2	350	65-120	31,5	18,9
4,0	350	115-140	48,1	28,8

BASINOX 347

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura degli acciai inossidahili austenitici stabilizzati AISI 321 e AISI 347. Le proprietà generali presentano un miglioramento rispetto alla versione semi-basica.

Low hydrogen electrode suitable for stabilized austenitic stainless steels AISI 321 and AISI 347. In comparison with the semi-basic type, the general properties have been considerably improved. Efficiency 100%.

Classification	
AWS	A5.4: E 347-15
EN	1600: E 19 9Nb B 12
GOST	10052-75: Э08Х20Н10Г 2Б similar

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.05	1.60	0.30	≤ 0.025	≤ 0.023	19	9.50	-	0.50	-	-	3-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 47	

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4550 (X6CrNiNb18-10);
AISI 347 - 321

Storage and redrying

Keep dry and avoid condensation. Re-drying not generally required.
If necessary: 280-300 °C for 1 hours, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	17,5	10,6
3,2	350	65-120	32,6	19,9
4,0	350	115-140	47,8	28,9
5,0	350	130-170	75,4	45,6

BASINOX 309L

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai inox. Deposito con contenuto di carbonio massimo 0.04%. Indicato per la saldatura di acciai dissimili, come acciaio al carbonio con acciaio inox e sottostrato di placcature resistenti alla corrosione.
Eccellente saldabilità con un arco completamente privo di proiezioni; scoria facilmente asportabile e cordone dall'aspetto piano e perfettamente raccordato. Buona resistenza alla corrosione.

Low-hydrogen MMA electrode suitable for the welding of stainless steels. The weld deposit carbon content is 0.04% max. Suitable for welding of dissimilar steels (i.e. carbon steel to stainless steel) and for buffer layers, cladding. Excellent weldability with a spatter free arc, self-releasing slag combined with a very smooth bead appearance. Good corrosion resistance.
Efficiency 100%.

Classification	
AWS	A5.4:E 309L-15
EN	1600: E 23 12 L B 12
GOST	10052-75: Э10Х25Н13Г2 simila

Approvals	Grades
MMI	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	1.40	0.35	≤ 0.030	≤ 0.025	22.50	13	-	-	-	-	5-15

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 320	≥ 520	≥ 30	≥ 60	

Materials

A312 TP309S; carbon steel to stainless steels joint

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	17,4	11,1
3,2	350	65-120	34,5	21,4
4,0	350	115-140	49,6	29,7
5,0	350	130-180	75,0	45,0

BASINOX 309Mo

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai inossidabili. È particolarmente indicato per la saldatura di acciai dissimili (acciaio inossidabile con acciaio al carbonio) e per l'esecuzione di sottostrati di placcature resistenti alla corrosione. È indicato per temperature di esercizio fino a +1000°C. In tale caso la presenza di Mo migliora la resistenza allo scorrimento lamellare.

Low hydrogen MMA electrode suitable for the welding of stainless steels. Particularly suitable for the welding of dissimilar steels (stainless steels to carbon steels). Service temperature up to +1000°C, at elevated temperatures the Mo content improves the creep properties. Efficiency 100%.

Classification	
AWS	A5.4: E 309MoL-15
EN	1600: E 23 12 2L B 12

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	1.40	0.40	≤ 0.030	≤ 0.025	22.50	13	2.50	-	-	-	5-15

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 60	

Materials

Cladding of carbon steel and low alloy steel

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

PA PB PC PF PE

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	18,5	11,1
3,2	350	65-120	36,0	22,0
4,0	350	115-140	51,8	31,6
5,0	350	130-180	78,5	46,5

BASINOX 309Nb

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai inossidabili. La presenza del niobio assicura un'azione stabilizzante agli effetti della corrosione intergranulare e migliora le caratteristiche meccaniche ad alte temperature di esercizio. Usato come strato intermedio per la placcatura dell'acciaio AISI 347 e per la saldatura degli acciai dissimili. Massima temperatura di esercizio +1000°C.

Low hydrogen MMA electrode suitable for the welding of stainless steels. The Nb content improves the resistance to intergranular corrosion and also the mechanical properties when working at high service temperatures. Used for the welding of buffer layers on AISI 347 clad steels and dissimilar steels. Max service temperature +1000°C.
Efficiency 100%.

Classification	
AWS	A5.4: E 309Cb-15
EN	1600: E 23 12 Nb B 12
GOST	10052-75: Э10 25Н13Г2 Б

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	1.50	0.45	≤ 0.030	≤ 0.025	22.50	13	-	0.80	-	-	5-15

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 60	

Materials

Cladding of carbon steel and low alloy steel

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	18,0	11,0
3,2	350	65-120	36,0	21,8
4,0	350	115-140	50,0	30,6
5,0	350	130-180	77,4	46,4

BASINOX 310

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico di deposito completamente austenitico per la saldatura di leghe resistenti al calore (fino a 1150°C) contenenti 25% Cr e 20% Ni (AISI 310).

Fully austenitic basic coated MMA electrode suitable for welding heat resistant alloys (up to 1150°C) containing 25% Cr and 20% Ni (AISI 310).
Efficiency 100%.

Classification	
AWS	A5.4: E 310-15
EN	1600: E 25 20 B 12

Approvals	Grades
MMI	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.09	2	0.60	≤ 0.030	≤ 0.025	26.50	20.80	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 27	

Materials

AISI 310; 1.4845 (X8CrNi25-21); 1.4841 (X15CrNiSi25-21); 1.4828 (X15CrNiSi20-12)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

PA PB PC PF PE PF2

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	18,8	11,2
3,2	350	70-120	34,6	20,7
4,0	350	110-140	51,6	30,9
5,0	350	140-170	77,5	46,5

BASINOX 310Mo

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico di deposito completamente austenitico per la saldatura di leghe resistenti al calore (fino a 1150°C) contenenti 25% Cr e 20% Ni (AISI 310). Usato nell'esecuzione nei ripristini di placcatura degli acciai placcati in AISI 316L e per la saldatura degli acciai dissimili.

Basic coated MMA electrode depositing a fully austenitic weld metal suitable for the welding of heat resisting alloys (up to +1150°C) containing 25% Cr and 20% Ni (AISI 310). Used for rebuilding on AISI 316L clad steels. Efficiency 100%.

Classification	Approvals	Grades
AWS A5.4: E 310Mo-15		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.10	1.50	0.50	≤ 0.030	≤ 0.025	25	20.50	2.80	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 400	≥ 550	≥ 30	≥ 27	

Materials

AISI 310; cladding

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	18,3	10,9
3,2	350	70-120	33,0	19,8
4,0	350	110-140	50,0	30,0

BASINOX 904L

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai resistenti alla corrosione in ambienti particolarmente aggressivi. La struttura completamente austenitica del deposito garantisce una elevata resistenza al pitting e al crevice in ambienti contenenti cloruri. Il basso contenuto di carbonio lo rende resistente alla corrosione intergranulare. Grazie all'elevato contenuto di Nichel il mettalo depositato ha una elevata resistenza alla SCC. Si consiglia di saldare con interpass inferiore a 150°C. Particolarmente indicato per la saldatura di acciai quali URANUS B6 - NSCD - HU7 - HU9, AISI 904L. Rendimento 150%.

Basinox 904L is suitable for the welding of Ni-Cr-Mo stainless steel with a low carbon content. Very good resistance to intergranular and pitting corrosion. It is particularly suitable for URANUS B6 - NSCD - HU7 - HU9, AISI 904L.
Efficiency 150%.

Classification	
AWS	A5.4: E 385-15
EN	1600: E Z 20 25 5 CuL B 12

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.027	1.70	0.50	≤ 0.030	≤ 0.025	21	24.60	4.80	-	1.50	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 310	≥ 520	≥ 30	≥ 47	

Materials

URANUS B6; AISI 904L; 1.4539 (X1NiCrMoCu25-20-5); 1.4439 (X2CrNiMoN17-13-5); 1.4537 (X1CrNiMoCuN25-25-5)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-80	25,8	15,4
3,2	350	95-120	50,1	30,0
4,0	350	130-160	72,6	46,0
5,0	350	165-200	112,5	54,1

BASINOX 318

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo per la saldatura di acciai inossidabili austenitici stabilizzati con Ti o Nb del tipo AISI 316Ti, 1.4571, 1.4580. Deposito di ottime proprietà meccaniche e di grande resistenza alla corrosione chimica. Utilizzabile per saldature in posizione. Scoria di facile rimozione. Imballato con sistema Gaspack in atmosfera inerte. Rendimento 100%.

Basic coated MMA electrode for welding stabilized austenitic stainless Cr-Ni-Mo steels and cast steels. Very good positional welding characteristics. Easy slag release. Vacuum packaging.

Classification	
AWS	A 5.4: E318-15
EN	1600: E 19 12 3 Nb B 42

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1	0.40	≤ 0.025	≤ 0.020	19	11.50	2.70	0.40	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 50	

Materials

1.4571 (X6CrNiMoTi17-12-2) - 1.4401 (X4CrNiMo17-12-2)
1.4580 (X6CrNiMoNb17-12-2) - 1.4408 (GX5CrNiMo19-11)
1.4581 (GX5CrNiMoNb19-10) - 1.4436 (X4CrNiMo17-13-3)
1.4583 (X10CrNiMoNb18-12)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-80	17,4	10,4
3,2	350	50-125	33,6	20,2
4,0	350	90-150	49,1	29,5

BASINOX 410S

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai al 11-13,5% Cr (AISI 410). Tali tipi di acciaio sono previsti per la tempra in aria e richiedono pertanto dei trattamenti di preriscaldo e di distensione al fine di ottenere delle saldature di sufficiente duttilità per la lavorazione meccanica.
Rendimento 115%.

Low hydrogen MMA electrode suitable for the welding of 11-13,5% Cr steels (AISI 410). These steel are air hardening and therefore pre-heating and stress relieving treatments are required in order to obtain a suitable ductility to allow mechanical working.
Efficiency 115%.

Classification	
AWS	A5.4: E 410-15
EN	1600: E 13 B 32
GOST	10052-75: Э12Х13 similar

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.04	0.30	0.30	≤ 0.030	≤ 0.025	13	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 760°C x 1h	≥ 250	≥ 450	≥ 20	≥ 47	

Materials

1.4000 (X6Cr13); 1.4006 (X12Cr13)
AISI 410

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 280-300 °C for 1 hour, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	18,2	10,9
3,2	350	85-140	38,8	23,2
4,0	350	120-190	55,0	33,8
5,0	350	190-240	87,2	52,9

BASINOX 410NiMoS

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai tipo ASTM CA6NM o analoghi. Deposito esente da ferrite microstrutturale ottenuto bilanciando il contenuto di Ni e Mo. Per spessori superiori a 10mm un preriscaldo di 150°C è raccomandato. Rendimento 115%.

Basic coated MMA electrode for welding stainless martensitic chromium-nickel steels or cast steels. For wall thicknesses over 10mm preheating to max. 150 °C is recommended. After welding, tempering or normalizing + tempering is required. Vacuum packaging.

Classification	
AWS	A5.4: E410NiMo-15
DIN	1600: E 13 4 B 22

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.06	0.90	0.40	≤ 0.025	≤ 0.020	11.50	4.50	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) - 60 °C	Hardness
610°Cx1h/air or 610°Cx5h	≥ 600	≥ 850	≥ 15	≥ 50	

Materials

1.4313 (X4CrNi13-4); 1.4413 (X3CrNiMo13-4)
1.4407 (G-X5CrNiMo13-4); 1.4414 (G-X4CrNiMo13-4)

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	65-95	18,5	11,1
3,2	350	85-130	38,4	23,0
4,0	350	120-180	53,2	31,9
5,0	350	190-240	87,5	52,5

BASINOX 430S

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai ferritici al 15-17% Cr (AISI 430).

Low hydrogen MMA electrode suitable for the welding of 15-17% Cr steels (AISI 430). These steels have been developed for air hardening and pre-heating and stress relieving treatments are required in order to obtain a suitable ductility to allow mechanical working.

Classification	
AWS	A5.4: E 430-15
EN	1600: E 17 B 32 (nearest)
Wr.	1.4016

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.04	0.60	0.40	≤ 0.030	≤ 0.025	16	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 790°C x 2h	≥ 300	≥ 450	≥ 20	≥ 47	

Materials

AISI 430

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 280-300 °C for 1 hour, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	350	85-140	40,0	24,1
4,0	350	120-190	55,0	33,0

BASINOX 22.9.3N

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai Duplex. Saldabile in tutte le posizioni eccetto verticale discendente.
Ottime caratteristiche di tenacità fino a -60°C. Imballato in Gaspack.

Classification	
AWS	A5.4: E2209-15
EN	1600: E 22 9 3N L B 42

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	1.20	0.36	≤ 0.020	≤ 0.015	23.40	9	2.80	-	-	0.15	25-65

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
AW	≥ 450	≥ 690	≥ 20	≥ 65	

Materials

1.4462 (X2CrNiMoN22-5-3)
UNS S31803 - S31500 - S31200 - S32304

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 350-370 °C for 1 hour, 3 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-70	16,3	9,6
3,2	350	65-120	33,0	19,2
4,0	350	115-160	49,5	29,1
5,0	350	140-190	71,3	48,6

BASINOX EB 25.10.4N

OERLIKON

MMA Electrodes
Stainless and Heat resistant steels

Elettrodo basico per la saldatura di acciai inossidabili SUPERDUPLEX, tipo UNS32550 – UNS32760; questo elettrodo produce una saldatura resistente alla vaiolatura (PREN > 40). Particolarmente indicato per la saldatura di apparecchi a pressione, tubazioni e off-shore. Esclusivamente imballato sotto vuoto (Vacuum Pack).

Low-hydrogen MMA electrode suitable for the welding of superduplex stainless steel, type UNS32550 – UNS32760; depositing weld metal with a high resistance to pitting and crevice corrosion (PREN > 40). Particularly suitable for pressure vessels, piping and off-shore processing equipment. Packed in Citodry.
Efficiency 115%.

Classification	Approvals	Grades
EN 1600: E 25 9 4 N L B 42		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	0.90	0.80	≤ 0.030	0.025	25	9.50	4	-	-	0.25	35-70

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
As Welded	≥ 650	≥ 850	≥ 20	≥ 27	

Materials

SAF 2507; Uranus 47N; UNS S32750; ASTM A182 F53

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC +

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	350	100 – 140	33,3	23,0
4,0	350	130 – 180	49,6	37,0

FREEZAL ENi9

OERLIKON

MMA Electrodes
Nickel and Copper alloys

Elettrodo basico avente rendimento del 140% idoneo alla saldatura di acciai ontenenti dal 5% al 9% di Nichel. Il suo speciale rivestimento lo rende idoneo anche ad essere saldato in corrente alternata, al fine di eliminare problemi di soffio magnetico. Deposito estremamente resistente alle cricche a caldo e con ottima tenacità alle basse temperature.

Basic coated MMA electrode with 140 % recovery for welding steels containing between 5 % and 9 % nickel. To reduce arc blow the special coating also allows welding with AC. Very high resistance to hot cracking and excellent toughness at low temperatures.

Classification	
AWS	A5.11: E NiCrMo6
EN ISO	14172: E Ni6620

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.06	3.50	0.20	≤ 0.020	≤ 0.012	13.50	Rem	6	1.30	9.60	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 196 °C	Hardness
As Welded	≥ 430	≥ 690	≥ 35	≥ 75	

Materials

A 353-70, A 553-70

Steels with 5 - 9 % nickel

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 340-360 °C for 2 hours, 5 times max.

Current condition and welding position

DC+; AC

PA PB PC PF PE

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	60-80	28,4	17,0
3,2	350	70-90	49,4	29,6
4,0	350	120-140	71,4	42,7
5,0	450	150-180	144,0	86,4

SUPRANEL Ni1

OERLIKON

MMA Electrodes
Nickel and Copper alloys

Elettrodo basico per la saldatura in tutte le posizioni. Utilizzabile per saldare il Nickel puro e le sue leghe, utilizzabile per saldare questi materiali con acciai legati e non, utilizzato specialmente per strati cuscinetto su acciai al carbonio e inossidabili prima di giuntarli con leghe di Nickel o Rame.

Low-hydrogen MMA electrode suitable for all positional welding. Suitable for welding pure nickel and nickel alloys and for joining these materials with unalloyed and low alloyed steels, additional applications include buffer layers on carbon steels or stainless steels before joining to nickel or copper alloys.
Efficiency 100%.

Classification	
AWS	A5.11: E Ni-1
EN ISO	14172: E Ni 2061

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.01	0.30	0.80	0.005	0.005	-	Rem	-	-	0.40	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 200	≥ 410	≥ 20	≥ 100	

Materials

2.4066; 2.4068; 2.4061; 2.4060
UNS N02200; UNS N02201; UNS N02205

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	350	65-100	33,5	20,1
4,0	350	85-120	50,4	30,2

SUPRANEL NiCrFe7

Elettrodo per la saldatura in tutte le posizioni di acciai al nichel tipo INCONEL 690. Ottime proprietà meccaniche.

Supranel NiCrFe7 is used for the all-positional welding of high nickel alloy steels type Inconel 690. Good mechanical properties.
Efficiency 100%

Classification	
AWS	A5.11: E NiCrFe-7
EN ISO	14172: E Ni 6152

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.02	3	0.40	≤ 0.005	≤ 0.005	29	Rem	-	2	10	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 360	≥ 550	≥ 30	≥ 60	

Materials

ASTM B166 - B167 - B168; UNS N06690

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
4,0	350	100-130	50,8	31,0

SUPRANEL SR

OERLIKON

MMA Electrodes
Nickel and Copper alloys

Elettrodo basico che deposita una lega contenente 65% Ni, 16% Cr e 8% Fe, idoneo alla saldatura di leghe di nichel resistenti al calore ed alla corrosione quali: NiCr15Fe (2.4816) e LC-NiCr15Fe (2.4817).
E' inoltre utilizzabile per la giunzione di queste leghe con acciai al carbonio o basso legati e con acciai inox. Applicabile fino a -196°C o in condizioni di creep fino a +800°C.
Trova inoltre applicazione nella giunzione di acciai ferritici con acciai austenitici in applicazioni fino a +300°C.
Grazie alla sua elevata tenacità può essere anche usato per la giunzione o riparazione di acciai difficili da saldare.

Basic coated MMA electrode depositing 65 % Ni, 16 % Cr and 8 % Fe for the welding of:
Heat and corrosion resisting nickel alloys, such as NiCr15Fe (2.4816) and LC-NiCr15Fe (2.4817), to itself or to unalloyed, low-or high-alloy steels, tough at sub zero temperatures down to –196 °C, and creep resisting up to 800 °C. Ferritic to austenitic steels subjected to operating temperatures of +300 °C.
Due to the high toughness properties and resistance to cracking, Supranel SR is suitable for joining difficult-to-weld steels and maintenance welding of critical components.

Classification	
AWS	A5.1: ENiCrFe-2
EN ISO	14172: E Ni 6062 (NiCr15Fe8Nb)

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
≤ 0.08	2	0.30	≤ 0.020	≤ 0.015	16	Rem	-	1.80	8.50	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 196 °C	Hardness
As Welded	≥ 360	≥ 550	≥ 35	≥ 60	

Materials

2.4816; 1.4876; 1.4958
UNS N06600; UNS N08800; UNS N08810

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-70	17,3	10,4
3,2	350	70-95	33,9	20,3
4,0	350	90-130	48,6	29,1

ETC PH CN 182

OERLIKON

MMA Electrodes
Nickel and Copper alloys

Elettrodo per la saldatura di acciai al 9% Ni e comunque, acciai con temperatura di esercizio fino a -196°C, come ASTM A333-64, gr. 8, A553 68, gr. A e B, ecc. E' anche idoneo per la saldatura di acciai dissimili, refrattari e difficilmente saldabili. Rendimento 100%.

This electrode is suitable for welding 9% Ni steels operating at temperatures down to -196°C. Also suitable for welding dissimilar, refractory and difficult-to-weld steels.
Efficiency 100%.

Classification	
AWS	A5.11: E NiCrFe-3
EN ISO	14172: E Ni 6182

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.04	7.50	0.60	≤ 0.020	≤ 0.015	16	Rem	-	1.80	7.50	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 360	≥ 550	≥ 30	≥ 60	

Materials

2.4816; 1.4876; 1.4958

UNS N06600; UNS N08800; UNS N08810

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-70	18,5	11,1
3,2	350	75-95	36,0	21,6
4,0	350	100-130	52,9	32,1
5,0	350	140-170	80,0	48,0

SUPRANEL 625

MMA Electrodes
Nickel and Copper alloys

Elettrodo basico per la saldatura in tutte le posizioni di acciai al Ni serie alloy 625 e 825. E' pure impiegato per la saldatura di giunti criogenici al 9% di Ni, acciai dissimili con temperatura di esercizio fino a –196°C. Il materiale di deposito riesce a resistere alla corrosione intergranulare, pitting e alla ossidazione ad alte temperature (max. 1200°). Rendimento 100%.

A low hydrogen MMA electrode for the all positional welding of high nickel alloys 625 and 825. It can also be used for welding 9% Ni steel and other different steels with working temperatures to –196°C.
The weld metal deposited is resistant to inter-granular corrosion, pitting and oxidation at high temperatures (max. 1200°C).
Efficiency 100%.

Classification	
AWS	A5.11: E NiCrMo-3
EN ISO	14172: E Ni 6625

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.02	0.60	0.40	≤ 0.015	≤ 0.015	21	Rem	9	3.30	3	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 420	≥ 760	≥ 30	≥ 50	

Materials

2.4856; 2.4839
UNS N06625; UNS N08825

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC +

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-70	18,5	11,1
3,2	350	75-95	36,0	21,6
4,0	350	100-130	51,8	32,1
5,0	350	140 - 170	90,0	43,0

SUPRANEL C276

OERLIKON

MMA Electrodes
Nickel and Copper alloys

Elettrodo basico per la saldatura in tutte le posizioni; questi elettrodi sono utilizzati per la saldatura di leghe Ni-Cr-Mo a basso carbonio, per depositi di saldatura su acciai placcati con questi tipi di leghe di nickel, e per la giunzione di questo tipo di lega con acciai o con altri tipi di leghe di nickel. Tipici materiali base saldabili sono ASTM B574, B575, B619, B622 e B626, tutti i quali hanno il numero UNS N10276 e HASTELLOY C 276. Alta resistenza alla corrosione in ambienti ossidanti fino a 1100°C.

Low-hydrogen MMA electrode suitable for all positional welding; Supranel C276 electrodes are used for welding low carbon Ni-Cr-Mo alloy, for the weld overlay of steels clad with these alloys, and for welding this nickel alloy to steels and to other nickel base alloys. High resistance to corrosion in oxidising environments to 1100°C.
Efficiency 100%.

Classification	
AWS	A5.11: E NiCrMo-4
EN ISO	14172: E Ni 6276

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.02	1	0.20	≤ 0.040	≤ 0.030	15.60	Rem	16	-	5	3.40	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 400	≥ 690	≥ 25	≥ 55	

Materials

ASTM B574; B575; B619; B622
UNS N10276; HASTELLOY C276

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC +

PA PB PC PF PE

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	50-70	17,7	12,0
3,2	350	75- 95	36,9	25,0
4,0	350	85-120	50,0	42,0

SUPRANEL NiCu7

Elettrodo con deposito indicato per la saldatura o ricarica di leghe aventi uguale composizione chimica o per sottostrati di placcature. Ottime caratteristiche meccaniche e resistenza chimica. Applicazione negli impianti di dissalazione per acciai tipo MONEL.

Supranel NiCu7 is suitable for the welding or facing of alloys having the same chemical composition or for cladding. Excellent mechanical properties and resistant to chemical corrosion. A typical application is in desalination plants for the welding of Monel type alloy.
Efficiency 100%.

Classification	
AWS	A5.11: E NiCu-7
EN ISO	14172: E Ni 4060

Approvals	Grades
MMI	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.015	3.40	0.40	≤ 0.020	≤ 0.015	-	Rem	-	-	0.80	-	29

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 200	≥ 480	≥ 30		

Materials

2.4360 (NiCu30Fe); 2.4375 (NiCu30Al)
UNS N04400; UNS N 05500

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 300-350 °C for 2 hours, 5 times max

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-70	16,3	9,8
3,2	350	75-100	31,6	19,0
4,0	350	90-130	48,0	28,8

CUPRONIC 70

OERLIKON

MMA Electrodes
Nickel and Copper alloys

Elettrodo studiato per la saldatura o ricarica di leghe con uguale composizione chimica. Ottime carattetistiche meccaniche del deposito. Elevata resistenza alla corrosione chimica in ambiente salino. Campo di applicazione nei dissalatori.

Cupronic 70 is suitable for the welding or facing of alloys having the same chemical composition. The weld metal has excellent mechanical properties and a high resistance to chemical corrosion in saline environments. Typical applications include desalination plants.
Efficiency 100%.

Classification	
AWS	A5.6: E CuNi

Approvals	Grades
MMI	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	Cu	Sn
0.008	1.40	0.02	≤ 0.010	≤ 0.010	-	29.40	-	-	0.50	Rem	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded		≥ 350	≥ 20		

Materials

2.0872 (CuNi10Fe1Mn9); 2.0882 (CuNi30Mn1Fe)
UNS C70600; UNS C71500

Storage and redrying

Keep dry and avoid condensation.
Re-dry at 280-300 °C for 1 hour, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	50-70	17,8	10,7
3,2	350	75-100	35,4	21,2
4,0	350	90-130	53,5	32,1

SUPERFONTE Ni

OERLIKON

MMA Electrodes
Cast-iron

Elettrodo con deposito di nichel quasi puro. Il metallo d'apporto ha una zona di fusione molto ristretta e, pertanto, anche quando si prendano particolari precauzioni, le zone alterate termicamente sono molto contenute. Questo tipo di elettrodo lavora a tensione bassa, con arco molto dolce, e ciò è necessario per introdurre il minimo calore richiesto dalla ghisa. Si può saldare la ghisa grigia con l'acciaio. Impiegato anche nella costruzione di ingranaggi, camme, blocchi motore, in bronzo d'alluminio, etc. Durezza Indicativa 140HB. Rendimento 100%.

Basic-graphite coated MMA electrode with a pure nickel core wire for welding cast iron without or with low preheating (max. +300 °C). For repair welding of cracked cast iron parts or joining components made of steel, copper or nickel materials to castings. Easy arc striking and restriking, stable arc, smooth bead surface. Weld short beads, about 30 to 50 mm long. In order to reduce weld residual stresses, hammer-peen welds slightly before cooling. Weld metal is machinable. Superfonte Ni is suitable for welding cast iron with lamellar graphite, white and black heart malleable and nodular cast iron.

Classification	
AWS	A5.15: ENi-CI
DIN	8573: E Ni BG - 22

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
1.20	0.20	0.50	-	-	-	Rem	-	-	1	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 200	≥ 400	≥ 5		≥ 140 HB

Materials

GG-10 - GG-35, GTS 35-10 - GTS 70-02, GGG-40 - GGG-70
GTW 35-04 - GTW S 38

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 80 °C for 1 hour, once only.

Current condition and welding position

DC-; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	50-80	18,1	10,9
3,2	350	80-110	32,1	19,2
4,0	350	110-150	47,0	28,2

SUPERFONTE NiFe

OERLIKON

MMA Electrodes
Cast-iron

Elettrodo con deposito in lega ferro-nichel. Adatto per tutti i tipi saldabili di ghisa, incluse quelle con un alto contenuto di fosforo. Il deposito è privo di cricche e pori e si può lavorare. Estrema facilità di saldatura e deposito piano di bell'aspetto. Facilità di rimozione della scoria. Impiegato per la saldatura di grossi pezzi o laddove ci sia presenza di alte sollecitazioni. L'elettrodo è adatto per la saldatura di ghise ferritiche o perlitiche, grafitosferoidali, come il tipo "Ductile", "Meehanite", etc. e per la saldatura di queste all'acciaio.

Superfonte NiFe deposits a nickel-iron alloy of relatively high strength and ductility, particularly suitable for all kinds of cast iron, including those with a high phosphorus content. The deposited weld metal is machinable and resistant to cracking. The slag is easily detachable. Suitable for welding mild steel to all grades of cast iron. Ideal for repairs to production castings and damaged castings Particularly suitable for ordinary grey irons, spheroidal cast irons, type "Ductile", "Meehanite", etc.
Efficiency 100%.

Classification	Approvals	Grades
AWS A 5.15: E NiFe Cl		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
1-2	0.50	0.80	≤ 0.030	≤ 0.030	-	Rem	-	-	43	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 296	400-579	≥ 6		≥ 165 HB

Materials

GJS-350 to GJS-700;GJMW -350-4 to GJMW-360-12;GJMB-300 to GJMB-700

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 80 °C for 1 hour, once only.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	30-80	19,1	11,5
3,2	350	50-100	31,0	18,6
4,0	350	80-130	45,7	27,4

SUPERFONTE BM

Elettrodo che deposita una lega tipo Monel. Tale lega ha un punto basso di fusione e garantisce una completa lavorabilità ed elasticità del deposito. Indicato per la riparazione di fusioni e getti.

Superfonte BM deposits a monel type alloy composition of relatively high strength and ductility, with a low fusion point.
Particularly suitable for the repair of casting defects and damaged castings.
Efficiency 100%.

Classification	
AWS	A 5.15: E NiCu B

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.40	0.80	0.05	≤ 0.025	≤ 0.025	-	Rem	-	-	5	-	30

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness

Materials

GJS-350 to GJS-700;GJMW -350-4 to GJMW-360-12;GJMB-300 to GJMB-700

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 80 °C for 1 hour, once only.

Current condition and welding position

DC+; AC

PA PB PC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	45-80	16,0	9,7
3,2	350	90-120	31,2	18,9
4,0	350	120-140	45,8	27,9

SUPRAMANGAN

OERLIKON

MMA Electrodes
Hardfacing

Elettrodo basico per leghe al 14% di Mn. La struttura è austenitica. Si raccomanda di riportare in arco corto ed a bassa intensità di corrente. La martellatura dopo deposito migliora la durezza e la resistenza alla criccatura. Nei casi in cui si debbano riportare acciai ad alevato CE, si consiglia di eseguire uno strato cuscinetto con un elettrodo basico classico (come l'ETC PH 35S) prima di depositare il riporto duro. Rendimento 100%.

Classification	
AWS	A5.13: E FeMn B
DIN	8555: E7-250K

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.60	14	0.50	≤ 0.030	≤ 0.030	-	-	1	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					225 - 275

Storage and redrying

Keep dry and store at room temperature. Redrying time 1 h 350°C, max 5 times.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,3	450	90-130	53,7	32,4
4,0	450	125-170	71,4	43,7

SUPRADUR 400

OERLIKON

MMA Electrodes
Hardfacing

Elettrodo rutile di facile utilizzo. La durezza del materiale depositato è di circa 240-290 HV in condizione "come saldato". Può raggiungere i 400HV dopo tempra in acqua. Sviluppato per l'esecuzione di riporti duri su acciai al carbonio di rotaie, guide, alberi di trasmissione, pale di scavatori, attrezzature utilizzate in agricoltura o in ambito civile. Depositare un massimo di 3 strati.

Rutile thin coated MMA electrode which is easy to use. Weld metal hardness of approx. 240 - 290 HV10 in the as-welded condition. It can reach 400 HV after water-quenching. Designed for surfacing carbon steel rails and track equipment, slideways, shafts, shovel buckets, bridge crane rollers, agricultural and civil works equipment.
Deposit a maximum of 3 layers.

Classification	Approvals	Grades
EN 14700: E Fe1		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.10	-	0.30	-	-	2.40	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					240-290

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 150-200 °C for 2 hours, 5 times max.

Current condition and welding position

AC; DC-

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	450	90-120	38,3	23,0
4,0	450	120-150	56,8	34,0

SUPRADUR 400B

OERLIKON

MMA Electrodes
Hardfacing

Elettrodo basico per il deposito di materiale resistente all'usura. Il deposito può essere lavorato di macchina usando utensili sinterizzati. E' particolarmente resistente agli urti ed agli impatti improvvisi. E' consigliabile utilizzare uno strato cuscinetto con elettrodi più dolci se si esegue un deposito su di un materiale base particolarmente suscettibile di criccabilità. Comunque possono essere depositati molti strati dello stesso elettrodo senza utilizzare strati cuscinetto. Indicato per ricarica di rotaie, scambi, particolari sottoposti ad usura come benne, draghe, utensili di bloccaggio, ruote e superfici soggette a carichi pesanti.

Thick basic-coated MMA electrode for producing highly wear resisting hard facing deposits. Weld metal can be machined only by using sintered hard metal tipped tools. It is particularly resistant to impact and shock. A tough buffer layer using Univers or Citochromax N electrodes is solely required in case of very crack sensitive base metal. Even multi layers can be deposited without the need for intermediate buffer layers. Supradur 400B can be welded in all positions, except vertically-down. Suitable for reconditioning of rails, rail crossings and switch points, wearing parts such as dredger parts, bearing surfaces, striking tools, wheel flanges, slide surfaces subject to heavy wear, reconditioning of dies and punches.

Classification	
DIN	8555: E 1 - UM - 400
EN	14700: E Fe1

Approvals	Grades
DB	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.20	0.40	0.50	-	-	2.80	-	-	-	Rem	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					375-450 HB

Materials

Rails up to grade 900/ tensile strength max. 1080 N/mm²

Storage and redrying

Keep dry and avoid condensation.
Re-drying recommended at 300-350 °C for 2 hours, 5 times max.

Current condition and welding position

DC+; AC

PA PB PC PF

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	350	105-135	35,1	23,1
4,0	450	120-180	68,2	47,2
5,0	450	170-240	107,5	73,0

SUPRADUR 600

OERLIKON

MMA Electrodes
Hardfacing

Elettrodo per riporti duri con deposito a struttura martensitica con carburi di cromo finemente distribuiti. Alta resistenza all'azione abrasiva nei casi di attrito radente e volvente. Non ne è raccomandato l'impiego in presenza di forti urti. Il deposito è lavorabile. La durezza di questo è funzione della velocità di raffreddamento e dell'uso di preriscaldi. Impiegato per il recupero di trapani, pale, utensili per escavatori, ecc.
Durezza in condizione As Welded: 52-57 HRC

Semi-thick basic coated rutile MMA electrode which is easy to use. Weld metal hardness approx. 550-650 HV and can be ground. Can be used for hardfacing carbon steels and low alloy steels. Preheating up to 400 °C is always necessary,especially for large workpieces. Very good resistance to medium impacts. Examples: civil works and mining equipment, shovel teeth, buckets, crawler shoes. Deposit a maximum of 3 layers. A tough buffer layer using Univers or Supradur 400 electrodes is only required in the case of very crack sensitive base metal.

Classification	
DIN	8555: E 2-55
EN	14700: E Fe2

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.60	1.10	1	-	-	2.80	-	-	-	Rem	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					550-650 HV

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 150-200 °C for 2 hours, 5 times max.

Current condition and welding position

DC-; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	450	90-120	40,6	24,4
4,0	450	120-150	61,6	36,9
5,0	450	150-185	97,5	58,5

SUPRADUR 600B

OERLIKON

MMA Electrodes
Hardfacing

Elettrodo basico per il deposito di strati resitenti all'usura su parti strutturali soggette ad alte sollecitazioni. Il deposito è esente da cricche e porosità e resiste agli urti e impatti istantanei. Può essere lavorato solo di mola. E' consigliabile utilizzare uno strato cuscinetto con elettrodi più dolci se si esegue un deposito su di un materiale base particolarmente suscettibile di criccabilità. Utilizzabile su parti di escavatori, sbriciolatori, punte per trivellazione e ganasce.

Thick basic coated MMA electrode for depositing tough and wear resisting overlays on structural members subjected to severe wear. The weld metal is free of cracks and pores and resistant to impact and shock. It can be machined only by grinding. Only in case of very crack sensitive base metals, a tough buffer layer, made with UNIVERS or CITOCHROMAX N electrodes, is required. Multi-layer deposits will be free of cracks, even without depositing intermediate buffer layers. Suitable for hard facing applications where wear resistance at temperature is a prime excavator parts, bucket edges and bucket teeth, drilling bits, coal planes, conveyor screws, polygon edges, crusher jaws and cones.

Classification	
DIN	8555: E 6 - UM - 60
EN	14700: E Fe3

Approvals	Grades
DB	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.50	0.30	0.40	-	-	7	-	0.50	-	Rem	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					57-62 HRC

Storage and redrying

Keep dry and avoid condensation.
Re-drying recommended at 300-350 °C for 2 hours, 5 times max.

Current condition and welding position

DC+; AC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	70-90	21,6	13,0
3,2	450	100-135	45,2	27,1
4,0	450	140-180	68,3	41,0
5,0	450	190-240	110,7	66,4
6,0	450	230-280	159,4	95,6

SUPRADUR 600RB

OERLIKON

MMA Electrodes
Hardfacing

Elettrodo rutile per il deposito di strati resitenti all'usura su parti soggette ad alte sollecitazioni. Il deposito mantiene le sue caratteristiche di durezza fino a 600°C. Può essere lavorato solo di mola. E' consigliabile utilizzare uno strato cuscinetto con elettrodi più dolci se si esegue un deposito su di un materiale base particolarmente suscettibile di criccabilità. Utilizzabile per riporti duri soggetti ad elevate temperature come nella pressofusione o rulli di laminatoi.

Thick rutile coated MMA electrode for depositing tough and wear resisting hard facing overlays. The weld metal retains sufficient hardness up to +600°C. It is machinable only by grinding. In case of crack sensitive base metals, a tough buffer layer made with Univers or Citochromax N electrodes is required with a further layer after every third hard facing layer. Suitable hard facing applications where resistance at temperatures is a prime concern, as in hot cut offs, dies for pressure castings, rolls, crushers and others.

Classification	
DIN	8555: E 3- UM-60-T
EN	14700: E Fe3

Approvals	Grades
DB	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.50	0.50	0.80	-	-	7	-	0.50	-	Rem	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					57-62 HRC

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 150-200 °C for 2 hours, 5 times max.

Current condition and welding position

AC; DC-

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	60-85	19,2	11,5
3,2	350	100-120	33,4	20,0
4,0	350	140-160	47,9	28,7

SUPRADUR V1000

OERLIKON

MMA Electrodes
Hardfacing

Elettrodo rutile per la ricarica, deposita una lega ipereutettica al cromo. Ideale per depositi resistenti ad alta abrasione da minerali. Le tipiche cricche trasversali che appaiono sulla superficie del deposito non danno nessun problema alla sua resistenza all'abrasione. Comunque il deposito non è resistente agli urti ed è lavorabile solo con la mola. E' consigliabile utilizzare uno strato cuscinetto con elettrodi più dolci se si esegue un deposito su di un materiale base particolarmente suscettibile di criccabilità. Questo elettrodo produce un cordone liscio ed una penetrazione piana. Il rendimento è di circa 160%. Utilizzabile per la ricarica di parti soggette all'abrasione minerale, trasportatori a vite, punte per scavatori, lame, parti di pompe per cemento, agitatori, schiacciasassi, soggetti a corrosione ad elevate temperature.

Thick rutile coated MMA electrode depositing a hypereutectic chromium hard deposit. It is suitable for producing highly wear resisting deposits subject to abrasion by mineral particles. The typical transverse cracks appearing in this hard facing weld metal are not detrimental to abrasion resistance. However, the weld metal is not resistant to impact and shock, and is machinable only by grinding. On difficult-to-weld steels, a buffer layer made with Citochromax N electrodes is required. Supradur V1000 produces very smooth weld beads with flat penetration. Metal recovery is approx. 160 %. Suitable for hard facing wearing parts subject to mineral abrasion, such as, conveyor screws, mixer blades, concrete pump parts, slurry pumps, stirring and agitator parts, crusher parts, excavator bucket edges, coal planes subject to corrosion at elevated temperatures.

Classification	
DIN	8555: E 10 - UM - 60 GR
EN	14700: E Fe14

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
4.30	1	1	-	-	34	-	-	-	Rem	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					58-62 HRC

Storage and redrying

Keep dry and avoid condensation.
Re-drying recommended at 300-350 °C for 2 hours, 5 times max.

Current condition and welding position

AC; DC+

PA

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	450	120-140	73,0	58,4
4,0	450	170-190	104,2	83,3

SUPRADUR VF1000

OERLIKON

MMA Electrodes
Hardfacing

Elettrodo utilizzato per ricariche che devono soprattutto resistere a forti abrasioni per sfregamento su sabbia , argilla e materiali simili. Principali applicazioni: utensili di perforazione di rocce, pale di mescolatori di betoniere, coclee e pezzi diversi di macchine movimento terra. Il deposito non è lavorabile all'utensile.
Durezza in condizione As Welded: 57-62 HRC.

Special MMA electrode with a flux cored wire used as core wire, for hardfacing of steels where a very high resistance against abrasion is required. Applications: hardfacing of pieces in contact with sand, clay and similar materials such as drilling tools, mixer blades, parts of earth moving machines. Weld metal is not machinable.
Hardness in as welded condition: 57-62 HRC

Classification	
DIN	8555: E 10 UM 60 RZ
EN	14700: E Fe14

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
3-4	1-1.50	1-1.50	≤ 0.030	≤ 0.030	30-38	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
PWHT 620°C x 1h					640-740 HB

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required.
If necessary: 300-350 °C for 2 hours, 5 times max.

Current condition and welding position

AC; DC+

PA PB

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	350	90-130	45,0	36,0
4,0	350	125 - 170	68,0	54,4
5,0	350	170 - 220	106,0	84,8

TOOLCORD

OERLIKON

MMA Electrodes
Hardfacing

Elettrodo basico per la ricarica di utensili alto legati, resistenti ad alta temperatura, buona resistenza all'abrasione. Deposito non lavorabile di macchina. Trattamento di tempra a 1180-1240°C (raffreddamento in olio). Distensione a 510-540°C. Rendimento 100%.

Low hydrogen MMA electrode for hardfacing of high alloy cutting tools, very high temperature resistance, good resistance in wear applications. Weld metal is not machinable. Quenching at 1180-1240°C (oil). Tempering at 510-540°C. Efficiency 100%.

Classification	
DIN	8555: E 6 UM 65 GS
EN	14700: E Fe4

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
1.50	1	-	-	-	4	-	8	-	Rem	2.50	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
Quenched					≥ 65 HRC
As Welded					≥ 58 HRC

Storage and redrying

Keep dry and avoid condensation.
Re-drying recommended at 300-350 °C for 2 hours, 5 times max.

Current condition and welding position

DC+; AC

PA PB PC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	300	60-80	16,6	13,3
3,2	350	90-130	34,3	27,4
4,0	350	125-170	51,3	41,0
5,0	350	190-230	83,5	66,8

ALCORD 5Si

OERLIKON

MMA Electrodes
Aluminum alloys

Elettrodo con rivestimento speciale per la saldatura di leghe alluminio-silicio e per giuntare leghe di alluminio dissimili. Durante la saldatura l'elettrodo va tenuto ad angolo retto rispetto al pezzo, con arco corto. Spessori superiori a 10 mm potranno richiedere preriscaldi di 150-250° C. Si raccomanda una completa rimozione della scoria. Data l'igroscopicità del rivestimento si consiglia lo stoccaggio in ambienti asciutti. Se necessario gli elettrodi possono essere ricondizionati.

Alcord 5 Si has special coating for welding aluminium-silicon alloys and for joining dissimilar aluminium alloys. When welding, hold the electrode at a right angle to the workpiece, with a short arc. Wall thicknesses greater than 10 mm and larger workpieces will require preheating from 150 °C to 250 °C. Since slag residues are corrosive, they must be completely removed from the weld bead. Alcord 5Si may be used for oxyacetylene welding. The covering being hygroscopic, electrodes must be stored in an absolutely dry location, or redried if required.

Classification	
AWS	A-5.3: E4043
DIN	1732: EL-AlSi 5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	-	5	-	-	-	-	-	-	0.30	-	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 90	≥ 180	≥ 15		

Materials

Al-Mg-Si and Al-Mg alloys with 2.5% Mg max. Al-Mn-Cu - AlSi cast

Storage and redrying

Keep dry and avoid condensation.
Once opened, store at 90-120 °C until used.
If necessary, Re-dry at 110-120 °C for 2 hours, 5 times max.

Current condition and welding position

DC+

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	60-90	9,1	5,0
3,2	350	80-110	13,3	8,0

ALCORD 12Si

OERLIKON

MMA Electrodes
Aluminum alloys

Elettrodo con rivestimento speciale per la saldatura di leghe di alluminio-silicio. Durante la saldatura l'elettrodo va tenuto ad angolo retto rispetto al pezzo, con arco corto. Spessori superiori a 10 mm potranno richiedere preriscaldi di 150-250°C. Si raccomanda una completa rimozione della scoria. Data l'igroscopicità del rivestimento si consiglia lo stoccaggio in ambienti asciutti. Se necessario gli elettrodi possono essere ricondizionati.

Alcord 12 Si has a special covering for welding aluminium-silicon cast alloys. When welding, hold the electrode at a right angle to the workpiece, with a short arc. Wall thicknesses greater than 10 mm and larger workpieces will require preheating from 150°C to 250°C. Since slag residues are corrosive, they must be completely removed from the weld bead.
Alcord 12Si may be used for oxyacetylene welding. The covering being hygroscopic, electrodes must be stored in an absolutely dry location, or redried if required.

Classification	Approvals	Grades
DIN 1732: El-AlSi 12		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	-	12	-	-	-	-	-	-	0.40	-	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 80	≥ 180	≥ 5		

Materials

Cast AlSi 12 - AlSi 12(Cu) - AlSi 10 Mg - AlSi 10 Mg(Cu) - AlSi 6 Cu 4

Storage and redrying

Keep dry and avoid condensation.
Once opened, store at 90-120 °C until used.
If necessary, Re-dry at 110-120 °C for 2 hours, 5 times max.

Current condition and welding position

DC+

PA PB

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	60-90	9,1	5,0
3,2	350	80-110	13,3	8,0

ALCORD Al

OERLIKON

MMA Electrodes
Aluminum alloys

Elettrodo con rivestimento speciale per la saldatura di alluminio. Durante la saldatura l'elettrodo va tenuto ad angolo retto rispetto al pezzo, con arco corto. Spessori superiori a 10 mm potranno richiedere preriscaldi di 150-250°C. Si raccomanda una completa rimozione della scoria. Data l'igroscopicità del rivestimento si consiglia lo stoccaggio in ambienti asciutti. Se necessario gli elettrodi possono essere ricondizionati.

Alcord Al has a special coating for welding aluminium. When welding, hold the electrode at a right angle to the workpiece, with a short arc. Wall thicknesses greater than 10 mm and larger workpieces will require preheating from
150°C to 250 °C. Since slag residues are corrosive, they must be completely removed from the weld bead. Alcord Al may be used for oxy flame welding. The covering being hygroscopic, electrodes must be stored in an absolutely dry location, or redried if required.

Classification	
AWS	A5.3: E1100
DIN	1732: EL-Al 99,5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	-	-	-	-	-	-	-	-	-	-	99.80

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 30	≥ 80	≥ 30		

Materials

Al 99,5 ;Al 99, Al 99,9 Mg 0,5, AlMg 0,5

Storage and redrying

Keep dry and avoid condensation.
Once opened, store at 90-120 °C until used.
If necessary, Re-dry at 110-120 °C for 2 hours, 5 times max.

Current condition and welding position

DC+

PA PB

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
2,5	350	60-90	9,2	5,0
3,2	350	80-110	14,0	8,4

SUPERCUT

OERLIKON

MMA Electrodes
Cutting

Elettrodo indicato per il taglio, la cianfrinatura e la scriccatura di acciai al Carbonio debolmente legati, ghisa, leghe al nichel, ecc. Utilizzato per rimuovere difetti di colata o ritiri di materozza, scriccare saldature difettose, eseguire riprese a rovescio e rimuovere rivettature.

Cutting, gouging or chamfering of mild and low-alloy steels, cast iron, nickel-based alloys, etc. Used for removing defects in castings or risers and gates, gouging out defective welds, back-gouging root runs and removing rivets.

Classification
Not

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
-	-	-	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness

Storage and redrying

Keep dry and avoid condensation.
Re-drying not generally required. If necessary: 100-110 °C for 1 hour

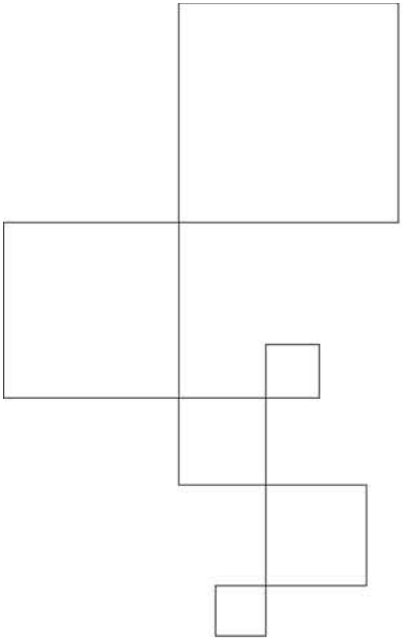
Current condition and welding position

DC-; AC

PA PB PC

Packaging data

Diameter (mm)	Length (mm)	Current (A)	Electrode average weight (g)	Weld metal weight per electrode (g)
3,2	350	130-150	35,3	0,0
4,0	350	200-230	56,1	0,0
5,0	350	220-280	82,5	0,0



FILI PIENI

SOLID WIRES

OERLIKON

Wire electrodes and weld metal for gas-shielded metal-arc welding of unalloyed steels and fine grain structural steels.

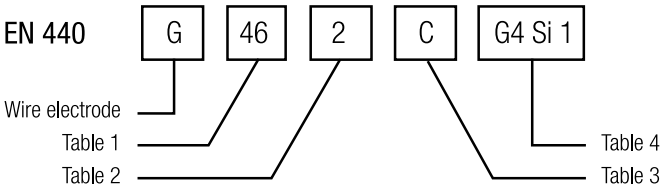


Table 1

Code digit for tensile and elongation properties of all-weld metal			
Code digit	Minimum yield strength[1] [N/mm²]	Tensile strength [N/mm²]	Minimum eleogation[2] [%]
35	355	440–570	22
38	380	470–600	20
42	420	500–640	20
46	460	530–680	20
50	500	560–720	18

[1] For yield strength the lower yield (R_{eL}) shall be used if yielding occurs, other-wise the 0,2% proof strength ($R_{p0,2}$) shall be applied.
[2] Gauge length is equal to five times the test specimen diameter.

Table 2

Symbols for impact energy of all-weld metal	
Symbols	Temperature for minimum average impact energy of 47 J [°C]
Z	no requirements
A	+20
0	0
2	–20
3	–30
4	–40
5	–50
6	–60

Table 3

Symbols for shielding gas	
Symbols	Meaning
M	This symbol for mixed gas shall be used if classification has been performed with shielding gas EN 439-M2, but without helium.
C	This symbol shall be used if classification has been performed with shielding gas EN 439-C1, carbon dioxide. Kohlendioxid, durchgeführt worden ist

Table 4

Symbols for the chemical composition of wire electrodes									
Symbols	Chemical composition [%] (m/m) [1] [2] [3]								
	C	Si	Mn	P	S	Ni	Mo	Al	Ti and Zr
GO	any other chemical composition agreed upon								
G2Si1	0,06–0,14	0,50–0,80	0,90–1,30	0,025	0,025	0,15	0,15	0,02	0,15
G3Si1	0,06–0,14	0,70–1,00	1,30–1,60	0,025	0,025	0,15	0,15	0,02	0,15
G4Si1	0,06–0,14	0,80–1,20	1,60–1,90	0,025	0,025	0,15	0,15	0,02	0,15
G3Si2	0,06–0,14	1,00–1,30	1,30–1,60	0,025	0,025	0,15	0,15	0,02	0,15
G2Ti	0,04–0,14	0,40–0,80	0,90–1,40	0,025	0,025	0,15	0,15	0,05–0,20	0,05–0,25
G3Ni1	0,06–0,14	0,50–0,90	1,00–1,60	0,020	0,020	0,80–1,50	0,15	0,02	0,15
G3Ni2	0,06–0,14	0,40–0,80	0,80–1,40	0,020	0,020	2,10–2,70	0,15	0,02	0,15
G2Mo	0,08–0,12	0,30–0,70	0,90–1,30	0,020	0,020	0,15	0,40–0,60	0,02	0,15
G4Mo	0,06–0,14	0,50–0,80	1,70–2,10	0,025	0,025	0,15	0,40–0,60	0,02	0,15
G2Al	0,08–0,14	0,30–0,50	0,90–1,30	0,025	0,025	0,15	0,15	0,35–0,75	0,15

[1] If not specified: Cr ≤ 0,15, Cu ≤ 0,35 and V ≤ 0,03. The amount of copper in the steel plus covering shall not exceed 0,35 %.
[2] Single values in this table are maximum values.
[3] The results shall be rounded to the same decimal place as the specified values using the Rule A, Appendix B of ISO 31-0 : 1992.

Wire electrodes, wires, rods and weld metal for gas-shielded metal-arc welding of high-strength steels.

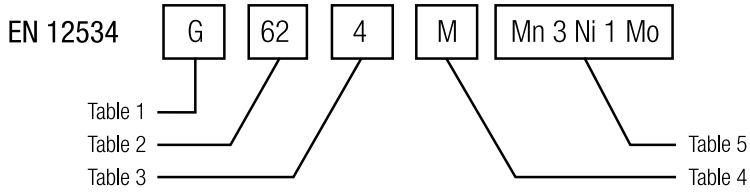


Table 1

Symbols for the product/welding process	
Symbols	Welding process
W	Tungsten-inert gas welding
G	Gas-shielded metal-arc welding

Table 2

Code digits for tensile and elongation properties of all-weld metal			
Code digits	Minimum yield strength[1] [N/mm²]	Tensile strength [N/mm²]	Minimum elongation[2] [%]
55	550	640–820	18
62	620	700–890	18
69	690	770–940	17
79	790	880–1080	16
89	890	940–1180	15

[1] For yield strength the lower (R_{eL}) shall be used if yielding occurs, otherwise the 0,2% proof strength ($R_{p0,2}$) shall be applied.
[2] Gauge length is equal to five times the test specimen diameter.

Table 3

Symbols for impact energy of all-weld metal	
Symbols	Temperature for minimum average impact energy of 47 J [°C]
Z	no requirements
A	+20
0	0
2	–20
3	–30
4	–40
5	–50
6	–60

Table 4

Symbols for shielding gas	
Symbols	Meaning
M	This symbol for mixed gas shall be used if classification has been performed with shielding gas EN 439-M2, but without helium
C	This symbol shall be used if classification has been performed with shielding gas EN 439-C1, carbon dioxide

Table 5

Symbols for the chemical composition of wire electrodes										
Symbols	Chemical composition [%] (m/m)[1] [2] [3]									
	C	Si	Mn	P	S	Cr	Ni	Mo	Cu	all other elements
Z	any other chemical composition agreed upon									
Mn3NiCrMo	0,14	0,60–0,80	1,30–1,80	0,015	0,018	0,40–0,65	0,50–0,65	0,15–0,30	0,30	0,25
Mn3Ni1CrMo	0,12	0,40–0,70	1,30–1,80	0,015	0,018	0,20–0,40	1,20–1,60	0,20–0,30	0,35	0,25 V = 0,05–0,13
Mn3Ni1Mo	0,12	0,40–0,80	1,30–1,90	0,015	0,018	0,15	0,80–1,30	0,25–0,65	0,30	0,25
Mn3Ni1,5Mo	0,08	0,20–0,60	1,30–1,80	0,015	0,018	0,15	1,40–2,10	0,25–0,55	0,30	0,25
Mn3Ni1Cu	0,12	0,20–0,60	1,20–1,80	0,015	0,018	0,15	0,80–1,25	0,20	0,30–0,65	0,25
Mn3Ni1MoCu	0,12	0,20–0,60	1,20–1,80	0,015	0,018	0,15	0,80–1,25	0,20–0,55	0,35–0,65	0,25
Mn3Ni2,5CrMo	0,12	0,40–0,70	1,30–1,80	0,015	0,018	0,20–0,60	2,30–2,80	0,30–0,65	0,30	0,25
Mn4Ni1Mo	0,12	0,50–0,80	1,60–2,10	0,015	0,018	0,15	0,80–1,25	0,20–0,55	0,30	0,25
Mn4Ni2Mo	0,12	0,25–0,60	1,60–2,10	0,015	0,018	0,15	2,00–2,60	0,30–0,65	0,30	0,25
Mn4Ni1,5CrMo	0,12	0,50–0,80	1,60–2,10	0,015	0,018	0,15–0,40	1,30–1,90	0,30–0,65	0,30	0,25
Mn4Ni2CrMo	0,12	0,60–0,90	1,60–2,10	0,015	0,018	0,20–0,45	1,80–2,30	0,45–0,70	0,30	0,25
Mn4Ni2,5CrMo	0,13	0,50–0,80	1,60–2,10	0,015	0,018	0,20–0,60	2,30–2,80	0,30–0,65	0,30	0,25

[1] If not specified: Ti ≤0,10, Zr ≤0,10, Al ≤0,12 and V ≤0,03. The amount of copper in the steel plus covering shall not exceed 0,35%.
[2] Single values in this table are maximum values.
[3] The results shall be rounded to the same decimal place as the specified values using Rule A, Appendix B of ISO 31-0 : 1992.

Wire electrodes, Wires and Rods for arc-welding of creep resistant steels

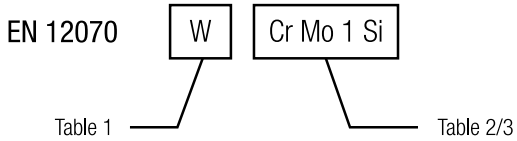


Table 1

Symbols for the product/welding process	
Symbols	Welding process
W	Tungsten-inert gas welding
S	Submerged-arc welding
G	Gas-shielded metal-arc welding

Table 2

Alloy symbols for the chemical composition of wire electrodes, wires and rods									
Symbols	Chemical composition [%] (m/m) [1) 2) 3)]								
	C	Si	Mn	P	S	Cr	Mo	V	other elements
Mo	0,08–0,15	0,05–0,25	0,80–1,20	0,025	0,025	–	0,45–0,65	–	–
MoSi	0,08–0,15	0,50–0,80	0,70–1,30	0,020	0,020	–	0,40–0,60	–	–
MnMo	0,08–0,15	0,05–0,25	1,30–1,70	0,025	0,025	–	0,45–0,65	–	–
MoV	0,08–0,15	0,10–0,30	0,60–1,00	0,020	0,020	0,30–0,60	0,50–1,00	0,25–0,45	–
MoVSi	0,08–0,15	0,40–0,70	0,70–1,10	0,020	0,020	0,30–0,60	0,50–1,00	0,20–0,40	–
CrMo1	0,08–0,15	0,05–0,25	0,60–1,00	0,020	0,020	0,90–1,30	0,40–0,65	–	–
CrMo1Si	0,08–0,14	0,50–0,80	0,80–1,20	0,020	0,020	0,90–1,30	0,40–0,65	–	–
CrMoV1	0,08–0,15	0,05–0,25	0,80–1,20	0,020	0,020	0,90–1,30	0,90–1,30	0,10–0,35	–
CrMoV1Si	0,06–0,15	0,50–0,80	0,80–1,20	0,020	0,020	0,90–1,30	0,90–1,30	0,10–0,35	–
CrMo2	0,08–0,15	0,05–0,25	0,30–0,70	0,020	0,020	2,2–2,8	0,90–1,15	–	–
CrMo2Si	0,04–0,12	0,50–0,80	0,80–1,20	0,020	0,020	2,3–3,0	0,90–1,20	–	–
CrMo2Mn[4)]	0,10	0,5	0,50–1,20	0,020	0,015	2,0–2,5	0,90–1,20	–	–
CrMo2L	0,05	0,05–0,25	0,30–0,70	0,020	0,020	2,2–2,8	0,90–1,15	–	–
CrMo2LSi	0,05	0,50–0,80	0,80–1,20	0,020	0,020	2,3–3,0	0,90–1,20	–	–
CrMo5	0,03–0,10	0,20–0,50	0,40–0,75	0,020	0,020	5,5–6,5	0,50–0,80	–	–
CrMo5Si	0,03–0,10	0,30–0,60	0,30–0,70	0,020	0,020	5,5–6,5	0,50–0,80	–	–
CrMo9	0,06–0,10	0,30–0,60	0,30–0,70	0,025	0,025	8,5–10,0	0,80–1,20	0,15	Ni 1,0
CrMo9Si	0,03–0,10	0,40–0,80	0,40–0,80	0,020	0,020	8,5–10,0	0,80–1,20	–	–
CrMo91	0,07–0,15	0,60	0,4–1,5	0,020	0,020	8,0–10,5	0,80–1,20	0,15–0,30	Ni 0,4–1,0 Nb 0,03–0,10 N 0,02–0,07 Cu 0,25
CrMoWV12	0,22–0,30	0,05–0,40	0,40–1,20	0,025	0,020	10,5–12,5	0,80–1,20	0,20–0,40	Ni 0,8 W 0,35–0,8
CrMoWV12Si	0,17–0,24	0,20–0,60	0,40–1,00	0,025	0,020	10,5–12,0	0,80–1,20	0,20–0,40	Ni 0,8 W 0,35–0,8
Z	any other chemical composition agreed upon								

1) If not specified N < 0,3, Cu < 0,3, V < 0,03, Nb < 0,01, Cr < 0,2.
2) Single values in this table are maximum values
3) The results shall be rounded to the same decimal place as the specified values using Rule A, Appendix B of ISO 31-0 : 1992.
4) A ratio of Mn to Si of > 2,0 is desirable.

Table 3

Mechanical properties of all-weld metal								
Alloy symbol	Minimum yield strength $R_{p0,2}$ [N/mm²]	Minimum tensile strength R_m [N/mm²]	Minimum elongation[1] A [%]	Impact energy (Kv) (J) at +20°C		Heat treatment of weld metal		
				Minimum average from three test specimens	Minimum single valuet[2]	Preheat and interpass temperature [°C]	Heat treatment of test specimen	
							Temperature[3] [°C]	Time[4] [min]
Mo / MoSi	355	510	22	47	38	<200	none	–
MnMo	355	510	22	47	38	<200	none	–
MoV / MoVSi	355	510	18	47	38	200–300	690–730	60
CrMo1 / CrMo1Si	355	510	20	47	38	150–250	660–700	60
CrMoV1 / CrMoV1Si	435	590	15	24	21	200–300	680–730	60
CrMo2 / CrMo2Si / CrMo2Mn	400	500	18	47	38	200–300	690–750	60
CrMo2L / CrMo2LSi	400	500	18	47	38	200–300	690–750	60
CrMo5 / CrMo5Si	400	590	17	47	38	200–300	730–760	60
CrMo9 / CrMo9Si	435	590	18	34	27	200–300	740–780	120
CrMo91	415	585	17	47	38	250–350	750–760	180
CrMoWV12 / CrMoWV12Si	550	690	15	34	27	250–350[5] or 400–500[5]	740–780	120
Z	any other mechanical properties agreed upon							

[1] Gauge length is equal to five times the test specimen diameter.
[2] Only one single value lower than minimum average is permitted.
[3] The test piece shall be cooled in the furnace to 300°C at a rate not exceeding 200°C/h.
[4] Tolerance ±10min
[5] Immediately after welding the specimen is to be cooled down to 120°C to 100°C and kept at this temperature for at least 1h.

CARBOFIL

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Filo pieno dalle ottime proprietà meccaniche usato per la saldatura in atmosfera di CO2 o miscela. Indicato nelle carpenterie per l'unione di acciai non legati ed al carbonio. Buona qualità radiografica ottimo aspetto della ramatura.

Carbofil is a copper coated solid wire suitable for welding with CO2 or mixed shielding gases. Excellent mechanical properties. Carbofil is used for a very wide range of structural steel applications. Good x-ray quality.

Classification	
AWS	A5.18: ER 70S-3
EN ISO	14341-A: G 42 3 M G2Si
EN ISO	14341-A: G 38 3 C G2Si

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1	0.65	≤ 0.025	≤ 0.025	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 0°C	Hardness
As Welded	≥ 420	480-550	≥ 22	≥ 90	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S(P)235 to S(P)355; GP240; GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,6	0,8	1,0	1,2	1,6	

CARBOFIL 1

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Filo pieno dalle ottime proprietà meccaniche usato per la saldatura in atmosfera di CO2 o miscela. Indicato nelle carpenterie per l'unione di acciai non legati ed al carbonio. Buona qualità radiografica ottimo aspetto della ramatura

Carbofil 1 is a copper coated solid wire suitable for welding with CO2 or 80% Ar-20% CO2 shielding gases. Excellent mechanical properties. Carbofil 1 is used for a wide range of structural steel applications. Good x-ray quality.

Classification	
AWS	A5.18: ER 70S-6
EN ISO	14341-A: G 42 4 M G3Si1
EN ISO	14341-A: G 42 3 C G3Si1

Approvals	Grades
DB	
GL	
LRS	
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.50	0.90	≤ 0.025	≤ 0.025	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -30°C	Hardness
As Welded	≥ 420	500-640	≥ 24	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S(P)235 to S(P)355; GP240; GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,6	0,8	0,9	1,0	1,2	1,6

CARBOFIL TP

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Da utilizzarsi con protezione di gas CO2 o miscele Ar/CO2. Adatto per lavori di carpenteria, movimento terra e costruzione. Indicato per acciai al carbonio-manganese ad alta resistenza tipo Fe 490 Fe 510.
* SVILUPPATO PER APPLICAZIONI TIME PROCESS.

Carbofil TP is a copper coated solid wire suitable for the welding with CO2 or mixed Ar/CO2 shielding gases. Suited for structural work, earthmoving and construction site work. Suitable for carbon-manganese steels.
Developed for the TIME process welding.

Classification	
AWS	A5.18: ER 70S-6
EN ISO	14341-A: G 42 3 M G3 Si1

Approvals	Grades
DB	
DNV	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.60	0.90	≤ 0.015	≤ 0.015	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -29°C	Hardness
As Welded	≥ 430	510-590	≥ 24	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20/21(Arcal21-Atal6) or C1(Arcal 2)

Materials

H I, H II, 17 Mn 4,
St 33, St 37, St 44, St 52-3,St E 255, St E 285, St E 315. St E 355, W St E 255, W St E 285,
St 45.8, St E 210.7, St E 240.7, St E 290.7, St E 320.7, St E 360.7
U St 37.0, St 37.0, St 37.4, St 44.0, St 44.4, St 52.0, St 52.4, St 35.8,

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	1,0	1,2				

CARBOFIL 1 GOLD

MIG-MAG Wires
C-Mn and low-alloy steels

Nuovo filo pieno prodotto con tecnologia MHC (Metal Hybrid Coating) che riduce gli attriti in guaina migliorandone lo scorrimento e riducendo significativamente l'effetto peeling e l'intasamento delle punte porta filo. Eccezionale stabilità d'arco. Assenza di proiezioni.

Carbofil 1 GOLD is a C-Mn solid wire with a special coating, suitable for welding with CO2 or 80% Ar-20% CO2 shielding gases.
It is used for a wide range of structural steel applications. Excellent mechanical properties and good x-ray quality.

Classification	
AWS	A5.18: ER 70S-6
EN ISO	14341-A: G 42 3 C G3Si1
EN ISO	14341-A: G 42 4 M G3Si1

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.50	0.90	≤ 0.025	≤ 0.025	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -30°C	Hardness
As Welded	≥ 420	500-640	≥ 24	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S(P)235 to S(P)355; GP240; GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2			

CARBOFIL 1A

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Da utilizzarsi con protezione di gas CO2 o miscele Ar/CO2. Adatto per lavori di carpenteria, movimento terra e costruzione. Indicato per acciai al carbonio-manganese ad alta resistenza tipo Fe 490 Fe 510.

Carbofil 1A is a copper coated solid wire used with CO2 or mixed Ar/CO2 shielding gases. Suited for welding a wide range of structural steels, earthmoving and construction site work. Suitable for high strength carbon-manganese steels, types Fe 490 Fe 510.

Classification	
AWS	A5.18: ER 70S-6
EN ISO	14341-A: G 46 4 M G4Si1
EN ISO	14341-A: G 46 3 C G4Si1

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.70	0.90	≤ 0.020	≤ 0.030	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -30°C	Hardness
As Welded	≥ 460	550-630	≥ 24	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S(P)235 to S(P)460; GP240; GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2	1,6		

CARBOFIL 1A GOLD

MIG-MAG Wires
C-Mn and low-alloy steels

Nuovo filo pieno prodotto con tecnologia MHC (Metal Hydrid Coating) che riduce gli attriti in guaina migliorandone lo scorrimento e riducendo significativamente l'effetto peeling e l'intasamento delle punte porta filo. Eccezionale stabilità d'arco, assenza di proiezioni.

Carbofil 1A GOLD is a C-Mn solid wire with a special coating, suitable for welding with CO2 or 80% Ar-20% CO2 shielding gases.
It is used for a wide range of structural steel applications. Excellent mechanical properties and good x-ray quality.

Classification	
AWS	A5.18: ER 70S-6
EN ISO	14341-A: G 46 3 C G4Si1
EN ISO	14341-A: G 46 4 M G4Si1

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.70	0.90	≤ 0.020	≤ 0.030	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -30°C	Hardness
As Welded	≥ 460	530-680	≥ 24	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S(P)235 to S(P)460; GP240; GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2	1,6		

CARBOFIL GALVA

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Filo pieno ramato per la saldatura in passata singola di acciai zincati.
Fondamentale l'utilizzo di miscele ternarie come ARCAL 14 per ottenere depositi esenti da spruzzi.
Raccomandato l'utilizzo in abbinamento a generatori di corrente sinergici.
Dopo la saldatura raccomandiamo il ripristino del trattamento di zincatura.

Carbofil Galva is a copper coated solid wire used for the single pass GMAW welding, of galvanized sheets. Used with ternary shielding gas mixtures, such as ARCAL 14, to obtain spatter free welding with a good bead appearance. The use of this wire with a synergic inverter generator such as CITO@PULS, gives excellent results. After welding it is recommended to restore the protective surface in the welding area.

Classification
EN ISO 14341-A: G 42 2 M G2Ti

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1.10	0.60	≤ 0.025	≤ 0.025	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
As Welded	≥ 480	≥ 570	≥ 22	≥ 90	

Gas test: Acc. To EN 14175: M20 (Arcal 21)

Shielding Gas: Acc. To EN 14175: M21(Arcal 21) or M14(Arcal 14)

Materials

S(P)235 to S(P)420

Storage
Keep dry and avoid condensation

Current condition and welding position
DC+
 PA PB PC PF

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2			

CARBOFIL MO

MIG-MAG Wires
C-Mn and low-alloy steels

Filo pieno ramato per la saldatura di acciai allo 0,5% di Molibdeno.

Carbofil Mo is a copper coated solid wire suitable for welding 0,5% Mo steels. Excellent mechanical properties. Cold cracking resistant weld deposit.

Classification	
AWS	A5.28: ER 70S-A1
EN	12070: G MoSi

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1	0.60	-	-	-	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
PWHT 580°C x 15h	≥ 380	480-560	≥ 22	≥ 47	
As Welded	≥ 400	515-620	≥ 22	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)235-S(P)460, 16Mo3

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2	1,6		

CARBOFIL KV5 (ETC KV5)

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Filo impiegato per la saldatura di acciai con 1,25% Cr e 0,5% Mo. Ottime caratteristiche meccaniche. Può essere anche usato per la saldatura dall'acciaio con 0,9% Cr e 0.5% Mo. Il deposito è insensibile alle fessurazioni di solidificazione.

Carbofil CrMo1 is a copper coated solid wire suitable for welding 1,25% Cr 0,5% Mo steels. Excellent mechanical properties.
Carbofil CrMo1 can also be used for welding 0,9% Cr 0.5% Mo steels. Cold cracking resistant weld deposit.

Classification	
AWS	A5.28: ER 80S-B2
EN ISO	21952-B: G 55M 1CM

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.56	0.50	≤ 0.020	≤ 0.020	1.25	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 620°C x 1h	≥ 470	≥ 550	≥ 20	≥ 80	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

13CrMo4-5, 13CrMoSi5-5; G17CrMo5-5

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2	1,6		

CARBOFIL KV3 (ETC KV3)

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Filo adatto per la saldatura dell'acciaio debolmente legato con 2,25% Cr e 1% Mo. Ottime caratteristiche meccaniche e deposito insensibile alle fessurazioni. Buone qualità radiografiche.

Carbofil CrMo2 is a copper coated solid wire suitable for the welding of low alloyed 2,25% Cr steels or 10 Cr Mo 910-G5 or 10 Cr Mo 910 steels. Excellent weld deposit mechanical properties and impact toughness. Good x-ray quality.

Classification	
AWS	A5.28: ER 90S-B3
EN ISO	21952-B: G 62M 2C1M

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.60	0.55	≤ 0.020	≤ 0.020	2.40	-	1	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 690°C x 1h	≥ 540	≥ 620	≥ 18	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

10CrMo9-10, 12CrMo9-10; A387 Gr.22, Cl 1and 2, A 182 Gr.F 22, A 336 Gr.F22

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC +

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2	1,6		

CARBOFIL CrMo5 (ETC KV4)

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Filo pieno per la saldatura di acciai resistenti allo scorrimento a caldo con 5,5% Cr 0,5% Mo. Impiegato nell'industria chimica e nei processi di sintesi dell'ammoniaca. Si consiglia preriscaldo ed interpass di 250-300°C.

Carbofil CrMo5 is a copper coated solid wire suitable for welding creep resistant 5,5% Cr 0,5% Mo steels, including chemical and ammonia synthesis applications. Pre-heating and interpass temperatures in the range 250-300°C are recommended.

Classification	
AWS	A5.28: ER 80S-B6
EN ISO	21952-A: G CrMo5 Si

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.50	0.40	≤ 0.020	≤ 0.020	5.70	-	0.60	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 760°C x 1h	≥ 470	≥ 590	≥ 17	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

12CrMo19-5, X12CrMo5; A182 Gr. F5, A199 Gr. T5, A213 Gr.T5, A335 Gr.P5
A 336 Cl. F5, A 369 Gr. FP5, A 387 Gr.5, Cl 1 and 2

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	1,0	1,2	1,6			

CARBOFIL CrMo9 (ETC KV7)

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Filo pieno per la saldatura di acciai resistenti allo scorrimento a caldo, legati al 9%Cr e 1%Mo. Questo tipo di acciaio è impiegato soprattutto nell'industria petrolchimica per temperature di esercizio fino a +625°C, ma a pressioni relativamente basse, dove si richieda particolare resistenza alla corrosione in presenza di idrogeno. Consigliato preriscaldo ed interpass di 250-300°C.

Carbofil CrMo9 is a copper coated solid wire used for the welding of creep resistant steels containing 9%Cr and 1%Mo.
During welding preheat and interpass temperature controls between 250-300°C are recommended.

Classification	
AWS	A5.28: ER 80S-B8
EN ISO	21952-A: G CrMo9

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.50	0.40	≤ 0.025	≤ 0.025	9	0.06	1	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) +20°C	Hardness
PWHT 760°C x 2h	≥ 470	≥ 590	≥ 18	≥ 34	
PWHT 760°C x 1h	≥ 470	≥ 550	≥ 17	≥ 27	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

A335 Gr. P9

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC +

Packaging data: K300 Kg. 16

Diameters	1,2					

CARBOFIL KV7M (ETC KV7M)

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Filo pieno per la saldatura di acciai debolmente legati tipo ASTM T/P91utilizzati fino a temperature di esercizio di 620°C. Si consigliano preriscaldo ed interpass di 200-300°C. Buone proprietà mecccaniche.

Solid wire suitable to weld low alloy steels like P91. Excellent mechancal properties.

Classification	
AWS	5.28: ER90S-B9
EN ISO	21952-A: G CrMo91

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.09	0.50	0.20	≤ 0.010	≤ 0.010	9	0.60	0.90	0.06	0.20	0.04	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) +20°C	Hardness
PWHT 760°C x 2h	≥ 415	≥ 585	≥ 17	≥ 47	
PWHT 760°C x 1h	≥ 410	≥ 620	≥ 16	≥ 27	

Gas test: Acc. To EN 14175: M20 (Arcal 21)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

1.4903 X10CrMoVNb9-1

A 199 Gr. T91, A335 Gr. P91, A213/213M Gr. T91

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

PA PB PC PG PG2

Packaging data: K300 Kg. 16

Diameters

CARBOFIL Ni1 (ETC 1Ni)

MIG-MAG Wires
C-Mn and low-alloy steels

Filo pieno per la saldatura di acciai debolmente legati al 1% Ni e a grano fine per applicazione a bassa temperatura.

Carbofil Ni1 is a copper coated solid wire suitable for welding low alloyed 1% Ni steels and fine grain steels for low temperature applications.

Classification	
AWS	A5.28: ER 80S-Ni1
EN ISO	14341-A: G 46 6 M G3Ni1

Approvals	Grades
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1	0.60	≤ 0.020	≤ 0.020	-	1	0.10	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
As Welded	≥ 470	550-680	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)235-S(P)460, GP240-GP280

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2			

CARBOFIL Ni2 (ETC 2Ni)

OERLIKON

MIG-MAG Wires
C-Mn and low-alloy steels

Filo pieno per la saldatura di acciai debolmente legati al 2% Ni e per applicazioni a bassa temperatura. Ottime caratteristiche meccaniche.

Carbofil Ni2 is a copper coated sollid wire suitable for the welding of alloyed steels, and 2%Ni steels for low temperature applications. Excellent mechanical properties.

Classification	
AWS	A5.28: ER 80S-Ni2
EN ISO	14341-A: G 46 6 M G2Ni2

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.10	0.50	≤ 0.020	≤ 0.020	-	2.50	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
As Welded	≥ 470	550-680	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)275-S(P)420

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC +

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2			

CARBOFIL MnMo (ETC KV2)

OERLIKON

MIG-MAG Wires
High strength steels

Filo pieno per la saldatura di acciai 0,5 Mo, usato anche per la saldatura di acciai ad alta resistenza. Il metallo depositato presenta una alta insensibilità alla fessurazione.

Carbofil MnMo is a copper coated solid wire suitable for the welding of 0,5%Mo steels and high temperature resistant steels. Resistant to cold cracking and retains strength after prolonged heat treatment.

Classification	
AWS	A5.28: ER 80S-D2
EN ISO	14341-A: G 46 2 M G4Mo

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.85	0.60	≤ 0.020	≤ 0.020	-	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -30°C	Hardness
PWHT 620°C x 1h	≥ 460	530-680	≥ 22	≥ 47	
As Welded	≥ 470	≥ 550	≥ 22	≥ 27	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)235-S(P)460, 16Mo3

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2	1,6		

CARBOFIL MnNiMoCr

OERLIKON

MIG-MAG Wires
High strength steels

Filo pieno legato Cr-Ni-Mo impiegato nella saldatura MAG di acciai ad elevata resistenza. Ottime proprietà meccaniche del materiale depositato. Si consiglia di lavorare con bassi apporti termici al fine di ottenere migliori caratteristiche.

Carbofil NiMo1 is a copper coated alloyed Ni-Mo solid wire suitable for the MAG welding of high strength steels.
Excellent mechanical properties. Low heat inputs are recommended to obtain optimum joint mechanical properties.

Classification	
AWS	A5.28: ER 90S-G
EN	12534: G 55 4 M Mn3Ni1Mo

Approvals	Grades
DB	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.50	0.60	≤ 0.015	≤ 0.018	0.50	0.50	0.25	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
As Welded	≥ 620	700-890	≥ 18	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)460-S(P)620

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	1,0	1,2	1,6			

CARBOFIL NiMoCr

OERLIKON

MIG-MAG Wires
High strength steels

Filo pieno legato al Cr-Ni-Mo impiegato nella saldatura MAG di acciai ad elevata resistenza tipo T1-HY100. Ottime proprietà meccaniche del materiale depositato. Si consiglia di lavorare con bassi apporti termici al fine di ottenere migliori caratteristiche.

Carbofil NiMoCr is a copper coated solid wire used for the MAG welding of high tensile strength steels and type TI-HY100 steels. Excellent mechanical properties. Low heat inputs are recommended to obtain optimum joint mechanical properties.

Classification	
AWS	A5.28: ER 100S-G
EN	12534:G 69 4 M Mn3Ni1CrMo

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1.60	0.60	≤ 0.015	≤ 0.018	0.30	1.50	0.25	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
As Welded	≥ 690	770 - 890	≥ 17	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S620, S690, HY 100

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2	1,6		

CARBOFIL 2NiMoCr

MIG-MAG Wires
High strength steels

Filo pieno per la saldatura di acciai debolmente legati al Cr-Ni-Mo ed acciai ad elevato limite elastico. Ottime caratteristiche meccaniche del metallo depositato con limite elastico = 890 N/mm2 carico di rottura = 920 N/mm2.

Carbofil 120 is a copper coated solid wire suitable for welding Cr-Ni-Mo low alloyed and high yield strength steels. Excellent mechanical properties, yield strength 890 N/mm² and tensile strength = 920 N/mm².

Classification	
AWS	A5.28: ER 120S-G
EN	12534: G 89 4 M Mn4Ni2CrMo

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1.60	0.75	≤ 0.015	≤ 0.018	0.30	2	0.60	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
As Welded	≥ 890	≥ 920	≥ 16	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S690; S890

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	1,0	1,2				

CARBOFIL NICU

OERLIKON

MIG-MAG Wires
Weathering steels

Filo per la saldatura sotto protezione gassosa di acciai al carbonio tipo Cor Ten. Le sue caratteristiche meccaniche consentono l' impiego anche su acciai ad elevato limite elastico. Acciai tipo Cor Ten A.B.C. Resco 36, Patinox, Tenaspo ecc.

Carbofil Cu is a copper coated solid wire suitable for the welding of weathering steels such as COR-TEN. The mechanical properties allow Carbofil Cu to be used for joining high yield strength steels.

Classification	
AWS	A5.28: ER 80S-G
EN ISO	14431-A: G 46 2 M G0

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1.40	0.80	≤ 0.020	≤ 0.030	-	0.60	-	-	-	-	0.40

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
As Welded	≥ 460	550-650	≥ 24	≥ 60	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S235J0W; S235J2W; S355J0W; S355J2W; S355K2W

Storage
Keep dry and avoid condensation

Current condition and welding position
DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2			

INERTFIL 307

Filo inox per la saldatura di acciai dissimili, acciai da bonifica, al 13% Mn, acciai al Cr, acciai da corazza a balistici. Deposito con notevoli caratteristiche meccaniche e di resistenza all' usura. Indicato anche per l'esecuzione di strati cuscinetto e strati intermedi di placcature.

Inertfil 307 stainless steel solid wire is suitable for welding dissimilar steels, hardening and tempering steels, 13% Mn steels, Cr steels and ballistic steels. Good mechanical properties and wear resistance. Used for buffer layers.

Classification	
AWS	A5.9: ER 307 (approx)
EN	12072: G 18 8Mn

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.10	7	0.80	≤ 0.030	≤ 0.030	19	9	-	-	-	-	≤ 5

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 420	≥ 590	≥ 30	≥ 50	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

Armour plate; Dissimilar Steels
X120Mn12 (1.3401)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,8	1,0	1,2			

INERTFIL 308L

OERLIKON

MIG-MAG Wires
Stainless and Heat resistant steels

Filo inox del tipo ER 308L indicato per la saldatura di acciai inox austenici del tipo AISI 304 e 308. Ottima resistenza meccanica e alla corrosione. Elevata resistenza alla fessurazione.

Inertfil 308L is a stainless steel solid wire similar to ER 308L suitable for welding austenitic stainless steels such as AISI 304 and AISI 304L. Excellent corrosion resistance and good mechanical properties.

Classification	
AWS	A5.9: ER 308L
EN	12072: G 19 9L

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.80	0.45	≤ 0.025	≤ 0.020	20	10	0.20	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 520	≥ 35	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)
AISI 304 - 304L - 302

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,8	1,0	1,2	1,6		

INERTFIL 308LSi

Filo inox del tipo ER 308L indicato per la saldatura di acciai inox austenici del tipo AISI 304 e 308L. Ottima resistenza meccanica e alla corrosione. Il contenuto Si ~ 0,85% conferisce una migliore caratteristica di saldabilità ed estetica.

Inertfil 308LSi is a stainless steel solid wire similar to ER 308LSi suitable for welding austenitic stainless steels such as AISI 304 and AISI 304L Excellent corrosion resistance and good mechanical properties. Si ~ 0,85% content improves weldability and bead appearance.

Classification	
AWS	A5.9: ER 308L Si
EN	12072: G 19 9 L Si

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.80	0.85	≤ 0.025	≤ 0.020	20	10	0.20	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 520	≥ 35	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)
AISI 304 - 304L - 302

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,6	0,8	1,0	1,2	1,6	

INERTFIL 308H

MIG-MAG Wires
Stainless and Heat resistant steels

Filo inox del tipo ER 308H indicato per la saldatura di acciai inox austenici del tipo AISI 304H e 308H. Ottima resistenza meccanica e alla corrosione. Elevata resistenza alla fessurazione.

Inertfil 308H is stainless steel solid wire similar to ER 308H and suitable for welding AISI 304H austenitic stainless steel and similar steels. Excellent corrosion resistance and good mechanical properties.

Classification	
AWS	A5.9: ER 308H
EN	12072: G 19 9H

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.06	1.90	0.50	≤ 0.030	≤ 0.020	20	10.50	-	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 35	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

AISI 304H; 1.4948 (X6CrNi18-10); 1.4310 (X10CrNi18-8)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: BS300 Kg. 15

Diameters	1,0	1,2				

INERTFIL 316L

OERLIKON

MIG-MAG Wires
Stainless and Heat resistant steels

Filo inox tipo ER 316L con C 0,03% max. Ottima resistenza meccanica e chimica, indicato nella saldatura o ricarica di acciai inox con uguale composizione chimica. Ottima estetica. Il filo pieno ETC 316H con C 0.08% max, è disponibile su richiesta (AWS A5.9: ER 316H)

Inertfil 316L is a stainless steel solid wire conforming to ER 316L with C=0,03% max. Excellent mechanical properties and resistance to chemical corrosion, suitable for welding or surfacing stainless steels having the same chemical analysis. Excellent weld bead appearance. Upon request Inertfil 316H with Carbon 0.08% max (AWS A5.9: ER 316H) can be supplied.

Classification	
AWS	A5.9: ER 316L
EN	12072: G 19 12 3L

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.40	0.45	≤ 0.025	≤ 0.020	19	12.50	2.60	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 510	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	1,0	1,2				

INERTFIL 316LSi

Filo inox tipo ER 316L con C 0,03%max con Si 0,85%. Ottima resistenza meccanica e chimica, indicato nella saldatura o ricarica di acciai inox con uguale composizione chimica. Ottima estetica.

Inertfil 316LSi is a stainless steel solid wire conforming to ER 316LSi with C=0.03% max and Si ~ 0,85 %. Excellent mechanical properties and resistance to chemical corrosion, suitable for welding or surfacing stainless steels having similar chemical compositions. Excellent bead appearance.

Classification	
AWS	A5.9: ER 316L Si
EN	12072: G 19 12 3L Si

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.40	0.85	≤ 0.025	≤ 0.020	19	12.50	2.60	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 510	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,6	0,8	1,0	1,2	1,6	

INERTFIL 20.16L

OERLIKON

MIG-MAG Wires
Stainless and Heat resistant steels

Filo inox tipo ER 316L con aggiunta di azoto. Ottima resistenza meccanica e chimica, indicato nella saldatura o ricarica di acciai inox e acciai al 5% di Ni.

Inertfil 20.16L is a stainless steel solid wire with the composition of ER 316L with N. Good mechanical properties and resistance to chemical corrosion, suitable for welding or hardfacing stainless steels and 5% Ni steels.

Classification	Approvals	Grades
EN 12072: G 20 16 3 Mn N L	RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	7	0.90	≤ 0.020	≤ 0.020	20	17	3	-	-	0.15	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -120°C	Hardness
As Welded	≥ 450	≥ 580	≥ 38	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1) or M12 (Arcal 12)

Materials

X2CrNiMoN17-13-3 (1.4429)

X2CrNiMoN18-14-3 (1.3952); X2CrNiMo18-14-3 (1.4435)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	1,0	1,2				

INERTFIL 347

Filo inox per la saldatura degli acciai austenici stabilizzati, del tipo AISI 321 e 347. La presenza dello stabilizzante migliora notevolmente la resistenza all'ossidazione del deposito.

Inertfil 347 is a stainless steel solid wire suitable for welding stabilised austenitic steels such as AISI 321 and 347. Nb+Ta additions improve the oxidation resistance of the weld deposit.

Classification	
AWS	A5.9: ER 347
EN	12072: G 19 9Nb

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.06	1.60	0.45	≤ 0.030	≤ 0.030	19.50	10	-	0.80	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 400	≥ 550	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4550 (X6CrNiNb18-10);
AISI 347 - 321

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,8	1,0	1,2			

INERTFIL 318Si

OERLIKON

MIG-MAG Wires
Stainless and Heat resistant steels

Filo inox per la saldatura di degli acciai austenitici stabilizzati del tipo AISI 318. La presenza di stabilizzanti migliora la resistenza all'ossidazione del deposito.

Inertfil 318Si is a stainless steel solid wire suitable for welding stabilized austenitic steels such as AISI 318.
Nb + Ta additions improve the oxidation resistance of the weld deposit.

Classification	
AWS	A5.9: ER318 (similar)
EN	12072: G 19 12 3 Nb Si

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.07	1.75	0.85	≤ 0.020	≤ 0.020	19	12.60	2.60	0.70	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 400	≥ 550	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

1.4571 (X6CrNiMoTi17-12-2) - 1.4401 (X4CrNiMo17-12-2)
1.4580 (X6CrNiMoNb17-12-2) - 1.4408 (GX5CrNiMo19-11)
1.4581 (GX5CrNiMoNb19-10) - 1.4436 (X4CrNiMo17-13-3)
1.4583 (X10CrNiMoNb18-12)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	1,0	1,2				

INERTFIL 309L

Filo inox per la saldatura di acciai austeno-ferritici e per saldature dissimili.

Inertfil 309L is a stainless steel solid wire suitable for welding austenitic-ferritic steels with 25% Cr and 12% Ni, for applications up to 300°C. Inertfil 309L can be supplied with Carbon= 0.12% max.

Classification	
AWS	A5.9: ER 309L
EN	12072: G 23 12L

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.80	0.45	≤ 0.030	≤ 0.020	24	13	-	-	-	-	10-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 520	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

A312 TP309S; carbon steel to stainless steels joining

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,8	1,0	1,2			

INERTFIL 309LSi

Filo inox del tipo 25Cr 12Ni con basso contenuto di C. La più alta percentuale di Si conferisce al filo un'ottima saldabilità. E' indicato per la saldatura di acciai inox austenitici del tipo AISI 309. Viene impiegato per la saldatura di acciai dissimili e per strati cuscinetto.

Inertfil 309LSi is a stainless steel solid wire with 25%Cr 12%Ni, low carbon content. The increased Si level gives excellent weldability. Inertfil 309LSi is suitable for welding austenitic stainless steels similar to AISI 309. It is also used for welding dissimilar steels and for buffer layers.

Classification	
AWS	A5.9: ER 309L Si
EN	12072: G 23 12 L Si

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.80	0.85	≤ 0.030	≤ 0.020	24	13	-	-	-	-	10-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 520	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

A312 TP309S; carbon steel to stainless steels joint

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,8	1,0	1,2	1,6		

INERTFIL 309LMo

Filo inox del tipo 25Cr 12Ni con basso contenuto di C e alto contenuto di Mo. E' indicato per la saldatura di acciai inox austenitici del tipo AISI 309. Viene impiegato per la saldatura di acciai dissimili.

Inertfil 309LMo is a stainless steel solid wire containing a 25%Cr 12%Ni low C and high Mo. Suitable for welding AISI 309 austenitic stainless steel and similar steels. Inertfil 309LMo is also used to weld dissimilar steels or for buffer layers on 316L.

Classification	
AWS	A5.9: ER 309L Mo (approx)
EN	12072: G 23 12 2L

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	1.60	0.45	≤ 0.030	≤ 0.020	22	15	2.70	-	-	-	10-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

Cladding of carbon steel and low alloy steel

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,8	1,0	1,2			

INERTFIL 310

OERLIKON

MIG-MAG Wires
Stainless and Heat resistant steels

Filo inox del tipo ER310 con 25%Cr e 20%Ni indicato per la saldatura di acciai aventi la stessa composizione chimica o per acciai dissimili. Deposito completamente austenico. Ottima resistenza alla corrosione anche a caldo.Filo inox del tipo ER310 con 25%Cr e 20%Ni indicato per la saldatura di acciai aventi la stessa composizione chimica o per acciai dissimili. Deposito completamente austenico. Ottima resistenza alla corrosione anche a caldo.

Inertfil 310 is a stainless steel solid wire conforming to the ER310 classification with 25% Cr and 20% Ni. Suitable for welding steels having the same chemical compositions or for dissimilar steel welding. The weld deposit is fully austenitic. Excellent high temperature corrosion resistance.

Classification	
AWS	A5.9: ER 310
EN	12072: G 25 20

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.12	1.80	0.60	≤ 0.030	≤ 0.020	26	21	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

AISI 310; 1.4845 (X8CrNi25-21); 1.4841 (X15CrNiSi25-21); 1.4828 (X15CrNiSi20-12)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,8	1,0	1,2			

INERTFIL 312

MIG-MAG Wires
Stainless and Heat resistant steels

Filo inox per la saldatura e la ricarica di acciai difficilmente saldabili. Adatto per l'esecuzione di strati intermedi di riporti duri. Le elevate caratteristiche meccaniche e la grande resistenza alla fessurazione rendono questo filo di impiego universale.

Inertfil 312 is a stainless steel solid wire suitable for welding or surfacing difficult to weld steels. Suitable for welding buffer layers when hardfacing. The excellent mechanical properties and the impact toughness mean that this wire is suitable for a wide range of applications.

Classification	
AWS	A5.9: ER 312
EN	12072: G 29 9

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.10	1.80	0.40	≤ 0.030	≤ 0.020	29	9	-	-	-	-	12-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 450	≥ 650	≥ 22	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

Dissimilar and difficult to weld steels

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,8	1,0	1,2			

INERTFIL 904L

OERLIKON

MIG-MAG Wires
Stainless and Heat resistant steels

Filo pieno per la saldatura di acciai tipo AISI 904L altamente legati, con basso contenuto di carbonio. Ottima resistenza alla corrosione in miscele solforose e cloridriche. Buona resistenza alla corrosione intergranulare.

Inertfil 904L is a solid wire for welding stainless steels type 904L. Low carbon content. Very good resistance to intergranular and pitting corrosion.

Classification	
AWS	A5.9: ER 385 L
EN	12072: G 20 25 5 Cu L

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	1.90	0.40	≤ 0.020	≤ 0.020	20	25	4.50	-	1.50	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -70°C	Hardness
As Welded	≥ 410	≥ 560	≥ 35	≥ 100	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

URANUS B6; AISI 904L; 1.4539 (X1NiCrMoCu25-20-5); 1.4439 (X2CrNiMoN17-13-5); 1.4537 (X1CrNiMoCuN25-25-5)

Storage
Keep dry and avoid condensation

Current condition and welding position
DC+

Packaging data: BS300 Kg. 15

Diameters	1,0	1,2				

INERTFIL 410

MIG-MAG Wires
Stainless and Heat resistant steels

Filo pieno per la saldatura di acciai al 12% Cr (AISI 410).Tali acciai sono del tipo autotemprante e pertanto richiedono trattamenti di preriscaldo e di distensione al fine di ottenere delle saldature con sufficiente duttilità. Il filo pieno ETC 410 con C 0,08% max, è disponibile su richiesta.

Inertfil 410L is a solid wire for welding 12%Cr steels (AISI 410). These are self- hardening steels and usually require pre-heating and stress relieving treatments in order to obtain adequate ductility. Upon request Inertfil 410 solid wire with carbon 0,08% max can be supplied.

Classification	
AWS	A5.9: ER 410
EN	12072: G 13L

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	0.40	0.50	≤ 0.030	≤ 0.020	13.50	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 750°C x 1h	≥ 350	≥ 450	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

1.4000 (X6Cr13); 1.4006 (X12Cr13)

AISI 410

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	1,0	1,2				

INERTFIL 410 NiMo

OERLIKON

MIG-MAG Wires
Stainless and Heat resistant steels

Filo pieno per la saldatura di acciai serie AISI 410 Ni Mo. Tali acciai sono del tipo autotemprante e pertanto richiedono trattamenti di preriscaldo e di distensione al fine di ottenere delle saldature con sufficiente duttilità.

Inertfil 410NiMo is a solid wire suitable for welding AISI 410 NiMo. These are self- hardening steels and usually require pre-heating and stress relieving treatments in order to obtain adequate ductility.

Classification	
AWS	A5.9: ER 410 NiMo
EN	12072: G 13 4

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.05	0.60	0.50	≤ 0.030	≤ 0.020	12.50	4	0.70	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 500	≥ 760	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

ASTM CA6NM; G-X5CrNi 13-4; Z6 CND 1304 M

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	1,0	1,2				

INERTFIL 430

Filo pieno per la saldatura di acciai al 15-17% Cr (AISI 430). Tali tipi di acciaio sono previsti per la tempra in aria e richiedono pertanto dei trattamenti di preriscaldo e di distensione al fine di ottenere delle saldature di sufficiente duttilità per la lavorazione meccanica.

Inertfil 430 is a solid wire suitable for the welding of 15-17% Cr steels (AISI 430). These steels have been developed for air hardening and require pre-heating and stress relieving treatments in order to obtain sufficient ductility to allow mechanical working.

Classification	
AWS	A5.9: ER 430
EN	12072: G 17

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.08	0.60	0.40	≤ 0.030	≤ 0.020	17	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 770°C x 2h	≥ 400	≥ 450	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

AISI 430

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	1,0	1,2				

INERTFIL 22 9 3

Filo pieno per la saldatura di acciai bifasici tipo Duplex. La ottima resistenza alla corrosione e le caratteristiche meccaniche del deposito dipendono molto dalla tecnica di saldatura. Temperatura di esercizio fino a 280°C.

Inertfil 22 9 3 is a solid wire suitable for welding duplex stainless steels. The weld metal has excellent corrosion resistance and weld metal mechanical properties.

Classification	
AWS	A5.9: ER 2209
EN	12072: G 22 9 3NL

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.70	0.50	≤ 0.030	≤ 0.020	23	9	3	-	-	0.15	30-65

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 450	≥ 600	≥ 26	≥ 80 J	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

1.4462 (X2CrNiMoN22-5-3)
UNS S31803 - S31500 - S31200 - S32304

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 15

Diameters	0,8	1,0	1,2			

NIFIL Ni1

OERLIKON

MIG-MAG Wires
Nickel and Copper alloys

Filo pieno indicato per la saldatura o ricarica di leghe con uguale composizione chimica. Buona estetica e ottima resistenza agli agenti chimici.

Nifil Ni1 is a solid wire suitable for welding alloys with similar chemical analysis and for weld overlay. Good appearance and excellent resistance to chemical corrosion.

Classification	
AWS	A5.14: ER Ni-1
EN ISO	18274: S Ni 2061 (NiTi3)

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.10	1	0.70	≤ 0.030	≤ 0.015	-	98	-	-	0.90	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 280	≥ 380	≥ 38		

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1) or I3 (Arcal 32)

Materials

Buffer layers for welding Ni or Cu alloys to steels

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	1,0	1,2				

NIFIL 600

OERLIKON

MIG-MAG Wires
Nickel and Copper alloys

Filo pieno per la saldatura o ricarica di leghe inconel 600 o incoloy 800. ETC 82 è anche indicato nel caso di saldature di acciai dissimili o difficilmente saldabili. Ottime caratteristiche meccaniche e resistenza alla corrosione.

Nifil 600 is a solid wire for welding Inconel 600 and Incoloy 800. Nifil 600 is also suitable for welding dissimilar or difficult to weld steels, particulary Ni alloys and stainless steels. Excellent mechanical properties and corrosion resistance at high temperatures up to 1100°C.

Classification	
AWS	A5.14: ER NiCr-3
EN ISO	18274: S Ni 6082

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.01	3	0.30	≤ 0.030	≤ 0.015	20	67	-	2	2	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 380	≥ 550	≥ 25	≥ 55	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1) or I3 (Arcal 32)

Materials

2.4816; 1.4876; 1.4958

UNS N06600; UNS N08800; UNS N08810

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2	1,6		

NIFIL 625

OERLIKON

MIG-MAG Wires
Nickel and Copper alloys

Filo pieno a struttura austenitica, può essere utilizzato per saldature criogeniche e acciai al 9% Ni, grazie alla sua buona tenuta alle alte temperature(1100°C) può essere utilizzato su tutte le installazioni soggette a trattamento termico. Buona resistenza alla corrosione intercristallina.

Nifil 625 is a nickel alloy solid wire, for use in cryogenic welding and 9% Ni steel welding applications. Suitable for high temperature applications (1100°C). It is used for components which will undergo heat treatments. Good resistance to intercrystalline corrosion.

Classification	
AWS	A5.14: ER NiCrMo-3
EN	18274: Ni 6625

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.025	-	0.30	≤ 0.020	≤ 0.015	21	60	9	3.50	3	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 440	≥ 760	≥ 35	≥ 55	

Gas test: Acc. To EN 14175: M12 (Arcal 12)

Shielding Gas: Acc. To EN 14175: M12 (Arcal12-Arcal121)

Materials

2.4856; 2.4839

UNS N06625; UNS N08825

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	0,8	1,0	1,2	1,6		

NIFIL C276

OERLIKON

MIG-MAG Wires
Nickel and Copper alloys

Filo pieno utilizzato per ricariche e riporti antiusura, buona resistenza alla corrosione in ambienti ossidanti, riducenti contenenti acidi o cloruri. E' inoltre utilizzato per la saldatura di leghe Ni-Cr-Mo a basso carbonio, per depositi di saldatura su acciai o con altri tipi di leghe al Nickel

This solid wire is applicable in welding of Ni-Cr-Mo alloys with low carbon content. In addition it can be used for dissimilar base metal or Ni alloy welding. Good corrosion resistance in presence of acids or chlorides.

Classification	Approvals	Grades
AWS A5.14: ER NiCrMo-4		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.02	≤ 1	≤ 0.08	≤ 0.030	≤ 0.025	14.50	Rem	15-17	-	≤ 0.50	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 490	≥ 700		≥ 55	

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1) or I3 (Arcal 32)

Materials

2.4602 (C22)
2.4610 (C4)
2.4819
ASTM B 574, B575, B622 e B626, UNS N10276 e HASTELLOY C 276

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 Kg. 16

Diameters

NIFIL NiCu7

Filo pieno indicato per la saldatura o ricarica di leghe con uguale composizione estetica e ottima resistenza alla corrosione in presenza di ambienti salini. Applicazione tipo dissalatori per leghe tipo MONEL.

Nifil NiCu7 is a solid wire suitable for welding alloys with similar chemical analyses. Good bead appearance with excellent corrosion resistance in saline solutions. Suitable for desalination plant construction applications and joining MONEL type alloys.

Classification	
AWS	A5.14: ER NiCu7
EN ISO	18274: S Ni 4060 (NiCu30Mn3Ti)

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.10	3	1	≤ 0.020	≤ 0.015	-	≥ 62	-	-	1	-	30

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 350	≥ 480	≥ 30		

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

2.4360 (NiCu30Fe); 2.4375 (NiCu30Al); 2.4377
UNS N04400; UNS N 05500

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	1,0	1,2				

COPPERFIL 70-30

Filo indicato per la saldatura o ricarica di leghe con uguale composizione chimica. Buona estetica e ottima resistenza agli agenti chimici e marini (es. dissalatori).

Copperfil 70-30 is a solid wire suitable for welding all copper-nickel alloys such as 70/30 - 80/20 - 90/10. Good bead appearance and excellent weld deposit properties. Excellent corrosion resistance in saline solutions.

Classification	
AWS	A5.7: ER CuNi (CuNi30)
EN	14640: S Cu 7158

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	Cu	Sn
-	1	0.20	≤ 0.020	-	-	30	-	-	0.50	Rem	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 250	≥ 345	≥ 20		

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

2.0872 (CuNi10Fe1Mn9); 2.0882 (CuNi30Mn1Fe); 2.0837
UNS C70600; UNS C71500

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	1,2					

COPPERFIL 90-10

Filo indicato per la saldatura o ricarica di leghe con uguale composizione chimica. Buona estetica e ottima resistenza agli agenti chimici e marini (es. dissalatori).

Copperfil 90-10 is a solid wire suitable for welding alloys with similar chemical analyses. Good bead appearance and excellent weld deposit properties. Excellent corrosion resistance in saline solutions.

Classification	
EN	14640: S Cu 7061 (CuNi10)

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	Cu	Sn
0.05	1	0.20	≤ 0.020	≤ 0.015	-	10	-	-	1	Rem	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded		≥ 380			

Gas test: Acc. To EN 14175: M13 (Cargal 1)

Shielding Gas: Acc. To EN 14175: M13 (Cargal 1)

Materials

2.0873

UNS C70600; UNS C71500

Storage
Keep dry and avoid condensation.

Current condition and welding position
DC +

Packaging data: K300 Kg. 16

Diameters	1,2					

COPPERFIL CuAl8

Filo pieno per la saldatura di leghe di rame. Impiegato nell'industria automobilistica e nelle fonderie artistiche. Ottima resistenza alla corrosione da acqua di mare e in soluzione acide.

Copperfil CuAl8 has been developed for welding copper alloys and steel castings, nickel alloys and for welding in artistic foundries. This composition offers a very high resistance to sea water-corrosion and to the most commonly used acids in any concentrations and at a wide range of operating temperatures. High erosion resistance. Used for welding galvanized steel sheets and components in the automobile industry.

Classification	
AWS	A5.7: ER CuAl-A1
DIN	1733: SG-CuAl8
EN	14640: S CuAl8-S Cu 6100

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	Cu	Sn
-	≤ 0.10	≤ 0.20	-	-	-	≤ 0.80	-	-	≤ 0.50	Rem	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded		390-450	≥ 45		80-100 HB

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Storage
Keep dry and avoid condensation.

Current condition and welding position
DC+
 PA PB PC

Packaging data: K300 Kg. 16

Diameters	1,0	1,2				

COPPERFIL CuSi3

Filo pieno idoneo alla saldatura di leghe rame-silicio o rame-zinco. Ottima resistenza alla corrosione.

Copperfil CuSi3 is used for the inert gas welding of copper base alloys, for example, copper-silicon, copper-zinc and galvanized sheets, also welded to steel. This wire is frequently used for joining in artistic foundries, for welding galvanized sheets and even as a steel coating. It is also suitable for surfaces subject to corrosion.

Classification	
AWS	A5.7: ER CuSi-A
DIN	1733: SG-Cu Si3
EN	14640: S CuSi3Mn1-S Cu 6560

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	Cu	Sn
-	0.75	2.80-4	≤ 0.020	-	-	-	-	-	≤ 0.30	Rem	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded		330-370	≥ 40		80-90 HB

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	1,0	1,2				

CARBOFIL A 250

Filo pieno per riporti antiusura di durezza 225-275 HB

Carbofil A 250 is a solid wire for hardsurfacing of wear resistant parts, subject to heavy impact and shock. Carbofil A 250 is suitable for the welding of rail, rail crossing and wear parts such as rope rollers.

Classification	
DIN	8555: MSG 1-GZ-250
EN	14700: S Fe1

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.30	1	0.50	-	-	1	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					225-275 HB

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Storage

keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: K300 Kg. 16

Diameters	1,2					

CARBOFIL A 350

Fili pieni per riporti antiusura indicati per pristinare superfici che devono essere sottoposte ad abrasioni. Le caratteristiche di durezza si ottengono in condizioni di solo materiale d'apporto. Si consiglia in alcuni casi uno strato cuscinetto.

Carbofil A 350 is a solid wire for hardfacing suitable for hardfacing surfaces subjected to abrasive wear. 325-380 HB is obtained in the all weld metal. In some cases the use of a buffer layer may be required.

Classification	
DIN	8555: MSG 2-GZ-350P
EN	14700: S Fe2

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.70	2	0.50	-	-	1	-	1	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					325-380 HB

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Storage
keep dry and avoid condensation.

Current condition and welding position
DC +
 PA PB PC

Packaging data: K300 Kg. 16

Diameters	1,2					

CARBOFIL A 600

OERLIKON

MIG-MAG Wires
Hardfacing

Fili pieni per riporti antiusura indicati per ripristinare superfici che devono essere sottoposte ad abrasione. Le caratteristiche di durezza si ottengono in condizioni di solo materiale d'apporto. Si consiglia in alcuni casi uno strato cuscinetto.

Carbofil A 600 is a solid wire for hardfacing surfaces to be subjected to abrasive wear. 570-660 HB is obtained in the all weld metal. In some cases the use of a buffer layer may be required.

Classification	
AWS	14700: S Fe8
DIN	8555: MSG 6-GZ-60-GP

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.45	0.40	3	-	-	9	-	1.40	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					57-62 HRC

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 Kg. 16

Diameters	1,0	1,2	1,6			

ALUFIL Al 99,5 Ti

Filo pieno che deposita alluminio al 99,55. Adatto per la saldatura di leghe d'alluminio e alluminio puro. Buone caratteristiche meccaniche e buona permeabilità magnetica. Ottima resistenza alla corrosione chimica.

Alufil Al 99,5Ti is a solid wire which deposits a 99,5% Al composition. Suitable for welding aluminium and pure aluminium alloys. Good mechanical properties and magnetic permeability. Excellent resistance to chemical corrosion.

Classification	Approvals	Grades
EN ISO 18273: S Al 1450	TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	0.05	0.20	-	-	-	-	0.15	-	-	≤ 0.05	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 20	≥ 65	≥ 35		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

3.0805

Al 99,5 ;Al 99; Al 99,9 Mg 0,5; AlMg 0,5

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: BS300 Kg. 7

Diameters	1,2	1,6				

ALUFIL AlSi 5

Filo pieno che deposita una lega con 5% di Si. Ottima saldabilità e buone caratteristiche meccaniche.

Alufil AlSi5 is a solid wire for welding of aluminium and aluminium alloys with a silicon content up to 7%.
Suitable for Al-Mg-Si alloys series 6000 and for dissimilar welding such as 6000/1000 or 6000/3000.

Classification	
AWS	A5.10: ER 4043
EN ISO	18273: S Al 4043

Approvals	Grades
DB	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	≤ 0.05	5	-	-	-	-	≤ 0.20	≤ 0.05	≤ 0.80	≤ 0.30	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 40	≥ 120	≥ 8		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

3.2245

Al-Mg-Si and Al-Mg alloys with 2.5% Mg max. Al-Mn-Cu - AlSi cast

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 7

Diameters	0,8	1,0	1,2	1,6		

ALUFIL AlSi 12

Filo pieno per la saldatura di leghe alluminio-silicio con contenuto di silicio >7%.

Alufil AlSi 12 is a solid wire for the welding of aluminium-silicon alloys with a silicon content >7%.

Classification	
AWS	A5.10: ER 4047

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	0.20	12	-	-	-	-	≤ 0.15	0.35	≤ 0.50	≤ 0.03	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 60	≥ 130	≥ 5		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

3.2211; 3.2373; 3.2585

G-Al Si 12

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC+

Packaging data: BS300 Kg. 7

Diameters	1,0	1,2	1,6	2,0	2,4	3,2

ALUFIL AlMg 4,5 Mn

OERLIKON

MIG-MAG Wires
Aluminum alloys

Filo pieno che deposita una lega con 4,5% di Mg. Ottime caratteristiche meccaniche.

Alufil AlMg 4,5 Mn is an aluminium alloy solid wire suitable for welding aluminium and magnesium alloys with 5% max of Mg. Zirconium promotes grain refinement and increases the mechanical properties and corrosion characteristics.

Classification	
AWS	A5.10: ER 5183
EN ISO	18273: S Al 5183

Approvals	Grades
DB	
GL	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	0.80	0.30	-	-	0.10	-	0.10	4.50	0.10	0.10	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 125	≥ 275	≥ 17		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

3.3548
Al Mg 3, Al Mg 5, Al Mg Mn, Al Zn 4,5 Mg 1
G-Al Mg 3 Si; G-Al Mg 5 Si; G-Al Mg 10;

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: BS300 Kg. 7

Diameters	1,0	1,2	1,6			

ALUFIL AlMg 5

Filo pieno che deposita una lega con 5% di Magnesio. Ottime caratteristiche meccaniche.

Alufil AlMg5 is a solid wire for the MIG welding of aluminium and aluminium alloys with a magnesium content up to 5%. Suitable for welding of all commercial aluminium alloys, also in structural work. Good mechanical properties and high resistance to corrosion including marine corrosion.

Classification	
AWS	A5.10: ER 5356
EN ISO	18273: S Al 5356

Approvals	Grades
DB	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	0.10	0.20	-	-	0.10	-	0.10	5	0.30	0.10	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 110	≥ 240	≥ 17		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

3.3556
Al Mg 1SiCu, Al Mg Si 0,7;
Al Mg 3, Al Mg 5, Al Zn 4,5 Mg 1;
G-Al Mg 3Si; G-Al Mg 5Si

Storage
Keep dry and avoid condensation

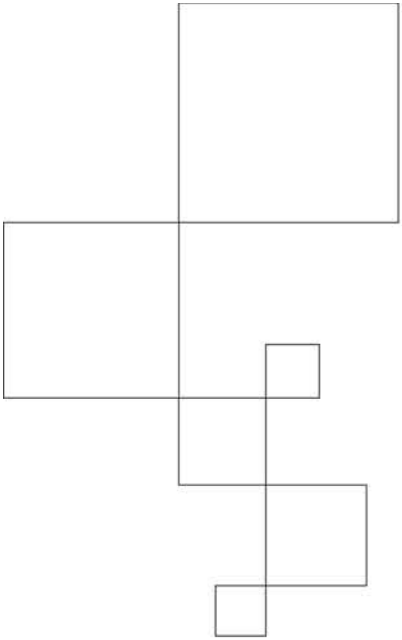
Current condition and welding position
DC+

Packaging data: BS300 Kg. 7

Diameters	0,8	1,0	1,2	1,6		

TIPO/SPOOL	S 200 / Plastic		B 200 / Basket		S 300 / Plastic		B 300 / Basket		BS 300 / Basket 52		DAYTONA SYSTEM
	R	LW	R	LW	R	LW	R	LW	R	LW	
FILI PIENI PER LA SALDATURA DI ACCIAI NON LEGATI											
CARBOFIL	5 Kg x 3				15 Kg	15 Kg	16 Kg	16 Kg			300 Kg
CARBOFIL 1	5 Kg x 3				15 Kg	15 Kg	16 Kg	16 Kg			300 Kg
CARBOFIL 1A	5 Kg x 3				15 Kg	15 Kg	16 Kg	16 Kg			300 Kg
CARBOFIL TP	5 Kg x 3				15 Kg	15 Kg	16 Kg	16 Kg			300 Kg
CARBOFIL Galva	5 Kg x 3				15 Kg	15 Kg	16 Kg	16 Kg			300 Kg
CARBOFIL 1 GOLD								16 Kg			300 Kg
CARBOFIL 1A GOLD								16 Kg			300 Kg
FILI PIENI PER LA SALDATURA DI ACCIAI COR-TEN											
CARBOFIL NiCu								16 Kg			
FILI PIENI PER LA SALDATURA DI ACCIAI AD ELEVATO LIMITE ELASTICO											
CARBOFIL MnNiMoCr								16 Kg			
CARBOFIL NiMoCr								16 Kg			
CARBOFIL 2NiMoCr								16 Kg			
FILI PIENI PER LA SALDATURA DI ACCIAI LEGATI E DEBOLMENTE LEGATI											
CARBOFIL 1Ni								15 Kg			
CARBOFIL 2Ni								15 Kg			
CARBOFIL MnMo								15 Kg			
CARBOFIL CrMo1								15 Kg			
CARBOFIL CrMo2								15 Kg			
CARBOFIL CrMo5								15 Kg			
CARBOFIL 9Cr								15 Kg			
ETC KV7M								15 Kg			
FILI PIENI PER LA SALDATURA DI ACCIAI INOSSIDABILI											
INERTFIL 307										15 Kg	
INERTFIL 308L	5kg x 3									15 Kg	200 kg
INERTFIL 308H										15 Kg	
INERTFIL 308LSi										15 Kg	
INERTFIL 309L										15 Kg	
INERTFIL 309LSi										15 Kg	
INERTFIL 309LMo										15 Kg	

SPOOL	S 200 / Plastic		B 200 / Basket		S 300 / Plastic		B 300 / Basket		BS 300 / Basket 52		DAYTONA SYSTEM
	R	LW	R	LW	R	LW	R	LW	R	LW	
FILI PIENI PER LA SALDATURA DI ACCIAI INOSSIDABILI											
INERTFIL 310										15 Kg	
INERTFIL 904L										15 Kg	
INERTFIL 312										15 Kg	
INERTFIL 316L										15 Kg	
INERTFIL 316LN										15 Kg	
INERTFIL 316LSi										15 Kg	
INERTFIL 318Si										15 Kg	
INERTFIL 22 9 3										15 Kg	
INERTFIL 347										15 Kg	
INERTFIL 410										15 Kg	
INERTFIL 410NiMo										15 Kg	
INERTFIL 430										15 Kg	
FILI PIENI PER LA SALDATURA DI LEGHE Nichel E Cu-Ni											
NIFIL NiCu7										16 kg	
COPPERFIL 70-30										16 kg	
NIFIL Ni1										16 kg	
COPPERFIL 90-10										16 kg	
FILI PIENI PER LA SALDATURA DI LEGHE Ni-Cr											
NIFIL 600						15 kg					
NIFIL 625						15 kg					
NIFIL C276						15 kg					
FILI PIENI PER LA SALDATURA DI ALLUMINIO											
ALUFIL AL99,5 Ti						6 kg				7 kg	
ALUFIL AlMg 5						6 kg				7 kg	
ALUFIL AlSi 5						6 kg				7 kg	
ALUFIL AlSi 12						6 kg				7 kg	
ALUFIL Al Mg4.5Mn						6 kg				7 kg	
FILI PIENI PER RIPORTI ANTIUSURA											
CARBOFIL A 250						15 kg					
CARBOFIL A 350						15 kg					
CARBOFIL A 600						15 kg					



FILI ANIMATI

FLUX CORED WIRES

OERLIKON

Tubular cored electrodes for metal-arc welding with or without shielding gas of unalloyed and fine grain structural steels.

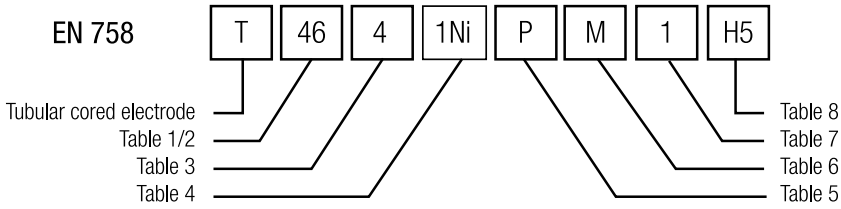


Table 1

Code digits for tensile strength properties of multi-pass welded joints			
Code digits	Minimum yield strength[1] [N/mm²]	Tensile strength [N/mm²]	Minimum eleongation[2] [%]
35	355	440–570	22
38	380	470–600	20
42	420	500–640	20
46	460	530–680	20
50	500	560–720	18

[1]) Lower yield strength (R_{eL}). will apply. In case the yield strength is not definitely determined, 0,2 % proof stress ($R_{p0,2}$) shall be applied.
[2]) Gauge length is equal to five times the test specimen diameter.

Table 2

Symbols for tensile strength properties of single-pass welded joints		
Symbols	Minimum yield strength of base metal [N/mm²]	Minimum tensile strength of welded joint [N/mm²]
3T	355	470
4T	420	520
5T	500	600

Table 3

Symbols for impact energy of all-weld metal or welded joint	
Symbols	Temperature for minimum impact energy 47 J [°C]
Z	no requirement
A	20
0	0
2	-20
3	-30
4	-40
5	-50
6	-60

Table 4

Symbols for chemical composition of all-weld metal			
Symbols	Chemical composition [%] (m/m) [1)2)3)]		
	Mn	Ni	Mo
No Symbols	2,0	–	–
Mo	1,4	–	0,3–0,6
MnMo	1,4–2,0	–	0,3–0,6
1Ni	1,4	0,6–1,2	–
1,5 Ni	1,6	1,2–1,8	–
2Ni	1,4	1,8–2,6	–
3Ni	1,4	2,6–3,8	–
Mn1Ni	1,4–2,0	0,6–1,2	–
1NiMo	1,4	0,6–1,2	0,3–0,6
Z	any other composition agreed upon		

[1]) If not specified: Mo<0,2%, Ni<0,5%, Cr<0,2%, V<0,08%, Nb<0,05%, Cu<0,3% and only tubular cored electrodes to be welded without shielding gas Al<2,0%
[2]) Single values in this table are maximum values.
[3]) The results are to be rounded to the same decimal place as the specified values using the rules as to ISO 31-0 : 1992, Appendix B, Rule A.

Table 5

Symbols for type of filling material			
Symbols	Properties	Type of weld	Shielding gas
R	Rutile, slow-freezing slag	Single and multipass welding	required
P	Rutile, fast-freezing slag	Single and multipass welding	required
B	Basic	Single and multipass welding	required
M	Metal powder	Single and multipass welding	required
V	Rutile or Basic / fluoride	Single pass welding	not required
W	Basic / fluoride fast-freezing slag	Single and multipass welding	not required
Y	Basic / fluoride fast-freezing slag	Single and multipass welding	not required
S	other types	–	–

Table 6

Symbols for shielding gas	
Symbols	Meaning
M	if specification has been realized with shielding gas EN 439-M2, without helium
C	if specification has been realized with shielding gas EN 439-C1, carbon dioxide
N	self, shielding tubular cored electrodes

Table 7

Code digits for welding positions	
Code digit	Welding positions
1	all positions
2	all positions, except vertical-down
3	flat butt welds, fillet welds in the flat and horizontal position
4	butt and fillet welds in the flat position
5	vertical-down welds and as under 3

Table 8

Symbols for hydrogen content of deposited weld metal	
Symbols	Hydrogen content ml/100 grams deposited weld metal max.
H5	5
H10	10
H15	15

Tubular cored electrodes for gas-shielded metal-arc welding of creep resistant steels

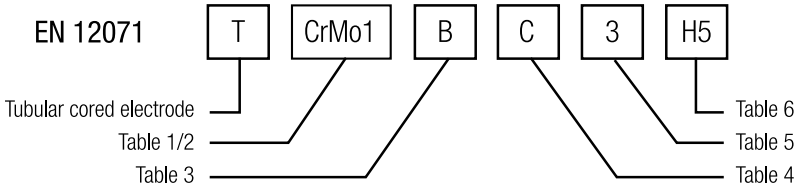


Table 1

Symbols for chemical composition of all-weld metal								
Symbols	Chemical composition [%] (m/m) [1)2)3)]							
	C	Si	Mn	P	S	Cr	Mo	V
Mo	0,07–0,12	0,80	0,60–1,30	0,020	0,020	–	0,40–0,65	–
MoL	0,07	0,80	0,60–1,70	0,020	0,020	–	0,40–0,65	–
MoV	0,07–0,12	0,80	0,40–1,00	0,020	0,020	0,30–0,60	0,50–0,80	0,25–0,45
CrMo 1	0,05–0,12	0,80	0,40–1,30	0,020	0,020	0,90–1,40	0,40–0,65	–
CrMo 1L	0,05	0,80	0,40–1,30	0,020	0,020	0,90–1,40	0,40–0,65	–
CrMo 2	0,05–0,12	0,80	0,40–1,30	0,020	0,020	2,00–2,50	0,90–1,30	–
CrMo 2L	0,05	0,80	0,40–1,30	0,020	0,020	2,00–2,50	0,90–1,30	–
CrMo 5	0,03–0,12	0,80	0,40–1,30	0,020	0,025	4,00–6,00	0,40–0,70	–
Z	any other chemical composition							

1) If not specified, Ni<0,3%, Cu<0,3%, V<0,03%, Nb<0,01%, Cr<0,2%.
2) Single values in this table are maximum values
3) The results have to be rounded to the same decimal place as the specified values using the rules as to ISO 31-0 : 1992 Appendix B, Rule A.

Table 2

Mechanical properties of all-weld metal								
Alloy symbol	Minimum yield strength $R_{p0,2}$ [N/mm²]	Minimum Tensile strength R_m [N/mm²]	Minimum Elongation A_5 [%]	Impact energy K_v [J] at +20 C		Heat treatment of weld metal		
				Minimum mean value from three specimens	Minimum individual value	Preheat and interpass temperature [°C]	Heat treatment of test piece	
							Temperatur[3)] [°C]	Time[4)] [min]
Mo/MoL	355	510	22	47	38	<200	570–620	60
MoV	355	510	18	47	38	200–300	690–730	60
CrMo 1	355	510	20	47	38	150–250	660–700	60
CrMo 1L	355	510	20	47	38	150–250	660–700	60
CrMo 2	400	500	18	47	38	200–300	690–750	60
CrMo 2L	400	500	18	47	38	200–300	690–750	60
CrMo 5	400	590	17	47	38	200–300	730–760	60
Z	any other mechanical values agreed upon by manufacturer and user							

1) The gauge length is equal to five times the test specimen diameter.
2) Only one single value lower than minimum average is permitted.
3) The test piece must be furnace-cooled to 300 °C, with a cooling rate below 200 °C/hr.
4) Tolerance ±10 minutes.

Table 3

Symbols for type of filler material	
Symbols	Properties
R	Rutile, slow-*freezing slag
P	Rutile, fast-freezing slag
B	Basic
M	Metal powder
Z	other types

Table 4

Symbols for shielding gas	
Symbols	Meaning
M	if specification has been realized with shielding gas EN 439-M2, without helium
C	if specification has been realized with shielding gas EN 439-C1, carbon dioxide

Table 5

Code digits for welding positions	
Code digit	Welding positions
1	all-positions
2	all positions, except vertical-down
3	flat butt welds, fillets in the flat and horizontal position
4	butt and fillet welds in the flat position
5	vertical-down and as under 3

Table 6

Symbols for hydrogen content of deposited weld metal	
Symbol	Hydrogen content ml/100 grams deposited weld metal max.
H5	5
H10	10

Tubular cored electrodes for metal-arc welding with or without shielding gas of austenitic stainless and heat resisting steels.

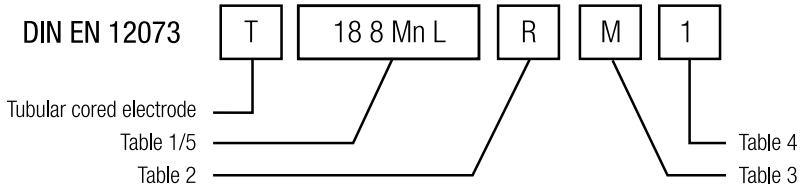


Table 1

Minimum tensile strength of all-weld metal				
Alloy symbol	Minimum 0,2 % proof stess $R_{p0,2}$ [N/mm²]	Minimum tensile strength R_m [N/mm²]	Minimum Elongation[1]) A_5 [%]	Heat treatment
13	250	450	15	[2])
13 Ti	250	450	15	[2])
13 4	500	750	15	[3])
17	300	450	15	[4])
19 9 L	320	510	30	none
19 9 Nb	350	550	25	none
19 12 3 L	320	510	25	none
19 12 3 Nb	350	550	25	none
19 13 4 NL	350	550	25	none
22 9 3 NL	450	550	20	none
18 16 5 NL	300	480	25	none
18 8 Mn	350	500	25	none
20 10 3	320	510	25	none
23 12 L	320	510	25	none
23 12 2 L	350	550	25	none
29 9	450	650	15	none
22 12 H	350	550	30	none
25 20	350	550	25	none

[1]) Gauge length is equal to five times the test specimen diameter.
[2]) 840°C to 870°C within 2hrs. – furnace cooling at 600°C, then air cooling.
[3]) 580°C to 620°C within 2hrs. – air cooling.
[4]) 760°C to 790°C within 2hrs. – furnace cooling at 600°C, then air cooling.
Remark: The elongation values of the weld metal may be lower than those of the base metal.

Table 2

Symbols for the type of tubular cored electrode	
Symbol	Eigenschaften
R	Rutile, slow-freezing slag
P	Rutile, fast-freezing slag
M	Metal powder
U	Selfshielding
Z	other types

Table 3

Symols for shielding gas	
Symbol	Meaning
M	if specification has been realized with shielding gas EN 439-M2 without helium
C	if specification has been realized with shielding gas EN 439-C1, carbon dioxide
N	self shielding tubular cored electrodes

Table 4

Code digits for welding position	
Code digit	Welding positions
1	all positions
2	all positions, except vertical-down
3	flat butt welds, fillets in the flat and horizontal position
4	butt and fillet welds in the flat position
5	vertical-down, and as under 3

Table 5

Symbols for chemical composition of all-weld metal									
Symbols	Chemical composition(%), (m/m), [1][2][3][4]								
	C	Si	Mn	P[5]	S[5]	Cr	Ni	Mo	Other Elements
Martensitic/ ferritic									
13	0,12	1,0	1,5	0,030	0,025	11,0–14,0	–	–	–
13 Ti	0,10	1,0	0,80	0,030	0,030	10,5–13,0	–	–	Ti[6]
13 4	0,06	1,0	1,5	0,030	0,025	11,0–14,5	3,0–5,0	0,4–1,0	–
17	0,12	1,0	1,5	0,030	0,025	16,0–18,0	–	–	–
Austenitic									
19 9 L	0,04	1,2	2,0	0,030	0,025	18,0–21,0	9,0–11,0	–	–
19 9 Nb	0,08	1,2	2,0	0,030	0,025	18,0–21,0	9,0–11,0	–	Nb[7]
19 12 3 L	0,04	1,2	2,0	0,030	0,025	17,0–20,0	10,0–13,0	2,5–3,0	–
19 12 3 Nb	0,08	1,2	2,0	0,030	0,025	17,0–20,0	10,0–13,0	2,5–3,0	Nb[7]
19 13 4 NL[8]	0,04	1,2	1,0–5,0	0,030	0,025	17,0–20,0	12,0–15,0	3,0–4,5	N 0,20 [5]
Ferritic-austenitic high-corrosion resistant 22 9 3 NL[9]	0,04	1,2	2,5	0,030	0,025	21,0–24,0	7,5–10,5	2,5–4,0	N 0,08–0,20
Fully austenitic high-corrosion resistant									
18 16 5 NL[8]	0,04	1,2	1,0–4,0	0,035	0,025	17,0–20,0	15,5–19,0	3,5–5,0	N 0,08–020 [5]
Special types	0,20	1,2	4,5–7,5	0,035	0,025	17,0–20,0	7,0–10,0	–	–
20 10 3	0,08	1,2	2,5	0,035	0,025	19,5–22,0	9,0–11,0	2,0–4,0	–
23 12 L	0,04	1,2	2,5	0,030	0,025	22,0–25,0	11,0–14,0	–	–
23 12 2 L	0,04	1,2	2,5	0,030	0,025	22,0–25,0	11,0–14,0	2,0–3,0	–
29 9	0,15	1,2	2,5	0,035	0,025	27,0–31,0	8,0–12,0	–	–
Heat resisting types									
22 12 H	0,15	1,2	2,5	0,030	0,025	20,0–23,0	10,0–13,0	–	–
25 20 [8]	0,06–0,20	1,2	1,0–5,0	0,030	0,025	23,0–27,0	18,0–22,0	–	–

[1] If not specified MO<0,75 %, Cu<0,75 %, Ni<0,60 %
[2] Individual values in this table are maximum values.
[3] Tubular cored electrodes not listed in this table are analogously to be marked with the preceding letter Z.
[4] The results obtained have to be rounded to the same decimal place as the specified values using the rules as to ISO 31-0 : 1992, Enclosure B, Rule A.
[5] The sum of P and S must not exceed 0,050 %, except for 18 16 5 NL, 18 8 Mn and 29 9.
[6] Ti at least 10 times C, not exceeding 1,5 %.
[7] Nb at least 8 times C, not exceeding 1,1 %; up to 20 % of the Nb-content may be substituded by Ta.
[8] In most cases, all-weld metal is fully austenitic and may tend to produce microcracks. The formation of such cracks will be reduced by increasing the manganese content. With regard to this fact, the range of manganese of some types has been extended.
[9] Tubular cored electrodes with this symbol are usually selected for special properties and are not simply interchangeable.

Tubular cored electrodes for gas-shielding metal-arc welding of high-strength steels.

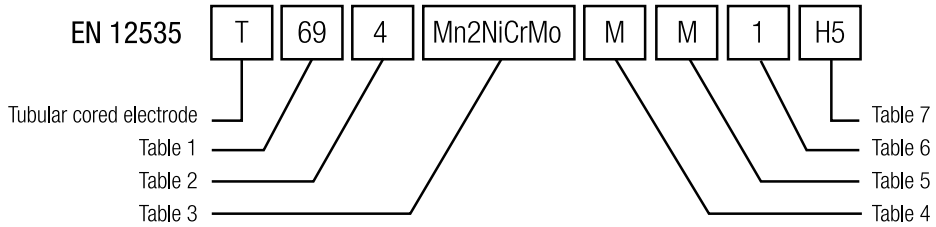


Table 1

Code digits for tensile strength properties of multi-pass welded joints			
Code digit	Minimum yield strength [1] [N/mm²]	Tensile strength [N/mm²]	Minimum elongation [2] %
55	550	610–780	18
62	620	690–890	18
69	690	760–960	17
79	790	880–1080	16
89	890	980–1180	15

[1] Lower yield strength (R_{eL}) will apply. In case yield strength is not definitely determined, 0,2 % proof stress ($R_{p0,2}$) shall be applied.
[2] Gauge length is equal to five times the test specimen diameter.

Table 2

Symbols for impact energy of all-weld metal	
Symbols	Temperature for minimum impact energy 47 J [°C]
Z	no requirement
A	20
0	0
2	-20
3	-30
4	-40
5	-50
6	-60

Table 3

Symbols for chemical composition of all-weld metal				
Symbols	Chemical composition [%] (m/m) [1][2][3]			
	Mn	Ni	Cr	Mo
MnMo	1,4–2,0	–	–	0,3–0,6
Mn1Ni	1,1–1,8	0,6–1,2	–	–
Mn1,5Ni	1,1–1,8	1,3–1,8	–	–
Mn2,5Ni	1,1–2,0	2,1–3,0	–	–
1NiMo	1,4	0,6–1,2	–	0,3–0,6
1,5NiMo	1,6	1,2–1,8	–	0,3–0,7
2NiMo	1,6	1,6–2,4	–	0,3–0,7
Mn1NiMo	1,3–2,0	0,6–1,2	–	0,3–0,7
Mn2NiMo	1,3–2,1	1,8–2,6	–	0,3–0,7
Mn2NiCrMo	1,4–2,0	1,8–2,6	0,3–0,6	0,3–0,6
Mn2Ni1CrMo	1,4–2,1	1,8–2,6	0,6–1,0	0,3–0,6
Z	any other composition agreed upon			

[1] If not specified: C 0,03%-0,10%, Cr<0,2%, Cu<0,3%, Mo<0,2%, Nb<0,05%, Ni<0,3%, P<0,020%, S<0,020%, V<0,05%.
[2] Individual values in this table are maximum values.
[3] The results have to be rounded to the same decimal place as the specified values using the rules as to ISO 31-0 : 1992, Appendix B, Rule A.

Table 4

Symbols for type of filler material			
Symbols	Properties	Type of weld	Shielding gas
R	Rutile slow-freezing slag	Single and multi-pass welds	required
P	Rutile fast-freezing slag	Single and multi-pass welds	required
B	Basic	Single and multi-pass welds	required
M	Metal powder	Single and multi-pass welds	required
Z	other types		

Table 5

Symbols for shielding gas	
Symbols	Meaning
M	If specification has been realized with shielding gas EN 439-M2, without helium.
C	If specification has been realized with shielding gas EN 439-C1, carbon dioxide.

Table 6

Code digits for welding positions	
Code digits	Welding positions
1	all positions
2	all positions, except vertical-down
3	flat butt welds, fillet welds in the flat and horizontal position
4	butt and fillet welds in the flat position
5	vertical-down welds and as under 3

Table 7

Symbols for hydrogen content of deposited weld metal	
Symbols	Hydrogen content ml/100 grams deposited weld metal max.
H5	5
H10	10

Table 8

Symbol for the stress-relieved condition	
Symbol	Meaning
T	Properties of the weld metal apply to the stress-relieved condition of 1 hr./560 °C to 600 °C, then furnace-cooling to 300 °C.

OE 6103
(ETC 6103)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato tubolare versione Metal Cored con accezionali caratteristiche di saldabilità sia in short-arc che in spray-arc. La modalità spray-arc consente la quasi totale eliminazione degli spruzzi. Idoneo all'utilizzo in isole robotizzate ed applicazioni automatiche. Principali caratteristiche: elevato tasso di deposito e alta velocità di saldatura, ottima estetica del cordone senza incisioni nel metallo base, anche su superfici non perfettamente pulite o contaminate. Si possono eseguire più passate senza dover pulire la minima formazione di scoria che questo filo genera sulla superficie della saldatura. In regime di short-arc il bagno è molto ben controllabile e si possono eseguire prime passate e saldature in posizione.

Seamless copper coated metal cored wire with outstanding welding characteristics in the short-arc and spray-arc ranges depositing slag free weld metal. Almost spatter-free when welding in the spray-arc range. Good restriking, even with a cold wire tip, thus being suitable for robotic applications. Characteristic features: high deposition rate and welding speed, good side wall fusion, finely rippled welds, without undercut into the base metal, even on contaminated or corroded metal surfaces. Little formation of silicates on the weld surface, so multi-pass welds can made without inter-run cleaning. Due to an easily controllable weld pool in the short-arc range, Fluxofil M 8 is well-suited for root- and positional welding and gap bridging.

Classification	
AWS	A5.18: E70C-3M H4 / E70C-3C H4
EN	758: T 46 2 M M 1 H5 / T 46 2 M C 1 H5

Approvals	Grades
BV	
DB	
DNV	
GL	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.05	1.30	0.60	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 20 °C	Hardness
As Welded	≥ 460	550-660	≥ 24	≥ 50	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S(P)235-S(P)460

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2	1,6			

OE 6105
(ETC 6105)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato metal cored per la saldatura di acciai al carbonio. Ottima tenacità fino a -40°C.

Seamless copper coated metal cored wire with outstanding welding properties in the short-arc and spray-arc ranges depositing slag free weld metal. Almost spatter-free when welding in the spray-arc range. Good restriking, even with a cold wire tip, thus being suitable for robotic applications. Characteristic features: good side wall fusion, smooth and finely rippled welds without undercut into the base metal. Little formation of silicates on top of weld, so that multi-pass welds can be made without inter-run cleaning. Due to an easily controllable weld pool in the short-arc range, Fluxofil M 10 is well-suited for root- and positional welding.

Classification	
AWS	A5.18: E70C-6M H4
EN	758: T 46 4 M M 1 H5

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	
TÜV	
UDT	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.30	0.60	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 40 °C	Hardness
PWHT 580 °C x 2 h/furnace	≥ 460	550-660	≥ 24	≥ 47	
As Welded	≥ 460	550-660	≥ 24	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)235-S(P)420, GP240-GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2	1,6			

OE 6130
(ETC 6130)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato a caratteristica basica. Le caratteristiche del deposito ottenute con questo filo si possono assimilare alle caratteristiche ottenute con elettrodi rivestiti basici. È quindi indicato per saldature fortemente sollecitate e per acciai ad elevato contenuto di carbonio equivalente. Bassissimo contenuto di H2 nel deposito, ottima qualità radiografica e facile rimozione della scoria.

Classification	
AWS	A5.20: E 70T5M-JH4
AWS	A5.20: E 70-T5 JH4
EN	758: T 42 4 BC 3 H5

Approvals	Grades
ABS	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.05	1.40	0.40	≤ 0.025	≤ 0.025	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
As welded Mix	≥ 430	500 - 560	≥ 26	≥ 70	
As Welded CO2	≥ 420	500 - 570	≥ 26	≥ 80	

Gas test: Acc. To EN 14175: M20 (Arcal21)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

Boiler plates H I, H II, 17 Mn 4, 19 Mn 5
Fine grain structural steels
including the thermo.mechanical grades
Non-alloyed structural steel St 33, St 37, St 44, St 52-3, St 50, St 60, St 70

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

PA PB PC

Packaging data: K300 kg. 16

Diameters

CITOFLUX R 00 (ETC 6100)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato a piattina di tipo rutile con scoria a rapida solidificazione. Indicato per la saldatura in tutte le posizioni verticale discendente inclusa. Indicato per la saldatura di serbatoi di stoccaggio. Cantieristica navale, carpenteria in genere. Minima formazione di spruzzi, scoria facilmente eliminabile. Ottima qualità radiografica.

Citoflux R00 is a rutile flux cored wire with enhanced filling. The weld pool is easily controllable with outstanding welding properties. The enhanced filling results in increased current carrying capacity and hence deposition rate, thus increasing welding speed, leading to savings of time and costs. Low spatter loss and easy slag removal result in smooth and finely rippled welds without undercut.

Classification	
AWS	A5.20: E 71T-1 MJ
EN	758: T 42 3 P C 1 H5
EN	758: T 42 3 P M 1 H5

Approvals	Grades
ABS	
DNV	
LRS	
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.05	1.40	0.50	≤ 0.020	≤ 0.025	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20° C	Hardness
As Welded	≥ 420	500-640	≥ 20	≥ 80	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1(Arcal 2)

Materials

S(P)235-S(P)460, GP240-GP280
Shipbuilding steels A,B,D,E,AH32 to EH36
X42 to X70

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 kg. 16

Diameters	1,0	1,2	1,6			

OE 6111

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato tubolare ramato a riempimento rutile, saldabile in tutte le posizioni. Produce un cordone di saldatura di ottimo aspetto. Scoria estremamente facile da rimuovere. E' idoneo per la ssaldatura di acciai al carbonio con requisiti di tenacità fino a -20°C.

Seamless copper coated rutile flux cored wire producing an excellent weld bead appearance. Easy slag removal, stable, practically spatter-free arc. Applications include structures with low temperature applications, to -20°C.

Classification	
AWS	A5.20: E71T-1M H4
EN	758: T 42 0 P C 1 H5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.04	1.40	0.45	≤ 0.020	≤ 0.020	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
As Welded	≥ 420	500-640	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S(P)235-S(P)420, GP240-GP280
Shipbuilding steels A,B,D,E,AH32 to EH36

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2	1,4	1,6		

OERLIKON

CITOFLUX M 00 (ETC 6200)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato a piattina del tipo Metal Cored con elevato tasso di deposito e ottima stabilità sia in short arc che in spray arc. Cordone senza spruzzi e con maglia regolare. Il deposito senza scoria rende ideale il filo animato ETC 6200 in applicazioni automatiche ed in isole robotizzate. Ottima qualità radiografica anche in fondo cianfrino.

Citoflux M00 is a high deposition rate metal cored wire. Excellent welding properties with both short and spray arc. Virtually spatter free in the spray-arc range. Particularly suitable for robotic applications. Characteristic features are: good edge wetting, finely rippled welds, little oxide formation on the weld surface making multipass welding possible without inter-run cleaning.The weld profile is easily controllable making this wire well suited for gap bridging and positional welding.

Classification	
AWS	A5.18: E 70 C-6M H4
EN	758: T 46 4 MM 1 H5

Approvals	Grades
DB	
DNV	
LRS	
RINA	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.04	1.70	0.50	≤ 0.020	≤ 0.020	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
PWHT 620°C x 2h	≥ 460	530-680	≥ 22	≥ 80	
As Welded	≥ 460	530-680	≥ 22	≥ 80	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)235-S(P)460, GP240-GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 kg. 16

Diameters	1,2					

CITOFLUX M60 A (ETC 6206)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato a piattina tipo metal cored, con elevato tasso di deposito e ottima stabilità d'arco. Deposito senza scoria, ideale per la saldatura in automatico con una o più passate. Principali applicazioni nelle costruzioni di tipo meccanico, macchine movimento terra, ecc..
Idrogeno diffusibile 5 ml/100g. max.

Citoflux M60A is a metal cored wire which produces a fine aspect to the weld bead. High deposition rate and excellent arc stability with no slag residue, suitable for single and multipass automatic welding. The main applications are mechanical constructions and earth moving equipment.
Diffusible hydrogen 5 ml/100g. max.

Classification	
AWS	A5.18: E 70C-6 M H8
EN	758: T 42 2 MM 1 H5

Approvals	Grades
BV	
DNV	
LRS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.50	0.60	≤ 0.020	≤ 0.020	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -30°C	Hardness
As Welded	≥ 420	500-640	≥ 20	≥ 60	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)235-S(P)460, GP240-GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 kg. 16

Diameters	1,2	1,6				

CITOFLUX B00 (ETC 6400)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato basico con tecnologia a piattina: ottime caratteristiche meccaniche, elevata resistenza alle fessurazioni. Utilizzato per saldatura di strutture molto sollecitate o di elevato spessore. Ottimi valori di resilienza a bassa temperatura sia allo stato come saldato che dopo distensione. Arco stabile ed esente da spruzzi sia in posizione piana che verticale. Deposito a basso contenuto di idrogeno diffusibile £ 5 ml/100g.

Citoflux B00 is a basic flux cored wire with excellent mechanical properties, suitable for the welding of heavy sections. Excellent low temperature impact toughness in both the as welded and stess-relieved conditions.
Stable arc, spatter-free both in the flat and vertical positions. The weld deposit has a very low hydrogen content.

Classification	
AWS	A5.20: E 71T-5 MJ
EN	758: T 42 5 B M1 H5
EN	758: T 42 4 B C1 H5

Approvals	Grades
DNV	
LRS	
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.50	0.60	≤ 0.025	≤ 0.025	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
PWHT 580°C x 2h	≥ 420	500-640	≥ 20	≥ 60	
As Welded	≥ 420	500-640	≥ 20	≥ 60	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S(P)235-S(P)420, GP240-GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC -

Packaging data: K300 kg. 16

Diameters	1,2	1,6				

CITOFLUX R82 (ETC 6121S)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato a piattina a caratteristica rutile. Ottima saldabilità in tutte le posizioni. Indicato per la saldatura di acciai a grana fine per applicazioni a bassa temperatura. Ideale per applicazioni offshore e cantieristica navale.

Citoflux R82 is a rutile flux cored wire with excellent all-positional weldability. Suitable for the welding of fine-grain structural steels for low temperature applications. Ideal for offshore and naval shipyard applications.

Classification	
AWS	A5.29: E 81T1 Ni1 M H4
EN	758: T 46 5 1Ni PM 1 H5

Approvals	Grades
DNV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1.40	0.40	≤ 0.015	≤ 0.015	-	0.80	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50° C	Hardness
As Welded	≥ 460	530-680	≥ 20	≥ 80	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)235-S(P)460, GP240-GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 kg. 16

Diameters	1,2					

CITOFLUX R82 SR (ETC 6121 SR)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato a piattina a caratteristica rutile. Ottima saldabilità in tutte le posizioni. Indicato per la saldatura di acciai a grana fine per applicazioni a bassa temperatura. Ideale per applicazioni offshore e cantieristica navale.

Citoflux R82SR is a rutile flux cored wire for all-positional welding with good impact toughness at -60°C (as welded and after PWHT). Very easy to use for vertical up welding. Suitable for the welding of fine-grain structural steels for low temperature applications. Ideal for offshore, naval shipbuilding, bridges and structures and pressure vessel applications. Good CTOD toughness.

Classification	
AWS	A5.29: E81 T1 Ni1 M H4
EN	758: T 46 6 Ni1 P M 1 H5

Approvals	Grades
ABS	
DNV	
FI	
LRS	
RINA	
RS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1.35	0.30	≤ 0.015	≤ 0.015	-	0.80	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -60° C	Hardness
PWHT 580°C x 2 h	≥ 460	530-680	≥ 20	≥ 47	
As Welded	≥ 460	530-680	≥ 20	≥ 70	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)235-S(P)460, GP240-GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 kg. 16

Diameters	1,2					

CITOFLUX R00 Ni (ETC 6100)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato a piattina di tipo rutile con scoria a rapida solidificazione. Indicato per la saldatura in tutte le posizioni, su materiali in acciaio al carbonio per temperature a -50°C. Ideale su applicazioni quali serbatoi di stoccaggio, cantieristica navale, carpenteria in genere.
Utizzo con gas di protezione CO2.

Citoflux R00Ni is a rutile flux cored wire with enhanced filling and a high deposition rate. Low spatter loss and easy slag removal result in smooth and finely rippled welds without undercut. It is suitable for all-positional welding with joint impact toughness values down to -40°C.

Classification	
AWS	A5.29: E 81T1-G
EN	758: T 46 4 1Ni PC 1 H5

Approvals	Grades
RINA	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.20	0.40	≤ 0.015	≤ 0.015	-	0.70	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -40° C	Hardness
As Welded	≥ 460	530-680	≥ 20	≥ 80	

Gas test: Acc. To EN 14175: C1 (Arcal 2)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

S(P)235-S(P)460, GP240-GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 kg. 16

Diameters	1,2					

CITOFLUX R20 C

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato rutile con scoria a rapida solidificazione e bagno di fusione molto ben controllabile garantendo in tal modo una eccellente saldabilità in tutte le posizioni. Basso livello di proiezioni, scoria molto facile da rimuovere anche utilizzando il supporto ceramico sul rovescio della saldatura. Cordone di ottimo aspetto senza incisioni sul materiale base. Trova applicazione in ambino navale, recipienti in pressione, Offshore, cantieristica in genere.

Citoflux R20 C is a rutile flux cored wire with a fast-freezing slag, and an easily controllable weld pool with outstanding welding properties in all positions. Low spatter loss, easy slag removal on ceramic backing or when joint filling, smooth and finely rippled welds without undercut. This cored wire has applications in shipyards, boiler (pressure water pipes), metallic framework and offshore.

Classification	
AWS	A5.29: E81T1-Ni1 H8
EN	T 46 5 Ni P C 1 H10

Approvals	Grades
ABS	
BV	
DB	
DNV	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1.30	0.50	≤ 0.020	≤ 0.020	-	0.90	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
As Welded	≥ 460	530-680	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: C1 (Arcal 2)

Shielding Gas: Acc. To EN 14175: C1 (Arcal 2)

Materials

S(P)235-S(P)460, GP240-GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2				

CRISTAL F100

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato rutile di nuova generazione che riduce l'emissione di fumi rispetto ai corrispettivi prodotti standard. Esso consente una riduzione di emissione di fumo pari al 30% (Gas di protezione C1). L'elevato tasso di riempimento permette alte velocità di saldatura e considerevoli tassi di deposito garantendo un risparmio in termini di tempo e costi. Il bagno di saldatura è facilmente controllabile con accellente saldabilità in tutte le posizioni. Assenza di spruzzi e ottima estetica del cordone. Scoria facilmente rimovibile.

Cristal F100 is a rutile cored wire which generates less welding fume than similar standard products. It enables a fume emission rate reduction of up to 30% (Standard shielding gas C1). The enhanced filling degree results in increased current carrying capacity and deposition rate, thus increasing welding speed and leading to a saving of time and costs. Low spatter loss and easy slag removal produce smooth and finely rippled welds without undercut into the base metal.

Classification	
AWS	A5.20: E71T-1 H4
EN	758: T 42 2 P C 1 H5

Approvals	Grades
ABS	
BV	
DNV	
GL	
LRS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.03	1.50	0.60	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 20 °C	Hardness
As Welded	≥ 420	510-610	≥ 24	≥ 50	

Gas test: Acc. To EN 14175: C1 (Arcal 2)

Shielding Gas: Acc. To EN 14175: C1 (Arcal 2)

Materials

S(P)235-S(P)460, GP240-GP280
Shipbuilding steels A,B,D,E,AH32 to EH36

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

CRISTAL F206

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo animato metal cored di nuova generazione che riduce l'emissione di fumi rispetto ai corrispettivi prodotti standard. Permette una riduzione delle emissioni di fumo dal 50% (Gas di protezione M21) fino all'80% (Gas di protezione M14). Il filo non genera scoria e può lavorare con alte densità di corrente. Esente da spruzzi in spray-arc. Il buon reinnesco lo rende idoneo ad applicazioni robotizzate. Principali caratteristiche: alto tasso di deposito e alta velocità di saldatura, ottimo bagno di fusione, ottima estetica del cordone. La minima formazione di scoria permette di eseguire più passate senza pulizia tra le stesse.

Cristal F206 is a new low fume metal cored wire which generates less welding fume than standard products. It enables a fume emission rate reduction from 50% (Standard shielding gas M21) up to 80% (shielding gas M14). High current carrying capacity, almost spatter-free when welding in the spray-arc range. Good restriking, even with a cold wire tip, thus being suitable for robotic applications. Characteristic features: high deposition rate and welding speed, good side wall fusion, finely rippled welds, without undercut into the base metal, not even on contaminated or corroded metal surfaces. Little formation of silicates on the weld surface, so that multi-pass welds can made without inter-run cleaning. Due to an easily controllable weld pool in the short-arc range, Cristal F 206 is well-suited for root- and positional welding and gap bridging.

Classification	
AWS	A5.18: E70C-6MH4
EN	758: T 42 3 M M 1 H5

Approvals	Grades
BV	
DB	
DNV	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.02	1.50	0.80	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 30 °C	Hardness
As Welded	≥ 420	510-610	≥ 26	≥ 65	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20(Arcal21-Atal6) or M14(Arcal 14)

Materials

S(P)235-S(P)420

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2	1,4				

CITOFLUX GALVA (ETC ZN)

OERLIKON

Cored Wires
C-Mn and low-alloy steels

Filo metal cored indicato per la saldatura in passata unica, manuale o automatica, di lamiere zincate con spessore da 0,8 a 4,00 mm. Principali applicazioni nell'industria automobilistica, cantieri navali impianti di condizionamento, strutture zincate in genere. Bagno con pochissimi spruzzi, ottima estetica del cordone. Limitata zona di ossidazione su bordo cordone.

Citoflux Galva is a metal cored wire suitable for manual or automatic, single-pass welding of thin zinc-coated or primed plates (0,8 to 4 mm). Low spatter level and excellent bead appearance. There is a limited oxidation zone around the weld bead. The main applications are in the car industry, shipyards and for air conditioning equipment.

Classification	
AWS	A5.18: E 70C GS
EN	758: T 3 T Z V 1 H15

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.40	1.20	0.30	-	-	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal21-Atal6)

Materials

S(P)235 to S(P)420

Storage

Keep dry and avoid condensation

Current condition and welding position

DC -

Packaging data: K300 kg. 16

Diameters	1,0	1,2				

OE 6602
(ETC 6602)

OERLIKON

Cored Wires
Chromium-Molybdenum steels

Filo animato basico per la saldatura di acciai resistenti al creep legati allo 0,5% di molibdeno.

Seamless copper coated basic flux cored wire suitable for the welding of creep resistant boiler and pipe steels for operating temperatures up to 530 °C, as well as fine grain structural steels. Quiet and stable arc with low spatter loss and easy slag removal produce a uniform and smooth weld bead surface which is free from porosity..

Classification	
AWS	A5.29: E80T5-G H 4 / E80T5-GM H 4
EN	12071: T MoL B C 3 H5 / T MoL B M 3 H5

Approvals	Grades
DB	
TÜV	
UDT	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.05	1.40	0.40	-	-	-	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 40 °C	Hardness
PWHT 580 °C x 2 h	≥ 470	520-620	≥ 22	≥ 40	
As Welded	≥ 490	550-650	≥ 22	≥ 40	

Gas test: Acc. To EN 14175: C1 (Arcal 2)

Shielding Gas: Acc. To EN 14175: C1(Arcal 2) or M20(Arcal21) - M21 (Atal 5)

Materials

S(P)235-S(P)460, 16Mo3

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2	1,6				

OE 6603
(ETC 6603)

OERLIKON

Cored Wires
Chromium-Molybdenum steels

Filo animato basico per la saldatura di acciai resistenti al creep legati al 2,25% di cromo e 1% di molibdeno.

Seamless copper coated basic flux cored wire, suitable for the welding of Cr Mo-alloyed boiler and pipe steels, for high creep rupture strength up to 600 °C. Quiet and smooth running and low spatter loss with easy slag removal produce uniform and smooth beads which are free from porosity.

Classification	
AWS	A5.29: E80T5-G H 4 / E80T5-GM H 4
EN	12071: T CrMo 2 B C 3 H5
EN	12071: T CrMo 2 B M 3 H5

Approvals	Grades
TÜV	
UDT	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	0.80	0.35	-	-	2.30	-	1	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
PWHT 930 °C x 40 min. / 730 °C x 40 min.	≥ 370	500-600	≥ 22	≥ 130	
PWHT 700 °C x 2 h	≥ 450	570-670	≥ 20	≥ 100	

Gas test: Acc. To EN 14175: C1 (Arcal 2)

Shielding Gas: Acc. To EN 14175: C1(Arcal 2) or M20(Arcal21) - M21 (Atal 5)

Materials

10CrMo9-10, 12CrMo9-10; A387 Gr.22, Cl 1and 2, A 182 Gr.F 22, A 336 Gr.F22

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

OE 6605
(ETC 6605)

OERLIKON

Cored Wires
Chromium-Molybdenum steels

Filo animato basico per la saldatura di acciai resistenti al creep legati al 1,2% di cromo e 0,5% di molibdeno.

Seamless copper coated basic flux cored wire suitable for the welding of Cr Mo-alloyed boiler and pipe steels for high creep rupture strength up to 570 °C. Quiet and smooth fusion and low spatter loss with easy slag removal produce uniform and smooth weld beads which are free from porosity.

Classification	
AWS	A5.29: E80T5-B2 H4 / E80T5-B2M H4
EN	12071: T CrMo 1 B C 3 H5
EN	12071: T CrMo 1 B M 3 H 5

Approvals	Grades
DB	
TÜV	
UDT	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1	0.40	-	-	1.20	-	0.45	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
PWHT 920 °C x 0,5 h/air + 700 °C x 0,5 h	≥ 310	420-520	≥ 28	≥ 150	
PWHT 700 °C x 2 h	≥ 470	560-660	≥ 20	≥ 120	

Gas test: Acc. To EN 14175: C1 (Arcal 2)

Shielding Gas: Acc. To EN 14175: C1 (Arcal 2)

Materials

13CrMo4-5, 13CrMoSi5-5; G17CrMo5-5

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2	1,6				

CITOFLUX M91

OERLIKON

Cored Wires
Chromium-Molybdenum steels

Filo animato a piattina metal cored. Utilizzato per la saldatura in posizione piano e piano frontale degli acciai debolmente legati tipo 9%Cr - 1%Mo - 0.25V . Particolarmente indicato in applicazioni quali chimico, petrolchimico, fonderie, ripristino di fusione.
NOTA: FORNITO SU IMBALLO SOTTO VUOTO.

Citoflux M91 is a metal cored wire for creep resistant steels of the type 9% Cr, 1%Mo, 0.25% V. Used in all positions. The main applications are petrochemical plant and power generation.

Classification	
AWS	A 5.22: E505 T-G H4
EN	12071: TZ MM 1 H5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.11	1	0.35	≤ 0.015	≤ 0.015	9.30	0.09	1	0.06	0.25	0.048	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 760°C x 2h	≥ 415	≥ 710	≥ 22	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

T 91 (ASTM A 213), F 91 (ASTM A 182)
X10CrMoVNb9-1, grade 91 (ASTM A 387), P 91 (ASTM A 335)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 kg. 16

Diameters	1,2					

CITOFLUX R07

OERLIKON

Cored Wires
High-strength steels

Filo animato rutile indicato per la saldatura di acciai legati al Cr-Ni-Mo utilizzati per la costruzione di macchine movimento terra, carri ponte e strutture dove vengono richieste elevate caratteristiche maccaniche. Deposito esente da spruzzi e con scoria facilmente eliminabile.

Citoflux R07 is a rutile flux cored wire suitable for welding high strength fine-grain structural steels. Low spatter, easy slag removal and regular bead appearance.

Classification	
AWS	A5.29: E 111 T1-G H4
EN	12535: T 69 5 Mn2,5Ni P 1 H5

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.40	0.40	≤ 0.015	≤ 0.015	-	2.50	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 50°C	Hardness
As Welded	≥ 690	770-940	≥ 17	≥ 47	

Gas test: Acc. To EN 14175: M20 (Arcal 21)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S620, S690, HY 100

Storage

Keep dry and avoid condensation

Current condition and welding position

DC +

Packaging data: K300 kg. 16

Diameters	1,2					

CITOFLUX R26

OERLIKON

Cored Wires
High-strength steels

Filo animato rutile per la saldatura di acciai ad elevato limite elastico ed acciai a grana fine per impieghi strutturali. Basso livello di spruzzi e scoria facilmente rimovibile. Ottima estetica del cordone.

Citoflux R26 is a rutile flux cored wire suitable for welding high strength fine-grain structural steels. Low spatter with easy slag removal and regular bead appearance.

Classification	
AWS	A5.29: E 101 T1-G M H4
EN	12535: T 62 5 Mn2,5Ni P 1 H5

Approvals	Grades
ABS	
DNV	
LRS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.35	0.35	≤ 0.015	≤ 0.015	-	2.20	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
As Welded	≥ 620	700-890	≥ 18	≥ 47	

Gas test: Acc. To EN 14175: M20 (Arcal 21)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)460-S(P)620

Storage

Keep dry and avoid condesation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

CITOFLUX M07

Cored Wires
High-strength steels

Filo animato metal cored per la saldatura in tutte le posizioni di acciai ad elevato limite elastico. Le principali applicazioni sono: saldatura di tubazioni, macchine movimento terra, impianti di sollevamento, etc.

Citoflux M07 is a metal cored wire for welding in all positions. Suitable for high yield strength steels. The main applications are piping, mobile lifting equipment, turbines, etc.

Classification	
AWS	A5.29: E 111-T5 K3 H4
EN	12535: T 69 5 Mn2NiMo M M 1 H5

Approvals	Grades
ABS	
BV	
LRS	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1.80	0.60	≤ 0.020	≤ 0.020	-	2.40	0.65	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
As Welded	≥ 690	770-940	≥ 17	≥ 47	

Gas test: Acc. To EN 14175: M20 (Arcal 21)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S620, S690, HY 100

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2	1,6				

CITOFLUX M20

OERLIKON

Cored Wires
High-strength steels

Filo animato metal cored legato al Nichel per la saldatura in tutte le posizioni. Trova applicazione in settori quali: Offshore, saldatura di tubazioni, recipienti in pressione, cantieristica navale. Può essere utilizzato in applicazioni automatiche multipass. Idrogeno diffusibile <3ml/100g di metallo depositato.

Citoflux M20 is a metal cored wire containing nickel, for welding in all positions. Main applications: Off-shore fabrications, pipework, pressure vessels, shipbuilding (LPG tankers, ice breakers).Citoflux M 20 can be used for automatic multi-run welding. Diffusible hydrogen <3ml/100g of deposited weld metal.

Classification	
AWS	A5.29: E 81 T5-G H4
EN	758: T 46 6 Mn1Ni 1 M M H5

Approvals	Grades
DNV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.04	1.70	0.50	≤ 0.020	≤ 0.020	-	0.90	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
PWHT 580°C x 2h	≥ 420	500-640	≥ 20	≥ 47	
As Welded	≥ 460	530-680	≥ 20	≥ 80	

Gas test: Acc. To EN 14175: M20 (Arcal 21)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

S(P)275-S(P)460

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2	1,4	1,6		

OE 6149R
(ETC 6149R)

OERLIKON

Cored Wires
Weathering steels

Filo animato tubolare ramato a riempimento rutile. Indicato per la saldatura in tutte le posizioni di acciai resistenti alla corrosione atmosferica come ad esempio il CORTEN. Ideale sia per saldature a passate singole che multipass. Trova utilizzo nella costruzione di infrastrutture, come ponti o viadotti. Utilizzare con miscela di gas Argono/CO2.

Classification	
AWS	A5.29: E81T1-GM

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.04	1	0.40	≤ 0.020	≤ 0.020	0.55	0.50	0.01	-	-	-	0.55

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -30°C	Hardness
As Welded	≥ 500	560-720	≥ 18	≥ 47	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal21) - M21 (Atal 5)

Materials

S235J0W; S235J2W; S355J0W; S355J2W; S355K2W

Storage
Keep dry and avoid condensation

Current condition and welding position
DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 307

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 307 is an alloyed rutile cored wire for crack-resistant joining and surfacing of heat treatable steels, armour plates, corrosion resisting steels and high manganese steels. It is also suitable for joining austenitic stainless steels to unalloyed steels. The weld metal is suitable for operating temperatures up to 300 °C, and is non-scaling up to 850°C. It is highly rust and corrosion resistant, and will harden by cold working.

Classification	
AWS	A5.22: E307T0-G
EN	12073: T 18 8 Mn R M 3 / T 18 8 Mn R C 3

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.13	6.50	0.70	-	-	19	8.50	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 590	≥ 30	≥ 40	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

Armour plate; Dissimilar Steels
X120Mn12 (1.3401)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 307-PF

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 307-PF is an alloyed rutile flux cored wire with a fast-freezing slag for crack-resistant joining and surfacing of heat treatable steels, armour plates, corrosion resisting steels and high manganese steels. It is also suitable for joining austenitic stainless steels to unalloyed steels. The weld metal is suitable for operating temperatures up to 300 °C, and is non-scaling up to 850 °C. It is highly rust and corrosion resistant, and will harden by cold working. Due to its fast-freezing slag, Fluxinox 307 PF is well-suited for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
AWS	A5.22: E 307T1-G
EN	12073: T 18 8 Mn P M 1 / T 18 8 Mn P C 1

Approvals	Grades
GL	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.10	6.50	0.70	-	-	19	8.50	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 590	≥ 30	≥ 40	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

Armour plate; Dissimilar Steels
X120Mn12 (1.3401)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 308 L

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 308L is an alloyed rutile flux cored wire for the welding of unstabilized and stabilized corrosion resistant Cr Ni-steels. Suitable for operating temperatures up to 350 °C, non-scaling up to approximately 800 °C. FLUXOFIL 308 L features outstanding, almost spatter-free, welding properties. Very easy slag removal from fillet welds. Flat and smooth weld beads without undercut. Due to little discolouration of the weld beads, pickling costs can be minimised.

Classification	
AWS	A5.22: E308LT0-4 / E308LT0-1
EN	12073: T 19 9 L R M 3 / T 19 9 L R C 3

Approvals	Grades
ABS	
BV	
DB	
DNV	
GL	
LRS	
TÜV	
UDT	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.40	0.60	-	-	20	10	-	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) - 196 °C	Hardness
As Welded	≥ 350	≥ 520	≥ 35	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)
AISI 304 - 304L - 302

Storage
Keep dry and avoid condensation

Current condition and welding position
DC+
 PA PB PC

Packaging data: K300 kg. 16

Diameters	1,0	1,2				

FLUXINOX 308 L-PF

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 308L-PF is an alloyed rutile flux cored wire with a fast-freezing slag for the welding of unstabilized and stabilized corrosion resistant Cr Ni-steels. Suitable for operating temperatures up to 350 °C, non-scaling up to approximately 800 °C. Fluxinox 308L-PF exhibits outstanding, almost spatter-free, welding properties with very easy slag removal from fillet welds resulting in flat and smooth weld beads without undercut into the base metal. Due to only slight discolouration of the weld beads, pickling costs can be minimised. Due to the fast-freezing slag of Fluxinox 308L-PF, it is well-suited for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
AWS	A5.22: E308LT1-4 / E308LT1-1
EN	12073: T 19 9 L P M 1 / T 19 9 L P C 1

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.40	0.60	-	-	20	10	-	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 196 °C	Hardness
As Welded	≥ 320	≥ 520	≥ 35	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)

AISI 304 - 304L - 302

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2				

FLUXINOX 308 H

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 308H is an alloyed rutile cored wire for joining and surfacing of identical and similar high temperature resisting steels and cast steels. The weld metal is suitable for operating temperatures up to 700°C and is non-scaling up to approximately 800°C. Fluxinox 308H features outstanding, almost spatter-free, welding properties with very easy slag removal from fillet welds and narrow grooves. The weld beads produced are flat and smooth without undercut into the base metal. Due to only slight discolouration of the weld beads, pickling costs can be minimised.

Classification	Approvals	Grades
AWS A5.22: E308HT0-4 / E308HT0-1		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.06	1.40	0.60	-	-	20	10	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 35	≥ 40	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4941(X8CrNiTi18-10)

AISI 304H; 1.4948 (X6CrNi18-10); 1.4310 (X10CrNi18-8)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2				

FLUXINOX 347

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 347 is an alloyed rutile flux cored wire for the welding of stabilized corrosion resistant Cr Ni-steels. The weld metal is used for operating temperatures up to 400 °C, non-scaling up to about 800 °C. Fluxinox 347 exhibits excellent, almost spatter-free, welding properties with very easy slag removal from fillet welds. The weld beads produced are flat and smooth without undercut and with little discolouration of the weld, thus pickling costs can be minimised.

Classification	
AWS	A5.22: E347T0-4 / E347T0-1
EN	12073: T 19 9 Nb R M 3 / T 19 9 Nb R C 3

Approvals	Grades
TÜV	
UDT	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.90	-	-	20	10	-	0.40	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 196 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4550 (X6CrNiNb18-10);
AISI 347 - 321

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2				

FLUXINOX 347-PF

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 347-PF is an alloyed rutile flux cored wire with a fast-freezing slag for the welding of stabilized corrosion resistant Cr Ni-steel. The weld metal is suitable for operating temperatures up to 400°C, non-scaling up to approximately 800°C. Fluxinox 347-PF exhibits outstanding, easy slag removal from fillet welds, even in acute angles. Welds produced are flat and smooth without undercut and due to only slight discolouration of the welds, pickling costs can be minimised. Owing to the fast-freezing slag, Fluxinox 347 PF is used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
AWS	A5.22: E347T1-4 / E347T1-1
EN	12073: T 19 9 Nb P M 1 / T 19 9 Nb P C 1

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.90	-	-	20	10	-	0.40	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 196 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4550 (X6CrNiNb18-10);
AISI 347 - 321

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2				

FLUXINOX 316 L

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 316L is an alloyed rutile flux cored wire for the welding of unstabilized and stabilized corrosion resistant Cr Ni Mo-steels. The weld metal is resistant to intergranular corrosion up to 400 °C and non-scaling up to 800 °C.
Fluxinox 316L exhibits outstanding, almost spatter-free, welding properties. Very easy slag removal from fillet welds, even in acute angles. The weld beads produced are finely rippled and without undercut. Due to only slight discolouration of the welds, pickling costs can minimised.

Classification	
AWS	A5.22: E316LT0-4 / E316LT0-1
EN	12073: T 19 12 3 L R M 3 / T 19 12 3 L R C 3

Approvals Grades
ABS
BV
DB
DNV
GL
LRS
TÜV
UDT

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.60	-	-	19	12	2.80	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) - 110 °C	Hardness
As Welded	≥ 320	≥ 510	≥ 30	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

PA PB PC

Packaging data: K300 kg. 16

Diameters	1,0	1,2				

FLUXINOX 316 L-PF

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 316L-PF is a rutile flux cored wire with a fast-freezing slag suitable for the welding of unstabilized and stabilized corrosion resistant CrNiMo steels. The weld metal is resistant to intergranular corrosion up to 400°C, and non-scaling up to 800°C. Fluxinox 316 L-PF exhibits outstanding, almost spatter-free, welding properties with very easy slag removal from fillet welds, even in acute angles. The weld beads produced are finely rippled without undercut. Due to only slight discolouration of the welds, pickling costs can be minimised. Due to its fast-freezing slag, Fluxinox 316 L-PF is used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
AWS	A5.22: E316LT1-4 / E316LT1-1
EN	12073: T 19 12 3 L P M 1/ T 19 12 3 L P C 1

Approvals	Grades
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.60	-	-	19	12	2.80	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) - 110 °C	Hardness
As Welded	≥ 320	≥ 510	≥ 30	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,0	1,2				

FLUXINOX 318

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 318 is an alloyed rutile flux cored wire for the welding of unstabilized and stabilized corrosion resistant Cr Ni Mo-steels. The weld metal is resistant to intergranular corrosion up to 400 °C and non-scaling up to 800 °C.
Fluxinox 318 is characterized by excellent, almost spatter-free, welding properties with very easy slag removal from fillet welds, even in acute angles. The weld beads produced are finely rippled and free of undercut and the weld surface is shiny.

Classification	
EN	12073: T 19 12 3 Nb R M 3
EN	12073: T 19 12 3 Nb R C 3

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.80	-	-	19	12	2.80	0.40	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 60 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 25	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4571 (X6CrNiMoTi17-12-2) - 1.4401 (X4CrNiMo17-12-2)
1.4580 (X6CrNiMoNb17-12-2) - 1.4408 (GX5CrNiMo19-11)
1.4581 (GX5CrNiMoNb19-10) - 1.4436 (X4CrNiMo17-13-3)
1.4583 (X10CrNiMoNb18-12)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 318-PF

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 318-PF is an alloyed rutile cored wire with a fast-freezing slag for the welding of unstabilized and stabilized corrosion resistant CrNiMo steels. The weld metal is resistant to intergranular corrosion up to 400°C, and non-scaling up to 800°C. Fluxinox 318-PF exhibits outstanding, almost spatter-free, welding properties with very easy slag removal from fillet welds, even in acute angles. The weld beads produced are finely rippled and free of undercut with a shiny weld surface. Due to its fast-freezing slag, Fluxinox 318-PF is used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
EN	12073: T 19 12 3 Nb P M 1
EN	12073: T 19 12 3 Nb P C 1

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.80	-	-	19	12	2.80	0.40	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 60 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 25	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4571 (X6CrNiMoTi17-12-2) - 1.4401 (X4CrNiMo17-12-2)
1.4580 (X6CrNiMoNb17-12-2) - 1.4408 (GX5CrNiMo19-11)
1.4581 (GX5CrNiMoNb19-10) - 1.4436 (X4CrNiMo17-13-3)
1.4583 (X10CrNiMoNb18-12)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 310

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 310 is an alloyed rutile flux cored wire for the joining of heat resistant Cr and Cr-Ni steels and cast steel. The weld metal is fully austenitic and non-scaling up to 1200 °C. It is not resistant to sulphur-bearing gases. Fluxinox 310 features outstanding, almost spatter-free, welding properties with very easy slag removal, finely rippled and shiny weld beads which are free of undercut into the base metal.

Classification	
AWS	A5.22: E 310T0-G
EN	12073: T 25 20 R M 3 / T 25 20 R C 3

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.10	2.50	0.55	-	-	25	20	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) +20 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 40	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

AISI 310; 1.4845 (X8CrNi25-21); 1.4841 (X15CrNiSi25-21); 1.4828 (X15CrNiSi20-12)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 310-PF

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 310-PF is an alloyed rutile flux cored wire with a fast-freezing slag for the welding of heat resistant Cr and Cr-Ni steels and cast steels. The weld metal is fully austenitic and non-scaling up to 1200 °C. It is not resistant to sulphur-bearing gases.Fluxinox 310-PF exhibits outstanding, almost spatter-free, welding properties with very easy slag removal, finely rippled and shiny welds which are free of undercut. Fluxinox 310-PF is used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
AWS	A5.22: E 310T1-G
EN	12073: T 25 20 P M 1 / T 25 20 P C 1

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.10	2.50	0.55	-	-	25	20	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) +20 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 40	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

AISI 310; 1.4845 (X8CrNi25-21); 1.4841 (X15CrNiSi25-21); 1.4828 (X15CrNiSi20-12)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 22.9.3 L

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 22.9.3L is an alloyed rutile flux cored wire, suitable for the joining and cladding of corrosion resistant ferritic-austenitic duplex-steels. The weld metal consists of approximately 30% ferrite and 70% austenite and is particularly resistant to pitting, crevice corrosion and stress corrosion cracking in chloride and hydrogen sulphide bearing media. Principal applications include the construction of chemical plants and offshore installations, for operating temperatures up to 250 °C.

Classification	
AWS	A5.22: E2209T0-4 / E2209T0-1
EN	12073: T 22 9 3 N L R M 3 / T 22 9 3 N L R C 3

Approvals	Grades
TÜV	
UDT	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.20	0.70	-	-	22	9	3	-	-	0.10	35-45

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) - 60 °C	Hardness
As Welded	≥ 450	≥ 690	≥ 20	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4462 (X2CrNiMoN22-5-3)
UNS S31803 - S31500 - S31200 - S32304

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2	1,6				

FLUXINOX 22.9.3 L-PF

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 22.9.3L-PF is an alloyed rutile flux cored wire, suitable for the joining and cladding of corrosion resistant ferritic-austenitic duplex steels. The weld metal consists of about 30% ferrite and 70% austenite and is particularly resistant to pitting, crevice corrosion cracking in chloride and hydrogen sulphide bearing media. Principal applications include the construction of chemical plants and offshore weldments for operating temperatures up to 250 °C. Due to its fast-freezing slag, Fluxinox 22.9.3 L-PF is used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
AWS	A5.22: E2209T1-4 / E2209T1-1
EN	12073: T 22 9 3 N L P M 1 / T 22 9 3 N L P C 1

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.20	0.70	-	-	22	9	3	-	-	0.10	35-45

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 60 °C	Hardness
As Welded	≥ 450	≥ 690	≥ 20	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

1.4462 (X2CrNiMoN22-5-3)
UNS S31803 - S31500 - S31200 - S32304

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 309 L

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 309L is an alloyed rutile flux cored wire for joining high-alloyed Cr and Cr-Ni-(Mo) steels with unalloyed steels, as well as for depositing austenitic stainless cladding. The highest operating temperature for dissimilar joints is 300°C. The weld metal is non-scaling up to 850°C. Preheating and interpass temperatures should be calculated according to the base metal used.
FLUXINOX 309 L exhibits outstanding, almost spatter-free, welding properties. It produces finely rippled flat and smooth welds, free of undercut into the base metal. Very easy slag removal.

Classification	
AWS	A5.22: E309LT0-4 / E309LT0-1
EN	12073: T 23 12 L R M 3 / T 23 12 L R C 3

Approvals	Grades
DB	
DNV	
GL	
TÜV	
UDT	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.60	-	-	24	13	-	-	-	-	12-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 60 °C	Hardness
As Welded	≥ 320	≥ 520	≥ 30	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

A312 TP309S; carbon steel to stainless steels joint

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 309 L-PF

Cored Wires
Stainless and Heat resistant steels

Fluxinox 309L-PF is an alloyed rutile flux cored wire for joining high-alloyed Cr and Cr-Ni-(Mo) steels to unalloyed steels, as well as for depositing austenitic stainless cladding. The highest operating temperature for dissimilar joints is 300 °C. The weld metal is non-scaling up to 850 °C. Preheating and interpass temperatures should be calculated according to the base metal used. Fluxinox 309L-PF exhibits outstanding, almost spatter-free, welding properties and produces finely rippled flat and smooth welds which are free of undercut. Very easy slag removal. Due to its fast-freezing slag, Fluxinox 309L-PF is used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
AWS	A5.22: E309LT1-4 / E309LT1-1
EN	12073: T 23 12 L P M 1 / T 23 12 L P C 1

Approvals	Grades
GL	
LRS	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.60	≤ -2	≤ -2	24	13	-	-	-	-	12-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) - 60 °C	Hardness
As Welded	≥ 320	≥ 520	≥ 30	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

A312 TP309S; carbon steel to stainless steels joint

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 309 Mo L

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 309MoL is an alloyed rutile flux cored wire mainly used for cladding. The highest operating temperature for dissimilar joints is 300 ‘ C.
Fluxinox 309MoL exhibits outstanding, almost spatter-free, welding properties. It produces finely rippled, flat and smooth welds, free of undercut with very easy slag removal. The weld metal, containing approximately 20% ferrite, is crack-resistant and therefore well-suited for buffer layers on high-carbon, difficult to weld steels.

Classification	
AWS	A5.22: E309LMoT0-4 / E309LMoT0-1
EN	12073: T 23 12 2 L R M 3 / T 23 12 2 L R C 3

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.70	-	-	24	13	2.50	-	-	-	12-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 25	≥ 40	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

Cladding of carbon steel and low alloy steel

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 309 Mo L-PF

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 309MoL-PF is an alloyed rutile flux cored wire mainly used for cladding. The highest operating temperature for dissimilar joints is 300°C and the weld metal is non-scaling up to 850 °C. Preheating and interpass temperatures should be calculated according to the base metal used. Fluxinox 309MoL-PF exhibits outstanding, almost spatter-free, welding properties. It produces finely rippled flat and smooth welds, free of undercut with very easy slag removal. Due to its fast-freezing slag, Fluxinox 309MoL-PF is used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
AWS	A5.22: E309MoLT1-4 / E309MoLT1-1
EN	12073: T 23 12 2 L P M 1 / T 23 12 2 L P C 1

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.04	1.50	0.70	-	-	24	13	2.50	-	-	-	12-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 350	≥ 550	≥ 28	≥ 40	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

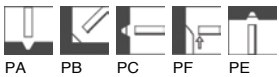
Cladding of carbon steel and low alloy steel

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+



Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 312

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 312 is an alloyed rutile flux cored wire for the joining and surfacing of dissimilar steels. The ferritic-austenitic weld metal (Delta-ferrite approximately 50%) is non-scaling up to 1100 °C. Due to the high ferrite content, the weld metal is suited for difficult-to-weld steels and stress-relaxing buffer layers on crack-susceptible base plates.
Fluxinox 312 is characterized by outstanding, almost spatter-free, welding properties. It produces finely rippled flat and smooth welds which are free of undercut into the base metal. Very easy slag removal. Fluxinox 312 is mainly used for joining dissimilar steels and difficult-to-weld steels, e.g. heat treatable steels, tool steels, and high manganese steels, and for surfacing or repair welding.

Classification	
AWS	A5.22: E312T0-4/E312T0-1
EN	12073: T 29 9 R M 3 / T 29 9 R C 3

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.15	1.30	0.90	-	-	29	9	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 450	≥ 660	≥ 25	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

Dissimilar and difficult to weld steels

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

PA PB PC

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 312-PF

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 312-PF is an alloyed rutile flux cored wire with a fast-freezing slag for joining and surfacing of dissimilar steels, as well as galvanized steels. The ferritic-austenitic weld metal (Delta-ferrite approximately 50%) is non-scaling up to 1100 °C. Fluxinox 312-PF is characterized by outstanding, almost spatter-free, welding properties. It produces finely rippled flat and smooth welds, free of undercut with very easy slag removal. Fluxinox 312-PF is mainly used for joining dissimilar steels, difficult-to-weld steels, e.g. heat treatable steels, tool steels and high manganese steels, and for surfacing or repair welding. Due to the fast-freezing slag, Fluxinox 312-PF is used for welding in the horizontal (PD), overhead (PE) and vertical-up (PF) positions.

Classification	
AWS	A5.22: E312T1-4/E312T1-1
EN	12073: T 29 9 P M 1 / T 29 9 P C 1

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.15	1.30	0.90	-	-	29	9	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) + 20 °C	Hardness
As Welded	≥ 450	≥ 660	≥ 25	≥ 32	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

Dissimilar and difficult to weld steels

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

PA PB PC PF PE

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 904 L

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 904L is a rutile flux cored wire for welding austenitic stainless steel type AISI 904L. Good weldability, easy slag removal, good bead appearance. Suitable for welding in all positions.

Classification	Approvals	Grades
AWS A5.22: similar to E385LT1-1/4		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	1.60	0.50	≤ 0.020	≤ 0.020	21	26	4.50	-	1.40	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
As Welded	≥ 430	≥ 640	≥ 32	≥ 70	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Materials

URANUS B6; AISI 904L; 1.4539 (X1NiCrMoCu25-20-5); 1.4439 (X2CrNiMoN17-13-5); 1.4537 (X1CrNiMoCuN25-25-5)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

Packaging data: K300 kg. 16

Diameters	1,2					

FLUXINOX 625

OERLIKON

Cored Wires
Stainless and Heat resistant steels

Fluxinox 625 ia a rutile flux cored wire used for welding cryogenic steels and 9% Nickel steel, alloys 625 and 825. The weld metal deposited is resistant to intergranular corrosion, pitting and oxidation at high temperatures (max. 1200°C).

Classification	Approvals	Grades
AWS similar to A5.11: ENiCrMo-3		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.03	0.80	0.60	≤ 0.015	≤ 0.015	21	Rem	9	4	3	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 440	≥ 750	≥ 35	≥ 50	

Gas test: Acc. To EN 14175: M21 (Atal 5)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5)

Materials

2.4856; 2.4839

UNS N06625; UNS N08825

Storage	Current condition and welding position
Keep dry and avoid condensation	**DC+**

Packaging data: K300 kg. 16

Diameters	1,2					

OE 6154
(ETC 6154)

OERLIKON

Cored Wires
Hardfacing

Filo animato basico per l'esecuzione di riporti duri. Ottima resistenza all'abrasione. 57-62 HRC.

Seamless copper coated basic flux cored wire for the hardfacing of wear parts, such as excavator parts, scraper blades, dipper teeth, worm conveyors, beaters, crusher jaws, crusher cones, subjected to heavy wear. The weld metal is tough, free of cracks and therefore resistant to shock and impact. Machining is only possible by grinding. A tough buffer layer using OE 6130 is only required with highly hardenable base plates.

Classification	
DIN	8555: MSG 6-GF-C1-60-GP
DIN	8555: MSG 6-GF-M21-60-GP

Approvals	Grades
DB	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.45	1.60	0.60	-	-	5.50	-	0.60	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded					57-62 HRC

Gas test: Acc. To EN 14175: C1 (Arcal 2)

Shielding Gas: Acc. To EN 14175: C1(Arcal 2) or M20(Arcal21) - M21 (Atal 5)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC+

PA PB

Packaging data: K300 kg. 16

Diameters	1,4	1,6	2,0	2,4		

CITOFLUX H06

OERLIKON

Cored Wires
Hardfacing

Citoflux H 06 is a basic tubular flux cored wire for hardfacing of wear parts, such as excavator components, scraper blades, dipper teeth, worm conveyors, beaters, crusher jaws, crusher cones, subjected to heavy wear. The weld metal is tough, free of cracks and therefore resistant to shock and impact. Machining is only possible by grinding.

Classification	
DIN	8555:MSG 6-GF-C1-60-GP
DIN	8555:MSG 6-GF-M21-60-GP

Approvals	Grades
DB	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.45	0.40	2.60	-	-	9.50	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -	Hardness
As Welded	≥ 320	≥ 520	-	-	35-40 HRC

Gas test: Acc. To EN 14175: C1 (Arcal 2)

Shielding Gas: Acc. To EN 14175: M20 (Arcal 21) - M21 (Atal 5) or C1 (Arcal 2)

Storage

Current condition and welding position

DC+

PA PB PC

Packaging data: K300 kg. 16

Diameters	1,2	1,6				

TIPO/SPOOL	S 200 / Plastic		B 200 / Basket		S 300 / Plastic		B 300 / Basket		BS 300 / Basket 52		DAYTONA SYSTEM
	R	LW	R	LW	R	LW	R	LW	R	LW	
FILI ANIMATI TUBOLARI PER LA SALDATURA DI ACCIAI NON LEGATI											
OE 6103								16 Kg			200 kg
OE 6105		5 kg x 3						16 Kg			200 kg
OE 6130		5 kg x 3						16 Kg			200 kg
FILI ANIMATI TUBOLARI PER LA SALDATURA DI ACCIAI COR-TEN											
OE 6149R								16 Kg			
FILI ANIMATI TUBOLARI PER RIPORTI ANTIUSURA											
CITOFLUX H06								16 Kg			
OE 6154								16 Kg			
FILI ANIMATI TUBOLARI PER LA SALDATURA DI ACCIAI DEBOLMENTE LEGATI											
OE 6602								16 Kg			
OE 6603								16 Kg			
OE 6605								16 Kg			
FILI ANIMATI A PIATTINA PER LA SALDATURA DI ACCIAI NON LEGATI E DEBOLMENTE LEGATI											
CRISTAL F100				5 kg x 3				16 kg			
CRISTAL F206								16 kg			230 kg
ETC 6100 (CITOFLUX R 00)		5 kg x 3						16 kg			
CITOFLUX R 00 Ni		5 kg x 3						16 kg			
CITOFLUX R20 C		5 kg x 3						16 kg			
CITOFLUX 6117	4,5 kg x 3					15 kg					
CITOFLUX R82		5 kg x 3						16 kg			
CITOFLUX R82 SR						16 kg					
CITOFLUX M20								18 kg			230 kg
CITOFLUX R 26								16 kg			
CITOFLUX R 07		5 kg x 3						16 kg			
CITOFLUX M 07								18 kg			
CITOFLUX M00		5 kg x 3						18 kg			230 kg
CITOFLUX M60A		5 kg x 3						18 kg			230 kg
CITOFLUX M 91								18 kg			
CITOFLUX B 00								18 kg			
CITOFLUX GALVA		5 kg x 3		5 kg x 3				18 kg			200 kg

TIPO/SPOOL	S 200 / Plastic		B 200 / Basket		S 300 / Plastic		B 300 / Basket		BS 300 / Basket 52		DAYTONA SYSTEM
	R	LW	R	LW	R	LW	R	LW	R	LW	
FILI ANIMATI A PIATTINA PER LA SALDATURA DI NICHEL E SUE LEGHE											
FLUXINOX 625								16 kg			
FILI ANIMATI A PIATTINA PER LA SALDATURA DI ACCIAI INOSSIDABILI											
FLUXINOX 22.9.3L-PF				4,5 kg x 3				15 kg			
FLUXINOX 22.9.3L								15 kg			
FLUXINOX 307-PF								15 kg			
FLUXINOX 307								15 kg			
FLUXINOX 308L-PF				4,5 kg x 3				15 kg			
FLUXINOX 308L								15 kg			
FLUXINOX 308H								15 kg			
FLUXINOX 309L-PF				4,5 kg x 3				15 kg			
FLUXINOX 309L								15 kg			
FLUXINOX 309MoL-PF								15 kg			
FLUXINOX 309MoL								15 kg			
FLUXINOX 316L-PF				4,5 kg x 3				15 kg			
FLUXINOX 316L								15 kg			
FLUXINOX 347-PF								15 kg			
FLUXINOX 347								15 kg			
FLUXINOX 318L-PF								15 kg			
FLUXINOX 318								15 kg			
FLUXINOX 310L-PF								15 kg			
FLUXINOX 310								15 kg			
FLUXINOX 312-PF								15 kg			
FLUXINOX 312								15 kg			
FLUXINOX 904L								15 kg			

BARRETTE TIG

TIG RODS

OERLIKON

CARBOROD (ETC TIG SG1)

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai dolci e al carbonio impiegata nelle prime passate e a fondo cianfrino come passata di supporto o nei casi dove sia impossibile la ripresa a rovescio. Ottime caratteristiche meccaniche e di tenacità a bassa temperatura.

Carborod is a TIG rod suitable for welding mild and C-Mn steels; Carborod is generally used for the root pass and to support welding when no back pass is possible. Excellent mechanical and toughness properties for low temperature applications.

Classification	
AWS	A5.18: ER 70S-3
EN	1668: W 42 4 W2Si

Approvals	Grades
DNV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1	0.65	≤ 0.025	≤ 0.025	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
As Welded	≥ 420	500-640	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

S(P)235 to S(P)355; GP240; GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 Kg

Diameters (L: 1000 mm)	1,0	1,2	1,6	2,0	2,4	3,2

Further forms of delivery on request.

CARBOROD 1

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai dolci e al carbonio impiegata nelle prime passate e a fondo cianfrino come passata di supporto o nei casi dove sia impossibile la ripresa a rovescio. Ottime caratteristiche meccaniche e di tenacità a bassa temperatura.

Carborod 1 is a TIG rod suitable for welding mild and C-Mn steels. Carborod 1 is generally used for the root pass and to support welding when no back pass is possible. Excellent mechanical and toughness properties for low temperature applications.

Classification	
AWS	A5.18: ER 70S-6
EN	1668: W 42 4 W3Si1

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.50	0.90	≤ 0.025	≤ 0.025	-	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
As Welded	≥ 420	500-640	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

S(P)235 to S(P)355; GP240; GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 Kg

Diameters (L: 1000 mm)	1,0	1,2	1,6	2,0	2,4	3,2

Further forms of delivery on request.

CARBOROD Mo

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta per la saldatura di acciai debolmente legati con 0,5 Mo e per acciai con elevata resistenza. Il metallo depositato presenta una notevole insensibilità alle cricche e alla fessurazione da solidificazione. Applicabile in campo nucleare.

Carborod Mo is a TIG rod suitable for welding 0,5 Mo steels and heat resistant steels. The weld deposit is highly resistant to cold cracking. Recommended for nuclear applications.

Classification	
AWS	5.28: ER70S-A1
EN	21952-A: W MoSi

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1	0.60	-	-	-	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -20°C	Hardness
PWHT 620°C x 1h	≥ 400	≥ 515	≥ 20	≥ 47	
As Welded	≥ 400	≥ 520	≥ 22	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

S(P)235-S(P)460, 16Mo3

Storage

Keep dry and avoid condensation

Current condition and welding position

DC -

Packaging data: Tube 5 Kg

Diameters (L: 1000 mm)	1,0	1,6	2,0	2,4	3,2	

Further forms of delivery on request.

CARBOROD 80S-D2 (ETC TIG KV2)

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta per la saldatura di acciai debolmente legati con 0,5 Mo e per acciai con elevata resistenza. Il metallo depositato presenta una notevole insensibilità alle cricche e alla fessurazione da solidificazione.

Carborod 80S-D2 is a TIG rod suitable for welding 0,5% Mo steels and high temperature resistant steels. The weld deposit is resistant to cold cracking.

Classification	
AWS	A5.28: ER 80S-D2

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.85	0.60	≤ 0.020	≤ 0.020	-	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -30°C	Hardness
PWHT 620°C x 1h	≥ 460	530-680	≥ 22	≥ 47	
As Welded	≥ 470	≥ 550	≥ 22	≥ 27	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

S(P)235-S(P)460, 16Mo3

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,2	1,6	2,0	2,4	3,2	

Further forms of delivery on request.

CARBOROD KV5 (ETC TIG KV5)

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai con 1,25% Cr e 0,5% Mo. Ottime caratteristiche meccaniche. Può essere impiegato per la saldatura dell'acciaio con 0,9% Cr e 0,5% Mo. Il deposito è insensibile al fenomeno delle fessurazioni.

Carborod CrMo1 is a TIG rod suitable for welding 1,25% Cr 0,5% Mo and 0,9% Cr 0,5% Mo steels. Excellent mechanical properties. The weld deposit is resistant to cold cracking.

Classification	
AWS	A5.28: ER 80S-B2
EN	21952-B: W 55M 1CM

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.56	0.50	≤ 0.020	≤ 0.020	1.25	-	0.50	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -29°C	Hardness
PWHT 690°C x 1h	≥ 355	≥ 550	≥ 20	≥ 70	
PWHT 620°C x 1h	≥ 470	≥ 550	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

13CrMo4-5, 13CrMoSi5-5; G17CrMo5-5

Storage
Keep dry and avoid condensation

Current condition and welding position
DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4	3,2		

Further forms of delivery on request.

CARBOROD KV3 (ETC TIG KV3)

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta adatta per la saldatura di acciai con 2,25% Cr. Indicata anche per la saldatura degli acciai debolmente legati con 2,25% Cr – 1,0% Mo. Ottime caratteristiche meccaniche e deposito e grande insensibilità alle fessurazioni.

Carborod CrMo2 is a TIG rod suitable for welding low alloy 2,25% Cr steels, 10 Cr Mo 910-G5 and 10 Cr Mo 9-10 steels. Excellent mechanical properties. Good x-ray quality.

Classification	
AWS	A5.28: ER 90S-B3
EN	21952-B: W 62M 2C1M

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.60	0.55	≤ 0.020	≤ 0.020	2.40	-	1	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -29°C	Hardness
PWHT 690°C x 1h	≥ 400	≥ 620	≥ 18	≥ 70	
PWHT 690°C x 1h	≥ 540	≥ 620	≥ 18	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

10CrMo9-10, 12CrMo9-10; A387 Gr.22, Cl 1and 2, A 182 Gr.F 22, A 336 Gr.F22

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4	3,2		

Further forms of delivery on request.

CARBOROD CrMo5 (ETC TIG KV4)

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai resistenti allo scorrimento a caldo con 5% Cr 0,5% Mo. Impiegato nell'industria chimica e nei processi di sintesi dell'ammoniaca. Si consiglia preriscaldo ed interpass di 250-300°C.

Carborod CrMo5 is a TIG rod suitable for welding creep resistant 5% Cr 0,5% Mo steels. Suitable for applications including chemical and ammonia synthesis plants.
Pre-heating and interpass temperatures in the range 250-300°C are recommended.

Classification	
AWS	A5.28: ER 80S-B6
EN	21952-A: W CrMo5 Si

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	0.50	0.40	≤ 0.020	≤ 0.020	5.70	-	0.60	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -29°C	Hardness
PWHT 760°C x 1h	≥ 470	≥ 590	≥ 20	≥ 60	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

12CrMo19-5, X12CrMo5; A182 Gr. F5, A199 Gr. T5, A213 Gr.T5, A335 Gr.P5
A 336 Cl. F5, A 369 Gr. FP5, A 387 Gr.5, Cl 1 and 2

Storage
Keep dry and avoid condensation

Current condition and welding position
DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	2,0	2,4				

Further forms of delivery on request.

CARBOROD KV7

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai resistenti al creep contenenti il 9% di cromo e 1% di molibdeno tipo P/T9. Ottime caratteristiche meccaniche.

Classification	
AWS	A5.28: ER80S-B8
EN	12070: W CrMo9

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1	0.50	≤ 0.025	≤ 0.025	9	-	1	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -29°C	Hardness
PWHT 750°C x 1h	≥ 470	≥ 590	≥ 20	≥ 60	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

SA 182 - P9
SA 387 - Gr9

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC-

Packaging data:

Diameters (L: 1000 mm)	2,0	2,4				

Further forms of delivery on request.

CARBOROD KV7M

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai resienti al creep tipo P91. Buone caratteristiche meccaniche.

Classification	
AWS	A5.28: ER 90S-B9
EN	21952-A: W CrMo91

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.09	0.50	0.20	≤ 0.010	≤ 0.010	9	0.60	0.90	0.06	0.20	0.04	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -29°C	Hardness
PWHT 760°C x 1h	≥ 415	≥ 620	≥ 16	≥ 65	
PWHT 760°C x 2h	≥ 415	≥ 585	≥ 17	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

SA 355 - P 91
SA 387 - Gr 91

Storage

Keep dry and avoid condensation.

Current condition and welding position

DC-

Packaging data:

Diameters (L: 1000 mm)	2,0	2,4				

Further forms of delivery on request.

CARBOROD Ni1

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai debolmente legati al 1% Ni e a grana fine per applicazione a bassa temperatura.

Carbofil Ni1 is a TIG rod suitable for welding low alloy, 1% Ni and fine grain steels for low temperature applications.

Classification	
AWS	A5.28: ER 80S-Ni1
EN	1668: W 46 6 M G3Ni1

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1	0.60	≤ 0.020	≤ 0.020	-	1	0.10	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
As Welded	≥ 470	550-680	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

S(P)235-S(P)460, GP240-GP280

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 Kg

Diameters (L: 1000 mm)	1,6	2,0	2,4	3,2		

Further forms of delivery on request.

CARBOROD Ni2

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai debolmente legati al 2% Ni e per applicazioni a bassa temperatura. Ottime caratteristiche meccaniche sia in condizione as-welded che dopo trattamento termico di distensione.

Carborod Ni 2 is a TIG rod suitable for welding low alloy and 2% Ni steels for low temperature applications. Excellent mechanical properties both in the as-welded and stress relieved conditions.

Classification	
AWS	A5.28: ER 80S-Ni2
EN	1668: W 46 6 M W2Ni2

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.10	0.50	≤ 0.020	≤ 0.020	-	2.50	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -60°C	Hardness
As Welded	≥ 470	550-680	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

S(P)275-S(P)420

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4	3,2		

Further forms of delivery on request.

CARBOROD NiMo1

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Bacchetta TIG per la saldatura di acciai ad elevato limite elastico quali ad esempio TI -HY 80 o S(P)460-S(P)620

Carborod NiMo1 is an alloyed Ni-Mo TIG rod suitable for welding high tensile strength steels such as TI -HY 80. Excellent mechanical properties. Low heat inputs are recommended to obtain optimum joint performance.

Classification	
AWS	A5.18: ER 90S-G
EN	1668: W Mn3Ni1Mo

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1.80	0.60	≤ 0.015	≤ 0.018	≤ 0.15	1	0.40	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -40°C	Hardness
As Welded	≥ 620	700-890	≥ 18	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

S(P)460-S(P)620

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data:

Diameters (L: 1000 mm)	1,2	1,6	2,0	2,4	3,2	

Further forms of delivery on request.

OE ALCROMO W225

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai 2.25% Cr 1% Mo per la saldatura di acciai resistenti al creep e dove sia richiesto lo Step Cooling. X factor <15ppm e J factor <150ppm

Classification	Approvals	Grades
AWS A5.28: ER 90S		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.12	0.60	0.20	≤ 0.010	≤ 0.010	2.30	-	0.90	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -29°C	Hardness
PWHT 690°C x 2h	≥ 550	≥ 650	≥ 20	≥ 54	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

SA 182 P 22
SA 387 Gr 22
SA 508 Gr 22 Cl 3
SA 542 Tp B Cl 4

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data:

Diameters (L: 1000 mm)	1,2	2,4				

Further forms of delivery on request.

OE ALCROMO W225V

OERLIKON

TIG Rods
C-Mn steels and low-alloy steels

Barretta TIG per la saldatura di acciai 2.25%Cr, 1%Mo, 0,25% V resistenti al creep e dove sia richiesto lo Step Cooling. X factor <15ppm e J factor <150ppm

Classification	Approvals	Grades
AWS A5.28: ER 90S-G		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.12	0.50	0.20	≤ 0.010	≤ 0.010	2.40	-	0.90	-	0.25	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) -29°C	Hardness
PWHT 710°C x 8h	≥ 550	550-750	≥ 18	≥ 54	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

12 Cr Mo V 910
SA 336 F 22 V
SA 541 Gr 22 V

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data:

Diameters (L: 1000 mm)	1,2	2,4				

Further forms of delivery on request.

INERTROD 307

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Filo inox per la saldatura di acciai dissimili, acciai da bonifica, al 13% Mn, acciai al Cr, acciai da corazza a balistici. Deposito con notevoli caratteristiche meccaniche e di resistenza all' usura. Indicato anche per l'esecuzione di strati cuscinetto e strati intermedi di placcature.

Inertrod 307 is a stainless TIG rod suitable for welding dissimilar steels, hardening and tempering steels, 13% Mn steels, Cr steels and ballistic steels. Good mechanical properties and wear resistance. Inertrod 307 is also used for buffer layers.

Classification	
AWS	A5.9: ER 307 (approx)
EN	12072: G 18 8 Mn

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.10	7	0.80	≤ 0.030	≤ 0.030	19	9	-	-	-	-	≤ 5

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 420	≥ 590	≥ 30	≥ 50	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

Armour plate; Dissimilar Steels
X120Mn12 (1.3401); 1.4370

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	2,4					

Further forms of delivery on request.

INERTROD 308 L

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta TIG inox del tipo ER 308L indicata per la saldatura di acciai inox austenitici del tipo AISI 304 e 308. Ottima reistenza meccanica e alla corrosione. Elevata resistenza alla fessurazione.

Inertrod 308L is a stainless TIG rod similar in composition to ER 308L suitable for welding austenitic stainless steels such as AISI 304 and 304L. Excellent corrosion resistance and mechanical properties.

Classification	
AWS	A5.9: ER 308L
EN	12072: W 19 9 L

Approvals	Grades
DB	
MMI	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.80	0.45	≤ 0.025	≤ 0.020	20	10	0.20	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 350	≥ 520	≥ 35	≥ 60	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)
AISI 304 - 304L - 302

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,0	1,2	1,6	2,0	2,4	3,2

Further forms of delivery on request.

INERTROD 308 L Si

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta TIG inox del tipo R308L indicata per la saldatura di acciai inox tipo AISI 304 e 308. Il contenuto di Si conferisce una migliore caratteristica di saldabilità ed estetica.

Inertrod 308LSi is a stainless TIG rod similar in composition to ER 308LSi suitable for welding austenitic stainless steels such as AISI 304.

Classification	
AWS	A5.9: R308LSi
EN	12072: W 19 9 L Si

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	1.80	0.85	0.025	0.020	20	10.20	0.20	-	0.20	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 520	≥ 35	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4311 (X2CrNiN18-10)
AISI 304 - 304L - 302

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,4	3,2			

Further forms of delivery on request.

INERTROD 308 H

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta TIG per la saldatura di acciai inox austenitici del tipo AISI 304H. Ottima resistenza meccanica.

Inertrod 308H is a stainless TIG rod of similar composition to ER 308H suitable for welding austenitic stainless steels such as AISI 304H. Excellent mechanical properties.

Classification	
AWS	A5.9: ER 308H
EN	12072: W 19 9 H

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.06	1.90	0.50	≤ 0.030	≤ 0.020	20	10.50	-	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 35	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

AISI 304H; 1.4948 (X6CrNi18-10); 1.4310 (X10CrNi18-8)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	2,0	2,4				

Further forms of delivery on request.

INERTROD 347

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta TIG per la saldatura di acciai inox stabilizzati. La presenza dello stabilizzante migliora le caratteristiche di resistenza alla corrosione a temperatura. Trova il suo campo d'impiego nella saldatura di AISI 347 e 321 in prima passata o ripristini di placcatura.

Inertrod 347 is a stainless TIG rod suitable for welding stabilized austenitic stainless steels such as AISI 321 and 347. The Nb addition considerably improves the oxidation resistance of the weld deposit.

Classification	
AWS	A5.9: ER 347
EN	12072: G 19 9Nb

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.06	1.60	0.45	≤ 0.030	≤ 0.030	19.50	10	-	0.80	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 400	≥ 550	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

1.4541 (X6CrNiTi18-10); 1.4301 (X4CrNi18-10); 1.4550 (X6CrNiNb18-10); 1.4551
AISI 347 - 321

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,0	1,2	1,6	2,0	2,4	3,2

Further forms of delivery on request.

INERTROD 316 L

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta in acciaio inox del tipo AISI 316L indicato per la saldatura di acciai inox con analoga composizione chimica. Buone caratteristiche di resistenza alla corrosione trova il suo naturale campo di applicazione nell'industria chimica e petrolchimica.

Inertrod 316L is a stainless TIG rod conforming to ER 316L with 0.03% C maximun. Excellent mechanical and corrosion resistance, suitable for the welding or surfacing of stainless steels having similar chemical analyses.

Classification	
AWS	A5.9: ER 316L
EN	12072: W 19 12 3L

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.40	0.45	≤ 0.025	≤ 0.020	19	12.50	2.60	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 510	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,0	1,2	1,6	2,0	2,4	3,2

Further forms of delivery on request.

INERTROD 316 L Si

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta TIG inox del tipo R316L indicata per la saldatura di acciai inox tipo AISI 316. Il contenuto di Si conferisce una migliore caratteristica di saldabilità ed estetica.

Inertrod 316LSi is a stainless TIG rod conforming to ER 316LSi with C 0.03% max and Si 0,85 %. Excellent mechanical properties and resistance to chemical corrosion, suitable for welding or surfacing stainless steels having a similar chemical analysis. Excellent bead appearance.

Classification	
AWS	A5.9: ER 316L Si
EN	12072: W 19 12 3 L Si

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.40	0.85	0.025	0.020	19	12.50	2.60	-	-	-	5-10

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) +20°C	Hardness
As Welded	≥ 350	≥ 510	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

1.4401 (X4CrNiMo17-12-2), 1.4435 (X2CrNiMo18-14-3)
1.4571 (X6CrNiMoTi17-12-2), 1.4583 (X10CrNiMoNb18-12)
AISI 316L

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data:

Diameters (L: 1000 mm)	1,2	1,6	2,0	2,4	3,2	

Further forms of delivery on request.

INERTROD 318 Si

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta in acciaio inox del tipo AISI 318. La presenza di stabilizzanti migliora la resistenza all'ossidazione del deposito.

Inertrod 318Si is a stainless TIG rod suitable for welding stabilised austenitic steels such as AISI 318. The niobium addition considerably improves the oxidation resistance of the weld deposit.

Classification	
AWS	A5.9: ER 318 (similar)
EN	12072: W 19 12 3 Nb Si

Approvals	Grades
DB	
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.07	1.75	0.85	≤ 0.020	≤ 0.020	19	12.60	2.60	0.70	-	-	3-12

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 25	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

1.4571 (X6CrNiMoTi17-12-2) - 1.4401 (X4CrNiMo17-12-2)
1.4580 (X6CrNiMoNb17-12-2) - 1.4408 (GX5CrNiMo19-11)
1.4581 (GX5CrNiMoNb19-10) - 1.4436 (X4CrNiMo17-13-3)
1.4583 (X10CrNiMoNb18-12)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4			

Further forms of delivery on request.

INERTROD 309 L

TIG Rods
Stainless and Heat resistant steels

Barretta TIG per la saldatura di acciai inox austenitici tipo AISI 309. Per le sue particolari caratteristiche chimico meccaniche viene impiegata per la saldatura anche di acciai dissimili inox ferro per sottostrati di riporti. Buone caratteristiche meccaniche di resistenza all'ossidazione a caldo.

Inertrod 309L is a stainless TIG rod conforming to ER 309L for welding austenitic stainless steels such as AISI 309. It is also used to weld dissimilar steels and for buffer layers. Excellent high temperature oxidation resistance.

Classification	
AWS	A5.9: ER 309L
EN	12072: W 23 12L

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.80	0.45	≤ 0.030	≤ 0.020	24	13	-	-	-	-	10-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 520	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

A312 TP309S; carbon steel to stainless steels joint

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,2	1,6	2,0	2,4	3,2	

Further forms of delivery on request.

INERTROD 309 L Mo

TIG Rods
Stainless and Heat resistant steels

Barretta TIG indicata per la saldatura di acciai inox austenitici tipo AISI 309. Basso contenuto di carbonio e alto contenuto di Mo.

Inertrod 309LMo is a stainless TIG rod with 25% Cr 12% Ni low C and high Mo. Suitable for welding austenitic stainless steels such as AISI 309. Inertrod 309LMo is also used for welding dissimilar steels and for buffer layers.

Classification	
AWS	A5.9: ER 309L Mo
EN	12070: W 23 12 2 L

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	1.60	0.45	≤ 0.030	≤ 0.020	22	15	2.70	-	-	-	10-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

Cladding of carbon steel and low alloy steel

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4			

Further forms of delivery on request.

INERTROD 310

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta TIG per la saldatura di acciai inox Completamente austenitici del tipo AISI 310 o similari. Il deposito completamente austenitico conferisce grandi qualità di resistenza alla corrosione ad alte temperature, può essere impiegata anche per la saldatura o placcatura di acciai dissimili o al carbonio.

Inertrod 310 is a stainless TIG rod conforming to ER 310 with 25% Cr and 20% Ni. Suitable for welding steels with similar chemical compositions or dissimilar steels. The weld deposit is fully austenitic. Excellent high temperature corrosion resistance.

Classification	
AWS	A5.9: ER 310
EN	12072: W 25 20

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.12	1.80	0.60	≤ 0.030	≤ 0.020	26	21	0.30	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 350	≥ 550	≥ 30	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

AISI 310; 1.4845 (X8CrNi25-21); 1.4841 (X15CrNiSi25-21); 1.4828 (X15CrNiSi20-12)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4	3,2		

Further forms of delivery on request.

INERTROD 312

TIG Rods
Stainless and Heat resistant steels

Barretta TIG per la saldatura di acciai inox di eguale composizione chimica e di acciai difficilmente saldabili quali acciai al C al Mn al Cr acciai da corazza e balistici. La notevole elasticità del deposito e la grande resistenza alle fessurazioni rendono l'impiego di tale bacchetta universale.

Inertrod 312 is a stainless TIG rod suitable for welding or surfacing difficult to weld steels. Suitable for welding buffer layers. The excellent mechanical properties and the notch toughness make Inertrod 312 suitable for a wide range of applications.

Classification	
AWS	A5.9: ER 312
EN	12072: W 29 9

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.10	1.80	0.40	≤ 0.030	≤ 0.020	29	9	-	-	-	-	12-20

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
As Welded	≥ 450	≥ 650	≥ 22	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

Dissimilar and difficult to weld steels

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4			

Further forms of delivery on request.

INERTROD 904 L

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Bacchetta TIG per la saldatura di acciai tipo AISI 904L altamente legati, con basso contenuto di carbonio. Ottima resistenza alla corrosione in miscele solforose e cloridriche. Buona resistenza alla corrosione intergranulare.

Inertrod 904L is a TIG rod for the welding of stainless steels type AISI 904L with low carbon content. Very good resistance to intergranular and pitting corrosion.

Classification	
AWS	A5.9: ER 385 L
EN	12072: W 20 25 5 Cu L

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	1.90	0.40	≤ 0.020	≤ 0.020	20	25	4.50	-	1.50	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -70°C	Hardness
As Welded	≥ 320	≥ 520	≥ 30	≥ 100	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

1.4519

URANUS B6; AISI 904L; 1.4539 (X1NiCrMoCu25-20-5); 1.4439 (X2CrNiMoN17-13-5); 1.4537 (X1CrNiMoCuN25-25-5)

Storage
Keep dry and avoid condensation

Current condition and welding position
DC-
 PA PB PC PF PE PF2

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4			

Further forms of delivery on request.

INERTROD 410L

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta TIG per la saldatura di acciaio con 12%Cr tipo AISI 410.

Inertrod 410L is a TIG rod suitable for welding 12% Cr steels (AISI 410).

Classification	
AWS	A5.9: ER 410
EN	12072: W 13L

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	0.40	0.50	≤ 0.030	≤ 0.030	13.50	-	-	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 750°C x 1h	≥ 350	≥ 450	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

1.4000 (X6Cr13); 1.4006 (X12Cr13)

AISI 410

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4			

Further forms of delivery on request.

INERTROD 410 NiMo

Barretta per saldatura di acciai serie 410 Ni Mo, acciai tipo autotemprante

Inertrod 410NiMo ia a TIG rod suitable for welding AISI 410 NiMo. These are self- hardening steels and usually require pre-heating and stress relieving treatments in order to obtain adequate joint ductility.

Classification	
AWS	A 5.9: ER 410 Ni Mo
EN	12072: W 13 4

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.05	0.60	0.50	≤ 0.030	≤ 0.030	12.50	4	0.70	-	-	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) 20°C	Hardness
PWHT 620°C x 1h	≥ 550	≥ 760	≥ 20	≥ 47	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

ASTM CA6NM; G-X5CrNi 13-4; Z6 CND 1304 M

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data:

Diameters (L: 1000 mm)	1,6	2,0	2,4			

Further forms of delivery on request.

INERTROD 22 9 3

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Barretta TIG per la saldatura di acciai bifasici tipo Duplex. La ottima resistenza alla corrosione e le caratteristiche meccaniche del deposito dipendono molto dalla tecnica di saldatura. Temperatura di esercizio fino a 280°C.

Inertrod 22 9 3 is a TIG rod suitable for welding duplex stainless steels. The excellent corrosion resistance and the weld metal mechanical properties are welding procedure dependant.

Classification	
AWS	A5.9: ER 2209
EN	12072: W 22 9 3NL

Approvals	Grades
TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.70	0.50	≤ 0.030	≤ 0.020	23	9	3	-	-	0.15	30-65

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -50°C	Hardness
As Welded	≥ 450	≥ 600	≥ 26	≥ 100	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

1.4462 (X2CrNiMoN22-5-3)
UNS S31803 - S31500 - S31200 - S32304

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4			

Further forms of delivery on request.

INERTROD 25 10 4

OERLIKON

TIG Rods
Stainless and Heat resistant steels

Bacchetta TIG per la saldatura di Acciai SuperDuplex secondo UNS 32520, UNS 32520 UNS 32750 UNS 32760. Applicazione negli apparecchi in pressione. Per ottenere depositi esenti da difetti. L'apporto termico deve essere compreso tra 0,4 – 1,4 kJ/mm.

Inertrod 25 10 4 is a TIG rod for welding super duplex stainless steels (UNS 32520, UNS 32520 UNS 32750 UNS 32760). The welding of pressure vessels is a typical application. The heat input should be in the range within 0,4 – 1,4 kJ/mm.

Classification	Approvals	Grades
EN 12072: 25 9 4 L		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	1	0.50	≤ 0.020	≤ 0.020	25	9.50	4	-	-	0.22	35-70

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -30°C	Hardness
As Welded	≥ 550	≥ 620	≥ 18	≥ 30	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

SAF 2507; Uranus 47N; UNS S32750; ASTM A182 F53

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	2,4					

Further forms of delivery on request.

NIROD Ni1

OERLIKON

TIG Rods
Nickel and Copper alloys

Bacchetta TIG per saldatura di Nickel 99.6, LC-Nickel99.2, Nickel 99.2, Nickel-Mangan. Applicabile anche per saldatura di acciai placcati in Nickel puro sia per esplosione che per laminazione. E' altresì possibile la placcatura di acciai al carbonio.

Nirod Ni1 is a TIG rod suitable for welding nickel alloys with similar chemical analysis and for weld overlay. The weld deposit has a good appearance and excellent resistance to chemical corrosion.

Classification	
AWS	A 5.14: ER Ni-1
EN ISO	18274: S Ni 2061 (NiTi3)

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.10	1	0.70	≤ 0.030	≤ 0.015	-	≥ 93	-	-	0.90	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 280	≥ 380	≥ 38		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

2.4155

Buffer layers for welding Ni or Cu alloys to steels

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	2,0	2,4				

Further forms of delivery on request.

NIROD 600

OERLIKON

TIG Rods
Nickel and Copper alloys

Barretta per la saldatura GTAW di leghe inconel 600 o incoloy 800. La barretta ETC TIG 82 è anche indicata nel caso di saldature di acciai difficilmente saldabili e dissimili. Ottima resistenza meccanica ed alla corrosione.

Nirod 600 is a nickel alloy TIG rod for welding Inconel 600 or Incoloy 800 alloys. Nirod 600 is also suitable for welding dissimilar or difficult to weld steels. Excellent mechanical properties and corrosion resistance.

Classification	
AWS	A5.14: ER NiCr 3
EN	18274: S Ni 6082

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.05	3	0.30	≤ 0.030	≤ 0.015	20	67	-	2	2	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 380	≥ 550	≥ 25	≥ 55	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

2.4816; 1.4876; 1.4958

UNS N06600; UNS N08800; UNS N08810

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,2	1,6	2,0	2,4		

Further forms of delivery on request.

NIROD 625

OERLIKON

TIG Rods
Nickel and Copper alloys

Barretta TIG a struttura austenitica, impiego per saldature criogeniche e acciai al 9% Ni, grazie alla sua buona tenuta alle alte temperature può essere utilizzato su tutte le installazioni soggette a trattamento termico. Buona resistenza alla corrosione intercristallina.

Nirod 625 is a nickel alloy TIG rod, for use in cryogenic welding and the welding of 9% Ni steels. The good resistance to high temperatures makes Nirod 625 suitable for the welding of components which will undergo heat treatments. Good resistance to intercrystalline corrosion.

Classification	Approvals	Grades
AWS A5.14: ER NiCrMo-3	TÜV	

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.10	-	0.30	≤ 0.020	≤ 0.015	21	60	9	3.50	3	-	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 440	≥ 760	≥ 35	≥ 55	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

2.4856; 2.4839

UNS N06625; UNS N08825

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)	1,2	1,6	2,0	2,4		

Further forms of delivery on request.

NIROD C276

Bacchetta TIG per la saldatura di acciai al 9% di nichel o leghe di nichel tipo Inconel C276.

Classification	
AWS	A5.14: ER NiCrMo-4

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
≤ 0.02	≤ 1	≤ 0.08	≤ 0.030	≤ 0.025	14.50	Rem	15-17	-	4-7	3-4.50	≤ 0.50

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J) -196°C	Hardness
As Welded	≥ 490	≥ 700		≥ 55	

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Storage

Current condition and welding position
DC-

Packaging data: Tube 5 kg

Diameters (L: 1000 mm)

Further forms of delivery on request.

NIROD NiCu7

Barrette per la saldatura GTAW di leghe con uguale composizione chimica. Buona estetica e ottima resistenza alla corrosione in presenza di ambienti salini. Applicazione tipo dissalatori per leghe tipo MONEL.

Nirod NiCu7 is a nickel alloy TIG rod suitable for welding alloys with similar chemical analyses. Good bead appearance and excellent corrosion resistance in saline solutions. Suitable for the fabrication of desalination plant using MONEL type alloy.

Classification	
AWS	A5.14: ER NiCu 7
EN ISO	S Ni 4060

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.10	3	1	≤ 0.020	≤ 0.015	-	Rem	-	-	1	-	30

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm²	Tensile Strength N/mm²	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 350	≥ 480	≥ 30		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

2.4360 (NiCu30Fe); 2.4375 (NiCu30Al)
UNS N04400; UNS N 05500

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data:

Diameters (L: 1000 mm)	2,0	2,4				

Further forms of delivery on request.

OE TIG CuNi 70-30

Barretta TIG indicata per la saldatura di leghe con uguale composizione chimica. Buona estetica ed ottime caratteristiche del deposito. Ottima resistenza alla corrosione da agenti chimici ed in ambienti marini.

Classification	Approvals	Grades
AWS A5.7: ER CuNi		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	Cu	Sn
0.05	1	0.25	-	-	-	30	-	-	0.50	Rem	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	-	≥ 345	≥ 20		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Storage

Keep dry and avoid condensation

Current condition and welding position

DC-

Packaging data:

Diameters (L: 1000 mm)	2,0	2,4				

Further forms of delivery on request.

OE TIG CuNi 90-10

Barretta TIG per la saldatura di leghe di equivalente composizione chimica. Ottima resistenza alla corrosione in ambienti marini.

Classification	
DIN	1733 Part.1 n° 2.0873

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	Cu	Sn
0.05	1	0.20	-	-	-	10	-	-	≤ 1.50	Rem	-

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded		≥ >380			

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Storage
Keep dry and avoid condensation

Current condition and welding position

Packaging data:

Diameters (L: 1000 mm)	2,0	2,4				

Further forms of delivery on request.

ALUROD Al 99,5 Ti

Barretta che deposita alluminio puro al 99,5%. Adatto per la saldatura con procedimento TIG alluminio al 99,5-99,8%. Buone caratteristiche di saldabilità e permeabilità magnetica. Ottima resistenza alla corrosione.

Alurod Al 99,5 Ti is a TIG rod depositing 99,5% pure Al. Suitable for welding Al and pure Al alloys. Good mechanical properties and magnetic permeability. Excellent chemical corrosion resistance.

Classification	
AWS	A5.10: ER 1100
Wr.	3.0259

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	0.04	0.30	-	-	-	-	0.05	-	0.40	0.05	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 20	≥ 65	≥ 35		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

Al 99,5 ;Al 99; Al 99,9 Mg 0,5; AlMg 0,5

Storage

Keep dry and avoid condensation

Current condition and welding position

AC

Packaging data: Box 5 kg

Diameters (L: 1000 mm)	2,0	2,4	3,2	4,0		

Further forms of delivery on request.

ALUROD AlSi 5

Barretta TIG che deposita una lega di alluminio al 5%Si. E' adatto per la saldatura di leghe Anticorodal 163 e 11.

Alurod AlSi5 is a TIG rod for the welding of aluminium and aluminium alloys with a silicon content up to 7%. Suitable for Al-Mg-Si alloys series 6000 and for dissimilar welding applications such as 6000/1000 or 6000/3000.

Classification	Approvals	Grades
AWS A5.10: ER 4043		

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	0.04	5	-	-	-	-	0.10	-	0.40	0.30	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 40	≥ 120	≥ 8		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

Al-Mg-Si and Al-Mg alloys with 2.5% Mg max. Al-Mn-Cu - AlSi cast

Storage

Keep dry and avoid condensation

Current condition and welding position

AC

Packaging data: Box 5 kg

Diameters (L: 1000 mm)	2,0	2,4	3,2	4,0		

Further forms of delivery on request.

ALUROD AlMg 5

Barretta che deposita una lega di alluminio al 5% di Magnesio. Indicato per la saldatura di leghe tipo Peraluman ed Anticoral. Ottime caratteristiche meccaniche.

Alurod AlMg5 is a TIG rod for the welding of aluminium and aluminium alloys with a magnesium content up to 5%. Suitable for welding of all commercial aluminium alloys. Good mechanical properties and high resistance to corrosion including marine corrosion.

Classification	
AWS	A5.10: ER 5356
EN ISO	18273: S Al 5356

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	0.10	0.20	-	-	0.10	-	0.10	5	0.30	0.10	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 110	≥ 240	≥ 17		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

Al Mg 1SiCu, Al Mg Si 0,7;
Al Mg 3, Al Mg 5, Al Zn 4,5 Mg 1;
G-Al Mg 3Si; G-Al Mg 5Si

Storage

Keep dry and avoid condensation

Current condition and welding position

AC

Packaging data: Box 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4	3,2	4,0	

Further forms of delivery on request.

ALUROD AlMg 4,5 Mn

Barretta TIG che deposita una lega con 4,5 %Mg. Ottime caratteristiche meccaniche.

Alurod AlMg 4,5 Mn is a TIG rod which deposits a 4,5% Mg aluminum alloy with high tensile strength requirements. Good mechanical properties.

Classification	
AWS	A5.10: ER 5183
EN	18273: S Al 5183

Approvals	Grades

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Zn	Ti	Mg	Fe	Cu	Al
-	0.80	0.25	-	-	0.10	-	0.10	4.50	0.30	0.10	Rem

All-weld metal Mechanical Properties

Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Impact Energy ISO - V (J)	Hardness
As Welded	≥ 125	≥ 275	≥ 17		

Gas test: Acc. To EN 14175: I1(Arcal1)

Shielding Gas: Acc. To EN 14175: I1(Arcal1)

Materials

Al Mg 3, Al Mg 5, Al Mg Mn, Al Zn 4,5 Mg 1
G-Al Mg 3 Si; G-Al Mg 5 Si; G-Al Mg 10;

Storage

Keep dry and avoid condensation

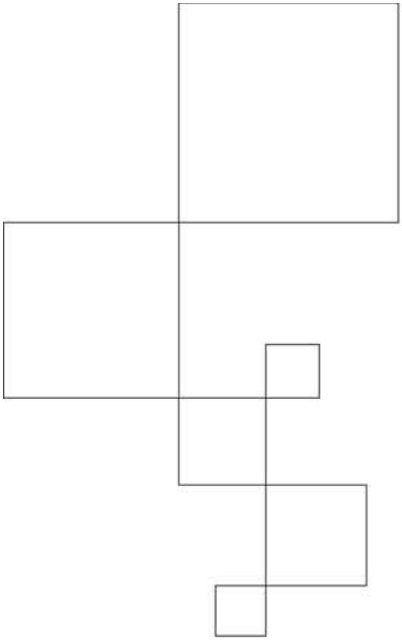
Current condition and welding position

AC

Packaging data: Box 5 kg

Diameters (L: 1000 mm)	1,6	2,0	2,4	3,2	4,0	

Further forms of delivery on request.



FLUSSI PER ARCO SOMMERSO

SUBMERGED ARC FLUXES

OERLIKON

Wire electrodes and wire/flux combinations for submerged-arc welding of un-alloyed steels and fine grain structural steels.

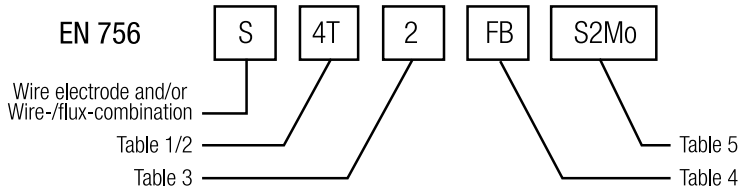


Table 1

Symbols for tensile properties by multi-run technique			
Symbols	Minimum yield strength[1] [N/mm²]	Tensile strength [N/mm²]	Minimum elongation[2] A_5 [%]
35	355	440–570	22
38	380	470–600	20
42	420	500–640	20
46	460	530–680	20
50	500	560–720	18

[1] For yield strength lower yield (R_{eL}) shall be used if yielding occurs, otherwise the 0,2% proof strength ($R_{p0,2}$) shall be applied.
[2] Gauge length is equal to five times the test specimen diameter.

Table 2

Symbols for tensile properties by two-run technique (both sides in one pass)		
Symbols	Minimum yield strength of base metal [N/mm²]	Minimum tensile strength of welded joint [N/mm²]
2T	275	370
3T	355	470
4T	420	520
5T	500	600

Table 3

Symbols for the impact energy of the all-well metal or welded joint made from both sides in one pass	
Symbols	Temperature for minimum average impact-energy of 47 J [°C]
Z	no requirement
A	20
0	0
2	-20
3	-30
4	-40
5	-50
6	-60
7	-70
8	-80

Table 4

Symbols for type of flux	
Type of flux	Symbols
Manganese-silicate	MS
Calcium-silicate	CS
Zirconium-silicate	ZS
Rutile-silicate	RS
Aluminate-rutile	AR
Aluminate-basic	AB
Aluminate-silicate	AS
Aluminate-fluoride-basic	AF
Fluoride-basic	FB
Other types	Z

Table 5

Chemical composition in [%] (m/m) [1][2][3]								
Symbol	C	Si	Mn	P	S	Mo	Ni	Cr
S0	any other chemical composition agreed upon							
S1	0,05–0,15	0,15	0,35–0,60	0,025	0,025	0,15	0,15	0,15
S2	0,07–0,15	0,15	0,80–1,30	0,025	0,025	0,15	0,15	0,15
S3	0,07–0,15	0,15	> 1,30–1,75	0,025	0,025	0,15	0,15	0,15
S4	0,07–0,15	0,15	> 1,75–2,25	0,025	0,025	0,15	0,15	0,15
S1Si	0,07–0,15	0,15–0,40	0,35–0,60	0,025	0,025	0,15	0,15	0,15
S2Si	0,07–0,15	0,15–0,40	0,80–1,30	0,025	0,025	0,15	0,15	0,15
S2Si2	0,07–0,15	0,40–0,60	0,80–1,30	0,025	0,025	0,15	0,15	0,15
S3Si	0,07–0,15	0,15–0,40	> 1,30–1,85	0,025	0,025	0,15	0,15	0,15
S4Si	0,07–0,15	0,15–0,40	> 1,85–2,25	0,025	0,025	0,15	0,15	0,15
S1Mo	0,05–0,15	0,05–0,25	0,35–0,60	0,025	0,025	0,45–0,65	0,15	0,15
S2Mo	0,07–0,15	0,05–0,25	0,80–1,30	0,025	0,025	0,45–0,65	0,15	0,15
S3Mo	0,07–0,15	0,05–0,25	> 1,30–1,75	0,025	0,025	0,45–0,65	0,15	0,15
S4Mo	0,07–0,15	0,05–0,25	> 1,75–2,25	0,025	0,025	0,45–0,65	0,15	0,15
S2Ni1	0,07–0,15	0,05–0,25	0,80–1,30	0,020	0,020	0,15	0,80–1,20	0,15
S2Ni1,5	0,07–0,15	0,05–0,25	0,80–1,30	0,020	0,020	0,15	>1,20–1,80	0,15
S2Ni2	0,07–0,15	0,05–0,25	0,80–1,30	0,020	0,020	0,15	>1,80–2,40	0,15
S2Ni3	0,07–0,15	0,05–0,25	0,80–1,30	0,020	0,020	0,15	>2,80–3,70	0,15
S2Ni1Mo	0,07–0,15	0,05–0,25	0,80–1,30	0,020	0,020	0,45–0,65	0,80–1,20	0,20
S3Ni1,5	0,07–0,15	0,05–0,25	> 1,30–1,70	0,020	0,020	0,15	>1,20–1,80	0,20
S3Ni1Mo	0,07–0,15	0,05–0,25	> 1,30–1,80	0,020	0,020	0,45–0,65	0,80–1,20	0,20
S3Ni1,5Mo	0,07–0,15	0,05–0,25	1,20–1,80	0,020	0,020	0,30–0,50	1,20–1,80	0,20

[1]) Chemical composition of finished product, Cu including copper cladding ≤0,30%, Al≤0,030%.
[2]) Single values in this table are maximum values.
[3]) The results shall be rounded to the same decimal place as in the specified values using the rules as to ISO 31-0, Appendix B, Rule A.

Fluxes for submerged-arc welding Classification

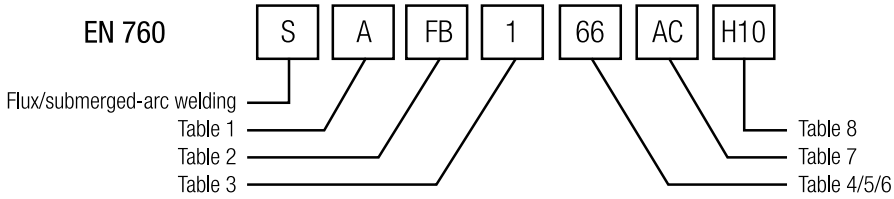


Table 1

Symbols for the method of manufacture	
Symbols	Method of manufacture
F	fused flux
A	agglomerated flux
M	mixed flux

Table 2

Symbols for type of flux, characteristic constituents		
Symbols	Characteristic constituents	Threshold values [%]
MS manganese-silicate	$MnO + SiO_2$	min. 50
	CaO	max. 15
CS calcium-silicate	$CaO + MgO + SiO_2$	min. 55
	$CaO + MgO$	min. 15
ZS zirconium-silicate	$ZrO_2 + SiO_2 + MnO$	min. 45
	ZrO_2	min. 15
RS rutile-silicate	$TiO_2 + SiO_2$	min. 50
	TiO_2	min. 20
AR aluminate-rutile	$Al_2O_3 + TiO_2$	min. 40
AB aluminate-basic	$Al_2O_3 + CaO + MgO$	min. 40
	Al_2O_3	min. 20
	CaF_2	max. 22
AS aluminate-silicate	$Al_2O_3 + SiO_2 + ZrO_2$	min. 40
	$CaF_2 + MgO$	min. 30
	ZrO_2	min. 5
AF aluminate-fluoride-basic	$Al_2O_3 + CaF_2$	min. 70
FB fluoride-basic	$CaO + MgO + CaF_2 + MnO$	min. 50
	SiO_2	max. 20
	CaF_2	min. 15
Z	other compositions	

Table 3

Code digits for the application, flux class	
Code digits	Application
1	Fluxes for submerged-arc welding of unalloyed and low-alloy steels, such as structural steels, high-tensile steels and creep resisting steels. The fluxes do not contain alloying elements other than Mn and Si, thus the weld metal analysis is predominantly influenced by the composition of the wire electrode and metallurgical reactions. The fluxes are suitable for both joint welding and surfacing.
2	Fluxes for joint welding and surfacing of austenitic stainless and heat resisting chromium and chromium-nickel steels and /or nickel and nickel-base alloys and unalloyed fluxes for hardfacing..
3	Fluxes mainly for surfacing purposes yielding a wear-resistant weld metal by transfer of alloying elements from the flux, such as C, Cr, or Mo.

Table 4

Code digits for the metallurgical behaviour of welding fluxes of class 1		
Metallurgical behaviour	Code digits	Amount by flux in the weld metal [%]
Burn-out	1	over 0,7
	2	over 0,5 up to 0,7
	3	over 0,3 up to 0,5
	4	over 0,1 up to 0,3
Pick-up and /or burn-out	5	0 up to 0,1
Pick-up	6	over 0,1 up to 0,3
	7	over 0,3 up to 0,5
	8	over 0,5 up to 0,7
	9	over 0,7
Pick-up and burn-out of the elements Si and Mn are indicated in this order.		

Table 5

Metallurgical behaviour of welding fluxes of class 2
The pick-up of alloying elements, except Si and Mn, is indicated by respective chemical symbols (e.g. Cr).

Table 6

Metallurgical behaviour of welding fluxes of class 3
Pick-up of alloying elements is indicated by respective symbols (e.g. C, Cr).

Table 7

Symbols for type of current	
Symbols	Type of current
DC	direct current
AC	alternating current

Table 8

Symbols for the hydrogen content of the all-weld metal	
Symbols	Hydrogen content ml/100 grams deposited weld metal max.
H5	5
H10	10
H15	15

Notes on SAW Welding Fluxes and Wires

Technical data in this part of the catalogue serve as a guide to selecting welding consumables and auxiliary materials used in submerged-arc welding.

Functions of welding fluxes

Welding fluxes are granulated, fusible mineral substances that have similar functions in submerged-arc welding as the coatings of MMA electrodes, namely:

a) Improving the conductivity of the arc gap, facilitating arc striking and stabilizing the arc.

b) Slag forming for protecting the metal droplet transfer, as well as the molten weld pool, shaping the weld bead and reducing its cooling rate.

c) Metallurgically influencing the weld metal, by the reactions taking place in the gaseous phase of the arc cavity between the fused flux and the weld metal.

d) Deoxidizing and alloying the weld metal by adding deoxidizing agents and, if necessary, alloying elements, such as Cr, Mo, Ni, ...

Manufacture of welding fluxes

Welding fluxes may be divided into three categories according to the manufacturing process:

a) fused fluxes

b) agglomerated fluxes

c) mixed fluxes

Fused fluxes are manufactured by re-fusing the raw material constituents into a vitreous product, which is subsequently crushed and then sieved to the desired grain size. The bulk densities, as well as the consumption of such fluxes are higher than agglomerated fluxes. Fused fluxes are relatively insensitive to moisture.

Agglomerated welding fluxes consist of small granules formed by mixing finely ground individual components with a bonding agent (silicates) and baking at temperatures between 600 °C and 800 °C after agglomeration. Since the manufacture of agglomerated fluxes is carried out at temperatures below the reactivity of the raw materials used, this permits the transfer of deoxidants and alloying constituents into the weld metal, thus favourably influencing operating characteristics, as well as mechanical properties. The consumption of agglomerated fluxes is lower than fused fluxes, owing to a lower bulk density.

Mixed fluxes are all those which are mixed by the manufacturer from two or more individual fluxes.

Type of flux

According to EN 760, welding fluxes are divided according to their mineralogical structure into various groups and classified in accordance with their flux reference analysis.

Recommendations for the Storage and Processing of Welding Fluxes.

Owing to their mineralogical structure and manufacture, welding fluxes are more or less susceptible to moisture. Agglomerated fluxes are bonded mixtures of finely ground raw materials which may absorb more moisture from the atmosphere than a fused flux. Therefore, their ability to be stored for long periods of time can be affected. Fluxes that have become damp, must be re-dried in order to reduce the moisture content to an acceptable level.

OERLIKON welding fluxes are supplied in PE bags of 25 kg. On demand, flux can also be supplied in DRY BAG, big bags or metal drums. It is recommended to store welding fluxes in a dry location at a constant temperature. Fluxes stored in such a way in undamaged containers, can be stored up to one year without deterioration.

The re-drying temperatures specified in the DVS-Richtlinie (Guideline) 0914 should be considered as reference values. Due to the variations in composition of different fluxes, the data provided by the manufacturer will be binding.

OERLIKON-welding fluxes should be re-dried as follows:
Agglomerated fluxes – not less than. 2 hours at 300-350 °C
Fused fluxes – not less than 2 hours at 250 °C

The maximum recommended re-drying time is 10 hours.

Recycling of fluxes

The portion of flux not fused during submerged-arc welding may be recovered and re-used. Recycling through the feeding system can take place several times, provided that the feeding system was designed for the handling of agglomerated fluxes. Transport speeds should be low and the route as short as possible, with smooth bends.

When removing the flux, a change in grain size cannot always be avoided. For this reason, following consumption of about 50-60 % of the flux in circulation, dry, fresh flux should be added in order to ensure that the flux circulating in the feeding system will always have a uniform grain size distribution, thus ensuring satisfactory flux performance.

In addition, the guidelines according to Richtlinie DVS 0914, are applicable to the storing and processing of welding fluxes.

Data sheets:

The mechanical properties indicated in the data sheets refer to the all-weld metal (see general references).

Interpass temperature:

a) for unalloyed and alloyed steels: 150-200 °C

b) for creep resistant steels: according to base metal

c) for Cr-Ni-steels: max. 100-150 °C

Welding parameters:

a) for unalloyed and alloyed steels, as well as creep resistant steels:

Wire diameter [mm]:	4,0
Welding current [A]:	600
Welding voltage [V]:	30
Welding speed [cm/min]:	60

b) for Cr-Ni-steels

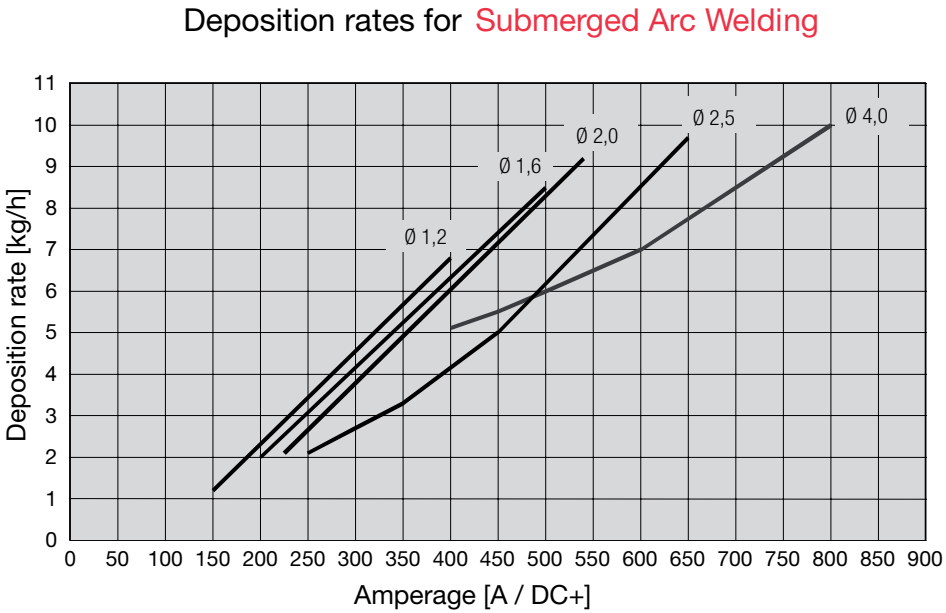
Wire diameter [mm]:	4,0
Welding current [A]:	550
Welding voltage [V]:	30
Welding speed [cm/min]:	70

Depending upon the base metal, joint preparation, welding parameters and cooling conditions, different mechanical properties of the welded joint may be obtained. Thus, for instance, in the case of a square butt joint, the dilution of base metal into the weld metal may be up to 75 %. In such a weld, the mechanical properties will most certainly deviate from those given in the respective data sheet. In the case of multi-pass joints, however, the technological properties of the all-weld metal produced by the respective wire/flux combination will apply.

For the reasons given above, it is advisable to carry out procedure test welds using the actual welding conditions and base materials. This will also be required if the welded joint is to be heat treated.

Submerged-arc smaller diameter wire welding technique

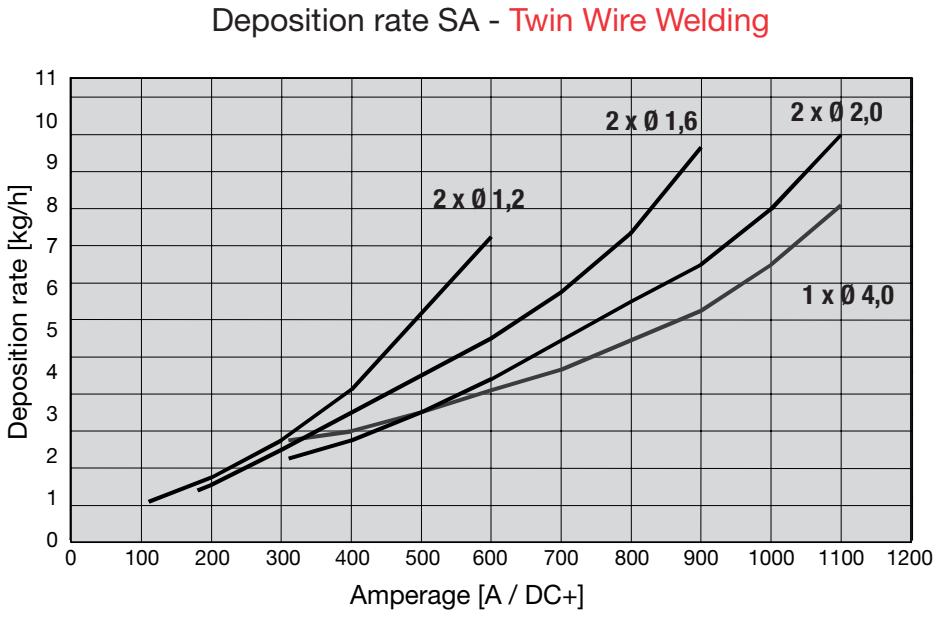
Submerged-arc welding with smaller diameter wires constitutes a high deposition rate process variant, which permits the optimisation of technology and efficiency. Using wire electrodes of ø1,2 mm, ø1,6 mm und ø 2,0 mm diameter, submerged-arc welding enters domains formerly reserved for MAG-welding, thus associating high efficiency with high-quality SAW-welding. OERLIKON offers both suitable welding fluxes and SAW-wires according to EN 756 and EN 12072.



The deposition rate is dependent upon the current in SAW single wire welding using thin diameter wires, as compared to SAW single wire welding with a 4.0 mm dia. wire.

Submerged-arc twin-wire welding technique

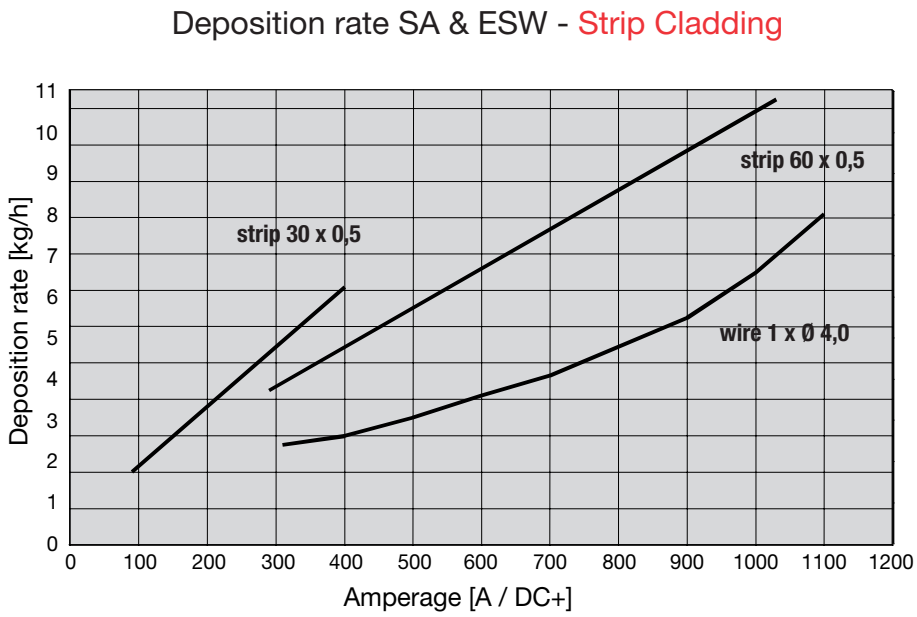
Submerged-arc twin-wire welding, a process variant using smaller diameter wires (e.g. 2 x 1,2 mm ø, 2 x 1,6 mm ø, ...), results in a significant increase in deposition rate compared to single wire welding while maintaining a favourable bead geometry (ratio of width to height). This process can be used for cost effective fillet and butt-welding. Owing to the high deposition rate, it is possible to obtain large weld beads. For smaller beads, the high deposition rate can be converted into considerably higher welding speeds. The OERLIKON product range contains suitable welding fluxes and wires according to EN 756; EN 12070 and EN 12072.



Deposition rate is dependent upon current in SA-twin-wire welding using small diameter wires, as compared to SAW single wire welding with a 4,0 mm dia. wire.

Submerged-arc and Electro-slag Strip Cladding

For high-efficiency corrosion resistant cladding of vessels used in the chemical and petro-chemical industries. Welds deposited are flat with a very smooth surface, even if cladding rates are as high as 0,8 m²/hour. For this application there is a range of OERLIKON fluxes used in combination with OERLIKON SUPRASTRIP electrodes.



Deposition rate is dependent upon current in SA & ESW-strip cladding, as compared to SAW single wire welding with a 4,0 mm dia wire.

Storage and Handling of Agglomerated Fluxes for Submerged Arc and Electroslag Welding

The flux handling practice and procedures in a fabrication environment should take into consideration the following:

Introduction: An inherent feature of all agglomerated submerged-arc welding fluxes is their tendency to re-absorb moisture. The superior mechanical properties provided by basic agglomerated fluxes has lead to their extensive use in critical applications where diffusible hydrogen in the weld deposit and heat-affected zone of the parent material can lead to cracking. In recognition of the need to control the flux moisture content and moisture re-absorption characteristics Oerlikon have developed manufacturing, storage and handling procedures designed to optimise this feature of flux quality.

Manufacturing. All basic type agglomerated fluxes are hygroscopic to some degree and it is essential that the manufacturing process be controlled to provide a low flux moisture content together with a high resistance to moisture re-absorption under workshop conditions. Oerlikon have gained extensive experience over the years in the manufacture and supply of submerged-arc welding consumables for critical applications. This experience, in combination with extensive research into flux moisture control, has led to the development of manufacturing procedures and quality control systems designed to ensure the supply of consistently low flux moisture contents. These procedures are based on the use of high flux baking temperatures during manufacture followed by packing into sealed drums or moisture resistant plastic bags, dependent upon customer requirements. The final baking procedure additionally enhances resistance to subsequent moisture re-absorption.
The weld metal hydrogen content of Oerlikon basic fluxes such as OP41TT and OP121TT is determined and recorded on the consumable test certificates. The fabricator is therefore provided with a clear indication of the potential level of hydrogen contribution to the weld that may be expected from a given batch of flux in the AS RECEIVED condition.

Storage: It is recommended that submerged-arc-welding fluxes are stored in controlled conditions:
Air temperature: 18 °C min. [64 °F]
Relative Humidity: 60% max.
Extended periods of exposure in workshops should be avoided and precautions taken to prevent direct contamination by moisture, oil, grease and rust.
Should moisture contamination be suspected it can be reconditioned by re-baking in accordance with the standard procedure outlined in the section on Re-baking.

Flux use and Re-Circulation: Where the flux storage conditions, given in the section on Storage, are met flux can be used directly from previously unopened bags or drums.
Re-circulation of flux should be limited to three cycles through the system. After this, the flux should be mixed with twice its volume of new flux prior to further use.
Oerlikon agglomerated fluxes are suitable for most vacuum type recovery units with soft bends. It is recommended that such units include a separator sieve capable of removing slag particles. Where flux from such units is considered visually to contain a large proportion of very fine particles [dust], a further sieving operation is recommended in order to remove particles with a size of less than 0.25mm, prior to further use.
In workshop conditions it is recommended that exposure of the flux be restricted to a maximum of 5 hours. However, his time period is dependent upon the prevailing atmospheric conditions of temperature and humidity.
When using fully basic fluxes i.e. OP41TT or OP121TT for high integrity weld joints, best results can be achieved by utilising purpose designed heated hoppers for storage within workshop areas. Recommended holding temperatures may be subject to variation depending on hopper design, however in general storage at a temperature of 100 °C [212 °F] minimum will prove effective.
When using heated hoppers flux must not be removed from the top of the hopper or the hopper emptied unless the flux has remained in the heated hopper for a minimum of 4 hours.
Any flux left exposed to workshop conditions for an excess period and the flux is suspected of being contaminated by moisture re-baking as described in the next section must be carried out.
Re-baking: When it is necessary to re-bake flux the following procedure may be adopted to restore the flux to its original condition. Flux should be baked in an oven in shallow trays [less than 50 mm [2 in] deep] at 350 °C to 400 °C [660 °F to 750 °F] for 2 hours using an oven that has free air circulation.

OP 119

OERLIKON

SAW Rutile-Acid Fluxes
C-Mn and low-alloy steels

OP 119 è un flusso agglomerato calcio-silicato indicato per la saldatura di acciai non legati a grano fine. É particolarmente indicato per la saldatura in multifilo e ad alte velocità. In caso di umidità il flusso il flusso deve essere ricondizionato ad un atemperatura di 300-350°C. Grano di dimensioni conforme alle EN 760: 2-20.

OP 119 is an agglomerated calcium-silicate type flux for welding of general structural steels, boiler and pipe steels, as well as fine grain structural steels. It produces silicon pick-up and when used with wire electrodes OE-S1, OE-S2 and OE-S3, also a manganese pick-up. The neutral point for manganese is about 2%, so that OP 119 can be combined with low manganese wire electrodes. OP 119 is particularly suited for twin-wire, tandem and multi-wire welding and for welding from both sides in one pass. For enhanced weld metal toughness, molybdenum alloyed wire electrodes (OE-S2Mo) should be used. OP 119 is suitable for use on either DC+ or AC up to 1000A, in single wire welding. Slag removal is easy in all cases. The fused slag is short which means that girth seams of small-diameter workpieces can be welded without the danger of the slag running off.

Wire	Classification	
OE-S1	AWS	A5.17: F7A0 EL 12
OE-S2	AWS	A5.17: F7A2 EM 12K
OE-S2Mo	AWS	A5.23: F8A0-EA2-A2
	EN	760: SA CS 1 77 AC

Wire	Approvals	Grades
OE-S1	DB	
OE-S1	TÜV	
OE-S2	DB	
OE-S2	TÜV	
OE-S2Mo	DB	
OE-S2Mo	TÜV	

Flux Analysis	
Al2O3 + MnO	25 %
SiO2 + TiO2	40 %
CaF2	10 %
CaO + MgO	20 %

Basicity to Boniszewski 1

Typical Applications

Wire	Materials
OE-S1	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: X 60, X 65, EN:16 Mo 3, S(P)355-S(P)460, L245-L450

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.05	1.10	0.50	-	-	-	-	-	-
OE-S2	0.05	1.40	0.50	-	-	-	-	-	-
OE-S2Mo	0.05	1.30	0.50	-	-	0.50	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 360	420 - 520	≥ 24
OE-S2	As Welded	≥ 400	520 - 620	≥ 24
OE-S2Mo	As Welded	≥ 480	600 - 700	≥ 20

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded	100 min	60 min	30 min					
OE-S2	As Welded	100 min	80 min	50 min					
OE-S2Mo	As Welded	90 min	50 min	35 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP 143

OERLIKON

SAW Rutile-Acid Fluxes
C-Mn and low-alloy steels

OP 143 è un flusso agglomerato calcio-silicato utilizzabile per la saldatura di strutture , boiler e tubazioni con acciai a grano fine. Il comportamento metallurgico del flusso prevede un incremento di Manganese e Silicio utilizzando fili del tipo OE-S1, OE-S2 e OE-S3. E' particolarmente indicato per processi come il Twin arc, il tandem ed il multi filo utilizzando elevate velocità di saldatura e con la tecnica della passata contrapposta. Per migliorare la tenacità della zona fusa può essere utilizzato il filo OE-S2Mo. OP 143 può essere utilizzato con corrente elevata, fino a 1200A con filo singolo ed anche in queste condizioni di saldatura la rimozione della scoria e l' aspetto del cordone risultano eccellenti. Il rapido raffreddamento della scoria permette il suo utilizzo anche in saldature circonferenziali di relativamente piccolo diametro senza che la scoria coli. Il flusso umido deve essere condizionato a 300-350°C. Granulometria in accordo a EN 760: 2-20.

OP 143 is an agglomerated calcium-silicate type flux for welding general structural steels, boiler and pipe steels, as well as fine grain structural steels. It produces a high silicon and manganese pick-up when using wire electrodes OE-S1, OE-S2 and OE-S3. It is particularly suited for twin-wire, tandem and multi-wire welding at high speeds and for welding from both sides in one pass. For enhanced weld metal toughness, molybdenum alloyed wire such as OE-S2Mo should be used. The high current carrying capacity up to 1200A in single wire makes OP 143 the ideal flux for all applications where high currents are involved (multiwire welding, surfacing, etc.) Easy slag removal in all cases. The fused slag is fast freezing and allows circumferential welding of small-diameter workpieces without the slag running off. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S1	AWS	5.17 F6A0 EL12
OE-S2	AWS	5.17 F7A0 EM12K
OE-S2Mo	AWS	5.23 F8A0 EA2-A2
	EN	760: SA CS 1 98 AC

Wire	Approvals	Grades
OE-S1	DB	
OE-S1	TÜV	
OE-S2	DB	
OE-S2	TÜV	

Flux Analysis	
CaF2	10 %
Al2O3 + MnO	25 %
SiO2 + TiO2	40 %
CaO + MgO	25 %

Basicity to Boniszewski 1,0

Typical Applications

Wire	Materials
OE-S1	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: API 5L Grades A, B, X42, X46, X52, X56, X60 EN:16 Mo 3, S(P)355-S(P)420, L245-L450

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.04	1.30	0.80	-	-	-	-	-	-
OE-S2	0.05	1.70	0.90	-	-	-	-	-	-
OE-S2Mo	0.05	1.70	0.90	-	-	0.50	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 360	460 - 560	≥ 24
OE-S2	As Welded	≥ 400	530 - 630	≥ 24
OE-S2Mo	As Welded	≥ 480	600 - 700	≥ 22

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded	90 min	50 min	30 min					
OE-S2	As Welded	90 min	50 min	35 min					
OE-S2Mo	As Welded	65 min	50 min	35 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
AC; DC+

OP 191

OERLIKON

SAW Rutile-Acid Fluxes
C-Mn and low-alloy steels

OP 191 è un flusso agglomerato rutile indicato per la saldatura di normale carpenteria. Può essere anche utilizzato con acciai a grano fine con limite elastico non superiore a 355 N/mm2. Ha un comportamento attivo in Silicio e se usato in abbinamento con fili del tipo OE-S1 e OE-S2 ha un comportamento attivo anche per quanto riguarda il Manganese. E' particolarmente indicato per la saldatura in tandem a due o più fili garantendo alte velocità di saldatura. Può essere utilizzata anche la tecnica delle due passate contrapposte. Grazie alla scoria facilmente asportabile si presta molto bene all'esecuzione di saldature ad angolo. OP 191 può essere saldato sia in DC+ che in AC fino ad amperaggi di circa 1000A. Il flusso umido deve essere ricondizionato a 300-350°C. Granulometria in accordo a EN 760: 2-20.

OP 191 is an agglomerated rutile type flux for welding general structural steels. It is also used for welding fine-grain steels with a yield strength of up to 355 N/mm². Relatively high silicon pick-up is achieved with this flux and when used in conjunction with OE-S1, OE-S2 wire electrodes manganese pick-up also results. OP 191 is particularly well-suited to twin-wire, tandem and multi-wire welding at high speeds. It can also be used with the two-run technique especially when weld Ihin-walled spiral tubes. The good slag detachability makes OP 191 a standard for fillet welding. OP 191 can be welded on DC+ or AC at up to 1500 A. Damp fluxes should be re-dryed at 300-350°C.
Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S1	AWS	A5.17: F7A0 EL 12
OE-S2	AWS	A5.17: F7A0 EM 12K
OE-S2NiCu	AWS	A 5.23: F8 AZ - EG-G
	EN	760: SA AR 1 87 AC
OE-S1	EN	756: S 4T A AR S1
OE-S2	EN	756: S 4T 0 AR S2
OE-S2NiCu	EN	756: S 4T 0 AR S0

Wire	Approvals	Grades

Flux Analysis	
Al2O3 + TiO2 + ZrO2	52 %
SiO2	19 %
MnO + FeO	17 %
CaO + CaF2 + MgO	17 %

Basicity to Boniszewski 0,4

Typical Applications

Wire	Materials
OE-S1	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2NiCu	ASME: EN:'S235J0W; S235J2W; S355J0W; S355J2W; S355K2W

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.03	0.90	0.80	-	-	-	-	-	≤ 0.35
OE-S2	0.025	1.10	0.50	-	-	-	-	-	≤ 0.35
OE-S2NiCu	0.03	1.20	0.80	0.20	0.60	-	-	-	≤ 0.50

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 400	520 - 650	≥ 22
OE-S2	As Welded	≥ 400	520 - 650	≥ 22
OE-S2NiCu	As Welded	≥ 470	550 - 690	≥ 22

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded			27 min					
OE-S2	As Welded			27 min					
OE-S2NiCu	As Welded		30 min						

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP 181

OERLIKON

SAW Rutile-Acid Fluxes

OP 181 è un flusso agglomerato rutil-alluminio indicato per la saldatura di acciai non legati e a grano fine con limite elastico max. 355 N/mm2. Il deposito è additivato con Silicio e Manganese ed è particolarmente bilanciato per l'impiego con fili del tipo OE-S1,OE-S2, OE-S2Si. L'elevata conducibilità elettrica consente alte velocità di saldatura sia con procedimento a monofilo che a doppio filo in tandem o twin-arc. Indicato per saldatura d'angolo o testa a testa a passate contrapposte o nell'esecuzione della saldatura longitudinale su tubazioni. Il distacco della scoria è estremamente facile, tale da consentire l'impiego anche su cianfrini molto stretti o saldature d'angolo. Si può utilizzare sia in DC + che in AC con amperaggi massimi di 1000 A. Il flusso umido deve essere ricondizionato ad una temperatura di 300-350 °C.
Granulometria in accordo a EN 760: 2-16.

OP 181 is an agglomerated aluminate-rutile type flux for welding general structural steels, pressure vessel steels and pipe steels as well as fine-grain steels with a yield strength of up to 355 N/mm². High silicon and manganese pick-up is obtained with this flux and it can therefore be combined with wire electrodes OE-S1, OE-S2 and OE-S 2Si. OP 181 is well suited to high-speed welding with the twin-wire process, as well as tandem and multi-wire welding. The metallurgical behaviour of this flux mean that it can be used effectively when welding with the two-run tecnique, e.g. longitudinal pipeline welds or spiral tubes in thin materials. A further application is the welding of pipe-web-pipe joints or membrane wall welds. The good slag detachability makes OP 181 particularly suitable for fillet welding applications.
OP 181 can be welded with DC or AC at up to 1000 A. When using DC the wire electrode should be connected to the +pole.
Damp flux should be re-dried at 300-350°C. Grain size in accordance with EN 760: 2-16.

Wire	Classification	
OE-S1	AWS	A5.17: F7A0-F7PZ EL 12
OE-S2	AWS	A5.17: F7A0-F7PZ EM 12K
	EN	760: SA AR 1 88 AC

Wire	Approvals	Grades
OE-S1	TÜV	
OE-S2	ABS	
OE-S2	BV	
OE-S2	DB	
OE-S2	DNV	
OE-S2	GL	
OE-S2	LRS	
OE-S2	RS	
OE-S2	TÜV	
OE-S2Mo	TÜV	

Flux Analysis	
CaF2	10 %
SiO2 + TiO2	30 %
Al2O3 + MnO	50 %

Basicity to Boniszewski 0,4

Typical Applications

Wire	Materials
OE-S1	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: API 5L Grades A, B, X42, X46, X52, X56 EN:16 Mo 3, S(P)355-S(P)420, L245-L450

OP 181

OERLIKON

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.03	1.10	0.60	-	-	-	-	-	-
OE-S2	0.04	1.30	0.60	-	-	-	-	-	-
OE-S2Mo	0.04	1.30	0.60	-	-	0.50	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 420	520 - 620	≥ 22
OE-S2	As Welded	≥ 450	560 - 660	≥ 22
OE-S2Mo	As Welded	≥ 490	610 - 710	≥ 18

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded	30 min							
OE-S2	As Welded	30 min							
OE-S2Mo	As Welded	50 min							

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

UNIFLUX D1

OERLIKON

SAW Rutile-Acid Fluxes
C-Mn and low-alloy steels

UNIFLUX D1 è un flusso agglomerato di tipo alluminato-rutile, adatto per saldare acciai da costruzione, serbatoi e carpenteria in generale. Può essere utilizzato anche su acciai a grana fine, con limite elastico fino a 355 N/mm². Questo flusso ha una scoria facilmente asportabile e pertanto è comunemente utilizzato su saldature ad angolo. Il metallo saldato non è suscettibile di porosità anche quando si fanno saldature su superfici in opera contaminate da ruggine, scorie, ecc. UNIFLUX D1 può essere saldato con AC o DC+ fino a 1000 A (nell'ambito di un procedimento ad un solo filo). Il flusso umido deve essere ricondizionato a 300-350°C. La granulometria è secondo EN 760: 2-16.

Uniflux D1 is an agglomerated aluminate rutile type flux for welding general structural steels, pressure vessel steels as well as fine-grain steels with a yield strength of up to 355 N/mm². The good slag detachability means that Uniflux D1 is commonly used when fillet welding. The weld metal is not susceptible to porosity when welding on workpiece surfaces contaminated by rust, scale, etc.
UNIFLUX D1 can be welded on DC+ or AC at up to 1000 A (with the single-wire process).
Damp flux should be re-dried at 300-350°C. Grain size in accordance with EN 760: 2-16.

Wire	Classification	
OE-S1	AWS	A5.17:F7A0 - EL12
OE-S2	AWS	A5.17:F7A0 - EM12K
	EN	760: SA AR 1 97 AC

Wire	Approvals	Grades

Flux Analysis	
Al2O3 + MnO	55 %
CaF2	5 %
SiO2 + TiO2	30 %

Basicity to Boniszewski 0,4

Typical Applications

Wire	Materials
OE-S1	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: ASTM A355 Gr. P1; A182M Gr. F1 EN:16 Mo 3,
OE-S2CrMo1	ASME: A199 and A200 grade T11, A213 Grades T11, T12 EN:'13CrMo4-5, 13CrMoSi5-5

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.04	0.90	0.50	-	-	-	-	-	-
OE-S2	0.03	1.20	0.50	-	-	-	-	-	-
OE-S2Mo	0.04	1.20	0.50	-	-	0.50	-	-	-

UNIFLUX D1

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 360	450 - 550	≥ 22
OE-S2	As Welded	≥ 400	500 - 600	≥ 22
OE-S2Mo	As Welded	≥ 450	580 - 680	≥ 18

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded	30 min							
OE-S2	As Welded	30 min							
OE-S2Mo	As Welded	50 min							

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

Pie 18

OERLIKON

SAW Rutile-Acid Fluxes
C-Mn and low-alloy steels

Pie 18 è un flusso fuso calcio-silicato per saldare acciai strutturali fino al grado StE 355. Utilizzato per applicazioni navali, gferroviarie e di carpenteria. Due classi granulometriche sono disponibili: 2-25 per applicazioni generali, 2-10 per saldature di tubi o come backing in applicazioni one-side. Corrente consigliata DC+. Il flusso umido deve essere ricondizionato a 300-350°C. Dimensioni grani in accordo a EN 760: 2-20.

Pie 18 is a fused calcium silicate type flux for welding structural steels up to StE 355. It is commonly used in conjunction with OE-S2 as general purpose flux in ship building, heavy machinery, and the railway industry. Pie 18 is available in two grain sizes: 2 – 25 for general applications and 2 – 10 for tube-web-tube joints in heat exchangers or as a backing flux in one-sided welding.
Pie 18 is not recommended for small diameter circumferential welds or thin section fillet welds (< 4mm). Connection of the welding electrode to DC+ electrode polarity is recommended. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	EN 760: SF CS 1 77

Wire	Approvals	Grades
OE-S2	DB	
OE-S2	TÜV	
OE-S2Mo	DB	
OE-S2Mo	TÜV	

Flux Analysis	
CaF2	5 %
Al2O3 + MnO	20 %
CaO + MgO	25 %
SiO2 + TiO2	45 %

Basicity to Boniszewski 1,0

Typical Applications

Wire	Materials
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: API 5L Grades A, B, X42, X46, X52, X56 EN:16 Mo 3; S(P)235-S(P)355; L245-L360
OE-S2NiCu	ASME: EN:'S235J0W; S235J2W; S355J0W; S355J2W; S355K2W

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S2	0.06	1.20	0.50	-	-	-	-	-	-
OE-S2Mo	0.06	1.20	0.50	-	-	0.40	-	-	-
OE-S2NiCu	0.06	1.20	0.50	0.20	0.60	-	-	-	0.40

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S2	As Welded	≥ 420	550 - 640	≥ 20
OE-S2Mo	As Welded	≥ 460	550 - 680	≥ 19
OE-S2NiCu	As Welded	≥ 460	530 - 680	≥ 19

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S2	As Welded	100 min	75 min	50 min					
OE-S2Mo	As Welded	60 min	47 min	28 min					
OE-S2NiCu	As Welded	60 min	47 min	28 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+

OP F55

OERLIKON

SAW Rutile-Acid Fluxes
C-Mn and low-alloy steels

Flusso fuso additivante in silicio e manganese. Idoneo per la saldatura di acciai al carbonio. Ottima rimozione della scoria. Particolarmente idoneo alla saldatura di lamiere di piccolo spessore (3-5mm) con elevate velocità di lavoro.

OP F55 is a fused flux which donates manganese and silicon. Suitable for welding carbon steels using the single or multipass techniques and single and multiwire applications. Good slag removal in fillet and groove joints. Especially suitable for high speed welding on thin plate (3 -5mm). It can also be used for welding with a copper backing. Damp flux should be re-dried at 300-350°C.
Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S1	AWS	A5.17: F7A0-EL12
OE-S2	AWS	A5.17: F7A0-EM12K
	EN	760: S F MS 1 67 AC
OE-S1	EN	756: S 42 0 MS S1
OE-S2	EN	756: S 42 0 MS S2

Wire	Approvals	Grades

Flux Analysis	
MnO	45 %
CaO	2 %
TiO2	20 %
SiO2	22 %
CaF2	3 %

Basicity to Boniszewski 0,9

Typical Applications

Wire	Materials
OE-S1	ASME: EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: EN: 'S(P)235-S(P)355; L245-L360

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.05	1.10	0.20	-	-	-	-	-	-
OE-S2	0.05	1.30	0.20	-	-	-	-	-	-

OP F55

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 400	490 - 560	≥ 22
OE-S2	As Welded	≥ 420	520 - 600	≥ 22

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded	40 min		27 min					
OE-S2	As Welded	40 min		27 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP F72

OERLIKON

SAW Rutile-Acid Fluxes
C-Mn and low-alloy steels

Flusso fuso additivante in silicio e manganese. Idoneo a saldature longitudinali e circolari nella fabbricazione di tubi in mono e multi filo.

OP F72 is a fused flux which donates manganese and silicon to the weld deposit. Suitable for longitudinal and spiral welding of pipes using single wire, tandem or multi-wires. It can be used for both single pass and multi pass welding. Good slag removal. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S1	AWS	A5.17: F6A0-EL12
OE-S2	AWS	A5.17: F7A2-EM12K
OE-S2Mo	AWS	A5.23: F8A0-EA2-A2
	EN	760: S F CS 1 66 AC
OE-S1	EN	756: S 35 0 CS S1
OE-S2	EN	756: S 42 2 CS S2
OE-S2Mo	EN	756: S 46 0 CS S2Mo

Wire	Approvals	Grades

Flux Analysis	
MnO	20 %
SiO2	40 %
CaO	19 %
CaF2	12 %
MgO	4 %

Basicity to Boniszewski 1,1

Typical Applications

Wire	Materials
OE-S1	ASME: EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: EN:16 Mo 3

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.04	0.80	0.35	-	-	-	-	-	-
OE-S2	0.03	1	0.35	-	-	-	-	-	-
OE-S2Mo	0.03	1	0.35	-	-	0.50	-	-	-

OP F72

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 350	440-490	≥ 21
OE-S2	As Welded	≥ 350	490-550	≥ 22
OE-S2Mo	As Welded	≥ 480	570-640	≥ 22

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded			35 min					
OE-S2	As Welded			35 min					
OE-S2Mo	As Welded			35 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP 100

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

Flusso agglomerato del tipo alluminato basico per la saldatura di acciai al carbonio a grano fine aventi limite elastico fino a 420 Mpa. Trova applicazione in settori quali caldareria, carpenteria e saldatura di tubazioni. Il flusso è idoneo per essere utilizzato in applicazioni multi-wire e per saldature a passate contrapposte. La rimozione della scoria è particolarmente agevole anche in cianfrini stretti (narrow gap). La scoria solidifica rapidamente, permettendo così la saldatura di tubi con piccolo diametro senza correre il rischio che questa coli oltre l'arco elettrico. OP 100 può essere saldato in DC+ come in AC fino a correnti di 1000A. Il flusso fuso deve essere ricondizionato a 300-350°C. Granulometria in accordo a EN 760: 2-20.

OP 100 is an agglomerated aluminate-basic type flux used for the welding of general structural steels, boiler and pipe steels, as well as fine grain structural steels, having a yield strength of up to 420 N/mm². It produces a silicon and manganese pick-up and is suitable for use in combination with OE-S1 to OE-S3 wire electrodes, including OE-S2 Mo. The weld metal produced is extremely resistant to cracking, and the weld bead is resistant to base plate impurities. OP 100 is suitable for single and multi-wire welding and for welding from both sides in one pass. The slag detaches very easily even in narrow V-type preparations. The fused slag freezes rapidly and allows small diameter circumferential pipe to be welded without the risk of slag running off.
OP 100 can be used on either DC+ or AC up to 1000A. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S1	AWS	5.17: F6A0-EL12
OE-S2	AWS	5.17: F7A0-EM12K
OE-S2Mo	AWS	5.23: F7A0-EA2-A2
	EN	760: S A AB 1 76 AC

Wire	Approvals	Grades
OE-S1	DB	
OE-S1	TÜV	
OE-S2		
OE-S2	DB	
OE-S2	TÜV	
OE-S2Mo	DB	
OE-S2Mo	TÜV	

Flux Analysis	
CaO + MgO	20 %
SiO2 + TiO2	25 %
Al2O3 + MnO	45 %
CaF2	10 %

Basicity to Boniszewski 0,8

Typical Applications

Wire	Materials
OE-S1	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: ASTM A355 Gr. P1; A182M Gr. F1 EN:16 Mo 3, S(P)355-S(P)460, L245-L450

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.06	1	0.30	-	-	-	-	-	-
OE-S2	0.06	1.40	0.40	-	-	-	-	-	-
OE-S2Mo	0.06	1.40	0.40	-	-	0.40	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 360	420 - 520	≥ 24
OE-S2	As Welded	≥ 400	500 - 600	≥ 24
OE-S2Mo	As Welded	≥ 450	600 - 700	≥ 20

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded	90 min	60 min	30min					
OE-S2	As Welded	90 min	60 min	30 min					
OE-S2Mo	As Welded	65 min	45 min	35 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
AC; DC+

OP 122

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

OP 122 è un flusso agglomerato di tipo fluor-basico adatto per la saldatura di strutture di carpenteria in acciaio al carbonio, contenitori a pressione, tubazioni e acciai a grano fine. OP122 ha la capacità di lavorare con alte densità di corrente e pertanto può essere utilizzato anche per saldature di angoli con gola di ampio spessore. La scoria di questo flusso è facilmente asportabile, può essere saldato sia in DC polo +, che in AC fino a 1200 A. Lo speciale metodo di produzione garantisce un basso contenuto di umidità, ed un basso contenuto di idrogeno nel deposito. Il flusso umido deve essere ricondizionato a 300-350°C. Granulometria in accordo a EN 760: 2-20.

OP 122 is an agglomerated fluoride-basic type flux for joint welding general structural steels, pressure vessel steels, pipe steels and fine-grain steels. OP 122 has a high current-carrying capacity and is therefore also suited to welding fillets with a large throat thickness in steel constructions. The flux has an easily detachable slag. As the bulk density is low, so is the consumption rate. OP 122 can be welded on DC+ pole and AC at up to 1200 A. The special production method ensures that the flux has low moisture pick-up and the weld metal a low hydrogen content. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S2	AWS	A5.17: F7A5-F6P5 EM 12K
OE-SD3	AWS	A5.17: F7A4-F6P4 EH 12K
OE-S2Mo	AWS	A5.23: F7 A2 - EA2 A2
	EN	760: SA FB 1 65 AC H5

Wire	Approvals	Grades

Flux Analysis	
CaF2	20 %
Al2O3 + MnO	25 %
CaO + MgO	30 %
SiO2 + TiO2	20 %

Basicity to Boniszewski 1,7

Typical Applications

Wire	Materials
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-SD3	ASME: EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: X 60, X 65, ASTM A355 Gr. P1; A182M Gr. F1 EN:16 Mo 3, S(P)355-S(P)460, L245-L450
OE-S2CrMo1	ASME: A199 and A200 grade T11, A213 Grades T11, T12 EN:'13CrMo4-5, 13CrMoSi5-5

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S2	0.04	0.80	0.10	-	-	-	-	-	-
OE-SD3	0.04	1.30	0.15	-	-	-	-	-	-
OE-S2Mo	0.04	0.80	0.10	-	-	0.50	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S2	As Welded	≥ 400	450 - 550	≥ 24
OE-SD3	As Welded	≥ 400	500 - 600	≥ 24
OE-S2Mo	As Welded	≥ 480	550 - 650	≥ 20

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S2	As Welded	150 min	110 min	90 min					
OE-SD3	As Welded	160 min	130 min	100 min		70 min			
OE-S2Mo	As Welded	90 min	70 min	40 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP 139

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

OP 139 è un flusso agglomerato del tipo alluminato-basico, particolarmente indicato per la saldatura con procedimenti ad elevato tasso di deposito quali twin-wire, tandem e multi wire. Può essere usato per saldature longitudinali, circonferenziali e d'angolo. Anche ad elevate velocità di saldatura il cordone risulta di ottimo aspetto estetico e molto ben raccordato. Viene utilizzato in settori quali carpenteria e costruzione di recipienti in pressionne. Scoria di facile rimozione. Nella tecnica a multi passate il flusso si utilizza in abbinamento al filo OE-S2; nella tecnica a due passate contrapposte si abbiba al filo OE-S2Mo. Il flusso risulta leggermente attivo nei confronti di silicio e manganese.
Il flusso umido dovrebbe essere ricondizionato a 300-350°C. Granulometria in accordo a EN 760: 2-20.

OP 139 is an agglomerated aluminate basic flux which has been designed for use with the high deposition rate submerged arc processes, such as twin-wire, tandem or multi-wire. It can be used for both longitudinal and circumferential seams. Even at high speeds the wetting at the toe of the weld remains smooth and straight. The slag detaches very easily in long pieces even in fillet welds.
OP 139 can be used for all structural, pipe and boiler steels and for fine grained steels. There is a slight donation of manganese and silicon. In multilayer welds OP 139 is used in conjunction with OE-S2 and in DSAW with OE-S2Mo. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S2	AWS	5.17 F7A5 EM12K
OE-S4	AWS	5.17 F8A5 EH 14
OE-S2Mo	AWS	5.23 F8A5 EA2-A2
	EN	760: SA AB 167 AC H5

Wire	Approvals	Grades
OE-S2	DB	
OE-S2	GL	
OE-S2	LRS	
OE-S2	TÜV	
OE-S2Mo	DB	
OE-S2Mo	TÜV	

Flux Analysis	
CaO + MgO	25 %
Al2O3 + MnO	35 %
CaF2	15 %
SiO2 + TiO2	20 %

Basicity to Boniszewski 1,5

Typical Applications

Wire	Materials
OE-S2	ASME: EN: 'S(P)235-S(P)355; L245-L360
OE-S4	ASME: EN S(P)355-S(P)460
OE-S2Mo	ASME: ASTM A285 Grades A, B, C; A106 Grades A, B, C; X 60, X 65 EN:16 Mo 3, S(P)355-S(P)460, L245-L450

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S2	0.06	1.30	0.30	-	-	-	-	-	-
OE-S4	0.07	1.80	0.40	-	-	-	-	-	-
OE-S2Mo	0.06	1.30	0.30	-	-	0.40	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S2	As Welded	≥ 400	480 - 510	≥ 27
OE-S4	As Welded	≥ 480	560 - 600	≥ 25
OE-S2Mo	As Welded	≥ 510	570 - 630	≥ 21

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 50	- 60	- 80
OE-S2	As Welded			140 min	100 min	40 min			
OE-S4	As Welded			100 min		60 min			
OE-S2Mo	As Welded			110 min		80 min	50 min		

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
AC; DC+

OP 160

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

OP160 è un flusso agglomerato alluminato basico utilizzabile nella saldatura di acciai strutturali, tubazioni ed in genere acciai a grano fine. Considerando il suo comportamento metallurgico ne suggerisce l' uso con fili come OE-S1 e OE-S2. OP 160 è adatto per saldature eseguite con processo arco sommerso monofilo, tandem e twin arc. La sua scorificazione risulta ottima anche nelle passate di radice.
Il flusso umido deve essere trattato a 300-350°C. Granulometria in accordo a EN 760 : 2-20.

OP160 is an agglomerated aluminate-basic type flux for welding general structural steels, pipe steels as well as fine-grain steels. On account of its metallurgical behaviour it is used with OE-S1, OE-S2 wires. OP 160 is suitable for submerged-arc single wire, tandem and twin arc. Excellent slag detachability even in the root pass.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760 : 2-20.

Wire	Classification	
OE-S2	AWS	A5.17: F7A2 EM12K
	EN	760: SA AB 1 66 AC H15
OE-S2	EN	756: S 38 2 AB S2

Wire	Approvals	Grades
OE-S2	ABS	
OE-S2	BV	
OE-S2	DNV	
OE-S2	LRS	

Flux Analysis	
$Al_2O_3 + TiO_2 + ZrO_2$	30 %
$MnO + FeO$	10 %
SiO_2	15 %
$CaO + CaF_2 + MgO$	30 %

Basicity to Boniszewski 1,2

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S2	0.05	1.30	0.40	-	-	-	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S2	As Welded	≥ 355	≥ 490	≥ 22

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 50	- 60	- 196
OE-S2	As Welded		80	47					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP 180S

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

Flusso alluminato basico per la saldatura di acciai al carbonio. Moderatamente additivante in Si ed Mn viene impiegato in carpenteria, caldareria e industria navale. Abbinabile ai fili OE-S1 ed OE-S2.
Il flusso umido deve essere trattato a 300-350°C. Granulometria in accordo a EN 760 : 2-20.

OP 180S is an agglomerated aluminate- basic type flux for welding of general structural steels, boiler and pipe steels, shipbuilding steels, as well as fine grain structural steels. It produces a low silicon pick-up and a moderate manganese pick-up, so that it can be used in combination with OE-S1 and OE-S2 wires. OP 180S is used in shipbuilding, being suitable for twin wire, tandem and multi-wire welding, as well as for welding from both sides in one pass.
Lower strength shipbuilding steels are welded with OP180S + OE-S1 wire, the higher strength steels are welded with OE-S2 wire. The weld metal is not susceptible to cracking and the slag removal is good. OP 180S is suitable for use on either DC+ or AC up to 1000 A. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S1	AWS	5.17: F6A0 EL12
OE-S2	AWS	5.17: F7A0 EM12K
OE-S2Mo	AWS	5.25: F8A0 EA2-A2
	EN	760: SA AB 1 67 AC

Wire	Approvals	Grades
OE-S2	ABS	
OE-S2	BV	
OE-S2	DB	
OE-S2	DNV	
OE-S2	GL	
OE-S2	LRS	
OE-S2	PR	
OE-S2	RS	
OE-S2	TÜV	

Flux Analysis	
CaO + MgO	15 %
Al2O3 + MnO	40 %
SiO2 + TiO2	25 %
CaF2	15 %

Basicity to Boniszewski 1,2

Typical Applications

Wire	Materials
OE-S1	ASME: EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: EN: 'S(P)235-S(P)355; Shipbuilding steels A,B,D,E,AH32 to EH36
OE-S2Mo	ASME: EN:16 Mo 3, S(P)355-S(P)460, L245-L450

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.05	1	0.20	-	-	-	-	-	-
OE-S2	0.05	1.40	0.30	-	-	-	-	-	-
OE-S2Mo	0.05	1.40	0.30	-	-	0.50	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 360	430 - 530	≥ 25
OE-S2	As Welded	≥ 400	520 - 620	≥ 22
OE-S2Mo	As Welded	≥ 450	600 - 700	≥ 20

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded	100 min	60 min	35 min					
OE-S2	As Welded	120 min	70 min	50 min					
OE-S2Mo	As Welded	60 min	50 min	35 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
AC; DC+

OP 192

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

Il flusso OP 192 è un flusso basico per la saldatura di strutture sollecitate meccanicamente, recipienti a pressione, tubazioni ed accia a grana fine. Ha un comportamento metallurgico neutro con l'impiego di fili del tipo OE-S1, OE-S2, OE-SD3. Può essere utilizzato in twin-arc tandem e multipass anche con elevata velocità di deposito. Ideale per la saldatura di pipe dove si ottengono degli ottimi risultati in termini d produttività. Può essere utilizzato sia in corrente continua che in corrente alternata.
Il flusso umido deve essere ricondizionato a 300 - 350°C.
Granulometria in accordo alla EN 760: 2-20.

OP 192 is an agglomerated semi basic type flux for welding general structural steels, pressure vessel steels, pipe steels and fine-grain steels. The flux behaviour in terms of manganese is neutral, the use of wires with a relatively high manganese content is therefore required (OE-S1 - OE-SD3) OP 192 is suitable for submerged- arc twin-wire, tandem and multi-wire welding as well as for welding with the two-run techinique, e.g. in the production of large pipes. OP 192 can be welded on DC+ and AC.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S1	AWS	A5.17:F6A2 F6P2-EL12
OE-S2	AWS	A5.17: F7A2 F7P4 - EM12K
OE-SD3	AWS	A5.17:F7A6 F7P6-EH12K
OE-S2Mo	AWS	A5.23:F8A3 F8P2-EA2 A2
OE-S2NiCu	AWS	A5.23:F7A2 - EG-G
	EN	760: S A AB 1 67 AC H5

Wire	Approvals	Grades
OE-S2 / OE-S2 Mo	LRS	
OE-S2 / OE-S2 Mo	RINA	
OE-S2	ABS	
OE-S2	GL	
OE-S2	TÜV	

Flux Analysis	
SiO2	20 %
CaO + CaF2 + MgO	39 %
MnO + FeO	9 %
Al2O3 + TiO2 + ZrO2	30 %

Basicity to Boniszewski 1,3

Typical Applications

Wire	Materials
OE-S1	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-SD3	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: ASTM A285 Grades A, B, C; A106 Grades A, B, C; X 60, X 65 EN:16 Mo 3, S(P)355-S(P)460, L245-L450
OE-S2NiCu	ASME: EN:'S235J0W; S235J2W; S355J0W; S355J2W; S355K2W
OE-SD3Mo	ASME:ASTM A381 Class Y60 EN:S(P)355-S(P)460, L245-L450

OP 192

OERLIKON

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.03	1	0.40	-	-	-	-	-	-
OE-S2	0.03	1.50	0.60	-	-	-	-	-	-
OE-SD3	0.04	1.70	0.70	-	-	-	-	-	-
OE-S2Mo	0.04	1.50	0.60	-	-	0.40	-	-	-
OE-S2NiCu	0.04	1.40	0.60	0.20	0.70	-	-	-	≤ 0.40
OE-SD3Mo	0.04	1.70	0.60	-	-	0.40	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 360	450 - 550	≥ 24
OE-S1	620°C x 1 h	≥ 330	420 - 550	≥ 22
OE-S2	As Welded	≥ 430	520 - 620	≥ 24
OE-S2	620°C x 1 h	≥ 400	490 - 650	≥ 22
OE-SD3	As Welded	≥ 440	530 - 650	≥ 22
OE-SD3	620°C x 1 h	≥ 420	510 - 650	≥ 22
OE-S2Mo	As Welded	≥ 500	560 - 680	≥ 22
OE-S2Mo	620°C x 1 h	≥ 480	560 - 690	≥ 20
OE-S2NiCu	As Welded	≥ 450	500 - 600	≥ 25
OE-SD3Mo	As Welded	≥ 490	560 - 680	≥ 22

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 50	- 60	- 80
OE-S1	As Welded			80 min	27 min				
OE-S1	620°C x 1 h			80 min	27 min				
OE-S2	As Welded			100 min	70 min	27 min			
OE-S2	620°C x 1 h			100 min	60 min	47 min			
OE-SD3	As Welded			90 min		70 min			
OE-SD3	620°C x 1 h					60 min			
OE-S2Mo	As Welded			100 min	27 min				
OE-S2Mo	620°C x 1 h			90 min	27 min				
OE-S2NiCu	As Welded			60 min	27 min				
OE-SD3Mo	As Welded			80 min	50 min				

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP 126

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

Il flusso OP 126 è del tipo agglomerato di tipo basico indicato per la saldatura di strutture altamente sollecitate, anche a bassa temperatura. Ideale per l'unione di acciai a grana fine e debolmente legati. OP 126 ha un comportamento neutro per quanto riguarda l'apporto di silicio e manganese, anche nel caso di utilizzo di fili del tipo OE-SD3. Tale abbinamento può soddisfare le più selettive richieste meccaniche sia in tandem che in multipass. Adatto sia per corrente continua che per corrente alternata. Il flusso può essere ricondizionato a 300 - 350°C.

OP 126 is an agglomerated basic type flux for welding high-tensile, fine-grain steels as well as steels which are tough at sub-zero temperatures and resistant to ageing. The neutral behaviour of OP 126 in terms of silicon and manganese pick-up and burn-out means that it should be welded with wires such as OE-SD3. The flux is particularly well-suited for welding with the tandem and multi-wire processes. Excellent CTOD fracture toughness is obtained with OE-SD3 and OP 126 is widely used for welding offshore applications. The flux can be welded on DC+ and AC. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-SD3	AWS	A5.17: F7A8 EH12K
	EN	760: S A FB 1 55 AC H5

Wire	Approvals	Grades
OE-SD3	DNV	

Flux Analysis	
Mn	4 %
MgO	28 %
CaFe2	25 %
CaO	18 %
SiO2	15 %

Basicity to Boniszewski 2,7

Typical Applications

Wire	Materials
OE-SD3	ASME: EN:S(P)235-S(P)420

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-SD3	0.05	1.30	0.25	-	-	-	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-SD3	As Welded	≥ 450	540 - 640	≥ 25

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-SD3	As Welded	200 min	180 min	140 min		100 min	70 min		

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP 123

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

Il flusso OP 123 è del tipo agglomerato di tipo basico-alluminato, adatto per la saldatura di acciai al carbonio, ed acciai a grana fine. La riduzione di manganese che si verifica è nella media, mentre la riduzione di silicio è lieve. Il flusso indicato può essere adatto in abbinamento con i fili OE-S1, OE-S2 oppure OE-S2Mo. OP 123 ha una buona scorificazione, che lorende adatto alla saldatura circonferenziale su pezzi in opera di piccolo diametro. Adatto sia per corrente continua che per corrente alternata fino a 1000A. Il flusso umido può essere ricondizionato a 300 - 350°C. La granulometria è in accordo alla EN 760: 2-20.

OP 123 is an agglomerated aluminate-basic type flux for welding general structural steels, pipe steels, pressure vessel steels as well as fine-grain steels. The slag characteristic results in slight silicon and medium manganese pick up. On account of its metallurgical behaviour, OP 123 can be used with OE-S1, OE-S2, OE-S2 Mo wire electrodes. It is suitable for submerged-arc single-wire, tandem and multi-wire welding and when using the two-run technique, for example in the production of large pipes. OP 123 has a fast freezing slag i.e. circumferantial welding can be carried out on small-diameter workpieces. OP 123 can be welded on DC+ and AC at up to 1000A.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-S1	AWS	A5.17:F7AZ-F7PZ EL 12
OE-S2	AWS	A5.17:F7AZ-F7PZ EM 12K
OE-S2Mo	AWS	A5.23:F8A2-EA2-A2
	EN	760: SA AB 1 67 AC

Wire	Approvals	Grades
OE-S1	TÜV	
OE-S2	TÜV	
OE-S2Mo	TÜV	

Flux Analysis	
CaO + MgO	20 %
CaF2	10 %
SiO2 + TiO2	20 %
Al2O3 + MnO	45 %

Basicity to Boniszewski 1,0

Typical Applications

Wire	Materials
OE-S1	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-SD3	ASME: EN: 'S(P)235-S(P)355; L245-L360
OE-S2Mo	ASME: X 60, X 65, ASTM A355 Gr. P1; A182M Gr. F1 EN:16 Mo 3, S(P)355-S(P)460, L245-L450
OE-S2CrMo1	ASME: A199 and A200 grade T11, A213 Grades T11, T12 EN:'13CrMo4-5, 13CrMoSi5-5

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1	0.05	0.70	0.20	-	-	-	-	-	-
OE-S2	0.05	1.20	0.20	-	-	-	-	-	-
OE-S2Mo	0.05	1.20	0.20	-	-	0.50	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1	As Welded	≥ 360	420 - 520	≥ 24
OE-S2	As Welded	≥ 400	500 - 600	≥ 22
OE-S2Mo	As Welded	≥ 450	600 - 700	≥ 18

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1	As Welded	90 min	50 min	35 min					
OE-S2	As Welded	90 min	50 min	35 min					
OE-S2Mo	As Welded	65 min	50 min	35 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP 121TTW

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

OP 121TT W è un flusso agglomerato basico idoneo alla saldatura di acciai ad alta resistenza, a grano fine e nei casi in cui si debba garantire una elevate tenacità alle basse temperature o una resistenza all'invecchiamento. Il comportamento metallurgico nei confronti del Silicio e del Manganese è neutro, pertanto questo flusso dovrebbe essere utilizzato in abbinamento a fili del tipo OE-SD3.
Il flusso si presta alla saldatura in tandem con più fili. Indicato nella saldatura Offshore anche quando viene richiesto il CTOD. La scoria prodotta da questo flusso è del tipo a rapida solidificazione, permettendo in tal modo l'esecuzione di saldature circonferenziali su parti di piccolo diametro senza che la scoria liquida possa colare. Cordone di forma regolare e senza incisioni. Il flusso può essere saldato in DC+ o AC fino a valori di corrente di circa 800°. Il flusso umido deve essere ricondizionato a 300-350°C. Granulometria in accordo a EN 760: 2-20.

OP 121TT W is an agglomerated basic flux used for welding high-tensile, fine-grain steels and for joints which are tough at sub-zero temperatures and resistant to ageing. The neutral behaviour of OP 121TTW in terms of silicon and manganese pick-up and burn-out indicates that OP 121TTW is used in combination with wires such as OE-SD3 and can be used for tandem wire and for multi-wire processes.
The slag is fast freezing and applications include circumferential joints on small-diameter components, which can be welded without the risk of slag run off. Regularly shaped welds are deposited without undercut.
The flux can be welded on DC+ and AC, up to approximately 800 A. Grain size according to EN 760: 2-20.
Damp flux should be re-dried at 300-350°C.

Wire	Classification	
OE-S1 CrMo2	AWS	A5.23:F8P2-EB3-B3
OE-S2 CrMo1	AWS	A5.23:F8P4-EB2-B2
OE-S2 Mo	AWS	A5.23:F8A6-F8P6 EA2
OE-S2	AWS	A5.17: F7A2 - F6P3 EM12K
OE-SD3	AWS	A5.17:F7A8-F7P8 EH12K
OE-SD3 1Ni 1/2Mo	AWS	A 5.23: F9 AP8 EF3-F3
OE-SD3 2NiCrMo	AWS	A5.23: F11A6-F11P5-EG-M4
OE-S2 Ni2	AWS	A5.23: F7A10-F7P10 ENi2-Ni2
OE-S2 Ni3	AWS	A5.23: F8A15-F7P15 ENi3-Ni3
	EN	760: SA FB 1 55 AC H5
OE-SD3 1Ni 1/2Mo	EN	756: S 50 5 FB S3Ni1Mo

Wire	Approvals	Grades
OE-SD3	DNV	
OE-SD3	TÜV	
OE-S2 Ni2	RINA	

Flux Analysis	
CaF2	30 %
Al2O3 + MnO	20 %
SiO2 + TiO2	15 %
CaO + MgO	35 %

Basicity to Boniszewski 3,1

Typical Applications

Wire	Materials
OE-S1 CrMo2	ASME:A387 Gr.22, Cl 1and 2, A 182 Gr.F 22, A 336 Gr.F22 EN:10CrMo9-10, 12CrMo9-10
OE-S2	ASME: ASTM A131 Grades A, B, D, DS; A253 All grades; A529 Grades 42, 50; A570 All grades; A572 Grades 42, 50; A709 Grades 36, 50 EN: 'S(P)235-S(P)355; L245-L360
OE-S2 CrMo1	ASME: A199 and A200 grade T11, A213 Grades T11, T12 EN:'13CrMo4-5, 13CrMoSi5-5
OE-SD3	ASME: A516 all grades EN:S(P)235-S(P)420
OE-S2Mo	ASME: X 60, X 65, ASTM A355 Gr. P1; A182M Gr. F1 EN:16 Mo 3, S(P)355-S(P)460, L245-L450
OE-SD3 1Ni 1/2Mo	ASME: X70, X80, N-A-XTRA 55, HY80, QIN EN: 'S(P)420-S(P)500; L245-L485; 20MnMoNi5-5, 15NiCuMoNb5
OE-SD3 2NiCrMo	ASME: Q1N, HY80, HY100; USS T1, T1A and T1B; RQT 601, RQT 701 EN: S620-S690; P690; L415-L555
OE-S2 Ni1	ASME: EN:
OE-S2 Ni2	ASME: EN: 11MnNi5-3, 15NiMn-3
OE-S2 Ni3	ASME: ASTM A333 Grade 3, ASTM A334 Grade 3; A352LC3; ASTM A203 D,E EN:12Ni14, S(P)275-S(P)460

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S2	0.05	0.70	0.15	-	-	-	-	-	-
OE-SD3	0.05	1.30	0.25	-	-	-	-	-	-
OE-S2Mo	0.05	0.80	0.20	-	-	0.50	-	-	-
OE-SD3 1Ni 1/2Mo	0.07	1.60	0.30	-	0.90	0.50	-	-	-
OE-SD3 2NiCrMo	0.07	1.40	0.40	0.60	2.20	0.50	-	-	-
OE-S2 Ni1	0.05	1	0.25	-	1.20	-	-	-	-
OE-S2 Ni2	0.065	0.60	0.25	-	2.70	-	-	-	-
OE-S2 Ni3	0.06	0.60	0.25	-	3.50	0.15	-	-	-
OE-S2CrMo1	0.05	0.80	0.20	1.20	-	0.50	-	-	-
OE-S1CrMo2	0.05	0.70	0.20	2.20	-	1	-	-	-

OP 121TTW

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S2	As Welded	≥ 360	450 - 550	≥ 28
OE-SD3	PWHT 600°C X 2 H	≥ 450	560 - 640	≥ 25
OE-SD3	As Welded	≥ 450	560 - 640	≥ 25
OE-S2Mo	As Welded	≥ 500	580-680	≥ 20
OE-SD3 1Ni 1/2Mo	PWHT 580-620°C	≥ 540	630 - 730	≥ 22
OE-SD3 1Ni 1/2Mo	As Welded	≥ 540	650 - 750	≥ 20
OE-SD3 2NiCrMo	PWHT 600°C X 2 H	≥ 690	780 - 820	≥ 19
OE-SD3 2NiCrMo	As Welded	≥ 720	830 - 870	≥ 18
OE-S2 Ni1	PWHT 580-620°C	≥ 380	480 - 580	≥ 26
OE-S2 Ni1	As Welded	≥ 420	500 - 600	≥ 24
OE-S2 Ni2	PWHT 580-620°C	≥ 400	480-660	≥ 22
OE-S2 Ni2	As Welded	≥ 400	480-660	≥ 22
OE-S2 Ni3	PWHT 580-620°C	≥ 430	500 - 610	≥ 26
OE-S2 Ni3	As Welded	≥ 460	565 - 645	≥ 24
OE-S2CrMo1	PWHT 920°C/air+710°C	≥ 380	530 - 630	≥ 24
OE-S1CrMo2	PWHT 940°C/air+740°C	≥ 450	550 - 650	≥ 22

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		0	-20	- 30	- 40	- 50	- 60	- 80	- 196
OE-S2	As Welded	160 min	100 min						
OE-SD3	PWHT	160 min	140 min		100 min		70 min		
OE-SD3	As Welded	160 min	140 min		100 min		70 min		
OE-S2Mo	As Welded	120 min	100 min		70 min		50 min		
OE-SD3 1Ni 1/2Mo	PWHT	140 min	120 min		90 min		70 min		
OE-SD3 1Ni 1/2Mo	As Welded	120 min	90 min		70 min		47 min		
OE-SD3 2NiCrMo	PWHT				50 min				
OE-SD3 2NiCrMo	As Welded				50 min				
OE-S2 Ni1	PWHT	90 min							
OE-S2 Ni1	As Welded	130 min	100 min		70 min		50 min		
OE-S2 Ni2	PWHT				160 min		100 min	80 min	
OE-S2 Ni2	As Welded				100 min		70 min	50 min	
OE-S2 Ni3	PWHT	160 min	140 min		120 min		90 min	70 min	
OE-S2 Ni3	As Welded	140 min	120 min		100 min		70 min	50 min	
OE-S2CrMo1	PWHT	150 min			40 min				
OE-S1CrMo2	PWHT	100 min	50 min						

Packaging data

25kg heavy duty sealed polythene sacks
25kg & 500kg Dry Bag packaging on demand

Current condition
DC+; AC

OP 41TT

OERLIKON

SAW Basic and Semi-basic Fluxes
C-Mn and low alloy steels

OP 41TT è un flusso agglomerato di tipo fluor-basico adatto per la saldatura di acciai a grano fine ed elevato carico di rottura. E' anche adatto per la saldatura di acciai resistenti allo scorrimento a caldo. Nel campo nucleare pùò essere usato in molte applicazioni, abbinandolo a diversi fili. E' particolarmente adatto per la saldatura di componenti, come recipienti a pressione per reattori, generatori a vapore,compressori, serbatoi di sicurezza per reattori, nei circuiti primari e secondari, come pure negli elementi ausiliari. OP 41TT deve essere saldato in DC polo + , fino ad un massimo di 800 A circa. Il flusso umido deve essere ricondizionato a 300 - 350°C. La granulometria è secondo EN 760: 2-20.

OP 41TT is an agglomerated fluoride-basic type flux for welding high-tensile fine grain steels as well as heat-resistant structural steels. In the nuclear sector it can be used for many applications in combination with different wires. It is best used for joint welding components such as reactor pressure vessels, steam generators, pressurizer, reactor safety tanks and pipes in the primary and secondary circuits as well as the auxiliary units. OP 41 TT should be welded on DC+ at up to approximately 800 A. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
OE-SD3	AWS	A5.17: F7A8-F6P8 EH12K
OE-S2Mo	AWS	A5.23: F8A8-F6P5 EA2
OE-S2 Ni1	AWS	A5.23: F7A8 - F7P10 ENi1
	EN	760: SA FB 1 53 DC H5

Wire	Approvals	Grades

Flux Analysis	
CaO + MgO	35 %
CaF2	30 %
Al2O3 + MnO	20 %
SiO2 + TiO2	10 %

Basicity to Boniszewski 3,1

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-SD3	0.05	1.20	0.20	-	-	-	-	-	-
OE-S2Mo	0.04	0.70	0.10	-	-	0.50	-	-	-
OE-S2 Ni1	0.05	0.90	0.20	0.15	1.15	0.30	-	-	-
OE-S2CrMo1	0.05	0.70	0.10	1	-	0.50	-	-	-
OE-S1CrMo2	0.05	0.40	0.10	2.20	-	1	-	-	-
OE-S1CrMo5	0.05	0.40	0.20	5	-	0.60	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-SD3	As Welded	≥ 450	530 - 630	≥ 24
OE-S2Mo	As Welded	≥ 490	570 - 670	≥ 20
OE-S2 Ni1	PWHT	≥ 380	480 - 500	≥ 26
OE-S2 Ni1	As Welded	≥ 420	500-600	≥ 24
OE-S2CrMo1	PWHT 700-720°C	≥ 380	530-630	≥ 24
OE-S1CrMo2	PWHT 730-750°C	≥ 450	550 - 650	≥ 22
OE-S1CrMo5	PWHT 730-750°C	≥ 450	550 - 650	≥ 20

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-SD3	As Welded	170 min	150 min	120 min		70 min	40 min		
OE-S2Mo	As Welded	140 min	120 min	100 min		70 min	50 min		
OE-S2 Ni1	PWHT	170 min	140 min	110 min		90 min	70 min		
OE-S2 Ni1	As Welded	150 min	130 min	100 min		70 min	50 min		
OE-S2CrMo1	PWHT	200 min	150 min						
OE-S1CrMo2	PWHT	140 min	100 min						
OE-S1CrMo5	PWHT	100 min	50 min						

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+

OP CROMO F537

OERLIKON

SAW Basic Fluxes
Chromium-Molybdenum steels

OP CROMO F537 è un flusso speciale agglomerato fluor basico studiato principalmente per la saldatura di acciai resistenti allo scorrimento a caldo per applicazioni dopo step cooling. Estremamente basso l'apporto di Si e neutro in termini di Mn, può essere utilizzato in AC o DC+ con amperaggi fino a 800 A. Flusso a bassa densità e a basso tasso di consumo. Il flusso può essere utilizzato con procedimenti twin-arc o tandem. Il flusso può essere ricondizionato a 300-350°C, le dimensioni del grano sono in accordo con le EN 760: 2-20. Valori di X e J factor controllati al fine di soddisfare il requisito di Step Cooling.

OP CROMO F537 is a special agglomerated fluoride-basic type flux for welding heat-resistant steels after step cooling. Exceptionally low silicon pick-up and neutral behaviour in terms of manganese are typical of the metallurgical properties of this flux. It can be welded on DC+ and AC at up to 800 A. As the bulk density of this flux is low, so is the rate of consumption. The flux can be welded with the twin-wire process and can also be used for tandem welding with two or more wire electrodes. Controlled X and J factor to satisty step cooling requirements. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20 and DIN 32522:2-20.

Wire	Classification	
OE CROMO S225	AWS	A5.23: F9P2-EB3R-B3R
OE CROMO S225V	AWS	A5.23: F9P2-EGR-GR
OE-S1CrMo5	AWS	A5.23: F8P0-EB6-B6
OE-CROMO S300V	AWS	A5.23: F9P2-EGR-GR
	EN	760: SA FB 1 55 AC H5

Wire	Approvals	Grades
OE-CROMO S225	TÜV	
OE-CROMO S225V	ABS	

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

Basicity to Boniszewski ~ 2,6

Typical Applications

Wire	Materials
OE-S1CrMo5	ASME:A182 Gr. F5, A199 Gr. T5, A213 Gr.T5, A335 Gr.P5; 'A 336 Cl. F5, A 369 Gr. FP5, A 387 Gr.5, Cl 1 and 2 EN:12CrMo19-5, X12CrMo5
OE-CROMO S225	ASME:A387 Gr.22, Cl 1and 2, A 182 Gr.F 22, A 336 Gr.F22 EN:10CrMo9-10, 12CrMo9-10
OE-CROMO S225V	ASME:'SA 541 Gr 22 V, SA 336 F 22 V EN:12 Cr Mo V 9 10
OE-CROMO S300V	ASME:SA 832 Gr 21 V, SA 182 Gr F 3 V, SA 542 Tp C Cl 4 a EN:

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S1CrMo5	≤ 0.12	≤ 1	≤ 0.50	5	-	0.50	-	-	-
OE-CROMO S225	≤ 0.12	≤ 1	≤ 0.25	2.20	-	1	-	-	-
OE-CROMO S225V	≤ 0.12	≤ 1	≤ 0.25	2.40	-	1	0.01	-	-
OE-CROMO S300V	≤ 0.12	≤ 1	≤ 0.25	3	-	1	0.01	-	-

OP CROMO F537

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-S1CrMo5	PWHT 760°C x 2h	≥ 470	550 - 700	≥ 20
OE-CROMO S225	PWHT 690°C x 8h	≥ 540	620 - 750	≥ 18
OE-CROMO S225V	PWHT 710°C x 8h	≥ 540	620 - 750	≥ 18
OE-CROMO S300V	PWHT 710°C x 8h	≥ 540	620 - 750	≥ 18

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-S1CrMo5	PWHT			27 min					
OE-CROMO S225	PWHT		100 min	100 min		50 min			
OE-CROMO S225V	PWHT			100 min					
OE-CROMO S300V	PWHT			100 min					

Packaging data

25kg heavy duty sealed polythene sacks
25kg Dry Bag packaging on demand

Further forms of delivery on request.

Current condition
DC+; AC

OP 33

OERLIKON

SAW Fluxes
Stainless and Heat resistant steels

OP 33 è un flusso semi basico, speciale per la saldatura di acciai inossidabili e resistenti al calore in combinazione a filo conforme ad AWS A5.9. I cordoni di saldatura si prestano piani e regolari senza tracce di ossidazione in zona di transizione e senza residui di scoria.
Il flusso si evidenzia grazie anche alla sua eccellente proprietà di rimozione della scoria ed è pertanto particolarmente appropriato per la saldatura in angoli stretti. Adatta per DC+ fino a 800A.
Il flusso umido deve essere ricondizionato a 300 - 350°C. Granulometria in accordo a EN 760: 2-20.

OP 33 is a special semi-basic welding flux for welding stainless and heat resistant steels in combination with wires according to AWS A5.9. In respect to the carbon content of the weld metal, OP 33 is neutral.
The welds are smooth and have a fine ripple without undercut at the toes and without slag residues. Slag detachability is superb, therefore this flux is ideal for fillet welding on DC+ with up to 800 A. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	EN 760: SA AF 2 54 DC

Wire	Approvals	Grades
OE-316L N	RINA	
OE-309LMo	RINA	
OE-316L	TÜV	
OE-S 22 09	RINA	

Flux Analysis	
CaF2	50 %
SiO2 + TiO2	10 %
Al2O3 + MnO	35 %

Basicity to Boniszewski 1,8

Typical Applications

Wire	Materials
OE-20.16L	ASME: EN: X2CrNiMoN17-13-3 (1.4429), X2CrNiMoN18-14-3 (1.3952); X2CrNiMo18-14-3 (1.4435)
OE-308 H	ASME: AISI 304H EN:X 2 Cr Ni 18 9 (1.4306)
OE-308L	ASME:AISI 304 - 304L - 302 EN:X 5 Cr Ni 18 8 (1.4301), X 2 Cr Ni 18 8 (1.4300)
OE-309LMo	ASME:Cladding of carbon steel and low alloy steel EN:Cladding of carbon steel and low alloy steel
OE-316L	ASME: ASTM A351 Grades CF3M, CF3MA EN:X 2 Cr Ni Mo 18 12 (1.4435), X 2 Cr Ni Mo 18 10 (1.4404), X 5 Cr Ni Mo 18 10 (1.4401)
OE-318	ASME: AISI 318L EN:X 10 Cr Ni Mo Ti 18 12 (1.4573), X 10 Cr Ni Mo Nb 18 12 (1.4583), X 10 Cr Ni Mo Ti 18 10 (1.4571), X 10 Cr Ni Nb 18 9 (1.4450), X 10 Cr Ni Mo Nb 18 10 (1.4580), X 12 Cr Ni Ti 18 9 (1.4870)
OE-347	ASME: ASTM A336 Grades F321, F347 EN:X 10 Cr Ni Ti 18 9 (1.4541), X 10 Cr Ni Nb 18 9 (1.4550), X 5 Cr Ni Nb 18 9 (1.4543), X 12 Cr Ni Ti 18 9 (1.4870)
OE-347	ASME: AISI 347 - 321 EN:X 12 Cr Ni Ti 18 9 (1.4878), X 10 Cr Ni Ti 18 9 (1.4541), X 10 Cr Ni Nb 18 9 (1.4550), X 5 Cr Ni Nb 18 9 (1.4543),
OE-S 22 09	ASME:A182 Grade F51, UNS S31803 - S31500 - S31200 - S32304 EN:X 2 Cr Ni Mo N 22 5 (1.4462)
OE-904L	ASME: AISI 904L; URANUS B6; EN: 1.4539 (X1NiCrMoCu25-20-5); 1.4439 (X2CrNiMoN17-13-5); 1.4537 (X1CrNiMoCuN25-25-5)

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-20 16L	≤	5	0.60	18.80	15	2.75	0.025	0.15	-
OE-308L	≤ 0.03	-	-	18	9	-	-	-	-
OE-309LMo	≤ 0.03	-	-	21	15	≥ 3	-	-	-
OE-316L	≤ 0.03	-	-	18	10	2.50	-	-	-
OE-318	≤ 0.07	-	-	18	10	2.50	-	-	-
OE-347	≤ 0.07	-	-	18	9	-	-	-	-
OE-S 22 09	≤ 0.03	-	-	23	9	3	-	-	-
OE-904L	≤ 0.03	-	-	19	22	4	-	-	1.50

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-20.16L	As Welded	≥ 390	≥ 570	≥ 35
OE-308L	As Welded	≥ 350	≥ 500	≥ 35
OE-309LMo	As Welded	≥ 420	≥ 600	≥ 25
OE-316L	As Welded	≥ 350	≥ 525	≥ 30
OE-318	As Welded	≥ 370	≥ 600	≥ 30
OE-347	As Welded	≥ 370	≥ 575	≥ 30
OE-S 22 09	As Welded	≥ 550	≥ 750	≥ 25
OE-904L	As Welded	≥ 370	≥ 560	≥ 35

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 196
OE-20.16L	As Welded	70 min							30 min
OE-308L	As Welded	75							
OE-309LMo	As Welded	80							
OE-316L	As Welded	75							
OE-318	As Welded	65							
OE-347	As Welded	65							
OE-S 22 09	As Welded						70		
OE-904L	As Welded						100		

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+

OP 76

OERLIKON

SAW Fluxes
Stainless and Heat resistant steels

OP 76 è un flusso basico per la saldatura degli acciai inossidabili a struttura austenitica e austeno-ferritica, nonchè stabilizzati. Da un punto di vista metallurgico ha un comportamento moderatamente compensante per quanto riguarda il Cromo. E' indicato per la saldatura di acciai austenitici anche del tipo E.L.C. In termini di Manganese ha un'azione compensante nel caso di fili con contenuti normali di Manganese e riducente solo nel caso si utilizzino fili alto legati in Manganese. OP 76 è indicato per la saldatura di grossi spessori anche in multipass. Il deposito è a bassissimo contenuto di Idrogeno ed ha una grande resistenza alle fessurazioni. Indicato per la saldatura sia in corrente alternata che in corrente continua. Il flusso può essere ricondizionato a temperature comprese tra i 300 ed i 350°C.
La granulometria è conforme alla EN 760: 2-20.

OP 76 is a special agglomerated, fluoride-basic type flux for welding stainless and heat-resistant steels when used in conjunction with wires according to AWS A5.9. In terms of weld metal C content, the behaviour of OP 76 can be described as neutral, thus if suitable wires are used, ELC quality steels may be welded. In terms of silicon and manganese, the metallurgical behaviour is neutral, i.e. there is neither pick-up nor burn-out. Manganese burn-out only occurs when wires with a high manganese content are used. OP 76 is intended for joint welding large cross-sections. It is one of the range of hydrogen-controlled fluxes, which deposit a weld metal with a low diffusible hydrogen content.
OP 76 is particularly suited to tandem and multi-wire welding. Smooth welds with a good finish are deposited.
Suitable for welding on both DC+ and AC at up to 800A.
Damp flux should be re-dried at 300-350°C. Grain size in accordance with EN 760: 2-20.

Wire	Classification	
OE-KV7M	AWS	A5.23: F9PZ-EB9-B9
	EN	760: SA FB 2 55 AC H5

Wire	Approvals	Grades

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

Basicity to Boniszewski 2,7

Typical Applications

Wire	Materials
OE-20.16L	EN:10 Ni 14 (1.5637)
OE-S600	ASME: UNS N06600; UNS N08800; UNS N08810 EN: '2.4816; 1.4876; 1.4958
OE-S625	ASME: UNS N06625; UNS N08825, A 353-70, A 553-70 EN: '2.4816; 1.4876; 1.4958
OE-KV7M	ASME: Grade 91 (ASTM A 387), P 91 (ASTM A 335) EN:X10CrMoVNb9-1
OE-308L	ASME:AISI 304 - 304L - 302 EN:X 2 Cr Ni 18 9 (1.4306), X 2 Cr Ni 19 11 (1.4306), X 5 Cr Ni 18 8 (1.4301), 12 Ni 19 (1.5680)
OE-316L	ASME: ASTM A351 Grades CF3M, CF3MA EN:X 2 Cr Ni Mo 18 12 (1.4435), X 2 Cr Ni Mo 18 10 (1.4404), X 5 Cr Ni Mo 18 10 (1.4401)
OE-318	ASME: AISI 318L EN:X 10 Cr Ni Mo Nb 18 10 (1.4580), X 10 Cr Ni Mo Ti 18 10 (1.4571), X 10 Cr Ni Mo Ti 18 12 (1.4573), X 10 Cr Ni Mo Nb 18 12 (1.4583)
OE-347	ASME: ASTM A336 Grades F321, F347 EN:X 12 Cr Ni Ti 18 9 (1.4878), X 10 Cr Ni Ti 18 9 (1.4541), X 10 Cr Ni Nb 18 9 (1.4550), X 5 Cr Ni Nb 18 9 (1.4543),
OE-S 22 09	ASME:A182 Grade F51, UNS S31803 - S31500 - S31200 - S32304 EN:X 2 Cr Ni Mo N 22 5 8 (1.4462)
OE-S 25 10	EN:X 2 CrNiMoN 25 7 4 (1.4410)
OE-904L	ASME: AISI 904L; URANUS B6; EN: 1.4539 (X1NiCrMoCu25-20-5); 1.4439 (X2CrNiMoN17-13-5); 1.4537 (X1CrNiMoCuN25-25-5)

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-20 16L	0.03	-	-	20	16	3	-	0.15	-
OE-S600	0.03	-	-	22	74	-	2.50	-	-
OE-S625	0.03	-	-	23	60	10	3.50	-	-
OE-KV7M	0.13	1.10	-	9.50	≤ 1	1.20	0.30	0.07	0.25
OE-308L	0.03	-	-	-	9	-	-	-	-
OE-316L	0.03	-	-	-	10	-	-	-	-
OE-318	0.07	-	-	-	10	-	-	-	-
OE-347	0.07	-	-	-	9	-	-	-	-
OE-S 22 09	0.03	-	-	23	9	3	-	0.10	-
OE-S 25 10	0.04	0.50	-	25	10	4	0.02	0.25	-
OE-904L	0.025	-	-	20	25	4.60	-	0.13	1.50

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-20.16L	As Welded	≥ 410	≥ 600	≥ 30
OE-S625	As Welded	≥ 450	≥ 760	≥ 23
OE-KV7M	PWHT 760°Cx4h	≥ 550	≥ 680	≥ 22
OE-308L	As Welded	≥ 350	≥ 550	≥ 35
OE-316L	As Welded	≥ 370	≥ 550	≥ 30
OE-318	As Welded	≥ 370	≥ 600	≥ 30
OE-347	As Welded	≥ 370	≥ 575	≥ 30
OE-S 22 09	As Welded	≥ 550	≥ 750	≥ 25
OE-S 25 10	As Welded	≥ 550	≥ 650	≥ 20
OE-904L	As Welded	≥ 380	≥ 560	≥ 35

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-20.16L	As Welded	120 min							
OE-S625	As Welded	60 min							
OE-308L	As Welded	75 min							
OE-316L	As Welded	75 min							
OE-318	As Welded	65 min							
OE-347	As Welded	65 min							
OE-S 22 09	As Welded					90 min			
OE-S 25 10	As Welded					50min			
OE-904L	As Welded	60 min		70 min					

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP F500

OERLIKON

SAW Fluxes
Stainless and Heat resistant steels

OP F500 è un flusso del tipo agglomerato indicato per la saldatura di acciai inox austenitici anche stabilizzati. E' compensante per quanto riguarda il contenuto di Cr. Indicato sia per la saldatura a filo singolo che a più fili. Adatto per la saldatura di spessori sottili ad alte velocità di lavoro. Ottima rimozione della scoria anche su lamiere calde. Il flusso può essere ricondizionato a temperature comprese tra i 300 ed i 350°C. La granulometria è conforme alla EN 760: 2-20.

OP F500 is a special agglomerated flux for welding austenitic stainless steels including stabilised compositions. OP F500 is neutral and it is used for welding both single wire and multiwire. Suitable for welding thin plates at high travel speeds. Excellent slag detachability even from hot plates. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	EN 760: S A FB 2 53 AC

Wire	Approvals	Grades
OE-316L	TÜV	

Flux Analysis	
Al2O3	37 %
SiO2	7 %
CaO + CaF2 + MgO	54 %

Basicity to Boniszewski 2,2

Typical Applications

Wire	Materials
OE-308L	ASME:AISI 304 - 304L - 302 EN:X 5 Cr Ni 18 8 (1.4301), X 2 Cr Ni 18 8 (1.4300)
OE-308H	ASME: AISI 304H EN:X 2 Cr Ni 18 9 (1.4306)
OE-309LMo	ASME: 'Cladding of carbon steel and low alloy steel EN: 'Cladding of carbon steel and low alloy steel
OE-316L	ASME: ASTM A351 Grades CF3M, CF3MA EN:X 2 Cr Ni Mo 18 10 (1.4404), X 2 Cr Ni Mo 18 12 (1.4435), X 5 Cr Ni Mo 18 10 (1.4401)
OE-318	ASME: AISI 318L EN:X 10 Cr Ni Mo Nb 18 10 (1.4580), X 10 Cr Ni Mo Ti 18 12 (1. 4573), X 10 Cr Ni Mo Nb 18 12 (1.4583)
OE-347	ASME: ASTM A336 Grades F321, F347 EN:X 10 Cr Ni Ti 18 9 (1.4541), X 12 Cr Ni Ti 18 9 (1.4870), X 10 Cr Ni Nb 18 9 (1.4550), X 5 Cr Ni Nb (1.4543)
OE-S 22 09	ASME:A182 Grade F51, UNS S31803 - S31500 - S31200 - S32304 EN:X 2 Cr Ni Mo N 22 5 8 (1.4462)
OE-904L	ASME: AISI 904L; URANUS B6; EN: 1.4539 (X1NiCrMoCu25-20-5); 1.4439 (X2CrNiMoN17-13-5); 1.4537 (X1CrNiMoCuN25-25-5)

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-308L	0.03	2	0.80	18	9	-	-	-	0.35
OE-309LMo	0.03	2	0.80	21	15	3	-	-	-
OE-316L	0.03	2	0.80	18	10	2.50	-	0.06	-
OE-318	0.07	2	0.80	18	10	2.50	-	-	-
OE-347	0.07	2	0.80	18	9	-	1	0.06	0.35
OE-S 22 09	0.03	1.50	0.80	21.50	8	3	-	0.18	-
OE-904L	0.025	2	0.80	19	24	4	-	-	1.50

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-308L	As Welded	≥ 350	≥ 500	≥ 35
OE-309LMo	As Welded	≥ 370	≥ 600	≥ 25
OE-316L	As Welded	≥ 350	≥ 525	≥ 30
OE-318	As Welded	≥ 390	≥ 600	≥ 30
OE-347	As Welded	≥ 500	≥ 575	≥ 30
OE-S 22 09	As Welded	≥ 400	≥ 690	≥ 25
OE-904L	As Welded	≥ 420	≥ 570	≥ 30

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-308L	As Welded	75 min							
OE-309LMo	As Welded	65 min							
OE-316L	As Welded	75 min							
OE-318	As Welded						100 min		
OE-347	As Welded						70 min		
OE-904L	As Welded	80 min							

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

OP 77

OERLIKON

SAW Fluxes
Stainless and Heat resistant steels

OP F77 è un flusso fuso sviluppato per dare una buona saldabilità in AC fino a correnti di circa 900A utilizzando un filo singolo. Particolarmente raccomandato in abbinamento a fili del tipo C276 per la saldatura di acciai al 9% di nichel in posizione 2G.

OP 77 is a fused flux, developed to give good weldability on AC current up to 900A on a single electrode. Very well adapted for horizontal welding, but can be used in the flat position for butt and fillet welds. Particularly recommended for welding 9% nickel steel in cryogenic (LPG/LNG) applications such as tank fabrication with OE-S C276 wire. Very low moisture pick-up and good slag detachment. When horizontal welding, OP 77 gives flat wettability and limited weld reinforcement. Good distribution of the flux and good uniformity of the slag in the 2G position.

Wire	Classification
	EN 760: SF CS 2 65 AC H5

Wire	Approvals	Grades

Flux Analysis	
SiO2	28 %
CaO + CaF2 + MgO	55 %
Al2O3 + TiO2 + ZrO2	10 %

Basicity to Boniszewski 1,3

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
NIFIL C276	0.013	0.60	0.30	15.50	Rem	16	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
NIFIL C276	As Welded	≥ 360	600-700	≥ 35

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 50	- 60	- 196
NIFIL C276	As Welded								100 min

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
AC; DC+

AST 300

OERLIKON

SAW Fluxes
Cladding

Il flusso è usato in combinazione con nastri austenitici della serie SUPRASTRIP (19 9L, 24 13L, 24 13 2L, 19 13 3L,…). Il flusso AST 300 compensa l' ossidazione di cromo e nickel durante la saldatura. L'ottima scorificazione permette di ottenere un deposito esente da residui e con un eccellente aspetto estetico.
AST 300 è dedicato alla placcatura con processo arco sommerso di componenti in pressione e reattori per l' industria chimica e petrolchimica.
Il flusso umido deve essere essiccato a 300-350°C. Granulometria in accordo con EN 760 : 2-20.

AST 300 is used with austenitic stainless strips (308L, 309L, 309LMo, 316L, etc). The AST 300 flux composition compensates for chromium and nickel loss during welding and enhances the weld bead profile, slag residues are self releasing.
AST 300 is used for submerged arc strip cladding of pressure vessels, chemical and petrochemical reactor vessels.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	DIN 32522: BCS 5 83255 DC+ 13 B-3

Wire	Approvals	Grades

Flux Analysis

Basicity to Boniszewski 1

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
SUPRASTRIP 19 9L 2nd Layer	0.014	1.40	0.90	19	10.70	-	-	-	-
SUPRASTRIP 24 13L 1st Layer	0.02	0.90	0.70	17.30	10.40	-	-	-	-

Packaging data

Metallic drum 30kg

Further forms of delivery on request.

Current condition
DC+

AST 347

OERLIKON

SAW Fluxes
Cladding

AST 347 è un flusso agglomerato utilizzato in combinazione con nastri inossidabili stabilizzati del tipo Suprastrip 19 9LNb con processo arco sommerso. La formulazione del flusso permette di ottenere un eccellente aspetto della passata ed una perfetta rimozione della scoria. Utilizzato per placcatura di componenti in pressione, per l' industria chimica, petrolchimica e nucleare.
Il flusso umido deve essere trattato a 300-350°C.Granulometria EN 760 : 2-20

AST 347 is an agglomerated submerged-arc welding flux used with austenitic stabilized stainless steel strips, such as Suprastrip 347.
The special formula enhances the weld bead profile with excellent and easy slag detachability. The flux is suitable for weld overlay in petrochemical, chemical and nuclear applications.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
	DIN	32522: B AB 6 8235 DC+ 15 B-3
	EN	760: SA AB 2

Wire	Approvals	Grades

Flux Analysis	
MgO	14 %
CaF2	13 %
CaF2	4 %
Al2O3	24 %
SiO2	35 %

Basicity to Boniszewski 0,8

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
SUPRASTRIP 19 9LNb 3rd	0.045	1	0.90	19	10	-	0.50	-	-

Packaging data

Metallic drum 30kg

Further forms of delivery on request.

Current condition
DC+

AST 600

OERLIKON

SAW Fluxes
Cladding

AST 600 è un flusso agglomerato basico utilizzato in combinazione con nastri ad alta lega di Nichel del tipo SUPRASTRIP 625 e SUPRASTRIP 600 con processo arco sommerso. La formulazione del flusso permette di ottenere un eccellente aspetto della passata ed una perfetta rimozione della scoria. Il materiale depositato mostra un eccellente resistenza alla criccabilità a caldo. Utilizzato per placcatura di componenti in pressione, per l' industria chimica, petrolchimica e nucleare.
Il flusso umido deve essere trattato a 300-350°C.Granulometria EN 760 : 2-20

AST 600 is a basic agglomerated submerged-arc welding flux used in combination with high nickel alloyed strip, such as Suprastrip 625.
The special formula enhances the weld bead profile with excellent and easy slag detachability. The weld bead shows a very high hot cracking resistance. The flux is suitable for weld overlay in petrochemical, chemical and nuclear applications.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	DIN 32522 : B AB 7 8934 DC+ 15 B-2

Wire	Approvals	Grades

Flux Analysis	
CaF2	12 %
MnO	5 %
Al2O3	39 %
CaO	19 %
MgO	7 %
SiO2	10 %

Basicity to Boniszewski 4

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
SUPRASTRIP 625 2nd Layer	0.03	1	0.24	20	Rem	9	3.10	-	-
SUPRASTRIP 625 3rd Layer	0.01	1	0.20	21	Rem	9	3.10	-	-

Packaging data

Metallic drum 30kg

Further forms of delivery on request.

Current condition
DC+

OP 87

OERLIKON

SAW Fluxes
Cladding

OP 87 è un flusso agglomerato indicato per essere utilizzato con fili inox austenitici, per placcatura o per giunzioni testa a testa in mono passata o con la tecnica delle due passate contrapposte. Ideale per saldature in angolo. Il flusso è caratterizzato da una bassa densità e ne consegue un limitato consumo per kg di materiale depositato. Si può saldare sia in corrente continua che in corrente alternata. Il flusso può essere ricondizionato a 300-350°C. La granulometria è conforme alle normative DIN 32 522: 2-20.

OP 87 is an agglomerated flux for joint welding and strip cladding with chromium, chromium nickel, and chrome nickel molybdenum consumables. It is also suitable for cladding with nickel-based alloys and the best results are obtained on DC (+ pole). The flux has a bulk density of approx. 1 kg/dm3. Flux consumption is approximately 650g per kg weld metal. OP 87 has chromium compensation. This flux may be welded on either AC or DC. The flux can be supplied in metal drums to prevent moisture pick-up.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	EN 760: SA CS 2 99 Cr AC

Wire	Approvals	Grades

Flux Analysis	
SiO2 + TiO2	35 %
CaO + MgO	20 %
CaF2	10 %
Al2O3 + MnO	25 %

Basicity to Boniszewski 1,0

Typical Applications

Wire	Materials
OE-308L	ASME:AISI 304 - 304L - 302 EN:X 2 Cr Ni 19 11 (1.4306)
OE-316L	ASME: ASTM A351 Grades CF3M, CF3MA EN:X 2 Cr Ni Mo 18 12 (1.4435), X 2 Cr Ni Mo 18 10 (1.4404),
OE-318	ASME: AISI 318L EN:X 10 Cr Ni Mo Nb 18 10 (1.4580), X 10 Cr Ni Mo Ti 18 12 (1.4573), X 10 Cr Ni Mo Ti 18 10 (1.4571), X 10 Cr Ni Mo Nb 18 12 (1.4583)
OE-347	ASME: ASTM A336 Grades F321, F347 EN:X 12 Cr Ni Ti 18 9 (1.4878), X 10 Cr Ni Nb 18 9 (1.4550), X 10 Cr Ni Ti 18 9 (1.4541), X 5 Cr Ni Nb 18 9 (1.4543)

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-308L	0.03	-	-	18	9	-	-	-	-
OE-316L	0.03	-	-	18	10	2.50	-	-	-
OE-318	0.07	-	-	18	10	2.50	-	-	-
OE-347	0.07	-	-	18	9	-	0.60	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)
OE-308L	As Welded	≥ 350	≥ 550	≥ 35
OE-316L	As Welded	≥ 370	≥ 550	≥ 30
OE-318	As Welded	≥ 370	≥ 600	≥ 30
OE-347	As Welded	≥ 350	≥ 575	≥ 30

All-weld metal Mechanical Properties - Cv

Wire	Heat Treatment	Charpy V Notch Impact Toughness (J)							
		+20	0	- 20	- 30	- 40	- 60	- 80	- 101
OE-308L	As Welded	55 min							
OE-316L	As Welded	55 min							
OE-318	As Welded	45 min							
OE-347	As Welded	45 min							

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
DC+; AC

ELT 300

OERLIKON

Electroslag Fluxes
Cladding

ELT 300 è un flusso agglomerato basico utilizzato in combinazione con nastri austenitici del tipo Suprastrip 24 13L, Suprastrip 19 9L,…. con processo ad elettroscoria. ELT 300 mostra un basso assorbimento di umidità.La formulazione del flusso permette di ottenere un eccellente aspetto della passata ed una perfetta rimozione della scoria. Il materiale depositato mostra un eccellente resistenza alla criccabilità a caldo. Utilizzato per placcatura di componenti in pressione, per l' industria chimica, petrolchimica e nucleare. Il flusso umido deve essere trattato a 300-350°C. Granulometria EN 760 : 2-20.

ELT 300 is a high basic agglomerated electroslag welding flux used in combination with austenitic stainless strip (Suprastrip 309L, Suprastrip 308L). ELT 300 shows a very low moisture pick up. The special formula enhances the weld bead profile with excellent and easy slag detachability. The weld bead exhibits a very high hot cracking resistance. The flux is suitable for weld overlay in petrochemical, chemical and nuclear applications. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
	DIN	32522: BF B 5 64355 DC+ 30 B-2
	EN	760: SA AB 2Cr

Wire	Approvals	Grades

Flux Analysis	
SiO2	6 %
CaF2	65 %
Al2O3	25 %
CaO	1 %

Basicity to Boniszewski 3,7

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
SUPRASTRIP 24 13L 1st Layer	0.02	1.50	0.50	19.40	10.30	-	-	-	-

Packaging data

Metallic drum 30kg

Further forms of delivery on request.

Current condition
DC+

ELT 300-S

OERLIKON

Electroslag Fluxes
Cladding

ELT 300 è un flusso agglomerato basico utilizzato in combinazione con nastri austenitici del tipo Suprastrip 24 13L, Suprastrip 19 9L,…. con processo ad elettroscoria ad elevata velocità. ELT 300-S mostra un basso assorbimento di umidità. La formulazione del flusso permette di ottenere un eccellente aspetto della passata ed una perfetta rimozione della scoria. Il materiale depositato mostra un eccellente resistenza alla criccabilità a caldo. Utilizzato per placcatura di componenti in pressione, per l' industria chimica, petrolchimica e nucleare. Il flusso umido deve essere trattato a 300-350°C. Granulometria EN 760 : 2-20.

Wire	Classification	
	DIN	32522: BF B 5 64355 DC+ 30 B-2
	EN	760: SA AB 2Cr

Wire	Approvals	Grades

Flux Analysis	
SiO2	6 %
CaF2	65 %
Al2O3	25 %
CaO	1 %

Basicity to Boniszewski 3,7

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
SUPRASTRIP 24 13L 1st Layer	0.02	1.50	0.50	19.40	10.30	-	-	-	-

Packaging data

Metallic drum 30kg

Further forms of delivery on request.

Current condition
DC+

ELT 600

OERLIKON

Electroslag Fluxes
Cladding

ELT 600 è un flusso agglomerato basico utilizzato in combinazione con nastri ad alta lega di Nichel del tipo SUPRASTRIP 625 e SUPRASTRIP 600 con processo ad elettroscoria. ELT 600 mostra un basso assorbimento di umidità.La formulazione del flusso permette di ottenere un eccellente aspetto della passata ed una perfetta rimozione della scoria. Il materiale depositato mostra un eccellente resistenza alla criccabilità a caldo. Utilizzato per placcatura di componenti in pressione, per l' industria chimica, petrolchimica e nucleare.
Il flusso umido deve essere trattato a 300-350°C.Granulometria EN 760 : 2-20

ELT 600 is a high basic agglomerated electroslag welding flux used in combination with high nickel alloyed strip, such as Suprastrip 625. ELT 600 exhibits a very low moisture pick up. The special formula enhances the weld bead profile with excellent and easy slag detachability. The weld bead shows a very high hot cracking resistance. The flux is suitable for weld overlay in petrochemical, chemical and nuclear applications. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	DIN 32522: BF B 7 6544 DC+ 40 B-2-12

Wire	Approvals	Grades

Flux Analysis	
SiO2	5 %
Al2O3	20 %
CaF2	60 %
CaO	6 %

Basicity to Boniszewski

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
SUPRASTRIP 625 - 2nd Layer	0.012	0.07	0.21	21.50	Rem	8.90	3.20	-	-

Packaging data

Metallic drum 30kg

Further forms of delivery on request.

Current condition
DC+

ELT 600S

OERLIKON

Electroslag Fluxes
Cladding

ELT 600S è un flusso agglomerato basico per elevata velocità utilizzato in combinazione con nastri ad alta lega di Nichel del tipo SUPRASTRIP 625 e SUPRASTRIP 600 con processo ad elettroscoria. ELT 600S mostra un basso assorbimento di umidità. La formulazione del flusso permette di ottenere un eccellente aspetto della passata ed una perfetta rimozione della scoria. Il materiale depositato mostra un eccellente resistenza alla criccabilità a caldo. Utilizzato per placcatura di componenti in pressione, per l' industria chimica, petrolchimica e nucleare.
Il flusso umido deve essere trattato a 300-350°C. Granulometria EN 760 : 2-20.

ELT 600-S is a highly basic, high speed agglomerated electroslag welding flux used in combination with high nickel alloyed strip, Suprastrip 625. ELT 600-S exhibits a very low moisture pick up. The special formula enhances the weld bead profile with excellent and easy slag detachability. The weld bead shows a very high hot cracking resistance. The flux is suitable for weld overlay in petrochemical, chemical and nuclear applications. Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification	
	DIN	32522 : BF B 7 6544 DC+ 40 B-2
	EN	760: SA FB 2

Wire	Approvals	Grades

Flux Analysis	
SiO2 + TiO2	25 %
CaF2	60 %

Basicity to Boniszewski 4

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
SUPRASTRIP 625 1st Layer	0.022	0.07	0.40	19.80	Rem	8.20	3.10	-	-

Packaging data

Metallic drum 30kg

Further forms of delivery on request.

Current condition
DC+

OP 1250A

OERLIKON

SAW Fluxes
Hardfacing

OP 1250A è un flusso agglomerato attivo utilizzato per l'esecuzione di riporti duri in combinazione con i fili OE-S2 e OE-S2MO. L'effetto degli elementi di lega dipende in larga parte dai parametri di saldatura utilizzati. Per esempio con filo di diametro 4,0 mm i parametri ottimali sono approssimativamente 600A, 32V, 50 cm/minuto. Il flusso può essere utilizzato sia in DC+ che AC. Il flusso umido deve essere trattato a 300 -350°C. Granulometria in accordo a EN 760: 2-20.

OP 1250A is an agglomerated alloy bearing flux used for hard facing applications in combination with low alloy OE-S2 and OE-S2Mo wire electrodes. Applications include the hard facing of machine gear parts, rails, etc. The alloying effect of the flux depends, to a large degree, on the welding parameters chosen. For instance, optimum welding parameters for a 4 mm wire electrode are approximately 600 A, 32 V, 50 cm/min. OP 1250A is suitable for use on both DC+ and AC.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	EN 760: SA CS 3 97 CCrMo AC

Wire	Approvals	Grades

Flux Analysis	
Al2O3 + MnO	20 %
CaF2	10 %
SiO2 + TiO2	40 %
CaO + MgO	30 %

Basicity to Boniszewski

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S2-1st	0.10	1.30	0.50	0.30	-	0.10	-	-	-
OE-S2-2nd	0.10	1.40	0.70	0.50	-	0.20	-	-	-
OE-S2-3rd	0.10	1.50	0.90	0.80	-	0.30	-	-	-
OE-S2Mo-1st	0.10	1.40	0.50	0.50	-	0.30	-	-	-
OE-S2Mo-2nd	0.10	1.40	0.50	0.50	-	0.40	-	-	-
OE-S2Mo-3rd	0.10	1.50	0.70	0.70	-	0.50	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Hardness
OE-S2-1st	As Welded				220 HB
OE-S2-2nd	As Welded				225 HB
OE-S2-3rd	As Welded				250 HB
OE-S2Mo-1st	As Welded				225 HB
OE-S2Mo-2nd	As Welded				230 HB
OE-S2Mo-3rd	As Welded				260 HB

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
AC; DC+

OP 1300A

OERLIKON

SAW Fluxes
Hardfacing

OP 1300A è un flusso agglomerato attivo utilizzato per l'esecuzione di riporti duri in combinazione con i fili OE-S2 e OE-S2MO. L'effetto degli elementi di lega dipende in larga parte dai parametri di saldatura utilizzati. Per esempio con filo di diametro 4,0 mm i parametri ottimali sono approssimativamente 600A, 32V, 50 cm/minuto. Il flusso può essere utilizzato sia in DC+ che AC. Il flusso umido deve essere trattato a 300 -350°C. Granulometria in accordo a EN 760: 2-20.

OP 1300A is an agglomerated alloy bearing flux used for hardfacing in combination with low alloy OE-S2 and OE-S2Mo wires. Applications include the hardfacing of machine gear parts, rails, and support rolls of caterpillars, etc. The alloying effect of the flux depends, to a large degree, on the welding parameters chosen. For instance, optimum welding parameters for a 4 mm wire electrode are approximately 600A, 32V, 50 cm/min. OP 1300A is suitable for use on both DC+ and AC.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	EN 760: SA CS 3 87 CCRMo AC

Wire	Approvals	Grades

Flux Analysis	
CaO + MgO	30 %
Al2O3 + MnO	20 %
CaF2	10 %
SiO2 + TiO2	40 %

Basicity to Boniszewski

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S2 -1st	0.10	1.20	0.50	1.10	-	0.10	-	-	-
OE-S2 -2nd	0.10	1.30	0.60	1.40	-	0.20	-	-	-
OE-S2 -3rd	0.10	1.50	0.70	1.80	-	0.30	-	-	-
OE-S2Mo -1st	0.10	1.20	0.50	1.30	-	0.30	-	-	-
OE-S2Mo -2nd	0.10	1.30	0.70	2	-	0.50	-	-	-
OE-S2Mo -3rd	0.10	1.40	0.80	2.10	-	0.60	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Hardness
OE-S2 -1st	As Welded				230 HB
OE-S2 -2nd	As Welded				280 HB
OE-S2 -3rd	As Welded				290 HB
OE-S2Mo -1st	As Welded				260 HB
OE-S2Mo -2nd	As Welded				350 HB
OE-S2Mo -3rd	As Welded				360 HB

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
AC; DC+

OP 1350A

OERLIKON

SAW Fluxes
Hardfacing

OP 1350A è un flusso agglomerato attivo utilizzato per l'esecuzione di riporti duri in combinazione con i fili OE-S2 e OE-S2MO. L'effetto degli elementi di lega dipende in larga parte dai parametri di saldatura utilizzati. Per esempio con filo di diametro 4,0 mm i parametri ottimali sono approssimativamente 600A, 32V, 50 cm/minuto. Il flusso può essere utilizzato sia in DC+ che AC. Il flusso umido deve essere trattato a 300 -350°C. Granulometria in accordo a EN 760: 2-20.

OP 1350A is an agglomerated alloy bearing flux used for hardfacing in combination with low alloy OE-S2 and OE-S2Mo wires. Applications include the hardfacing of machine gear parts, rails, support rolls of caterpillars, etc. The alloying effect of the flux depends, to a large degree, on the welding parameters chosen. For instance, optimum welding parameters for a 4 mm wire electrode are approximately 600 A, 32 V, 50 cm/min. OP 1350A is suitable for use on both DC+ and AC.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	EN 760: SA CS 3 99 CCrMo AC

Wire	Approvals	Grades

Flux Analysis	
CaO + MgO	30 %
Al2O3 + MnO	20 %
CaF2	10 %
SiO2 + TiO2	40 %

Basicity to Boniszewski

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S2 -3rd	0.10	1.90	≥ 1	1.90	-	0.30	-	-	-
OE-S2-1st	0.10	1.50	≥ 1	1.20	-	0.20	-	-	-
OE-S2-2nd	0.10	1.70	≥ 1	1.40	-	0.20	-	-	-
OE-S2Mo -1st	0.10	1.50	≥ 1	1.30	-	0.40	-	-	-
OE-S2Mo -2nd	0.10	1.70	≥ 1	1.50	-	0.50	-	-	-
OE-S2Mo -3rd	0.10	1.90	≥ 1	2.10	-	0.60	-	-	-

All-weld metal Mechanical Properties

Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Hardness
OE-S2-1st	As Welded				260 HB
OE-S2-2nd	As Welded				320 HB
OE-S2-3rd	As Welded				330 HB
OE-S2Mo-1st	As Welded				280 HB
OE-S2Mo-2nd	As Welded				370 HB
OE-S2Mo-3rd	As Welded				390 HB

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
AC; DC+

OP 1450A

OERLIKON

SAW Fluxes
Hardfacing

OP 1450A è un flusso agglomerato attivo utilizzato per l'esecuzione di riporti duri in combinazione con i fili OE-S2 e OE-S2MO. L'effetto degli elementi di lega dipende in larga parte dai parametri di saldatura utilizzati. Per esempio con filo di diametro 4,0 mm i parametri ottimali sono approssimativamente 600A, 32V, 50 cm/minuto. Il flusso può essere utilizzato sia in DC+ che AC. Il flusso umido deve essere trattato a 300 -350°C. Granulometria in accordo a EN 760: 2-20.

OP 1450A is an agglomerated alloy bearing flux used for hardfacing in combination with low alloy OE-S2 and OE-S2Mo wires. Applications include the hardfacing of piston rod ends and earth moving equipment, etc. The alloying effect of the flux depends, to a large degree, on the welding parameters chosen. For instance, optimum welding parameters for a 4 mm wire are approximately 600 A, 32 V, 50 cm/min. OP 1450A is suitable for use on both DC+ and AC.
Damp flux should be re-dried at 300-350°C. Grain size according to EN 760: 2-20.

Wire	Classification
	EN 760: SA CS 3 87 CCrMo AC

Wire	Approvals	Grades

Flux Analysis	
SiO2 + TiO2	40 %
CaO + MgO	30 %
Al2O3 + MnO	20 %
CaF2	10 %

Basicity to Boniszewski

Analysis of all-weld metal (Typical values in %)

Wire	C	Mn	Si	Cr	Ni	Mo	Nb	N	Cu
OE-S2 -1st	0.14	1.20	0.40	1.90	-	0.10	-	-	-
OE-S2 -2nd	0.18	1.30	0.50	2.80	-	0.20	-	-	-
OE-S2 -3rd	0.19	1.30	0.60	2.80	-	0.30	-	-	-
OE-S2Mo -1st	0.17	0.90	0.40	1.90	-	0.30	-	-	-
OE-S2Mo -2nd	0.19	1.10	0.60	2.60	-	0.60	-	-	-
OE-S2Mo -3rd	0.20	1.20	0.70	2.90	-	0.60	-	-	-

All-weld metal Mechanical Properties

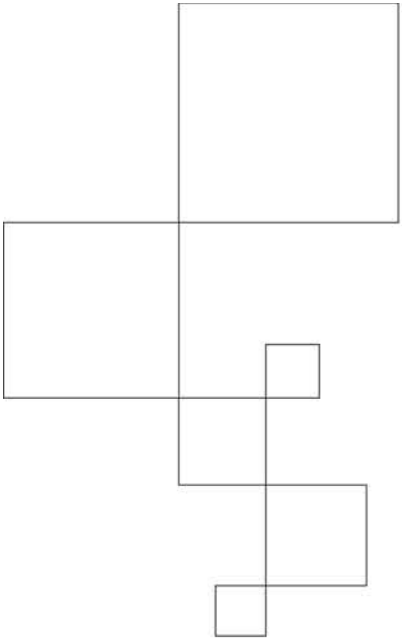
Wire	Heat Treatment	Yield Strength N/mm^2	Tensile Strength N/mm^2	Elongation A5 (%)	Hardness
OE-S2 - 1st	As Welded				280 HB
OE-S2- 2nd	As Welded				350 HB
OE-S2- 3rd	As Welded				370 HB
OE-S2Mo -1st	As Welded				310 HB
OE-S2Mo -2nd	As Welded				440 HB
OE-S2Mo -3rd	As Welded				450 HB

Packaging data

25kg heavy duty sealed polythene sacks

Further forms of delivery on request.

Current condition
AC; DC+



FILI PER ARCO SOMMERSO

SUBMERGED ARC WIRES

OERLIKON

OE-S1

Classification	
AWS	A5.17: EL 12
EN	756: S1

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.50	0.10	≤ 0.020	≤ 0.020	-	-	-	-	-	-	-

OE-S2

Classification	
AWS	A5.17: EM 12K
EN	756: S2

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1	0.10	0.010	0.010	-	-	-	-	-	-	-

OE-SD3 (ETC ASH3)

Classification	
AWS	A5.17: EH 12K
EN	756: S3Si

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1.70	0.30	0.010	0.006	-	-	-	-	-	-	0.04

OE-S4

Classification	
AWS	A5.17: EH 14
EN	756: S4

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1.90	0.10	0.010	0.010	-	-	-	-	-	-	-

OE-S2NiCu

Classification	
AWS	A5.23: EG
EN	756: SZ

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1	0.25	≤ 0.020	≤ 0.020	0.30	0.20	-	-	-	-	0.40

OE-S2 Ni1

Classification	
AWS	A5.23: ENi1
EN	756:S2Ni1

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1	0.15	-	-	-	0.90	-	-	-	-	-

OE-S2 Ni2

Classification	
AWS	A5.23: ENi2
EN	756: S2Ni2

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.06	1	0.20	≤ 0.015	≤ 0.015	-	2.30	-	-	-	-	-

OE-S2 Ni3

Classification	
AWS	A5.23: ENi3
EN	756: S2Ni3

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.08	1	0.20	≤ 0.015	≤ 0.015	-	3.20	-	-	-	-	-

OE-SD3 1Ni 1/2Mo

Classification	
AWS	A.23: EF3
EN	14295: S3NiMo1
EN	756: S3NiMo1

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.12	1.80	0.20	≤ 0.015	≤ 0.015	-	0.90	0.60	-	-	-	-

OE-SD3 1Ni 1/4Mo

Classification	
AWS	A5.23: EG
EN	14295: SZ
EN	756: SZ

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1.50	0.25	-	-	-	1	0.25	-	-	-	-

OE-SD3 2NiCrMo

Classification	
AWS	A5.23: EG
EN	14295: S 3Ni2,5CrMo

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1.50	0.20	-	-	0.70	2.40	0.50	-	-	-	-

TIBOR 22

Classification	
AWS	A5.23: EG

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1.30	≤ 0.10	-	-	-	-	0.40	-	-	-	-

TIBOR 33

Classification	
AWS	A5.23: EG

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.07	1.20	0.30	≤ 0.015	≤ 0.015	-	-	0.50	-	-	-	-

OE-S2Mo

Classification	
AWS	A5.23: EA2
EN	756: S2Mo

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	1	0.20	≤ 0.020	≤ 0.020	-	-	0.50	-	-	-	-

OE-S2CrMo1

Classification	
AWS	A5.23: EB2
EN	12070: SCrMo1

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.12	1	0.20	≤ 0.020	≤ 0.020	1.20	-	0.50	-	-	-	-

OE-S1CrMo2

Classification	
AWS	A5.23: EB3
EN	12070: SCrMo2

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.12	0.50	0.20	≤ 0.020	≤ 0.020	2.50	-	1	-	-	-	-

OE-S1CrMo5

Classification	
AWS	A5.23: EB6
EN	12070: SCrMo5

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.50	0.30	≤ 0.020	≤ 0.020	5.50	-	0.50	-	-	-	-

OE-CROMO S225

Classification	
AWS	A5.23: EB3 R
EN	12070: SCrMo2

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.13	≤ 1	≤ 0.20	≤ 0.010	≤ 0.010	2.50	-	1	-	-	-	-

OE-CROMO S225V

Classification	
AWS	A5.23: EG R

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
≤ 0.13	≤ 1	≤ 0.20	-	-	2.50	-	1	-	0.25	-	-

OE-KV7M

Classification	
AWS	A5.23: EB9
EN	12070: SCrMo91

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	V	N	Cu
0.10	0.50	0.15	≤ 0.010	≤ 0.010	9	0.60	1	0.07	0.20	-	-

OE-410

Classification
AWS A5.9: ER410

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.12	≤ 0.40	≤ 0.50	-	-	13	-	-	-	-	-	-

OE-410L

Classification
AWS A5.9: ER410

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.03	0.40	0.30	-	-	13	-	-	-	-	-	-

OE-410NiMo

Classification
AWS A5.9: ER410NiMo

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.06	0.50	0.30	-	-	12	4.50	0.50	-	-	-	-

OE-420

Classification
AWS A5.9: ER420

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.30	0.20	0.40	-	-	13	-	-	-	-	-	-

OE-430

Classification
AWS A5.9: ER430

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.10	≤ 0.60	≤ 0.50	-	-	16	-	-	-	-	-	-

OE-308L

Classification
AWS A5.9: ER308L

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.50	0.40	≤ 0.020	≤ 0.020	20	10	-	-	-	-	-

OE-308H

Classification	
AWS	A5.9: ER308H

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.05	0.80	0.40	≤ 0.020	≤ 0.020	19	9	-	-	-	-	-

OE-309L

Classification	
AWS	A5.9: ER309L

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.80	0.40	≤ 0.020	≤ 0.020	24	13.50	-	-	-	-	-

OE-316L

Classification	
AWS	A5.9: ER316L

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.60	0.40	≤ 0.020	≤ 0.020	18	12.50	2.50	-	-	-	-

OE-347

Classification	
AWS	A5.9: ER347

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.05	1.60	0.40	≤ 0.020	≤ 0.020	19.50	9.50	-	0.70	-	-	-

OE-309LMo

Classification	
AWS	A5.9: ER309LMo

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.80	0.40	≤ 0.020	≤ 0.020	24	13.50	2.70	-	-	-	-

OE-22 12

Classification	
EN	12072: G 22 12 H

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
≤ 0.12	2	1	-	-	22	12	-	-	-	-	-

OE-318

Classification	
AWS	A5.9: ER318

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.05	1.30	0.40	-	-	19	12	2.70	0.70	-	-	-

OE-310

Classification	
AWS	A5.9: ER310

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.12	1.80	0.45	≤ 0.020	≤ 0.020	26	20.80	0.30	-	-	-	-

OE-904L

Classification	
AWS	A5.9: ER385

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	1.90	0.40	≤ 0.020	≤ 0.020	20	25	4.60	-	1.50	-	-

OE-312

Classification	
AWS	A5.9: ER312

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.10	1.80	0.40	≤ 0.020	≤ 0.020	30	10	-	-	-	-	-

OE-20 16L

Classification	
EN	12072: G 20 16 3 Mn L (nearest)

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	7	0.20	≤ 0.020	≤ 0.020	20	16	3	-	-	0.15	-

OE-317L

Classification	
AWS	A5.9: ER317L

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	1.80	0.40	≤ 0.020	≤ 0.020	19	14	3.50	-	-	-	-

OE-S 22 09

Classification	
AWS	A5.9: ER2209

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.025	1.80	0.40	≤ 0.020	≤ 0.020	23	9	3	-	-	0.12	-

OE-S 25 10

Classification	
EN	12072: G 25 9 4 N L

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.02	2	0.40	≤ 0.020	≤ 0.020	26	10	4	-	-	0.25	-

NIFIL 600

Classification	
AWS	A5.14: ERNiCr-3

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.02	3	0.10	-	-	20	Rem	-	2.50	0.40	-	-

NIFIL 625

Classification	
AWS	A5.14: ERNiCrMo-3

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.015	0.03	0.09	0.002	0.005	21	Rem	9	3.90	0.30	-	-

NIFIL C276

Classification	
AWS	A5.14: ERNiCr-4

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.02	0.60	0.10	-	-	15	Rem	16	-	5	4	-

SUPRASTRIP 19 9L

Classification
AWS A5.9: EQ308L

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.012	1.90	0.30	-	-	20	10.50	-	-	-	-	-

SUPRASTRIP 24 13L

Classification
AWS A5.9: EQ309L

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.015	1.60	0.40	-	-	23.60	13.30	-	-	-	-	-

SUPRASTRIP 24 13 2L

Classification
AWS A5.9: EQ309LMo

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.015	1.80	0.30	-	-	24	13	3	-	-	-	-

SUPRASTRIP 19 13 3L

Classification
AWS A5.9: EQ316L

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.014	1.60	0.35	-	-	18.70	12.60	2.70	-	-	-	-

SUPRASTRIP 19 9LNb

Classification
AWS A5.9: EQ347

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.053	1.40	0.30	-	-	19.50	10.10	-	0.57	-	-	-

SUPRASTRIP 24 13LNb

Classification

Analysis of all-weld metal (Typical values in %)

C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Cu	N	Ferrite
0.015	1.60	0.40	-	-	23.60	13.30	-	0.70	-	-	-

SUPRASTRIP 625

Classification	
AWS	A5.14: EQ NiCrMo3

Analysis of all-weld metal (Typical values in %)

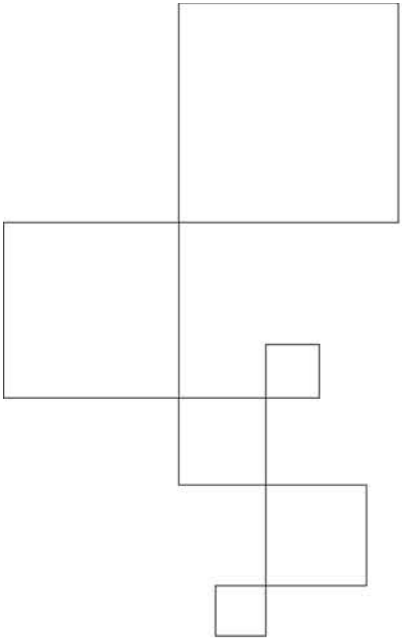
C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.02	0.07	0.13	-	-	21.70	Rem	9	3.60	0.50	-	-

SUPRASTRIP 600

Classification	
AWS	A5.14: EQNiCr-3

Analysis of all-weld metal (Typical values in %)

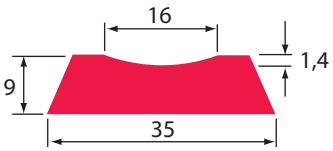
C	Mn	Si	P	S	Cr	Ni	Mo	Nb	Fe	W	Cu
0.02	3	0.10	-	-	20	Rem	-	2.50	0.40	-	-



FILI PER ARCO SOMMERSO

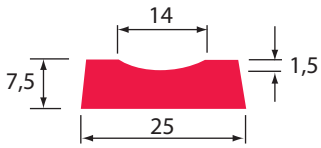
SUBMERGED ARC WIRES

OERLIKON



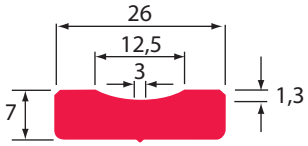
KERAWELD F006
Code: 0041012200
Metal Tracks

Total Length = 600 mm
1 Box contains N° 30 pcs
Total MT. = 18



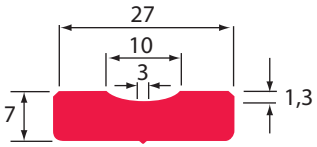
KERAWELD F007
Code: 0041009700
Metal Tracks

Total Length = 600 mm
1 Box contains N° 40 pcs
Total MT. = 24



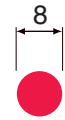
KERAWELD P003
Code: 0041011700
Aluminium tape

Total Length = 600 mm
1 Box contains N° 40 pcs
Total MT. = 24



KERAWELD P002
Code: 0041011500
Aluminium tape

Total Length = 600 mm
1 Box contains N° 40 pcs
Total MT. = 24

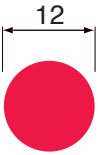


KERAWELD D8T
Code: 0041013400
Aluminium tape

Total Length = 600 mm
1 Box contains N° 80 pcs
Total MT. = 48

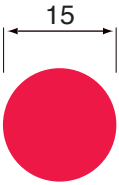
KERAWELD D10T
Code: 0041013900
Aluminium tape

Total Length = 600 mm
1 Box contains N° 60 pcs
Total MT. = 36



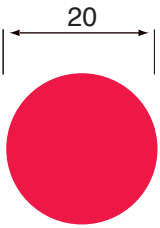
KERAWELD D12T
Code: 0041014200
Aluminium tape

Total Length = 600 mm
1 Box contains N° 60 pcs
Total MT. = 36



KERAWELD D15T
Code: 0041014500
Aluminium tape

Total Length = 600 mm
1 Box contains N° 30 pcs
Total MT. = 18



KERAWELD D20T
Code: 0041014800
Aluminium tape

Total Length = 600 mm
1 Box contains N° 20 pcs
Total MT. = 12

OERLIKON

Un sistema di packaging innovativo per flussi per arco sommerso

OERLIKON presenta DRYBAG, un nuovo sistema di packaging per flussi che impedisce l'assorbimento di umidità consentendone l'uso in modo pratico ed efficace e riducendo i costi di stoccaggio e ricondizionamento. Qualsiasi siano le condizioni climatiche infatti, questo sistema di imballaggio garantisce uno stoccaggio sicuro e prolungato nel tempo consentendo di utilizzare il flusso senza alcun trattamento di ricondizionamento.
DRYBAG è realizzato in materiale composito di alluminio-polietilene estremamente resistente e sviluppato in particolare per applicazioni di packaging sottovuoto. Per aumentare la sicurezza, durante l'imballaggio del flusso viene prodotto nel DRYBAG un parziale grado di vuoto che consentirà di identificare le confezioni integre e isolare facilmente quelle che hanno eventualmente subito dei danni. Oerlikon DRYBAG offre livelli di sicurezza simili a quelli del packaging in fusto.
DRYBAG è disponibile in formati da 25 / 800 e 1000 kg.
Il DRYBAG da 25 kg può essere immagazzinato, trasportato e pallettizzato come i normali sacchi di flusso, mentre le confezioni più grandi arrivano su pallet.

DRYBAG: protezione in profondità.

L'innovativo packaging dei flussi per arco sommerso.

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