Welding filler metals 2024

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- Flux cored wire electrodes
- TIG
- Gas welding rods
- MMA
- Submerged-arc welding
- Packaging

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Created on 2024-12-20

CERTIFICATE

on the
Approval of a manufacturer of Welding Consumables pursuant to
VdTÜV-Merkblatt Schweißtechnik 1153:2017
Approval Testing of Welding Consumables

EWM GmbH
Dr.-Günter-Henle-Str. 8, 56271 Mündersbach, Germany

have furnished conclusive evidence of the proper application of their in-shop quality assurance procedures to approved welding consumables. A survey covering the manufacturer`s quality assurance system has been conducted by the undersigned Inspector of TÜV Rheinland Industrie Service GmbH proves that the requirements of the VdTÜV-Merkblatt are satisfied.

With this, the requirements for registration of your welding consumables in VdTÜV-Kennblatt 1000 is fulfilled.

This certificate is valid till August 31, 2027

The validity of the certificate may be extended by a new renewal of the approval acc. to VdTÜV 1153:2017.

Cologne, 04.09.2024
Revision 00

Certification Body
for Welding Consumables

TÜV Rheinland Industrie Service GmbH
Am Grauen Stein
D-51105 Köln

Tel. +49-(0) 221 806 - 2250
Fax +49-(0) 221 806 - 1354
e-mail makowka@de.tuv.com

i.A. Dipl.-Ing. A. Makowka

www.tuv.com

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Certificate

Conformity of the factory production control

according Regulation 305/2011/EU: System 2+

Certificate Registr. No. **0035-CPR-C921**

In compliance with Regulation 305/2011/EU of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation - CPR), this certificate applies to the construction product:

Scope:

Welding consumable (filler metals and fluxes)
for fusion welding of metallic materials intended to be used in metal structures or metal/concrete composite structures:
Filler wires acc. to EN ISO 14171, EN ISO 14341-A, EN ISO 14343-A, EN ISO 16834-A, EN ISO 21952-A
Filler rods filler wires acc. to EN 12536, EN ISO 636-A, 14341-A, EN ISO 14343-A, EN ISO 16834-A, EN ISO 20378 *), EN ISO 21952-A
Covered electrodes acc. to EN ISO 2560-A, EN ISO 3580-A, EN ISO 3581-A
Tubular cored electrodes acc. to EN ISO 17632-A, EN ISO 17633-A
Welding Fluxes acc. to EN ISO 14174

Name and address of the manufacturer:

EWM GmbH
Dr.-Günter-Henle-Str. 8
56271 Mündersbach, Germany

Manufacturing plant:

Sälzerstrasse 20a, 56235 Ransbach-Baumbach, Germany

Specification:

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in Annex ZA of the standard(s):

EN 13479:2017

under system 2+ are applied and that the factory production control fulfills all the prescribed requirements set out above.

Validity:

This certificate was first issued on 2012-08-15 and will remain valid as long as the test methods and/or factory production control requirements included in the harmonized standard used to assess the performance of the declared characteristics, do not change, and the product, and the manufacturing conditions in the plant are not modified significantly, but not longer than 2027-08-31.

Cologne, 2024-09-04

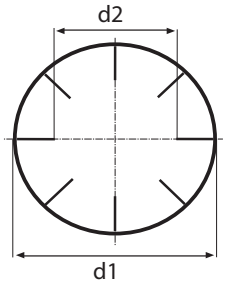
Dipl.-Ing. Achim Makowka
Certification body for construction products

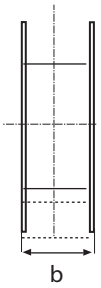
TÜV Rheinland Industrie Service GmbH
Notified Body for construction products (NB 0035)
Am Grauen Stein, D-51105 Cologne

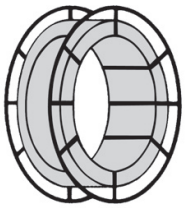
MS-0044512 K-103-Rev.011

Delivery forms
Wire electrodes

Wire basket spools

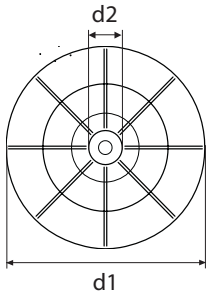


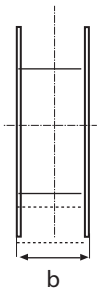




Standard designation		Outer diameter (d1)	Inner diameter (d2)	Outer width (b)	Weight in kg
DIN EN ISO 544	**B 300**	300	180	103	15/16/18
DIN 8559	**K 300**				

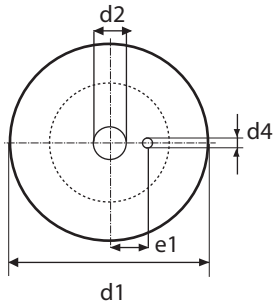
Wire baskets

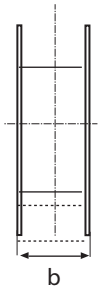


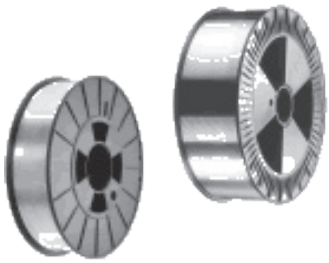


Standard designation		Outer diameter (d1)	Inner diameter (d2)	Outer width (b)	Weight in kg
DIN EN ISO 544	**BS 300**	300	50,5	103	15/16/18
DIN 8559	**K 300 (without adapter)**				

Plastic spools

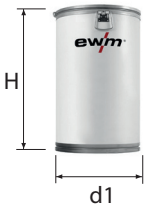






Standard designation		Outer diameter (d1)	Inner diameter (d2)	Outer width (b)	Tapped hole		Weight in kg
					d4	e1	
DIN EN ISO 544	**S200**	200	50,5	55	10	44,5	5
	S300	300	51,5	103	10	44,5	15
DIN 8559	**D200**	200	50,5	55	10	44,5	5
	D300	300	51,5	103	10	44,5	15

Drum container



	d1	H
Fass 100	590	900
Fass 250	510	800
Fass 275	510	800
Fass 450	590	970

Abbreviations

Test certificates in accordance with EN 10204

Type		Certificate content	Certificate confirmation
2.1	Factory certification	Confirmation of agreement with the order	Manufacturer
2.2	Inspection certificate	Confirmation of agreement with the order stating the results of non-specific testing	Manufacturer
3.1	Acceptance test certificate	Confirmation of agreement with the order stating the results of specific testing	The manufacturer's inspectors independent of the production department.
3.2	Acceptance test certificate	Confirmation of agreement with the order stating the results of specific testing	The manufacturer's inspectors independent of the production department and the customer's appointed inspectors or the inspectors named in the official regulations.

Approval and acceptance authorities

ABS	American Bureau of Shipping
BV	Bureau Veritas
CE	Conformité Européenne
CWB	Canadian Welding Bureau
DB	Deutsche Bahn
DNV	Det Norske Veritas
GL	Germanischer Lloyd
LR	Lloyd´s Register of Shipping
NK	Nippon Kaiji Kyōkai
TÜV	Technischer Überwachungsverein

! The current scope of the permit for individual welding consumables should always be requested if necessary. Separate copies may be provided.

Acceptance authorities

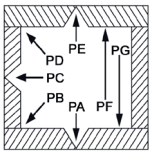
AWS	American Welding Society
BS	British Standard
DIN	Deutsche Industrienorm
EN	Europäische Norm
ISO	International Standards Organization

Power symbols

= −	Direct current (negatively charged electrode)
= +	Direct current (positively charged electrode)
~	Alternating current

Welding positions

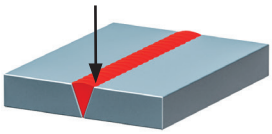
In accordance with DIN EN ISO 6947 (ASME Code Section IX)



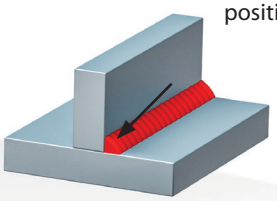
PA (1G, 1F)	Flat position
PB (2F)	Horizontal
PC (2G)	Horizontal to vertical wall
PD (4F)	Horizontal overhead
PE (4G)	Overhead
PF (3G, 3F)	Vertical up
PG (3G, 3F)	Vertical down

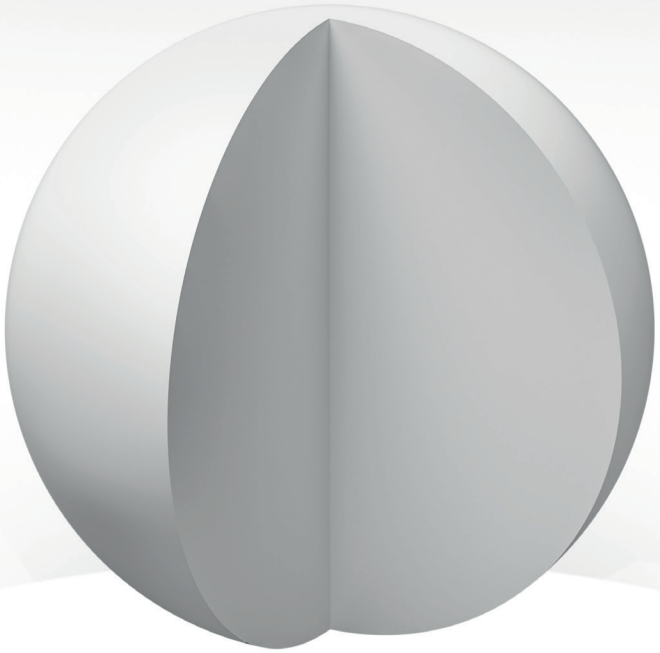
! The welding position is obtained from the position of the workpiece to be welded and the accessibility of the welding torch or the electrode to the weld seam

PA
Horizontal welding of butt and fillet welds (flat position)

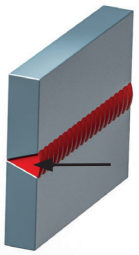


PB
Horizontal welding of fillet welds (horizontalvertical position)

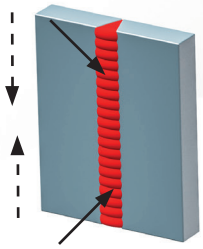




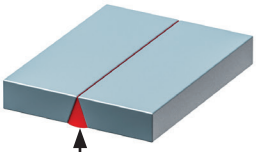
PC
Horizontal position (horizontal welding to vertical wall)



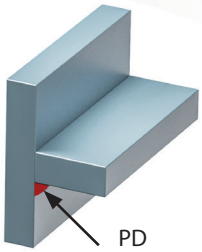
PG
Vertical-down position or vertical-down welding (vertical welding from the top to the bottom)



PF
Vertical-up position or vertical-up welding vertical welding from the bottom to the top)



PE
Overhead welding or overhead position



PD
Horizontal overhead position

Classification of shielding gases
In accordance with DIN EN ISO 14175

Main groups		Components in volume percent					
Main group	Sub-group	Oxidising		Inert		Reduced	Slow-responding
		CO_2	O_2	Ar	He	H_2	N_2
I	1			100			
	2				100		
	3			Rest	0,5 < He < 95		
M1	1	0,5 < CO_2 < 5		Rest*		0,5 < H_2 < 5	
	2	0,5 < CO_2 < 5		Rest*			
	3		0,5 < O_2 < 3	Rest*			
	4	0,5 < CO_2 < 5	0,5 < O_2 < 3	Rest*			
M2	0	5 < CO_2 < 15		Rest*			
	1	15 < CO_2 < 25		Rest*			
	2		3 < O_2 < 10	Rest*			
	3	0,5 < CO_2 < 5	3 < O_2 < 10	Rest*			
	4	5 < CO_2 < 15	0,5 < O_2 < 3	Rest*			
	5	5 < CO_2 < 15	3 < O_2 < 10	Rest*			
	6	15 < CO_2 < 25	0,5 < O_2 < 3	Rest*			
	7	15 < CO_2 < 25	3 < O_2 < 10	Rest*			
M3	1	25 < CO_2 < 50		Rest*			
	2		10 < O_2 < 15	Rest*			
	3	25 < CO_2 < 20	2 < O_2 < 10	Rest*			
	4	5 < CO_2 < 25	10 < O_2 < 15	Rest*			
	5	25 < CO_2 < 50	10 < O_2 < 15	Rest*			
C	1	100					
	2	Rest	0,5 < O_2 < 30				
R	1			Rest*	0,5 < H_2 < 15		
	2			Rest*	15 < H_2 < 50		
N	1						100
	2			Rest*			0,5 < N_2 < 5
	3			Rest*			5 < N_2 < 50
	4			Rest*	0,5 < H_2 < 10		0,5 < N_2 < 5
	5				0,5 < H_2 < 50		Rest
O	1						
Z	Mixed gases not listed in the table or mixed gases with a composition outside the ranges stated **						

*Argon may be completely replaced by helium for this classification

** Two mixed gases with the same Z classification may not be replaced with each other

Stick electrode coating types

Abbreviation	Short description	Definition
R	Rutile	Standard electrode for universal use, fine to average droplet transfer, good mechanical properties, welding positions PA, PB,PC, PE, PF, (PG limited only)
RB	Basic/rutile	Use as a combination of achievable, high toughness values and universal use with increased demands on the welder and the seam finishing work.
B	Basic	Use for the requirement of high mechanical properties, average to coarse droplet transfer, poorly detaching slag, possible in all positions, please allow for baking of the electrodes
RC	Rutile-cellulose	Used as replacement for rutile electrodes, to make welding position PG safer, less slag formation, higher demands on the welder and the finishing work
C	Cellulose	Used mainly for the root pass on pipe connectors (pipeline welding) in position PG, good mechanical properties, average droplets, almost no slag

Standards and abbreviations

DIN EN standards

Standard	Standard title
DIN EN 12536	Welding consumables – Rods for gas welding of non alloy and creep-resisting steels – Classification
DIN EN 14700	Welding consumables – Welding consumables for hard-facing
DIN EN ISO 636	Welding consumables – Rods, wires and deposits for tungsten inert gas welding of non-alloy and fine-grain steels – Classification
DIN EN ISO 1071	Welding consumables – Covered electrodes, wires, rods and tubular cored electrodes for fusion welding of cast iron – Classification
DIN EN ISO 2560	Welding consumables – Covered electrodes for manual metal arc welding of non-alloy and fine-grain steels – Classification
DIN EN ISO 3580	Welding consumables – Covered electrodes for manual metal arc welding of creep-resisting steels – Classification
DIN EN ISO 14172	Welding consumables – Covered electrodes for manual metal arc welding of nickel alloys – Classification
DIN EN ISO 14341	Welding consumables – Wire electrodes and weld deposits for gas shielded metal arc welding of non alloy and fine grain steels – Classification
DIN EN ISO 14343	Welding consumables – Wire electrodes, strip electrodes, wires and rods for arc welding of stainless and heat resisting steels – Classification
DIN EN ISO 16834	Welding consumables – Wire electrodes, wires, rods and deposits for gas shielded arc welding of high strength steels – Classification
DIN EN ISO 17632	Welding consumables – Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of non-alloy and fine grain steels – Classification
DIN EN ISO 17633	Welding consumables – Tubular cored electrodes and rods for gas shielded and non-gas shielded metal arc welding of stainless and heat-resisting steels – Classification
DIN EN ISO 17634	Welding consumables – Tubular cored electrodes for gas shielded metal arc welding of creep-resisting steels – Classification
DIN EN ISO 18273	Welding consumables – Wire electrodes, wires and rods for welding of aluminium and aluminium alloys – Classification
DIN EN ISO 18274	Welding consumables – Solid wire electrodes, solid strip electrodes, solid wires and solid rods for fusion welding of nickel and nickel alloys – Classification
DIN EN ISO 18276	Welding consumables – Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high-strength steels – Classification
DIN EN ISO 21952	Welding consumables – Wire electrodes, wires, rods and deposits for gas shielded arc welding of creep-resisting steels – Classification
DIN EN ISO 24373	Welding consumables – Solid wires and rods for fusion welding of copper and copper alloys – Classification
DIN EN ISO 544	Technical delivery conditions for filler materials and fluxes – Type of product, dimensions, tolerances and markings
DIN EN ISO 14175	Welding consumables – Gases and gas mixtures for fusion welding and allied processes
DIN EN ISO 14174	Welding consumables – Fluxes for submerged arc welding and electroslag welding – Classification
DIN EN ISO 24598	Welding consumables – Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of creep-resisting steels
DIN EN ISO 3581	Welding consumables – Covered electrodes for manual metal arc welding of stainless and heat-resisting steels – Classification
DIN EN ISO 26304	Welding consumables – Solid wire electrodes, tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels – Classification
DIN EN ISO 14171	Welding consumables – Solid wire electrodes, tubular cored electrodes and electrode/flux combinations for submerged arc welding of non alloy and fine grain steels – Classification

Standardisation example DIN EN ISO 14341-A

Wire electrodes and weld deposits for gas shielded metal arc welding of non alloy and fine grain steels

DIN EN ISO 14341-A–G 46 2 M21 G4Si1

- Number of international standard
- Code for manual arc welding process
- Mechanical characteristics of the pure weld metal
  Minimum yield strength, tensile strength and minimum elongation at break A5 — See table 1
- Impact energy — See table 2
- Gas — Overview of gases in accordance with DIN EN ISO 14175
- Chemical composition — See table 3

Table 1

Code for mechanical characteristics of the pure weld metal

Code	Minimum yield strength*1 Re (N/mm2)	Tensile strength: Rm (N/mm2)	Minimum elongation at break A5 (%)
35	355	440-570	22
38	380	470-600	20
42	420	500-640	20
46	460	530-680	20
50	500	580-720	18

*1 The yield strength is lower yield strength R. If it is not specified, the 0.2 % elongation limit R should be chosen.

Table 2

Code for impact energy

Symbol/ number	Minimum Charpy impact 47 J at °C
Z	no requirements
A	+ 20
0	0
2	- 20
3	- 30
4	- 40
5	- 50
6	- 60

Table 3

Codes and chemical analysis of wire electrodes

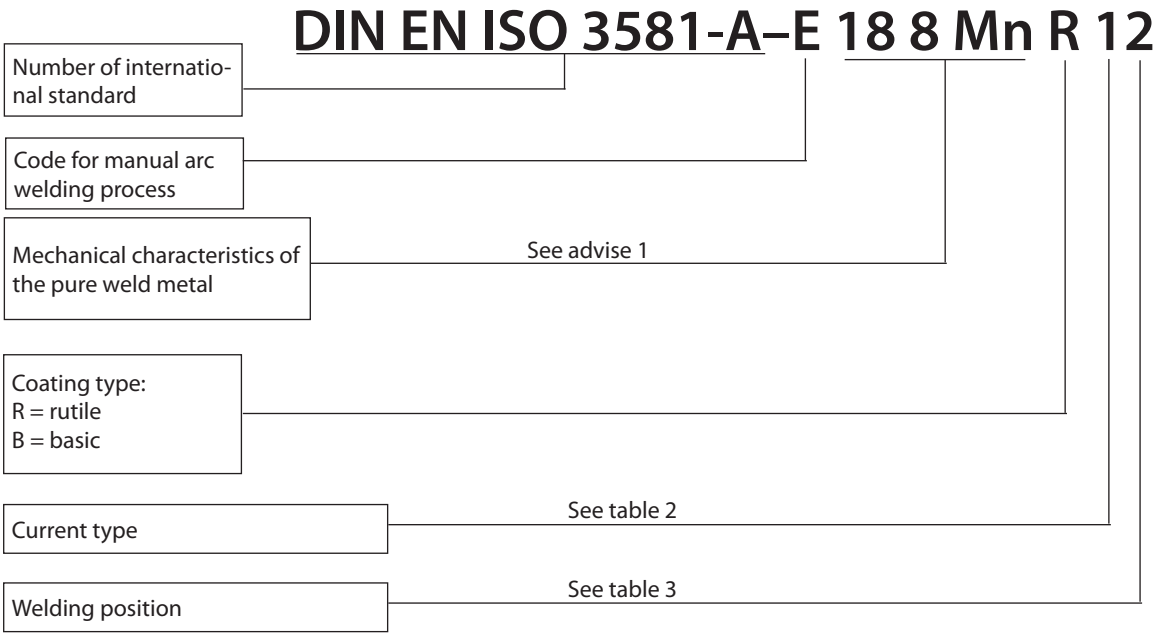
Abbreviated symbol	Chemical analysis in % (m/m) [a, b]								
	C	Si	Mn	P	S	Ni	Mo	Al	Ti and Zr
G0	Any other agreed composition								
G2Si1	0,06-0,14	0,5-0,8	0,9-1,3	0,025	0,025	0,15	0,15	0,02	0,15
G3Si1	0,06-0,14	0,7-1,0	1,3-1,6	0,025	0,025	0,15	0,15	0,02	0,15
G4Si1	0,06-0,14	0,8 1,2	1,6-1,9	0,025	0,025	0,15	0,15	0,02	0,15
G3Si2	0,06-0,14	1,0-1,3	1,3-1,6	0,025	0,025	0,15	0,15	0,02	0,15
G2Ti	0,04-0,14	0,4-0,8	0,9 -1,4	0,025	0,025	0,15	0,15	0,05-0,2	0,05-0,25
G3Ni1	0,06-0,14	0,5-0,9	1,0-1,6	0,02	0,02	0,8-1,5	0,15	0,02	0,15
G2Ni2	0,06-0,14	0,4-0,8	0,8-1,4	0,02	0,02	2,1-2,7	0,15	0,02	0,15
G2Mo	0,08-0,12	0,3-0,7	0,9 -1,3	0,02	0,02	0,15	0,4-0,6	0,02	0,15
G4Mo	0,06-0,14	0,5-0,8	1,7-2,1	0,025	0,025	0,15	0,4-0,6	0,02	0,15
GG2Al	0,08-0,14	0,3-0,5	0,9-1,3	0,025	0,025	0,15	0,15	0,35-0,75	0,15

[a] Single values shown in the table are maximum values.

[b] Consumables for which the chemical composition is not listed in this table shall be symbolized similarly and prefixed by the letter Z. The chemical composition ranges are not specified and therefore two electrodes with the same Z classification may not be interchangeable.

Standardisation example DIN EN ISO 3581-A

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



Advise 1

The components of the alloy are given in the order Cr, Ni and Mo, respectively, without the chemical code. Alloy components such as niobium, manganese and nitrogen are included as chemical codes with no number for the alloy component. The additional L stands for a very low carbon content. The mechanical properties specified in the standard must be met.

Table 2

Ratio	Metal recovery (%)	Current type
1	<105	Direct current, alternating current
2	<105	Direct current
3	>105 - 125	Direct current, alternating current
4	>105 - 125	Direct current
5	>125 - 160	Direct current, alternating current
6	>125 - 160	Direct current
7	>160	Direct current, alternating current
8	>160	Direct current

Proof of suitability for alternating current with open circuit voltage of max. 65 V

Table 3

Ratio	Welding position
1	All positions
2	All positions except vertical-down weld
3	Butt weld in flat position
	Fillet weld in flat and horizontal position
4	Butt weld in horizontal position
	Fillet weld in flat position
5	For fillet welds and as per figure 3

Standardisation example DIN EN ISO 2560-A

Covered electrodes for manual metal arc welding of non-alloy and fine grain steels

DIN EN ISO 2560-A–E 46 4 Z B 42 H5

- Number of international standard
- Code for manual arc welding process
- Mechanical characteristics of the pure weld metal
  Minimum yield strength, tensile strength and minimum elongation at break A5 — See table 1
- Minimum Charpy impact 47 J at °C — See table 2
- Legierung — See table 3
- Coating type — See table 4
- Current type — See table 5
- Welding position — See table 6
- Maximum diffusible hydrogen content*
  H5 = 5
  H10 = 10
  H15 = 15
  *(ml/100 g molten weld material)

Table 1

Code for mechanical characteristics of the pure weld metal			
Code	Minimum yield strength*1 Re (N/mm2)	Tensile strength: Rm (N/mm2)	Minimum elongation at break A5 (%)
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 The yield strength is lower yield strength R. If it is not specified, the 0.2 % elongation limit R should be chosen			

Table 2

Symbol/ number	Minimum Charpy impact 47 J at °C
Z	no requirements
A	+20
0	0
2	-20
3	-30
4	-40
5	-50
6	-60

Table 3

Code	Chemical composition		
	Mn	Mo	Ni
No code	2	-	-
Mo	1,4	0,3 - 0,6	-
Mn Mo	> 1,4 - 2,0	0,3 - 0,6	-
1 Ni	1,4	-	0,6 - 1,2
2 Ni	1,4	-	1,8 - 2,6
3 Ni	1,4	-	2,6 - 3,8
Mn 1 Ni	> 1,4 - 2,0	-	0,6 - 1,2
1 Ni Mo	1,4	0,3 - 0,6	0,6 - 1,2
Z	Any otherwise agreed composition		

"*2 if not specified: Mo<0.2, Ni<0.3,Cr<0.2, V<0.08, Nb<0.05, Cu<0.3, are each maximum values

Table 4

Code	Coating type
A	Acid
C	Cellulose
R	Rutile
RR	Thick rutile
RC	Rutile/cellulose
RA	Rutile/acid
RB	Rutile/basic
B	Basic
*3 ratio of coating to rod diameter 1.6	

Table 5

Ratio	Metal recovery (%)	Current type
1	<105	Direct current, alternating current
2	<105	Direct current
3	>105 - 125	Direct current, alternating current
4	>105 - 125	Direct current
5	>125 - 160	Direct current, alternating current
6	>125 - 160	Direct current
7	>160	Direct current, alternating current
8	>160	Direct current
*3 ratio of coating to rod diameter 1.6		

Table 6

Ratio	Welding position
1	All positions
2	All positions except vertical-down weld
3	Butt weld in flat position
	Fillet weld in flat and horizontal position
4	Butt and fillet welds in flat position
5	For fillet welds and as per figure 3

Standardisation example DIN EN 14700
Welding consumables for hardfacing

DIN EN 14700–E Fe 15

- Number of international standard
- The product type — See table 1
- The alloy code — See table 2

Table 1

Product type code (consumables)	
E	Coated electrode
S	Solid wire and solid rod
T	Flux cored wire and flux cored rod
R	Cast rod
B	Solid strip
C	Sintered rod, flux cored strip and sintered strip
P	Metal flux

Table 2

Code[a]	Suitability	Chemical analysis in % (m/m)									
		C	Cr	Ni	Mn	Mo	W	V	Nb	Other	Rest
Fe1	p	≤ 0,4	≤ 3,5	-	0,5 - 3	≤ 1	≤ 1	≤ 1	-	-	Fe
Fe2	p	0,4 - 1,2	≤ 7	≤ 1	0,5 - 3	≤ 1	≤ 1	≤ 1	-	-	Fe
Fe3	s t	0,2 - 0,5	1 - 8	≤ 5	≤ 3	≤ 4,5	≤ 10	≤ 1,5	-	Co, Si	Fe
Fe4	s t (p)	0,2 - 1,5	2 - 6	≤ 4	≤ 3	≤ 10	≤ 19	≤ 4	-	Co, Ti	Fe
Fe5	c p s t w	≤ 0,5	≤ 0,1	17 - 22	≤ 1	3 - 5	-	-	-	Co, Al	Fe
Fe6	g p s	≤ 2,5	≤ 10	-	≤ 3	≤ 3	-	-	≤ 10	Ti	Fe
Fe7	c p t	≤ 0,2	4 - 30	≤ 6	≤ 3	≤ 2	-	≤ 1	≤ 1	Si	Fe
Fe8	g p t	0,2 - 2	5 - 18	-	0,3 - 3	≤ 4,5	≤ 2	≤ 2	≤ 10	Si, Ti	Fe
Fe9	k (n) p	0,3 - 1,2	≤ 19	≤ 3	11 - 18	≤ 2	-	≤ 1	-	Ti	Fe
Fe10	c k (n) p z	≤ 0,25	17 - 22	7 - 11	3 - 8	≤ 1,5	-	-	≤ 1,5	Si	Fe
Fe11	c n z	≤ 0,3	18 - 31	8 - 20	≤ 3	≤ 4	-	-	≤ 1,5	Cu	Fe
Fe12	c (n) z	≤ 0,08	17 - 26	9 - 26	0,5 - 3	≤ 4	-	-	≤ 1,5		Fe
Fe13	g	≤ 1,5	≤ 6,5	≤ 4	0,5 - 3	≤ 4	-	-	-	B, Ti	Fe
Fe14	g	1,5 - 4,5	25 - 40	≤ 4	0,5 - 3	≤ 4	-	-	-	-	Fe
Fe15	g	4,5 - 5,5	20 - 40	≤ 4	0,5 - 3	≤ 2	-	-	≤ 10	B	Fe
Fe16	g z	4,5 - 7,5	10 - 40	-	≤ 3	≤ 9	≤ 8	≤ 10	≤ 10	B, Co	Fe
Fe20	c g t z	Hard materials[b]	-	-	-	-	-	-	-	-	Fe
Ni1	c p t	≤ 1	15 - 30	Rest	0,3 - 1	≤ 6	≤ 2	≤ 1	-	Si, Fe, B	Ni
Ni2	c k p t z	≤ 0,1	15 - 30	Rest	≤ 1,5	≤ 28	≤ 8	≤ 1	≤ 4	Co, Si, Ti	Ni
Ni3	c p t	≤ 1	1 - 15	Rest	0,3 - 1	≤ 6	≤ 2	≤ 1	-	Si, Fe, B	Ni
Ni4	c k p t z	≤ 0,1	1 - 15	Rest	≤ 1,5	≤ 28	≤ 8	≤ 1	≤ 4	Co, Si, Ti	Ni
Ni20	c g t z	Hard materials[b]	-	-	-	-	-	-	-	-	Ni
Co1	c k t z	≤ 0,6	20 - 35	≤ 10	0,1 - 2	≤ 10	≤ 15		≤ 1	Fe	Co
Co2	t z (c s)	0,6 - 3	20 - 35	≤ 4	0,1 - 2		4 - 10	-	-	Fe	Co
Co3	t z (c s)	1 - 3	20 - 35	≤ 4	≤ 2	≤ 1	6 - 14	-	-	Fe	Co
Cu1	c (n)	-	-	≤ 6	≤ 15	-	-	-	-	Al, Fe, Sn	Cu
Al1	c n	-	-	10 - 35	≤ 0,5	-	-	-	-	Cu, Si	Al
Cr	g n	1 - 5	Rest	-	≤ 1	-	-	15 - 30	-	Fe, B, Si, Zr	Cr

c: non-corroding
k: strain-hardening ability
p: impact-resistant
t: heat-resistant
w: precipitation-hardening
g: sanding-resistant
n: not magnetisable
s: edge-holding
z: scale-resistant
(): May not apply to all alloys of this classification.

[a] Alloys not specified in the table are to be marked in a similar way, prefixing the letter „Z".
[b] Tungsten melt carbides or tungsten sintered carbides broken or spherical

Running lengths of welding wire

Steel wire in meters

	Ø-Wire							
Weight in kg	4,0	3,0	2,4	2,0	1,6	1,2	1,0	0,8
1000	10137,3	18021,8	28159,0	40549,0	63357,9	112636,2	162196,1	253431,4
400	4054,9	7208,7	11263,6	16219,6	25343,1	45054,5	64878,4	101372,6
330	3345,3	5947,2	9292,5	13381,2	20908,1	37169,9	53524,7	83632,4
300	3041,2	5406,5	8447,7	12164,7	19007,4	33790,9	48658,8	76029,4
150	1520,6	2703,3	4223,9	6082,4	9503,7	16895,4	24329,4	38014,7
100	1013,7	1802,2	2815,9	4054,9	6335,8	11263,6	16219,6	25343,1
75	760,3	1351,6	2111,9	3041,2	4751,8	8447,7	12164,7	19007,4
50	506,9	901,1	1408,0	2027,5	3167,9	5631,8	8109,8	12671,6
30	304,1	540,7	844,8	1216,5	1900,7	3379,1	4865,9	7602,9
25	253,4	450,5	704,0	1013,7	1583,9	2815,9	4054,9	6335,8
20	202,7	360,4	563,2	811,0	1267,2	2252,7	3243,9	5068,6
19	192,6	342,4	535,0	770,4	1203,8	2140,1	3081,7	4815,2
18	182,5	324,4	506,9	729,9	1140,4	2027,5	2919,5	4561,8
17	172,3	306,4	478,7	689,3	1077,1	1914,8	2757,3	4308,3
16	162,2	288,3	450,5	648,8	1013,7	1802,2	2595,1	4054,9
15	152,1	270,3	422,4	608,2	950,4	1689,5	2432,9	3801,5
14	141,9	252,3	394,2	567,7	887,0	1576,9	2270,7	3548,0
13	131,8	234,3	366,1	527,1	823,7	1464,3	2108,5	3294,6
12	121,6	216,3	337,9	486,6	760,3	1351,6	1946,4	3041,2
11	111,5	198,2	309,7	446,0	696,9	1239,0	1784,2	2787,7
10	101,4	180,2	281,6	405,5	633,6	1126,4	1622,0	2534,3
9	91,2	162,2	253,4	364,9	570,2	1013,7	1459,8	2280,9
8	81,1	144,2	225,3	324,4	506,9	901,1	1297,6	2027,5
7	71,0	126,2	197,1	283,8	443,5	788,5	1135,4	1774,0
6	60,8	108,1	169,0	243,3	380,1	675,8	973,2	1520,6
5	50,7	90,1	140,8	202,7	316,8	563,2	811,0	1267,2
4	40,5	72,1	112,6	162,2	253,4	450,5	648,8	1013,7
3	30,4	54,1	84,5	121,6	190,1	337,9	486,6	760,3
2,7	27,4	48,7	76,0	109,5	171,1	304,1	437,9	684,3
2	20,3	36,0	56,3	81,1	126,7	225,3	324,4	506,9
1	10,1	18,0	28,2	40,5	63,4	112,6	162,2	253,4
0,5	5,1	9,0	14,1	20,3	31,7	56,3	81,1	126,7

Running lengths per spool in metres

Wire diameter	CrNi steels 15 kg spool	Aluminium 7.0 Kg spool	Copper 15 kg spool	Nickel 15 kg spool	Medium-alloy and unalloyed 15 kg
0,8 mm	3826	5158	3353	3511	3801
1,0 mm	2449	3301	2146	2247	2433
1,2 mm	1700	2292	1490	1560	1698
1,6 mm	956	1289	838	878	952
2 mm	612	825	536	562	608
2,4 mm	425	573	373	390	422
3 mm	272	367	238	250	270
3,2 mm	239	322	210	219	ka
4 mm	153	206	134	140	152

Number of TIG rods
per 1 kg

Number of TIG rods 1,000 mm long	CrNi steels 1 kg	Aluminium 1 kg	Copper 1 kg	Nickel 1 kg	Medium-alloy and unalloyed 1 kg
1,0 mm	163	471	143	150	162
1,2 mm	113	327	99	104	113
1,6 mm	63	184	55	59	64
2 mm	41	117	38	38	41
2,4 mm	28	82	25	26	29
3 mm	18	52	16	17	18
3,2 mm	16	46	14	15	ka
4 mm	11	30	9	10	11

Notes on working
Steel

Unalloyed and low-alloy steels
General information:
The suitability for welding of unalloyed and low-alloy steels depends largely on their carbon content. Steels with a C-content up to 0.22% can be worked using all welding procedures without limitation.

With increased carbon content and thus increased cooling rates, the suitability for welding is reduced as a result of hardening. A coarse-grained structure forms in the heat-affected zone, and the Charpy impact strength decreases considerably.

The hardening tendency of low-alloy structural steels can be estimated from the carbon equivalent value. In the International Institute of Welding carbon equivalent value (CEV), the influence of the key alloy elements is calculated using an empirically determined formula:

$$IIIW\ C_{ev} = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$$

The general limit for the welding suitability of low-alloy steels is CEV = 0.45. The welding suitability can be increased up to a CEV ≈ 0.60 through the suitable choice of an EWM filler material and correct application of heat.

However, the CEV is only an estimation of the expected increase in hardness because other process and material dimensions are not taken into account in the calculation.

The welding time, temperature and transformation details (welding ZTU) provide a more accurate idea of the welding suitability of low-alloy steels. This allows the structural transformations in the HAZ to be predicted for each material.speziell für jeden Werkstoff.

Welding recommendation:
Welding consumables should match the mechanical properties and chemical composition of the parent metal. Basic coated stick electrodes should be used for unalloyed steels and preheated according to the CEV. In the case of rimmed cast steels, basic electrodes should be used for the segregation zones and rutile electrodes for root and final passes..

Fine-grained steels
General information:
Fine-grained steels are generally suitable for welding. These steels are characterised by a maximum carbon content of 0.22% and use of the main strength-enhancing alloying elements manganese, silicon, chromium, molybdenum, copper and nitrogen.

Other micro-alloying elements such as aluminium, niobium, vanadium and boron are also added. In addition to enhancing strength, these also significantly increase the toughness of the steel by reducing the granularity of the structure. The type of hot forming during steel manufacture also influences its quality and properties.

Fine-grained steels are currently standardised up to a yield strength of 960 MPa and can be welded using all procedures. However components should be preheated before and after welding using the t8/5 method in order to prevent faults.

SEW sheet 088 provides relevant recommendations here. Preheating should generally be used above certain thickness limits. The following recommendations apply, depending on the yield strength:

Yield strength (N/mm)2	Thickness limit (mm)
<355	30
>355 bis 420	20
>420 bis 590	12
>590	8

Welding recommendation:
Welding consumables should match the mechanical properties and chemical composition of the parent metal. EWM can supply solid wire electrodes and flux cored wires for all fine-grained steels.

Pressure vessel and tubular steels, creep-resistant steels
General information:
Creep-resistant steels are generally well suited to welding. This is mainly a result of their high purity and low carbon content. Creep-resistant steels are used for boiler, tube, container and reactor construction at operating temperatures between 500 °C and 600 °C. Aside from having creep-resistant properties, these steels are very-scale resistant and creep-resistant at high temperatures. The temperature resistance is due mainly to the alloy elements manganese and molybdenum.

Welding recommendation:
Creep-resistant steels should be preheated to suit their sheet thickness because of the risk of hardening crack formation. The steel manufacturer will make recommendations here. Similar kinds of welding consumables are mainly used in order to guarantee the creep strength of the parent and weld metals.

Notes on working
Stainless Steel

Austenitic steels
General information:

Chromium and nickel are among the main alloying elements of austenitic materials. If the correct ratio is achieved (approx. 18% chromium and 8% nickel) the austenitic range is increased so that a stable structure results even at ambient temperature.

Unlike ferritic chromium steel, austenitic material cannot be further hardened and is also non-magnetic. We differentiate between stable and metastable austenites. Whereas stable austenites have no ferritic structure at ambient temperature, metastable austenites can have a ferrite component of up to 10% at ambient temperature.

Welding recommendation:

Austenitic steels can be welded without problems using similar welding consumables. It should however be noted that stable austenites are prone to developing heat cracks. In such cases, the heat input should be monitored during the welding process. Welding consumables containing manganese reduce this risk.

Austenitic/ferritic steels (duplex steels)
General information:

Austenitic steels can be welded without problems using similar welding consumables. It should however be noted that stable austenites are prone to developing heat cracks. In such cases, the heat input should be monitored during the welding process. Welding consumables containing manganese reduce this risk.

Ferritic chromium steels (chromium/ferrite)
General information:

The ferritic chromium steels include materials with carbon contents below 0.1% and chromium contents between 13% and 30%. Unlike fully austenitic steels, they contain no nickel. Stabilised ferrites should be used for welding purposes. This group is alloyed with strong carbide-forming elements such as titanium and niobium which combine with the carbon during welding. The carbon cannot combine with chromium to form chromium carbide which prevents intercrystalline corrosion.

Welding recommendation:

Fully ferritic welding consumables with a slightly increased content of chromium, niobium and titanium should generally be used for welding, because alloying elements can be lost in the welding zone. Austenitic consumables with a slightly increased chromium and molybdenum content can be used with multi-layer welds. Only pure argon a mixture of argon and helium should be used as a shielding gas, because the steels are very given to oxidation when molten due to their high chromium content.

The argon/hydrogen mixes normally used with austenitic materials are not recommended. The hydrogen makes the material very brittle.

EWM description	Material number	DIN EN ISO	AWS	Approvals	Page
unalloyed					
SW 70S G3 XQ	1.5125	G 42 4 C1 3Si1 / G 42 5 M21 3Si1	ER 70S-6	CE / TÜV / DB / DNV-GL	17
SW 70S G3 XQ Brillance	1.5125	G 42 2 C1 3Si1 / G 42 4 M21 3Si1	ER 70S-6	CE / TÜV / DB	18
SW 70S G3 Ti	1.5125	G 42 2 C1/M21 3Si1 Ti	ER 70S-6	CE / TÜV	19
SW 70S G3 Bronze	1.5125	G 42 2 C1 3Si1 / G 42 4 M21 3Si1	ER 70S-6		20
SW 70S G4 XQ	1.5130	G 46 4 C1 / G 46 5 M21 4Si1	ER 70S-6	CE / TÜV / DB / DNV-GL	21
SW 70S G4 XQ Brillance	1.5130	G 42 3 C1 4Si1 / G 46 4 M21 4Si1	ER 70S-6	CE / TÜV	22
SW 70S G4 Bronze	1.5130	G 42 3 C G4Si1 / G 46 4M21 4Si1	ER 70S-6		23
low-alloy					
SW 100S NiMo		G 62 6 M21 Mn3Ni1Mo	ER 100S-G	CE / TÜV / DB	24
SW 100S NiMoCr		G 62 6 M21 Mn3Ni1Mo	ER 110S-G	CE / TÜV / DB	25
SW 120S NiMoCr		G 89 6 M21 Mn4Ni2CrMo	ER 120S-G	CE / TÜV / DB	26
SW 80S Mo	1.5424	G46 6 M21 2 Mo	ER 80S-G	CE / TÜV / DB	27
SW 80S CrMo1	1.7339	G CrMo1Si	ER 80S-G	CE / TÜV / DB	28
SW 90S CrMo2	1.7384	G CrMo2Si	ER 90S-G	CE / TÜV / DB	29
SW 80S NiCu		G 42 2 M21 Z2NiCu	ER 80S-G	CE / DB	30
SW 80S Ni1		G 50 6 M21 3Ni1	ER 80S-Ni1	CE / TÜV	31
SW 80S Ni2		G 46 7 M21 2Ni2	ER 80S-Ni2	CE	32
High-alloy					
SW 307 Si XQ	1.4370	G 18 8 Mn	ER 307 Si	CE / TÜV / DB	33
SW 308 LSi XQ	1.4316	G 19 9 L Si	ER 308 L Si	CE / TÜV / DB	34
SW 309 LSi XQ	1.4332	G 23 12 L Si	ER 309 L Si	CE / TÜV	35
SW 309 H	1.4829	G 22 12 H	ER 309 Si		36
SW 310 XQ	1.4842	G 25 20	ER 310		37
SW 312 XQ	1.4337	G 29 9	ER 312		38
SW 316 LSi XQ	1.4430	G 19 12 3 L Si	ER 316LSi	CE / TÜV / DB	39
SW 318 Si	1.4576	W 19 12 3 Nb Si	ER 318	CE / TÜV / DB	40
SW 347 Si XQ	1.4551	G 19 9 Nb Si	ER 347 Si		41
SW 2209 Duplex XQ	1.4462	G 22 9 3 LN	ER 2209	CE / TÜV / More on request	42
SW 2594 Super Duplex XQ		G 25 9 4 N L	ER 2594	On request	43
Hardfacing					
SW Hard 60	1.4718				44
Nickel-based					
SW 625	2.4831	Ni 6625 – NiCr22Mo9Nb	ER NiCrMo3	TÜV	45
SW NiCr82	2.4806	Ni 6082 – NiCr20Mn3Nb	ER NiCr 3		46
Aluminium					
SW ML 1450 Al99,5Ti	3.0805	S AL 1450 (Al99,5Ti)	ER 1450	On request	47
SW ML 3103 AlMn1	3.0516	S AL 3103 (AlMn1)	ER 3103	On request	48
SW ML 5087 AlMg4,5MnZr	3.3546	S AL 5087 (AlMg4,5MnZr)		CE / DNV-GL / ABS / DB / TÜV / Bureau Veritas	49
SW ML 5183 AlMg4,5Mn0,7	3.3548	S AL 5183 (AlMg4,5Mn0,7)	ER 5183	CE / DNV-GL / ABS / LR / DB / TÜV / KR (Korean Register) / BWB / Bureau Veritas	50
SW ML 5754 AlMg3	3.3536	S Al 5754 (AlMg53)	ER 5754	On request	51
SW ML4047 AlSi12	3.2585	S Al 4047 (AlSi12 (A))	ER 4047	CE / DB	52
SW ML 4043 AlSi5	3.2245	S Al 4043 (AlSi5(A))	ER 4043	CE / DB / TÜV	53
SW ML 5356 AlMg5Cr	3.3556	S AL 5356 (AlMg5Cr)	ER 5356	CE / DNV-GL / ABS / DB / TÜV / Bureau Veritas	54
Copper-based					
SW CuSi3		CuSi3Mn (Cu 6560)	ER CuSi-A		55
SW CuAl8		CuAl7 (Cu 6100)	ER CuAl-A1		56
SW CuSn1		CuSn1 (Cu 1898)	ER Cu		57

SW 70S G3 XQ

Standards	DIN EN ISO 14341-A - G 42 4 C1 3Si1 / G 42 5 M21 3Si1
	AWS A-5.18 - ER 70S-6
Material number	1.5125
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC+
Shielding gas	M2
	M3
	C1
Yield strength	≥420 MPa
Tensile strength, Rm	≥500 MPa
Expansion, A5	≥22 %
Impact energy, Av	-50 °C: ≥ 47 J
Approvals	CE / TÜV / DB / DNV-GL
Base materials	S235JR - S355JR | S235JO - S355JO | S235J2 - S355J2 | S275N - S420N | S275M - S420M | P235GH - P355GH | P275NL1 - P355NL1 | P215NL | P265NL | P355N | P285NH - P420NH | P195TR1 - P265TR1 | P195TR2 - P265TR2 | P195GH - P265GH | L245NB - L415NB | L245MB - L415MB | GE200 - GE240
	ASTM: A 106 Gr. A, B, C | A 181 Gr. 60, 70 | A 283 Gr. A, C | A 285 Gr. A, B, C | A 350 Gr. LF1 | A 414 Gr. A, B, C, D, E, F, G | A 501 Gr. B | A 513 Gr. 1018 | A 516 Gr. 55, 60, 65, 70 | A 573 Gr. 58, 65, 70 | A 588 Gr. A, B | A 633 Gr. C | A 662 Gr. B | A 711 Gr. 1013 | A 841 Gr. A | API 5 L Gr. B, X42, X52, X56, X60

Shipbuilding steels: A, B, D, E, A 32-E 36

- Unalloyed solid wire electrode
- Copper-plated, layer wound
- EWM premium quality
- High arc stability, low spatter
- Low impurity of the feed system
- Very good mechanical properties
- Operating temperature ranges from -50°C to 450°C

- **Fields of application:**
  - Industry, trade and repair shops and shipbuilding

Chemical analysis (in %)

C	Mn	Si	P	S
0.06 - 0.14	1.3 - 1.6	0.7 - 1	<0.025	<0.025

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	0.8 mm	-	097-005374-20008
Plastic spool	S200	5 kg	1 mm	-	097-005374-20010
Plastic spool	S200	5 kg	1.2 mm	-	097-005374-20012
Plastic spool	S280	15 kg	0.8 mm	-	097-005374-28008
Plastic spool	S280	15 kg	1 mm	-	097-005374-28010
Plastic spool	S280	15 kg	1.2 mm	-	097-005374-28012
Plastic spool	S280	15 kg	1.6 mm	-	097-005374-28016
Basket spool	B300	15 kg	1 mm	-	097-005374-30010
Basket spool	B300	15 kg	1.2 mm	-	097-005374-30012
Basket spool	B300	15 kg	1.6 mm	-	097-005374-30016
Drum	F250	250 kg	1 mm	-	097-005374-25010
Drum	F250	250 kg	1.2 mm	-	097-005374-25012

SW 70S G3 XQ Brillance

Standards	DIN EN ISO 14341-A - G 42 2 C1 3Si1 / G 42 4 M21 3Si1
	AWS A-5.18 - ER 70S-6
Material number	1.5125
Welding positions	PA / PB / PC / PE / PF / PG
Polarity	DC+
Shielding gas	C1
	M21
Yield strength	≥470 MPa
Tensile strength, Rm	560 MPa
Expansion, A5	≥26 %
Impact energy, Av	20 °C: ≥ 70 J
	-40 °C: 90 J
Approvals	CE / TÜV / DB
Base materials	10113-2 S275, S355, S420 | 10113-3 S275M, S275ML, S355M, S355ML | 10113-3 S420M, S420ML | 10025 S185, S235, S275, S355 |10208-1 L210, L240, L290, L360
	ASTM: A 139 | A 210 Gr A1, C | A 36 | A 234 Gr WPB | A 334 Gr 1 | A 106 Gr A B, C | A 131 Gr A B, D | API 5LX42 | API 5LX46 | AP1 5LX52 | API 5LX60 | API 5LX65

- Unalloyed solid wire electrode
- Non-copper coated wire
- EWM premium quality
- High arc stability, low spatter
- Low impurity of the feed system
- Very good mechanical properties
- High current load
- Operating temperature ranges from -50°C to 450°C

Chemical analysis (in %)

C	Mn	Si	P	S
0.06 - 0.14	1.3 - 1.6	0.7 - 1	0.025	0.025

Ni	Cr	Mo	Cu
0.15	0.15	0.15	0.3

- **Fields of application:**
  - Industry, trade and repair shops and shipbuilding

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	0.8 mm	-	097-005299-30008
Basket spool	B300	15 kg	1 mm	-	097-005299-30010
Basket spool	B300	15 kg	1.2 mm	-	097-005299-30012
Basket spool	B300	15 kg	1.6 mm	-	097-005299-30016
Drum	F250	250 kg	1 mm	-	097-005299-25010
Drum	F250	250 kg	1.2 mm	-	097-005299-25012
Drum	F250	250 kg	1.6 mm	-	097-005299-25016

SW 70S G3 Ti

Standards	DIN EN ISO 14341-A - G 42 2 C1/M21 3Si1 Ti
	AWS A-5.18 - ER 70S-6
Material number	1.5125
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	C1
	M21
Yield strength	534 MPa
Tensile strength, Rm	600 MPa
Expansion, A5	28.6 %
Impact energy, Av	-29 °C: ≥ 102 J
Approvals	CE / TÜV
Base materials	S185 - S355J0 | S255N - S355N

- Unalloyed solid wire electrode
- Layer-wound
- Low-spatter thanks to high chemical purity
- Excellent for rusty, primed, contaminated and galvanised surfaces

- **Fields of application:**
  - Shipbuilding, steel construction and automotive industry

Chemical analysis (in %)

C	Si	Mn	P	S	Ti
0.05	0.82	1.5	0.011	0.01	0.18

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	0.8 mm	-	097-005432-20008
Plastic spool	S200	5 kg	1 mm	-	097-005432-20010
Plastic spool	S280	15 kg	0.8 mm	-	097-005432-28008
Basket spool	B300	15 kg	1 mm	-	097-005432-30010
Basket spool	B300	15 kg	1.2 mm	-	097-005432-30012
Basket spool	B300	15 kg	1.6 mm	-	097-005432-30016

SW 70S G3 Bronze

Standards	DIN EN ISO 14341-A - G 42 2 C1 3Si1 / G 42 4 M21 3Si1
	AWS A-5.18 - ER 70S-6
Material number	1.5125
Welding positions	PA / PB / PC / PE / PF / PG
Polarity	DC+
Shielding gas	C1
	M21
Yield strength	470 MPa
Tensile strength, Rm	560 MPa
Expansion, A5	26 %
Impact energy, Av	20 °C: 70 J
	-40 °C: 90 J
Base materials	10113-2 S275, S355, S420 | 10113-3 S275M, S275ML, S355M, S355ML | 10113-3 S420M, S420ML | 10025 S185, S235, S275, S355 |10208-1 L210, L240, L290, L360
	ASTM: A 139 | A 210 Gr A1, C | A 36 | A 234 Gr WPB | A 334 Gr 1 | A 106 Gr A B, C | A 131 Gr A B, D | API 5LX42 | API 5LX46 | AP1 5LX52 | API 5LX60 | API 5LX65

- Unalloyed solid wire electrode
- Bronze plated, layer wound
- Low-spatter thanks to high chemical purity
- For welding unalloyed steels with a yield strength of less than 540 N/mm2

- **Fields of application:**
  - Industry, trade and repair shops and shipbuilding

Chemical analysis (in %)

C	Mn	Si	P	S
0.06 - 0.14	1.3 - 1.6	0.7 - 1	0.025	0.025

Ni	Cr	Mo	Cu
0.15	0.15	0.15	0.3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	0.6 mm	-	097-005396-30006
Basket spool	B300	15 kg	0.8 mm	-	097-005396-30008
Basket spool	B300	15 kg	1 mm	-	097-005396-30010
Basket spool	B300	15 kg	1.2 mm	-	097-005396-30012
Basket spool	B300	15 kg	1.6 mm	-	097-005396-30016
Drum	F250	250 kg	0.8 mm	-	097-005396-25008
Drum	F250	250 kg	1 mm	-	097-005396-25010
Drum	F250	250 kg	1.2 mm	-	097-005396-25012

SW 70S G4 XQ

Standards	DIN EN ISO 14341-A - G 46 4 C1 / G 46 5 M21 4Si1
	AWS A-5.18 - ER 70S-6
Material number	1.5130
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC+
Shielding gas	C1
	M21
	M20 - M33
Yield strength	≥460 MPa
Tensile strength, Rm	≥530 MPa
Expansion, A5	≥20 %
Impact energy, Av	-50 °C: ≥ 47 J
Approvals	CE / TÜV / DB / DNV-GL
Base materials	S185 - S355G1 | S255N - S355N | P255NH - P355NH | P235GH - P285NH | P235 - P355T2 | 20MnNb6 | L210 - L360N
	Shipbuilding steels A, B, D, E

- Unalloyed solid wire electrode
- Copper-plated, layer wound
- EWM premium quality
- High arc stability, low spatter
- Low impurity of the feed system
- Very good mechanical properties
- Operating temperature ranges from -50°C to 450°C

- **Fields of application:**
  - Industry, trade and repair shops and shipbuilding

Chemical analysis (in %)

C	Mn	Si	P	S
0.06 - 0.14	1.6 - 1.9	0.8 - 1.2	max. 0.025	max. 0.025

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	0.8 mm	-	097-005375-20008
Plastic spool	S200	5 kg	1 mm	-	097-005375-20010
Plastic spool	S200	5 kg	1.2 mm	-	097-005375-20012
Plastic spool	S280	15 kg	0.8 mm	-	097-005375-28008
Plastic spool	S280	15 kg	1 mm	-	097-005375-28010
Plastic spool	S280	15 kg	1.2 mm	-	097-005375-28012
Basket spool	B300	15 kg	1 mm	-	097-005375-30010
Basket spool	B300	15 kg	1.2 mm	-	097-005375-30012
Basket spool	B300	15 kg	1.6 mm	-	097-005375-30016
Drum	F250	250 kg	1 mm	-	097-005375-25010
Drum	F250	250 kg	1.2 mm	-	097-005375-25012

SW 70S G4 XQ Brillance

Standards	DIN EN ISO 14341-A - G 42 3 C1 4Si1 / G 46 4 M21 4Si1
	AWS A-5.18 - ER 70S-6
Material number	1.5130
Welding positions	PA / PB / PC / PE / PF / PG
Polarity	DC+
Shielding gas	C1
	M21
Yield strength	≥510 MPa
Tensile strength, Rm	580 MPa
Expansion, A5	≥26 %
Impact energy, Av	20 °C: ≥ 140 J
	-40 °C: 70 J
Approvals	CE / TÜV
Base materials	Construction steels: S275, S355 | P235TR2 - P355T2 | E295, E335, E360 | C10 - C35, fine-grained steels: S255N - S420N | P255NH - P355NH
	Pressure vessel and tubular steels, creep-resistant steels: P235GH, P265GH | P295GH, P355GH | P235G1TH - P255G1TH
	Cast steel: GE200, GE240, GE260
	Pipeline steels: L210 - L415NB
	Shipbuilding steels: A, B, C, D, E

- Unalloyed solid wire electrode
- Non-copper coated wire
- EWM premium quality
- High arc stability, low spatter
- Low impurity of the feed system
- Very good mechanical properties
- Operating temperature ranges from -50°C to 450°C

- **Fields of application:**
  - Industry, trade and repair shops and shipbuilding

Chemical analysis (in %)

C	Mn	Si	P	S
0.06 - 0.14	1.6 - 1.9	0.8 - 1.2	0.025	0.025

Ni	Cr	Mo	Cu
0.15	0.15	0.15	0.3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	0.8 mm	-	097-005300-30008
Basket spool	B300	15 kg	1 mm	-	097-005300-30010
Basket spool	B300	15 kg	1.2 mm	-	097-005300-30012
Basket spool	B300	15 kg	1.6 mm	-	097-005300-30016
Drum	F250	250 kg	1 mm	-	097-005300-25010
Drum	F250	250 kg	1.2 mm	-	097-005300-25012
Drum	F250	250 kg	1.6 mm	-	097-005300-25016

SW 70S G4 Bronze

Standards	DIN EN ISO 14341-A - G 42 3 C G4Si1 / G 46 4M21 4Si1
	AWS A-5.18 - ER 70S-6
Material number	1.5130
Welding positions	PA / PB / PC / PE / PF / PG
Polarity	DC+
Shielding gas	C1
	M21
Yield strength	≥510 MPa
Tensile strength, Rm	580 MPa
Expansion, A5	≥26 %
Impact energy, Av	20 °C: ≥ 100 J
	-40 °C: 70 J
Base materials	Construction steels: S275, S355 | P235TR2 - P355T2 | E295, E335, E360 | C10 - C35, fine-grained steels: S255N - S420N | P255NH - P355NH
	Pressure vessel and tubular steels, creep-resistant steels: P235GH, P265GH | P295GH, P355GH | P235G1TH - P255G1TH
	Cast steel: GE200, GE240, GE260
	Pipeline steels: L210 - L415NB
	Shipbuilding steels: A, B, C, D, E | AH32 - EH36

- Unalloyed solid wire electrode
- Bronze plated, layer wound
- Low-spatter thanks to high chemical purity
- Low impurity of the feed system

- **Fields of application:**
  - Industry, trade and repair shops and shipbuilding

Chemical analysis (in %)

C	Mn	Si	P	S
0.06 - 0.14	1.6 - 1.9	0.8 - 1.2	0.025	0.025

Ni	Cr	Mo	Cu
0.15	0.15	0.15	0.3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	0.8 mm	-	097-005402-30008
Basket spool	B300	15 kg	1 mm	-	097-005402-30010
Basket spool	B300	15 kg	1.2 mm	-	097-005402-30012
Drum	F250	250 kg	1 mm	-	097-005402-25010
Drum	F250	250 kg	1.2 mm	-	097-005402-25012

SW 100S NiMo

Standards	DIN EN ISO 16834-A - G 62 6 M21 Mn3Ni1Mo
	AWS A-5.28 - ER 100S-G
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M21
Yield strength	≥620 MPa
Tensile strength, Rm	≥760 MPa
Expansion, A5	≥18 %
Impact energy, Av	20 °C: ≥ 100 J
	-60 °C: ≥ 47 J
Approvals	CE / TÜV / DB
Base materials	High tensile, thermomechanically rolled and tempered, fine-grain construction steels with a yield strength of up to 620 MPa
	S500Q - S620Q | S500QL - S620QL | P500Q - P620Q | P500QL1 - P620QL1
	Alform Plate 620 M | NAXTRA 620 | Strenx 600

- Low-alloy solid wire electrode
- Copper-plated, layer wound
- For welding high tensile and fine-grain construction steels

- **Fields of application:**
  - For steel, machine, crane and mining construction, as well as pipeline and container construction

Chemical analysis (in %)

C	Si	Mn	Ni	Mo	Ti
0.08	0.6	1.7	0.95	0.38	0.08

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1 mm	-	097-003525-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003525-30012

SW 100S NiMoCr

Standards	DIN EN ISO 16834-A - G 62 6 M21 Mn3Ni1Mo
	AWS A-5.28 - ER 110S-G
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M21
Yield strength	≥620 MPa
Tensile strength, Rm	≥760 MPa
Expansion, A5	≥18 %
Impact energy, Av	20 °C: ≥ 100 J
	-60 °C: ≥ 47 J
Approvals	CE / TÜV / DB
Base materials	High tensile, thermomechanically rolled and tempered, fine-grain construction steels with a yield strength of up to 620 MPa
	S500Q-S620Q, S500QL-S620QL, P500Q-P620Q, P500QL1-P620QL1
	Alform Plate 620 M | NAXTRA 620 | Strenx 600

- Low-alloy solid wire electrode
- Copper-plated, layer wound
- Low-spatter thanks to high chemical purity
- For welding high-tensile fine-grain structural steels up to 690 MPa yield strength

- **Fields of application:**
  - For steel, machine, crane, pipeline and mining construction

Chemical analysis (in %)

C	Si	Mn	Ni	Mo	Ti
0.08	0.6	1.7	0.95	0.38	0.08

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1 mm	-	097-003548-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003548-30012
Basket spool	B300	15 kg	1.6 mm	-	097-003548-30016

SW 120S NiMoCr

Standards	DIN EN ISO 16834-A - G 89 6 M21 Mn4Ni2CrMo
	AWS A-5.28 - ER 120S-G
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M21
Yield strength	≥890 MPa
Tensile strength, Rm	≥940 MPa
Expansion, A5	≥15 %
Impact energy, Av	20 °C: ≥ 70 J
	-60 °C: ≥ 47 J
Approvals	CE / TÜV / DB
Base materials	High tensile fine-grain construction steels with a yield strength above 890 MPa
	S690Q - S890Q | S690QL - S890QL | S690QLN - S890QLN | S960QL | S1100QL | S1300QL

- Low-alloy solid wire electrode
- Copper-plated, layer wound
- Low-spatter thanks to high chemical purity
- For welding high tensile, medium-alloy steels
- Excellent toughness characteristics down to -60°C

- **Fields of application:**
  - For structures under high load, mobile crane construction, lattice masts, shipbuilding, the automotive industry and pressure vessel construction

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Mo
0.09	0.8	1.8	0.3	2.25	0.55

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1 mm	-	097-003558-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003558-30012

SW 80S Mo

Standards	DIN EN ISO 14341-A - G46 6 M21 2 Mo
	AWS A-5.28 - ER 80S-G
Material number	1.5424
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M21
Yield strength	≥460 MPa
Tensile strength, Rm	≥560 MPa
Expansion, A5	≥22 %
Impact energy, Av	20 °C: ≥ 100 J
	-40 °C: ≥ 47 J
Approvals	CE / TÜV / DB
Base materials	Similarly alloyed creep-resistant steels and cast steel
	S355 | P235G1TH - P255G1TH | P310GH | L320 | L360NB - L415NB | 16Mo3
	ASTM: A182/A336 grade F1 | A204 grades A/B/C | A209/A250 grade T1 | A217 grade WC1 | A335 grade P1 | A352 grade LC

- Low-alloy solid wire electrode, creep-resistant
- Copper-plated, layer wound
- Low-spatter thanks to high chemical purity
- Mainly for welding creep-resistant 0.5% Mo steels
- Maximum operating temperature 500 °C

- **Fields of application:**
  - Boiler, container, pressure vessel and pipeline construction

Chemical analysis (in %)

C	Si	Mn	Mo
0.1	0.6	1.15	0.52

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	0.8 mm	-	097-003547-30008
Basket spool	B300	15 kg	1 mm	-	097-003547-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003547-30012

SW 80S CrMo1

Standards	DIN EN ISO 21952-A - G CrMo1Si
	AWS A-5.28 - ER 80S-G
Material number	1.7339
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC+
Shielding gas	M21
Yield strength	≥355 MPa
Tensile strength, Rm	≥510 MPa
Expansion, A5	≥20 %
Impact energy, Av	20 °C: ≥ 100 J
	-10 °C: ≥ 47 J
Approvals	CE / TÜV / DB
Base materials	13CrMo 4-4 | 13CrMo 4-5 | 16CrMo 4-4 | G-17CrMo 5-5
	ASTM: A182 grades F11/F12 | A199/A200 grade T11 | A217 grades WC6/WC11 | A234 grades WP11/WP12 | A335 grades P11/P12 | A387 grades 11/12

- Low-alloy solid wire electrode, creep-resistant
- Copper-plated, layer wound
- Low-spatter thanks to high chemical purity
- For welding creep-resistant, ferritic 1.25 % Cr - 0.5 % Mo steels
- For operating temperatures up to max. 550°C
- Low Bruscato factor (X<10ppm) = insensitive to temper embrittlement or 500°C embrittlement

- **Fields of application:**
  - Pressure pipe, turbine and boiler construction, as well as for the chemical and petrochemical industry

Chemical analysis (in %)

C	Si	Mn	Cr	Mo
0.1	0.6	1	1.2	0.52

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1 mm	-	097-003546-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003546-30012

SW 90S CrMo2

Standards	DIN EN ISO 21952-A - G CrMo2Si
	AWS A-5.28 - ER 90S-G
Material number	1.7384
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M21
Yield strength	≥400 MPa
Tensile strength, Rm	≥520 MPa
Expansion, A5	≥20 %
Impact energy, Av	20 °C: ≥ 80 J
Approvals	CE / TÜV / DB
Base materials	10CrMo 9-10 | G-17CrMo 9-10
	ASTM: A182 grade F22 | A199/A200 grades T21/T22 | A213 grade T22 | A217 grade WC9 | A234 grade WP22 | A335 grade P22 | A387 grades 21/22

- Low-alloy solid wire electrode, creep-resistant
- Copper-plated, layer wound
- Low-spatter thanks to high chemical purity
- For operating temperatures up to max. 600°C
- Low Bruscato factor (X<10ppm) = insensitive to temper embrittlement or 500°C embrittlement
- For welding creep-resistant, ferritic 2.25% Cr - 1% Mo steels

- **Fields of application:**
  - Power plant, turbine, boiler and pressure line construction, as well as for chemicals and petrochemicals

Chemical analysis (in %)

C	Si	Mn	Cr	Mo
0.08	0.6	0.92	2.45	1

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1 mm	-	097-003526-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003526-30012
Basket spool	B300	15 kg	1.6 mm	-	097-003526-30016

SW 80S NiCu

Standards	DIN EN ISO 14341-A - G 42 2 M21 Z2NiCu
	AWS A-5.28 - ER 80S-G
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	C1
	M2
	M3
Yield strength	≥450 MPa
Tensile strength, Rm	≥550 MPa
Expansion, A5	≥22 %
Impact energy, Av	20 °C: ≥ 80 J
	-20 °C: ≥ 47 J
Approvals	CE / DB
Base materials	S235J0W - S355J0W | S235J2W - S355J2W | S355J0WP | S355J2WP | S355K2W
	ASTM: A242 grades 1/2 | A588 grades A/B/C/K | A606 | A709 grade 50W | Corten | Patinax

- Low-alloy solid wire electrode, weather-resistant
- Copper-plated, layer wound
- Low-spatter thanks to high chemical purity
- Increased corrosion resistance compared to construction steels
- For joining and surfacing weather-resistant steels (Corten, Patinax)

- **Fields of application:**
  - For building construction (facades), sea containers and bridge construction

Chemical analysis (in %)

C	Si	Mn	Ni	Cu
0.08	0.8	1.4	0.8	0.4

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	0.8 mm	-	097-003524-30008
Basket spool	B300	15 kg	1 mm	-	097-003524-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003524-30012

SW 80S Ni1

Standards	DIN EN ISO 14341-A - G 50 6 M21 3Ni1
	AWS A-5.28 - ER 80S-Ni1
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M21
Yield strength	≥500 MPa
Tensile strength, Rm	≥560 MPa
Expansion, A5	≥18 %
Impact energy, Av	20 °C: ≥ 80 J
	-60 °C: 47 J
Approvals	CE / TÜV
Base materials	Nickel-alloyed, low-temperature tough steels
	11MnNi5-3 | 13MnNi6-3 | S275NL - S460NL | S275ML - S460ML | P275NL2 - P460NL2 | P355ML2 - P460ML2
	ASTM: A333/A334 grades 1/6 | A350 grades LF2/LF6 | A352 grades LCB
	API: 5L X65

- Low-alloy solid wire electrode, low-temperature tough
- Copper-plated, layer wound
- Low-spatter thanks to high chemical purity
- For welding low-temperature tough steels
- Low temperature requirements down to - 60°C

- **Fields of application:**
  - Oil and gas industry, offshore sector and steel construction

Chemical analysis (in %)

C	Si	Mn	Ni
0.09	0.5	1.05	0.9

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1 mm	-	097-003622-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003622-30012

SW 80S Ni2

Standards	DIN EN ISO 14341-A - G 46 7 M21 2Ni2
	AWS A-5.28 - ER 80S-Ni2
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M21
Yield strength	≥470 MPa
Tensile strength, Rm	≥570 MPa
Expansion, A5	≥20 %
Impact energy, Av	20 °C: ≥ 100 J
	-70 °C: ≥ 47 J
Approvals	CE
Base materials	Nickel-alloyed, low-temperature tough steels
	11MnNi5-3 | 13MnNi6-3 | 12Ni14 | S275NL - S460NL | S275ML - S460ML | P275NL2 - P460NL2 | P355ML2 - P460ML2
	ASTM: A203 grade A/B | A333/A334 grades 1/6/7 | A350 grade LF2/LF5/LF6 | A352 grade LC1/LC2

- Low-alloy solid wire electrode, low-temperature tough
- Copper-plated, layer wound
- Low-spatter thanks to high chemical purity
- For welding low-temperature tough steels
- For low temperature requirements down to - 90°C

- **Fields of application:**
  - Oil and gas industry, offshore sector and steel construction

Chemical analysis (in %)

C	Si	Mn	Ni
0.09	0.52	1.1	2.45

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1 mm	-	097-003640-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003640-30012

SW 307 Si XQ

Standards	DIN EN ISO 14343-A - G 18 8 Mn
	AWS A-5.9 - ER 307 Si
Material number	1.4370
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M13
	M12
Tensile strength, Rm	≥600 MPa
Expansion, A5	≥35 %
Impact energy, Av	20 °C: ≥ 120 J
Approvals	CE / TÜV / DB
Hardness	190 BHN
Base materials	Dissimilar steels (black-and-white joints)
	Claddings, buffer layers for hardfacing, high carbon and difficult-to-weld steels, manganese high carbon steel (e.g. 1.3401)

- High-alloy solid wire electrode, non-corroding
- Layer-wound
- Suitable for dissimilar joints and buffer layers
- For welding heat-resistant Cr and CrNi steels, as well as austenitic stainless steels containing Mn
- Scale resistant up to approx. 850°C
- Strain-hardening

- **Fields of application:**
  - Exhaust system construction (e.g. exhaust systems), spring technology, repair of shafts

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	P	S	Mo
max. 0.12	0.65 - 1	5 - 8	17 - 20	7.5 - 9	max. 0.03	max. 0.03	max. 0.3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	0.8 mm	-	097-005370-20008
Wire basket	BS300	15 kg	0.8 mm	-	097-005370-30008
Wire basket	BS300	15 kg	1 mm	-	097-005370-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-005370-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-005370-30016
Drum	F250	250 kg	1 mm	-	097-005370-25010
Drum	F250	250 kg	1.2 mm	-	097-005370-25012

SW 308 LSi XQ

Standards	DIN EN ISO 14343-A - G 19 9 L Si
	AWS A-5.9 - ER 308 L Si
Material number	1.4316
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Tensile strength, Rm	≥600 MPa
Expansion, A5	≥35 %
Impact energy, Av	20 °C: ≥ 110 J
	-196 °C: ≥ 40 J
Approvals	CE / TÜV / DB
Hardness	190 BHN
Base materials	1.4301 | 1.4306
	304 | 304L

- High-alloy solid wire electrode, non-corroding
- Layer-wound
- Good resistance to intergranular and atmospheric corrosion
- Excellent welding properties (better seam appearance) due to higher Si content
- For welding stabilised and non-stabilised CrNi steels
- For operating temperatures up to approx. +350°C, low-temperature tough down to -196°C

- **Fields of application:**
  - Chemical and food industry, as well as pipeline and boiler construction

Chemical analysis (in %)

C	Si	Mn	P	S	Cr	Ni	Mo
max. 0.03	0.65 - 1	1 - 2.5	max. 0.03	max. 0.02	19.5 - 21	9 - 11	max. 0.3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	0.8 mm	-	097-005391-20008
Plastic spool	S200	5 kg	1 mm	-	097-005391-20010
Wire basket	BS300	15 kg	0.8 mm	-	097-005391-30008
Wire basket	BS300	15 kg	1 mm	-	097-005391-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-005391-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-005391-30016
Drum	F250	250 kg	1 mm	-	097-005391-25010
Drum	F250	250 kg	1.2 mm	-	097-005391-25012
Drum	F250	250 kg	1.6 mm	-	097-005391-25016

SW 309 LSi XQ

Standards	DIN EN ISO 14343-A - G 23 12 L Si
	AWS A-5.9 - ER 309 L Si
Material number	1.4332
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Tensile strength, Rm	≥650 MPa
Expansion, A5	≥35 %
Impact energy, Av	20 °C: ≥ 120 J
	-196 °C: 55 J
Approvals	CE / TÜV
Base materials	Austenite-ferrite joints (dissimilar), cladding, corrosion-resistant layers on non-alloyed construction steels, buffer layers

- High-alloy solid wire electrode, non-corroding
- Layer-wound
- Very good corrosion and scale resistance
- Excellent welding properties (better seam appearance) due to higher Si content
- Suitable for dissimilar joints and buffer layers
- Heat and scale resistant up to approx. +950°C
- For operating temperatures up to approx. +300°C

- **Fields of application:**
  - Industrial furnaces and boiler parts, annealing chambers, heat exchangers, processing plants

Chemical analysis (in %)

C	Mn	Si	P	S	Cr	Ni	Mo
max. 0.03	1 - 2.5	0.65 - 1	max. 0.03	max. 0.02	23 - 25	12 - 14	max. 0.3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	1 mm	-	097-005393-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-005393-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-005393-30016

SW 309 H

Standards	DIN EN ISO 14343-A - G 22 12 H
	AWS A-5.9 - ER 309 Si
Material number	1.4829
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Yield strength	≥400 MPa
Tensile strength, Rm	≥600 MPa
Expansion, A5	≥25 %
Impact energy, Av	20 °C: 130 J
Base materials	1.4828 | 1.4826 | 1.4833 | 1.4713 | 1.4724 | 1.4742 | 1.4710 | 1.4740 | 1.4829 | 1.4832 | 1.4878 | 1.4713

- High-alloy solid wire electrode
- Not prone to hot crack formation due to high delta-ferrite content
- Joint welding and surfacing of heat-resisting CrSi, CrAl and CrNiSi steels
- For similar heat- and scale-resistant steels
- Scale-resistant up to 950 °C

- **Fields of application:**
  - Industrial furnaces and boiler parts

Chemical analysis (in %)

C	Si	Mn	Ni	Cr	Mo	Cu
0.08 - 0.12	0.65 - 1.2	1 - 2.5	12 - 14	22 - 24	≤0.5	≤0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	0.8 mm	-	097-004878-30008
Wire basket	BS300	15 kg	1 mm	-	097-004878-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-004878-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-004878-30016

SW 310 XQ

Standards	DIN EN ISO 14343-A - G 25 20
	AWS A-5.9 - ER 310
Material number	1.4842
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Tensile strength, Rm	≥590 MPa
Expansion, A5	≥35 %
Impact energy, Av	20 °C: ≥ 140 J
Hardness	9 HRC
Base materials	1.4710 | 1.4713 | 1.4726 | 1.4745 | 1.4823 | 1.4832 | 1.4837 | 1.4840 | 1.4841 | 1.4845 | 1.4846 |1.4848 | 1.4849

- High-alloy solid wire electrode
- Weld metal made of fully austenitic chrome nickel steel
- Moderate corrosion resistance in wet environments
- For welding heat-resistant steels
- Scale resistant up to 1150°C
- Not resistant to hot cracking

- **Fields of application:**
  - Industrial furnaces, boiler construction, heat exchangers

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	S	P	Mo
0.08 - 0.15	1 - 2.5	0.3 - 0.65	25 - 27	20 - 22	max. 0.03	max. 0.02	max. 0.75

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	1 mm	-	097-005394-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-005394-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-005394-30016

SW 312 XQ

Standards	DIN EN ISO 14343-A - G 29 9
	AWS A-5.9 - ER 312
Material number	1.4337
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Tensile strength, Rm	≥760 MPa
Expansion, A5	≥25 %
Impact energy, Av	20 °C: ≥ 45 J
Base materials	Corrosion-resistant analogue steel and cast steel (e.g. 1.4762, 1.4085)
	Difficult-to-weld steel, manganese high carbon steel, spring steel, tool steel

- High-alloy solid wire electrode, creep-resistant
- The weld metal has a ferritic-austenitic structure
- Suitable for dissimilar joints and buffer layers
- Good scale resistance
- High hot crack resistance

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	S	P	Mo
max. 0.15	1 - 2.5	0.3 - 0.65	28 - 32	8 - 11	max. 0.02	max. 0.03	max. 0.3

- **Fields of application:**
  - Offshore industry

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	0.8 mm	-	097-005403-30008
Wire basket	BS300	15 kg	1 mm	-	097-005403-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-005403-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-005403-30016

SW 316 LSi XQ

Standards	DIN EN ISO 14343-A - G 19 12 3 L Si
	AWS A-5.9 - ER 316LSi
Material number	1.4430
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Tensile strength, Rm	≥600 MPa
Expansion, A5	≥40 %
Impact energy, Av	20 °C: 110 J
	-196 °C: 40 J
Approvals	CE / TÜV / DB
Base materials	1.4401 | 1.4404 | 1.4406 | 1.4408 | 1.4429 | 1.4435 | 1.4436 | 1.4541 | 1.4550 | 1.4571 | 1.4580 | 1.4581 | 1.4583

- High-alloy solid wire electrode, creep-resistant
- Layer-wound
- Excellent corrosion resistance in acidic media and chlorinated solutions
- Excellent welding properties (better seam appearance) due to higher Si content
- For welding stabilised and non-stabilised austenites of similar types
- For operating temperatures up to + 400°C, low-temperature tough down to - 196°C

- **Fields of application:**
  - Chemical and food industry (containers, pipes, pumps)

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	S	P	Mo
max. 0.03	1 - 2.5	0.65 - 1	18 - 20	11 - 14	max. 0.02	max. 0.03	2 - 3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	0.8 mm	-	097-005372-20008
Plastic spool	S200	5 kg	1 mm	-	097-005372-20010
Wire basket	BS300	15 kg	0.8 mm	-	097-005372-30008
Wire basket	BS300	15 kg	1 mm	-	097-005372-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-005372-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-005372-30016
Drum	F250	250 kg	0.8 mm	-	097-005372-25008
Drum	F250	250 kg	1 mm	-	097-005372-25010
Drum	F250	250 kg	1.2 mm	-	097-005372-25012

SW 318 Si

Standards	DIN EN ISO 14343-A - W 19 12 3 Nb Si
	AWS A-5.9 - ER 318
Material number	1.4576
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Tensile strength, Rm	≥600 MPa
Expansion, A5	≥32 %
Impact energy, Av	20 °C: 120 J
	-196 °C: 30 J
Approvals	CE / TÜV / DB
Base materials	1.4401 | 1.4404 | 1.4408 | 1.4420 | 1.4435 | 1.4436 | 1.4571 | 1.4573 | 1.4580 | 1.4581 | 1.4583

- High-alloy solid wire electrode, creep-resistant
- Layer-wound
- Good resistance to intergranular and pitting corrosion
- Excellent welding properties (better seam appearance) due to higher Si content
- For welding stabilised austenites of similar types
- For operating temperatures up to + 400°C, low-temperature tough down to - 196°C

- **Fields of application:**
  - For chemical apparatus and container construction

Chemical analysis (in %)

C	Mn	Si	Cr	Ni
max. 0.08	1 - 2.5	0.65 - 1	18 - 20	11 - 14

S	P	Mo	Nb
max. 0.03	max. 0.02	2.5 - 3.5	≥10 xC

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	0.8 mm	-	097-003476-20008
Plastic spool	S200	5 kg	1 mm	-	097-003476-20010
Wire basket	BS300	15 kg	0.8 mm	-	097-003476-30008
Wire basket	BS300	15 kg	1 mm	-	097-003476-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-003476-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-003476-30016
Drum	F250	250 kg	1 mm	-	097-003476-25010

SW 347 Si XQ

Standards	DIN EN ISO 14343-A - G 19 9 Nb Si
	AWS A-5.9 - ER 347 Si
Material number	1.4551
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Tensile strength, Rm	≥610 MPa
Expansion, A5	≥35 %
Impact energy, Av	20 °C: ≥ 110 J
	-196 °C: 30 J
Hardness	190 BHN
Base materials	1.4541 | 1.4550 | 1.4552 | 1.4301 | 1.4312 | 1.4546 | 1.4311 | 1.4306

- High-alloy solid wire electrode, creep-resistant
- Layer-wound
- Good resistance to intergranular and pitting corrosion
- For welding stabilised austenites of similar types
- Heat and scale resistant up to approx. 700°C
- For operating temperatures up to + 400°C, low-temperature tough down to - 196°C

Chemical analysis (in %)

C	Si	Cr	Ni	Mn	P	Mo	S
max. 0.08	0.65 - 1	19 - 21	9 - 11	1 - 2.5	max. 0.03	max. 0.3	max. 0.02

- **Fields of application:**
  - Chemical plant engineering

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	0.8 mm	-	097-005378-30008
Wire basket	BS300	15 kg	1 mm	-	097-005378-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-005378-30012

SW 2209 Duplex XQ

Standards	DIN EN ISO 14343-A - G 22 9 3 LN
	AWS A-5.9 - ER 2209
Material number	1.4462
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Tensile strength, Rm	≥790 MPa
Expansion, A5	≥25 %
Impact energy, Av	20 °C: ≥ 120 J
	-80 °C: ≥ 40 J
Approvals	CE / TÜV / Weitere auf Anfrage
Base materials	1.4462 | 1.4417 | 1.4460 | 1.4362
	Dissimilar joints

- High-alloy solid wire electrode
- Good resistance to pitting and stress corrosion cracking, even in media containing chloride
- For joining austenitic-ferritic stainless steels and all other lean duplex steels
- Suitable for black/white joints
- To be used in the temperature range from -80°C to approx. 250°C

- **Fields of application:**
  - Offshore (e.g. pipeline construction), pulp and paper industry

Chemical analysis (in %)

C	Mn	Mo	Cr	Ni	S	P	N
max. 0.03	0.5 - 2	2.5 - 3.5	21.5 - 23.5	7.5 - 9.5	max. 0.02	max. 0.03	0.08 - 0.2

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	0.8 mm	-	097-005380-30008
Wire basket	BS300	15 kg	1 mm	-	097-005380-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-005380-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-005380-30016

SW 2594 Super Duplex XQ

Standards	DIN EN ISO 14343-A - G 25 9 4 N L
	AWS A-5.9 - ER 2594
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M12
	M13
Tensile strength, Rm	≥830 MPa
Expansion, A5	≥22 %
Impact energy, Av	-196 °C: ≥ 80 J
Approvals	auf Anfrage
Base materials	Austenitic-ferritic super duplex steels such as 1.4410
	Dissimilar joints

- High-alloy solid wire electrode
- Excellent resistance to pitting, air gap and stress corrosion cracking in chloride-containing environments
- Suitable for surfacing on steels in particularly aggressive environments
- For welding duplex and super-duplex steels

- **Fields of application:**
  - Chemical and petrochemical industry (chloride environment)

Chemical analysis (in %)

C	Mn	Mo	Cr	Ni	S
max. 0.03	2.5	2.5 - 4.5	24 - 27	8 - 10.5	max. 0.02

P	N	Si	W	Cu
max. 0.03	0.2 - 0.3	max. 1	max. 1	max. 1.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	0.8 mm	-	097-005422-30008
Wire basket	BS300	15 kg	1 mm	-	097-005422-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-005422-30012

SW Hard 60

Standards	DIN EN 14700 - S Fe8
Material number	1.4718
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC+
Shielding gas	M21
	I1
Hardness	55 - 60 HRC
Base materials	X45CrSi9-3 | 4Xr9Si2 | X45CrSi8 | HNV1 | HNV2 | SUH11 | X45CrSi 9-3 | 401 S45 | SUH 1 | STR 1 | 40Ch9S2

- High-alloy solid wire electrode
- Copper-plated, layer wound
- Good wear and impact resistance
- Up to 60 HRC

- **Fields of application:**
  - Impact drill bits, cutting tools, screw conveyors, etc.

Chemical analysis (in %)

C	Si	Cr	Mn	P	S
0.45	3	9.3	0.4	<0.025	<0.02

Cu	Ni	Mo	Al	V	W
<0.25	<0.15	<0.15	<0.03	<0.03	<0.1

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1 mm	-	097-003549-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003549-30012
Basket spool	B300	15 kg	1.6 mm	-	097-003549-30016

SW 625

Standards	DIN EN ISO 18274 - Ni 6625 – NiCr22Mo9Nb
	AWS A-5.14 - ER NiCrMo3
Material number	2.4831
Welding positions	PA / PB / PC / PD / PE / PF
Shielding gas	I3
	M12
Tensile strength, Rm	≥720 J
Expansion, A5	35 %
Impact energy, Av	20 °C: 200 J
	-17 °C: 180 J
	-40 °C: 160 J
Approvals	TÜV
Base materials	1.4529 | 1.4539 | 1.4558 | 1.4876 | 1.5680 | 1.5681 | 1.5662 | 2.4605 | 2.4618 | 2.4856 | 2.4858 | 2.4951 | 2.4952
	Alloy 625, alloy 800 and similar Ni-Cr alloys

- High-alloy solid wire electrode made of nickel-based alloy
- Very good corrosion resistance to hydrochloric, sulphuric and nitric acid
- Very good resistance to pitting, air gap and intergranular corrosion
- Suitable for nickel-based alloys, dissimilar joints up to 300°C and surfacing
- Can be used in temperature range from -196°C to 550°C

- **Fields of application:**
  - High-temperature applications, marine and offshore environments, pipework systems, reactor components

Chemical analysis (in %)

C	Si	Mn	Cr	Ni
≤0.03	≤0.5	≤1	21 - 23	≥60

Mo	Cu	Fe	(Nb + Ta)
8.5 - 9.5	≤0.5	≤1	3.2 - 4

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	1 mm	-	097-003515-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-003515-30012

SW NiCr82

Standards	DIN EN ISO 18274 - Ni 6082 – NiCr20Mn3Nb
	AWS-SFA-5.14 - ER NiCr 3
Material number	2.4806
Welding positions	PA / PB / PC / PD / PE / PF / PG
Shielding gas	M12
	M13
	I3
Tensile strength, Rm	660 MPa
Expansion, A5	35 %
Impact energy, Av	20 °C: 150 J
	-50 °C: 60 J
Base materials	1.4558 | 1.4859 | 1.4861 | 1.4876 | 1.4877 | 1.4885 | 1.4958 | 1.4968 | 2.4669 | 2.4694 | 2.4816 | 2.4817 | 2.4867 | 2.4867 | 2.4869 | 2.4951 | 2.4952
	Nickel-based alloys, dissimilar joints (also at temperatures >300 °C), cladding, surfacing

- High-alloy solid wire electrode made of nickel-based alloy
- Good resistance to stress and intergranular corrosion
- Suitable for nickel-based alloys, dissimilar joints up to 300°C and surfacing
- Scale-resistant up to 1,200 °C
- Cold tough up to -196 °C

- **Fields of application:**
  - Petrochemicals and offshore technology (e.g. furnace systems)

Chemical analysis (in %)

C	Si	Mn	Cr	Ni
≤0.05	≤0.1	2.5 - 3.5	18 - 22	≥67

Cu	Ti	Fe	(Nb + Ta)
≤0.5	≤0.7	≤3	2 - 3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	0.8 mm	-	097-003586-30008
Wire basket	BS300	15 kg	1 mm	-	097-003586-30010
Wire basket	BS300	15 kg	1.2 mm	-	097-003586-30012
Wire basket	BS300	15 kg	1.6 mm	-	097-003586-30016

SW ML 1450 Al99,5Ti

Standards	DIN EN ISO 18273 - S AL 1450 (Al99,5Ti)
	AWS A-5.10 - ER 1450
Material number	3.0805
Welding positions	PA / PB / PC / PF
Polarity	DC+
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥65 MPa
Expansion, A5	35 %
Approvals	auf Anfrage
Base materials	Al99,0 | Al99,5 | Al99,7 | E-Al

- MIG solid wire electrode, aluminium
- High strength due to titanium content
- High corrosion resistance
- Resistant to hot cracks
- Well suited to welding
- For welding pure aluminium alloys

- **Fields of application:**
  - Chemical and food industry (containers, pipes, pumps)

Chemical analysis (in %)

Si	Fe	Cu	Mn	Zn	Mg	Ti	Al
<0.25	<0.4	<0.05	<0.05	<0.07	0.05	0.1 - 0.2	≥99.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	7 kg	0.8 mm	-	097-580017-30008
Wire basket	BS300	7 kg	1 mm	-	097-580017-30010
Wire basket	BS300	7 kg	1.2 mm	-	097-580017-30012
Wire basket	BS300	7 kg	1.6 mm	-	097-580017-30016
Wire basket	BS300	7 kg	2 mm	-	097-580017-30020
Wire basket	BS300	7 kg	2.4 mm	-	097-580017-30024

SW ML 3103 AlMn1

Standards	DIN EN ISO 18273 - S AL 3103 (AlMn1)
	AWS A-5.10 - ER 3103
Material number	3.0516
Welding positions	PA / PB / PC / PF
Polarity	DC+
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥105 MPa
Expansion, A5	≥29 %
Approvals	auf Anfrage
Base materials	Similar materials

- MIG solid wire electrode, aluminium
- Shaved several times
- Seawater resistant
- Resistant to hot cracks
- Well suited to welding

- **Fields of application:**
  - Shipbuilding, chemical plant construction, pipeline construction, vehicle construction (coolers)

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<0.5	<0.3	<0.1	0.9 - 1.5	<0.3

Cr	Zn	Ti+Zr	Al
<0.1	<0.2	<0.1	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	7 kg	0.8 mm	-	097-580019-30008
Wire basket	BS300	7 kg	1 mm	-	097-580019-30010
Wire basket	BS300	7 kg	1.2 mm	-	097-580019-30012
Wire basket	BS300	7 kg	1.6 mm	-	097-580019-30016
Wire basket	BS300	7 kg	2 mm	-	097-580019-30020
Wire basket	BS300	7 kg	2.4 mm	-	097-580019-30024

SW ML 5087 AlMg4,5MnZr

Standards	DIN EN ISO 18273 - S AL 5087 (AlMg4,5MnZr)
Material number	3.3546
Welding positions	PA / PB / PC / PF
Polarity	DC+
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	275 MPa
Expansion, A5	17 %
Approvals	CE / DNV-GL / ABS / DB / TÜV / Bureau Veritas
Base materials	AlMg4,5Mn | AlZnMgCu1,5 | AlMg5Mn | AlMg3 | AlMg5 | AlMgMn | AlZn | Mg1 | G-AlMg3Si | G-AlMg10 | AlMgSi0,7

- MIG solid wire electrode, aluminium
- Improved seawater and corrosion resistance as well as tensile strength due to Zr content
- Insensitive to hot cracking (with low dilution)
- Mainly for welding Al-Mg alloys with max. 5% Mg
- Not suitable for anodising

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg	Cr
<0.25	<0.4	<0.05	0.7 - 1.1	4.5 - 5.2	0.05 - <0.25

Zn	Ti	Zr	Al	Others
<0.25	<0.15	0.1 - 0.2	Remainder	<0.15

- **Fields of application:**
  - Shipbuilding, offshore, automotive industry, rail transport

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	7 kg	0.8 mm	-	097-580010-30008
Wire basket	BS300	7 kg	1 mm	-	097-580010-30010
Wire basket	BS300	7 kg	1.2 mm	-	097-580010-30012
Wire basket	BS300	7 kg	1.6 mm	-	097-580010-30016
Wire basket	BS300	7 kg	2 mm	-	097-580010-30020
Wire basket	BS300	7 kg	2.4 mm	-	097-580010-30024

SW ML 5183 AlMg4,5Mn0,7

Standards	DIN EN ISO 18273 - S AL 5183 (AlMg4,5Mn0,7)
	AWS A-5.10 - ER 5183
Material number	3.3548
Welding positions	PA / PB / PC / PF
Polarity	DC+
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥275 MPa
Expansion, A5	17 %
Approvals	CE / DNV-GL / ABS / LR / DB / TÜV / KR (Korean Register) / BWB / Bureau Veritas
Base materials	AlMg4,5Mn | AlMg5 | AlMg2Mn0,8 | AlZnMg1 | AlZnMgCu0,5 | AlMgSi0,5 | AlMgSi1 | G-AlMg10 | G-AlMg5 | G-AlMg3Si | G-AlMg5Si

- MIG solid wire electrode, aluminium
- Very high resistance to seawater and corrosion
- Higher tensile strength
- For welding high tensile Al alloys
- Mainly for welding Al-Mg alloys with max. 5% Mg
- Suitable for anodising

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<0.4	<0.4	<0.1	<0.5 - 1	<4.3 - 5.2
Cr	**Zn**	**Ti**	**Al**	**Others**
<0.05 - <0.25	<0.25	<0.15	Remainder	<0.15

- **Fields of application:**
  - Shipbuilding, offshore, automotive industry, rail transport

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	2 kg	0.8 mm	-	097-580012-20008
Plastic spool	S200	2 kg	1 mm	-	097-580012-20010
Plastic spool	S200	2 kg	1.2 mm	-	097-580012-20012
Wire basket	BS300	7 kg	0.8 mm	-	097-580012-30008
Wire basket	BS300	7 kg	1 mm	-	097-580012-30010
Wire basket	BS300	7 kg	1.2 mm	-	097-580012-30012
Wire basket	BS300	7 kg	1.6 mm	-	097-580012-30016
Wire basket	BS300	7 kg	2 mm	-	097-580012-30020
Wire basket	BS300	7 kg	2.4 mm	-	097-580012-30024

SW ML 5754 AlMg3

Standards	DIN EN ISO 18273 - S Al 5754 (AlMg53)
	AWS A-5.10 - ER 5754
Material number	3.3536
Welding positions	PA / PB / PC / PF
Polarity	DC+
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥190 MPa
Expansion, A5	20 %
Approvals	auf Anfrage
Base materials	AlMgMn | AlMg1 | AlMg2,7Mn | AlMg3 | AlMg3,5 | AlMgSi0,5 | AlMgSi0,8 | G-AlMg3Si

- MIG solid wire electrode, aluminium
- High corrosion resistance (against seawater) and strength
- Mainly for welding Al-Mg alloys with max. 3% Mg
- Suitable for anodising

- **Fields of application:**
  - Shipbuilding, plant engineering, construction

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<0.4	<0.4	<0.1	<0.5	2.6 - 3.6
Cr	**Ti**	**Zn**	**Al**	**Others**
<0.3	<0.15	<0.2	Remainder	<0.15

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	2 kg	0.8 mm	-	097-580013-20008
Plastic spool	S200	2 kg	1 mm	-	097-580013-20010
Plastic spool	S200	2 kg	1.2 mm	-	097-580013-20012
Wire basket	BS300	7 kg	0.8 mm	-	097-580013-30008
Wire basket	BS300	7 kg	1 mm	-	097-580013-30010
Wire basket	BS300	7 kg	1.2 mm	-	097-580013-30012
Wire basket	BS300	7 kg	1.6 mm	-	097-580013-30016
Wire basket	BS300	7 kg	2 mm	-	097-580013-30020
Wire basket	BS300	7 kg	2.4 mm	-	097-580013-30024

SW ML4047 AlSi12

Standards	DIN EN ISO 18273 - S Al 4047 (AlSi12 (A))
	AWS A-5.10 - ER 4047
Material number	3.2585
Welding positions	PA / PB / PC / PF
Polarity	DC+
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥130 N/mm²
Expansion, A5	5 %
Approvals	CE / DB
Base materials	G-AlSi10Mg | G-AlSi11 | G-AlSi12(Cu) | G-AlSi7Mg | G-AlSi6Cu4 | AlMgSi0,8 | AlMgSi1

- MIG solid wire electrode, aluminium
- Shaved several times
- High corrosion resistance, low distortion
- Resistant to hot cracks
- Very good flow and wetting properties
- Bright and virtually dirt-free weld seams
- Suitable for welding and brazing aluminium alloys and cast aluminium alloys with up to 12% Si content
- Not suitable for anodising

- **Fields of application:**
  - Brazing of sheet metal and extruded profiles from cast workpieces

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg	Zn	Al	Others
11 - 13	<0.8	<0.3	<0.15	<0.1	<0.2	<Remainde	0.15

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	7 kg	0.8 mm	-	097-580016-30008
Wire basket	BS300	7 kg	1 mm	-	097-580016-30010
Wire basket	BS300	7 kg	1.2 mm	-	097-580016-30012
Wire basket	BS300	7 kg	1.6 mm	-	097-580016-30016
Wire basket	BS300	7 kg	2 mm	-	097-580016-30020
Wire basket	BS300	7 kg	2.4 mm	-	097-580016-30024

SW ML 4043 AlSi5

Standards	DIN EN ISO 18273 - S Al 4043 (AlSi5(A))
	AWS A-5.10 - ER 4043
Material number	3.2245
Welding positions	PA / PB / PC / PF
Polarity	DC+
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥130 MPa
Expansion, A5	≥5 %
Approvals	CE / DB / TÜV
Base materials	AlMgSi0,5 | AlMgSi0,8 | AlMgSi1 | AlZnMg | AlCuMg

- MIG solid wire electrode, aluminium
- High corrosion resistance
- Resistant to hot cracks
- Very good flow and wetting properties
- Bright and virtually dirt-free weld seams
- Not suitable for anodising

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<4.5 - 6	<0.8	<0.3	<0.05	<0.05

Zn	Ti	Al	Others
<0.1	<0.2	Remainder	<0.15

- **Fields of application:**
  - Bicycles, trucks, trailers and aluminium constructions

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	2 kg	0.8 mm	-	097-580015-20008
Plastic spool	S200	2 kg	1 mm	-	097-580015-20010
Plastic spool	S200	2 kg	1.2 mm	-	097-580015-20012
Wire basket	BS300	7 kg	0.8 mm	-	097-580015-30008
Wire basket	BS300	7 kg	1 mm	-	097-580015-30010
Wire basket	BS300	7 kg	1.2 mm	-	097-580015-30012
Wire basket	BS300	7 kg	1.6 mm	-	097-580015-30016
Wire basket	BS300	7 kg	2 mm	-	097-580015-30020
Wire basket	BS300	7 kg	2.4 mm	-	097-580015-30024
Drum	F100	100 kg	1.2 mm	-	097-580015-10012

SW ML 5356 AlMg5Cr

Standards	DIN EN ISO 18273 - S AL 5356 (AlMg5Cr)
	AWS A-5.10 - ER 5356
Material number	3.3556
Welding positions	PA / PB / PC / PF
Polarity	DC+
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥240 MPa
Expansion, A5	17 %
Approvals	CE / DNV-GL / ABS / DB / TÜV / Bureau Veritas
Base materials	AlMg5 | AlMg3 | AlZnMg1 | AlZnMgCu0,5 | AlMgSi0,7 | AlMg1SiCu | G-AlMg10 | G-AlMg3Si | G-AlMg5Si

- MIG solid wire electrode, aluminium
- Shaved several times
- High strength and significantly improved seawater resistance
- Mainly for welding Al-Mg alloys with max. 5% Mg
- Suitable for anodising
- Not resistant to stress corrosion cracking at >65°C

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<0.25	<0.4	<0.1	<0.05 - 0.2	<4.5 - 5.5

Cr	Zn	Ti	Al	Others
<0.05 - 0.2	<0.1	0.06 - 0.2	Remainder	<0.015

- **Fields of application:**
  - Shipbuilding, offshore, automotive industry, rail transport

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	2 kg	0.8 mm	-	097-580011-20008
Plastic spool	S200	2 kg	1 mm	-	097-580011-20010
Plastic spool	S200	2 kg	1.2 mm	-	097-580011-20012
Wire basket	BS300	7 kg	0.8 mm	-	097-580011-30008
Wire basket	BS300	7 kg	1 mm	-	097-580011-30010
Wire basket	BS300	7 kg	1.2 mm	-	097-580011-30012
Wire basket	BS300	7 kg	1.6 mm	-	097-580011-30016
Wire basket	BS300	7 kg	2 mm	-	097-580011-30020
Wire basket	BS300	7 kg	2.4 mm	-	097-580011-30024

SW CuSi3

Standards	DIN EN ISO 24373 - CuSi3Mn (Cu 6560)
	AWS A-5.7 - ER CuSi-A
Welding positions	PA / PB / PC / PE / PF
Polarity	DC+
Shielding gas	I1
Tensile strength, Rm	350 MPa
Expansion, A5	40 %
Impact energy, Av	20 °C: 60 J
Hardness	80 HB
Base materials	CuSi2Mn | CuSi3Mn | CuZn5 | CuZn10 | CuZn15

- Solid wire electrode made of Cu-Si alloy
- Layer-wound
- Excellent flow characteristics
- Suitable for joint welding, brazing and surfacing
- Ideal for MIG brazing of galvanised, thin sheets

- **Fields of application:**
  - Galvanised body panels, heating construction, ventilation construction
  - Applications on unalloyed and low-alloy steels and cast iron

Chemical analysis (in %)

Si	Mn	Cu	Others
2.8 - 2.95	0.75 - 0.95	Remainder	max. 0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	0.8 mm	-	097-003485-20008
Plastic spool	S200	5 kg	1 mm	-	097-003485-20010
Basket spool	B300	15 kg	0.8 mm	-	097-003485-30008
Basket spool	B300	15 kg	1 mm	-	097-003485-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003485-30012
Drum	F200	200 kg	1 mm	-	097-003485-20110

SW CuAl8

Standards	DIN EN ISO 24373 - CuAl7 (Cu 6100)
	AWS A-5.7 - ER CuAl-A1
Welding positions	PA / PB / PC / PE / PF
Polarity	DC+
Shielding gas	I1
Tensile strength, Rm	430 MPa
Expansion, A5	40 %
Impact energy, Av	20 °C: 100 J
Hardness	100 HB
Base materials	CuAl5 | CuAl8 | CuAl9 | CuZn20Al

- Solid wire electrode made of Cu-Al alloy
- The weld metal is corrosion-resistant, seawater-resistant and wear-resistant
- Suitable for joint welding, brazing and surfacing
- Excellent for GMAW brazing of galvanised and aluminised thin sheets
- Surfacing on unalloyed and low-alloy steels and cast iron
- Joint welding of Cu materials and various steel sheets

- **Fields of application:**
  - Vehicle/vehicle body construction, air conditioning and ventilation system construction and container construction

Chemical analysis (in %)

Al	Mn	Ni	Cu	Others
7.5 - 8	0.1 - 0.3	0.1 - 0.5	Remainder	max. 0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	0.8 mm	-	097-003486-30008
Basket spool	B300	15 kg	1 mm	-	097-003486-30010
Basket spool	B300	15 kg	1.2 mm	-	097-003486-30012

SW CuSn1

Standards	DIN EN ISO 24373 - CuSn1 (Cu 1898)
	AWS A-5.7 - ER Cu
Welding positions	PA / PB / PC / PE / PF
Polarity	DC+
Shielding gas	I1
Tensile strength, Rm	220 MPa
Expansion, A5	30 %
Impact energy, Av	20 °C: 75 J
Hardness	60 HB
Base materials	OF-Cu | SE-Cu | SW-Cu | SF-Cu | CuZn0,5

- Solid wire electrode made of copper-tin alloy
- The weld metal is corrosion-resistant, seawater-resistant and wear-resistant
- Non-porous weld seams
- Very good welding properties
- Suitable for highly stressed welded joints on oxygen-free copper / Cu materials
- For joint welding and surfacing on pure copper and copper alloys

- **Fields of application:**
  - Vehicle/vehicle body construction, air conditioning and ventilation system construction and container construction

Chemical analysis (in %)

Sn	Mn	Si	P	Cu	Others
0.75 - 0.9	0.15 - 0.3	0.15 - 0.25	0.005 - 0.02	Remainder	max. 0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1.2 mm	-	097-003559-30012
Basket spool	B300	15 kg	1.6 mm	-	097-003559-30016

EWM description	Material number	DIN EN ISO	AWS	Approvals	Page
unalloyed					
SC-70 Zn		T3T Z M M21 1	E70C-GS		59
FCW 71T Selfshield			E 71T-11		60
FCW 71T Rutil Black		T 46 3 P C1/M21 1 H5	E71T-9C/9M H4(H8)	CE / TÜV / DB / DNV-GL / LR	61
FCW 70-M		T 46 3 M M21 1 H5 / T 42 3 M C1 1 H5	E70C-3C / E70C-6M	CE / TÜV / DB / DNV-GL / LR	62
Low-alloy					
FCW MEGAFIL 825 R			E81T1-A1M H4	On request	63
FCW 111T NiMoCr			E111T1-M21A4-G-H4	On request	64
FCW MEGAFIL 742M			E110C-K4 H4	On request	65
High-alloy					
FCW 308 Rutile	1.4316	T 19 9 L R C1/M21 3	E 308LT0-1/4	On request	66
FCW 316 Rutile	1.4430	T 19 12 3 L R C1/M21 3	E 316LT0-1/4	On request	67
FCW 316 METAL	1.4430	T 19 12 3 L M M12 1	EC 316L	On request	68
Hardfacing					
FCW Hard 52 G					69
FCW DURMAT FD 665					70
FCW STELLOY 21-G			ERCCoCr-E		71

SC-70 Zn

Standards	DIN EN ISO 17632-A - T3T Z M M21 1
	AWS A-5.18 - E70C-GS
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	M20-M21
Yield strength	>355 MPa
Tensile strength, Rm	>490 MPa

- Specially developed metal cored wire for welding galvanised sheet metal (approx. 0.8–4.0 mm)
- Suitable for single pass welding on galvanised steel sheets
- Low reworking effort due to very low spatter tendency and easy cleaning of the weld seam
- Stable arc in the lower current range
- Low spatter tendency even in the short arc range
- Wide arc compensates for inaccuracies during seam preparation
- Suitable for pulse welding procedures

- **Fields of application:**
  - General metal and sheet metal construction
  - Automotive and vehicle industry
  - Air conditioning and ventilation construction
  - Shipbuilding

Chemical analysis (in %)

C	Si	Mn	P	S	Al
0.45	0.37	1.15	0.008	0.003	2.05

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	BS 300	15 kg	1.2 mm	-	097-145495-30012

FCW 71T Selfshield

Standards	EN ISO 17632-A - T 42 Z Z Z N 1
	AWS A-5.20 - E 71T-11
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	--
Yield strength	510 MPa
Tensile strength, Rm	580 MPa
Expansion, A5	21 %
Base materials	S185 - P275JR | S355J0 - S335 | P255N - P355N | P235GH | P265GH | P310GH | P295Gh | S460N | S460M

- Unalloyed self-shielding flux cored wire electrode
- No shielding gas required
- Bright, layer wound
- Very high arc stability, easy handling
- Can be welded in any position, including vertically down
- Single-pass and multi-pass welding
- Slag is removed very easily
- Low spatter formation

- **Fields of application:**
  - Galvanised and non-galvanised structural steels

Chemical analysis (in %)

C	Si	Mn	P	S	Al
0.18	0.34	0.5	0.012	0.006	1.35

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	2 kg	0.9 mm	-	097-003455-20209
Plastic spool	S200	5 kg	0.9 mm	-	097-003455-20009
Plastic spool	S200	5 kg	1.2 mm	-	097-003455-20012
Plastic spool	S300	15 kg	1.2 mm	-	097-003455-30012
Plastic spool	S300	15 kg	1.6 mm	-	097-003455-30016

FCW 71T Rutil Black

Standards	DIN EN ISO 17632-A - T 46 3 P C1/M21 1 H5
	AWS A 5.36 - E71T-9C/9M H4(H8)
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC+
Shielding gas	M21
	C1
Yield strength	575 MPa
Tensile strength, Rm	630 MPa
Expansion, A5	28 %
Impact energy, Av	-20 °C: ≥ 105 J
Approvals	CE / TÜV / DB / DNV-GL / LR
Base materials	Material groups 1.1, 1.2, 1.3, 2.1, 3.1

- Unalloyed, rutile flux-cored wire electrode
- Bright, layer wound
- Stable arc
- Can be welded in any position, including vertically down
- Quick solidifying slag
- Easily removable slag
- Low smoke development and spatter formation
- Low H2 content and good crack resistance
- Insensitive to non-optimised surfaces

Chemical analysis (in %)

C	Si	Mn	P	S
0.04	0.6	1.35	0.01	0.006

- **Fields of application:**
  - Ship, steel, bridge and vehicle construction

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	1.2 mm	-	097-005265-20012
Plastic spool	S200	5 kg	1.6 mm	-	097-005265-20016
Plastic spool	S300	15 kg	1.2 mm	-	097-005265-30012
Plastic spool	S300	15 kg	1.6 mm	-	097-005265-30016

FCW 70-M

Standards	DIN EN ISO 17632-A - T 46 3 M M21 1 H5 / T 42 3 M C1 1 H5
	AWS A-5.18 - E70C-3C / E70C-6M
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC+
Shielding gas	M21
	C1
Yield strength	540 MPa
Tensile strength, Rm	610 MPa
Expansion, A5	26.4 %
Impact energy, Av	-30 °C: 70 J
Approvals	CE / TÜV / DB / DNV-GL / LR
Base materials	Material groups 1.1, 1.2, 1.3, 2.1, 3.1

- Unalloyed, flux-cored wire electrode
- Bright, layer wound
- Stable arc
- Can be welded in any position, including vertically down
- Suitable for multi-pass welding without slag removal
- Excellent gap bridging and sidewall fusion
- Low smoke development and spatter formation
- Notch-free seam transitions
- Increased productivity thanks to high metal recovery and deposition rate

- **Fields of application:**
  - Ship, machine, bridge and steel construction as well as automated robot welding

Chemical analysis (in %)

C	Si	Mn	P	S
0.06	0.55	1.55	0.01	0.009

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Plastic spool	S200	5 kg	1.2 mm	-	097-005267-20012
Plastic spool	S200	5 kg	1.6 mm	-	097-005267-20016
Plastic spool	S300	15 kg	1.2 mm	-	097-005267-30012
Plastic spool	S300	15 kg	1.6 mm	-	097-005267-30016

FCW MEGAFIL 825 R

Standards	EN ISO 17634-A - T Mol P M21 1 H5
	AWS A-5.29 - E81T1-A1M H4
	AWS A5.36 - E81T1-M21PY-A1-H4
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC+
Shielding gas	M21
Yield strength	520 MPa
Tensile strength, Rm	600 MPa
Expansion, A5	23 %
Impact energy, Av	20 °C: 80 J
Approvals	auf Anfrage
Base materials	P235GH - P355GH | 16Mo3 | P235T1/P235T2 - P460NL2 | L210 - L445MB | S255 - S460

- Low-alloy, rutile flux-cored wire electrode with rapidly solidifying slag
- Stable, low-spatter arc
- Can be welded in any position, including vertically down
- Single-pass and multi-pass welding
- Easy modelling capabilities and slag detachability
- Very crack-resistant weld metal
- Toughness down to -60°C
- Extremely low, diffusible H2 content in weld metal

- **Fields of application:**
  - Steel and container construction, as well as pipeline, ship and mechanical engineering

Chemical analysis (in %)

C	Si	Mn	Mo	S	P
0.07	0.5	1.1	0.5	0.015	0.015

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	16 kg	1.2 mm	-	097-103603-30012

FCW 111T NiMoCr

Standards	EN ISO 18276-A - T 69 6 Z P M21 1 H5
	AWS A5.36 - E111T1-M21A4-G-H4
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC+
Shielding gas	M21
Yield strength	750 MPa
Tensile strength, Rm	820 MPa
Expansion, A5	18 %
Impact energy, Av	-20 °C: 110 J
	-40 °C: 80 J
	-60 °C: 55 J
Approvals	auf Anfrage
Base materials	S620 – S690 | A106 | A600 | P620GH – P690GH bis A517 | A537 | A625 | P620T1/T2 - P690NL2 bis A625 | S620 – S629QL1 bis A625 | X70 – X100 / HY100

- Low-alloy, rutile flux-cored wire electrode
- Copper-plated, layer wound
- Stable arc
- Can be welded in any position, including vertically down
- Easy modelling capabilities and slag detachability
- Crack-resistant weld metal – also for positional welding
- Excellent gap bridging and sidewall fusion
- Low smoke development and spatter formation
- For joining fine-grained construction steels up to 690 MPa yield strength
- Toughness down to -60°C
- Extremely low, diffusible H2 content in weld metal

- **Fields of application:**
  - Steel construction, pipeline construction, shipbuilding, offshore

Chemical analysis (in %)

C	Si	Mn	Mo	Ni	P	S
0.08	0.5	1.7	0.15	2	0.015	0.015

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	16 kg	1.2 mm	-	097-003630-30012

FCW MEGAFIL 742M

Standards	EN ISO 18276-A - T 69 6 Mn2NiCrMo M M21 1 H5
	AWS A-5.28 - E110C-K4 H4
	AWS A5.36 - E111T15-M21A8-K4-H4
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC+
Shielding gas	M21
Yield strength	750 MPa
Tensile strength, Rm	820 MPa
Expansion, A5	20 %
Impact energy, Av	-40 °C: 120 J
	-60 °C: 90 J
Approvals	auf Anfrage
Base materials	S620 - S690 | A 106 | A 600 | P620GH - P690GH bis A517 | A537 | A625 | P620T1/T2 - P690NL2 bis A 625 | S620 - S690QL1 bis A 625 | X70 - X100 / HY100

- Low-alloy, flux-cored wire electrode
- Quiet, stable, low-spatter arc
- Can be welded in any position, including vertically down
- Single-pass and multi-pass welding
- Crack-resistant weld metal
- Good re-ignition properties
- Excellent gap bridging
- No slag formation
- Toughness down to -60°C
- Extremely low, diffusible H2 content in weld metal

- **Fields of application:**
  - Steel construction, pipeline construction, shipbuilding, offshore

Chemical analysis (in %)

C	Si	Mn	Mo	Ni	P	S	Cr
0.05	0.4	1.6	0.5	2.2	0.015	0.015	0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS 300	16 kg	1.2 mm	-	097-004914-30012

FCW 308 Rutile

Standards	DIN EN ISO 17633-A - T 19 9 L R C1/M21 3
	AWS A-5.22 - E 308LT0-1/4
Material number	1.4316
Welding positions	PA / PB / PC
Polarity	DC+
Shielding gas	C1
	M21
Yield strength	410 MPa
Tensile strength, Rm	570 MPa
Expansion, A5	40 %
Impact energy, Av	-20 °C: 45 J
Approvals	auf Anfrage
Base materials	18%-Cr-10%-Ni steels such as 304L or EN 1.4307

- High-alloy, rutile flux-cored wire electrode with slowly solidifying slag
- Stable, low-spatter arc
- High resistance to intergranular corrosion
- Mainly for PA, PB and PC welding positions
- Shiny, smooth weld surfaces
- Self-dissolving slag
- For welding stainless Cr-Ni steels with a low carbon content

- **Fields of application:**
  - Chemical, textile and pharmaceutical industry

Chemical analysis (in %)

C	Si	Mn	P	S
0.02	0.6	1.6	0.02	0.005

Ni	Cr	FS	FN	FNW
10.1	19.7	8.9	12.4	10.8

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	1.2 mm	-	097-063561-30012

FCW 316 Rutile

Standards	DIN EN ISO 17633-A - T 19 12 3 L R C1/M21 3
	AWS A-5.22 - E 316LT0-1/4
Material number	1.4430
Welding positions	PA / PB / PC
Polarity	DC+
Shielding gas	C1
	M21
Tensile strength, Rm	570 MPa
Expansion, A5	39 %
Impact energy, Av	-20 °C: 44 J
Approvals	auf Anfrage
Base materials	18%Cr-12%Ni-2.5%Mo steels such as 316L or EN 1.4435

- High-alloy, rutile flux-cored wire electrode with slowly solidifying slag
- Stable, low-spatter arc
- High resistance to intergranular corrosion
- Molybdenum improves pitting corrosion and creep resistance
- Mainly for PA, PB and PC welding positions
- Shiny, smooth weld surfaces
- Self-dissolving slag
- For non-rusting Cr-Ni-Mo steels with low carbon content

- **Fields of application:**
  - Chemical, textile and pharmaceutical industry

Chemical analysis (in %)

C	Si	Mn	P	S	Ni
0.03	0.6	1.6	0.02	0.006	12.2

Cr	Mo	FS	FN	FNW
18.7	2.8	7.7	12.8	9.7

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	1.2 mm	-	097-003457-30012

FCW 316 METAL

Standards	DIN EN ISO 17633-A - T 19 12 3 L M M12 1
	AWS A-5.9 - EC 316L
Material number	1.4430
Welding positions	PA / PB / Positional welding with pulsed arc possible
Polarity	DC+
Shielding gas	M12
	M13
	I1
	Z
Tensile strength, Rm	610 MPa
Expansion, A5	35 %
Impact energy, Av	-60 °C: 40 J
Approvals	auf Anfrage
Base materials	1. 4401 | 1.4404 | 1.4406 | 1.4571 | 1.4583

- High-alloy, flux-cored wire electrode
- Stable, low-spatter arc
- Particularly suitable for welding in trough lengths; positional welding (except PG) also possible by using a pulsed arc
- Very good sidewall wetting, good X-ray resistance
- Shiny, smooth weld surfaces
- For welding stabilised and non-stabilised Cr-Ni steels

- **Fields of application:**
  - Chemical, textile and pharmaceutical industry

Chemical analysis (in %)

C	Si	Mn	Cr	Mo	Ni	S	P
0.02	0.6	1.4	19.5	2.8	12	0.008	0.02

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	B300	15 kg	1.2 mm	-	097-003631-30012

FCW Hard 52 G

Standards	DIN EN 14700 - T Z Fe 16
	DIN 8555 - MF10-GF-50-G
Welding positions	PA / PB
Polarity	DC+
Shielding gas	M21
Hardness	52 HRC

- C-, Cr-, Si-, Mn-alloyed flux-cored wire
- Low spatter and smoke formation
- For armour-plating that is subject to heavy abrasive wear with medium impact stress
- The weld metal is rust-resistant and can be machined by grinding

- **Fields of application:**
  - Waste and recycling industry, screw conveyors, crusher rollers

Chemical analysis (in %)

C	Si	Mn	Cr
3	1.8	1.8	15

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS 300	15 kg	1.6 mm	-	097-003732-30016
Wire basket	BS 300	15 kg	2 mm	-	097-003732-30020

FCW DURMAT FD 665

Standards	DIN EN 14700 - -
Welding positions	PA / slightly vertical up, slightly vertical down
Polarity	DC+
Hardness	56 - 61 HRC

- Iron-based flux-cored wire
- Good toughness and insensitivity to impact loads
- Good crack resistance with customised welding parameters
- Suitable for semi-automatic and fully automatic applications

- **Fields of application:**
  - Applications on tools that are exposed to abrasion and impact loads

Chemical analysis (in %)

C	Mn	Si	Cr	Mo	Ti	Fe
<5	<3	<3	<10	<5	<10	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	1.6 mm	-	097-325049-30016

FCW STELLOY 21-G

Standards	DIN EN 14700 - T Co1
	AWS A-5.21 - ERCCoCr-E
Welding positions	PA / slightly vertical up, slightly vertical down
Polarity	DC+
Shielding gas	I1
	M13
Hardness	33 - 47 HRC

- Cobalt-based flux-cored wire
- Can be welded using shielding gas
- Very good resistance to corrosion, frictional wear and impact stress
- Good toughness and insensitivity to thermal shocks and alternating stresses
- Less susceptible to cracking than other co-alloys

- **Fields of application:**
  - Applications on components that are exposed to a combination of impact stress, abrasion, high pressure and corrosion at temperatures of up to 900°C, such as valve seats and guides for large water or high-pressure fittings, forging hammers, pump shafts, etc.

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	Mo	Fe	Co
0.25	1	1	28.5	3	5.5	4	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Wire basket	BS300	15 kg	1.2 mm	-	097-004943-30012

EWM description	Material number	DIN EN ISO	AWS	Approvals	Page
unalloyed					
TR 70S G2	1.5112	W 42 4 2Si	ER 70S-3	CE	73
TR 70S G3	1.5125	W 46 5 3Si1	ER 70S-6	CE / TÜV / DB	74
TR 70S G4	1.5130	W 50 5 4Si1	ER 70S-6	CE	75
low-alloy					
TR 80S Mo	1.5424	W MoSi	ER 70S-A1 (ER 80S-G)	CE / TÜV / DB	76
TR 80S CrMo1	1.7339	W CrMo1Si	ER 80S-G	CE / TÜV / DB	77
TR 90S CrMo2	1.7384	W CrMo2Si	ER 90S-G		78
TR CrMo5	1.7373	W CrMo5 Si	ER 80S-B6		79
TR 80S Ni1		W 46 6 3Ni1	ER 80S-Ni1		80
High-alloy					
TR 307 Si XQ	1.4370	W 18 8 Mn	ER 307 Si	CE	81
TR 308 LSi XQ	1.4316	W 19 9 L Si	ER 308 L Si	CE / TÜV / DB	82
TR 309 L Si XQ	1.4332	W 23 12 L Si	ER 309 L Si	CE / TÜV	83
TR 309 H	1.4829	W 22 12 H	ER 309 Si		84
TR 310 XQ	1.4842	G 25 20	ER 310		85
TR 312 XQ	1.4337	W 29 9	ER 312		86
TR 316 LSi XQ	1.4430	W 19 12 3 LSi	ER 316 LSi	CE / TÜV / DB	87
TR 318 Si	1.4576	W 19 12 3 Nb Si	ER 318 Si	CE / TÜV / DB	88
TR 347 XQ	1.4551	W 19 9 Nb	ER 347		89
TR 2209 Duplex XQ		W22 9 3 NL	ER 2209	CE / TÜV	90
TR 2594 Super Duplex XQ		W 25 9 4 N L	ER 2594	On request	91
Tool steels					
TR Tool 45 T	1.2567				92
TR Tool 55 T					93
Hardfacing					
TR Stelloy 21			ERCCoCr-E		94
TR Corolit T 21			ER CoCr E		95
Nickel-based					
TR NiCr82	2.4806	Ni 6082 – NiCr20Mn3Nb	ER NiCr 3		96
TR 625	2.4831	Ni 6625 – NiCr22Mo9Nb	ER NiCrMo3	TÜV	97
Aluminium					
TR ML 1450 Al99,5Ti	3.0805	S AL 1450 (Al99,5Ti)	ER 1450	On request	98
TR ML 3103 AlMn1	3.0516	S AL 3103 (AlMn1)	ER 3103	On request	99
TR ML 4043 AlSi5	3.2245	S Al 4043 (AlSi5(A))	ER 4043	CE / DB / TÜV	100
TR ML 4047 AlSi12	3.2585	S AL 4047A (AlSi12(A))	ER 4047	CE / DB	101
TR ML 5087	3.3546	S AL 5087 (AlMg4,5MnZr)	ER 5087	CE / DNV-GL / ABS / DB / TÜV / Bureau Veritas	102
TR ML 5183 AlMg4,5Mn0,7	3.3548	S AL 5183 (AlMg4,5Mn0,7)	ER 5183	CE / DNV-GL / ABS / LR / DB / TÜV / KR (Korean Register) / BWB / Bureau Veritas	103
TR ML 5356 AlMg5Cr	3.3556	S AL 5356 (AlMg5Cr)	ER 5356	CE / DNV-GL / ABS / DB / TÜV / Bureau Veritas	104
TR ML 5754 AlMg3	3.3536	S Al 5754 (AlMg3)	ER 5754	On request	105
Copper-based					
TR CuSi3		CuSi3Mn (Cu 6560)	ER CuSi-A		106
TR CuSn1		CuSn1 (Cu 1898)	ER Cu		107
TR CuSn6		S Cu 5180A (CuSn6P)	ER CuSn-A		108
TR CuAl8		CuAl7 (Cu 6100)	ER CuAl-A1		109

TR 70S G2

Standards	DIN EN ISO 636-A - W 42 4 2Si
	AWS A-5.18 - ER 70S-3
Material number	1.5112
Welding positions	PA / PB / PC / PE / PF
Polarity	DC-
Yield strength	≥420 MPa
Tensile strength, Rm	≥510 MPa
Expansion, A5	≥22 %
Impact energy, Av	20 °C: ≥ 100 J
	-46 °C: ≥ 200 J
Approvals	CE
Base materials	S185 - E360 | S235JR - S355JR | S235J0 - S355J0 | S235J2 - S355J2 | S275N - S420N | S275M - S420M | P235GH - P355GH | P275N - P355N | P355M - P420M | P355Q
	ASTM: A36 | A106 grades A/B/C | A139 | A210 grades A1/C | A214 | A216 grades WCA/WCB/WCC | A234 grade WPB | A334
	API: 5L grades X42-X60

- Unalloyed TIG welding rod
- Copper-plated and stamped
- High chemical purity
- For single-pass and multi-pass welding
- Semi-fluid weld pool, good controllability
- Welding of steels with a yield strength of 420 MPa

- **Fields of application:**
  - Shipbuilding, pressure vessel and boiler construction

Chemical analysis (in %)

C	Si	Mn
0.09	0.6	1.15

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-003580-10016
Package	Package	5 kg	2 mm	1000 mm	097-003580-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003580-10024
Package	Package	5 kg	3 mm	1000 mm	097-003580-10030

TR 70S G3

Standards	DIN EN ISO 636-A - W 46 5 3Si1
	AWS A-5.18 - ER 70S-6
Material number	1.5125
Welding positions	PA / PB / PC / PE
Polarity	DC-
Yield strength	≥460 MPa
Tensile strength, Rm	≥560 MPa
Expansion, A5	≥22 %
Impact energy, Av	20 °C: ≥ 100 J
Approvals	CE / TÜV / DB
Base materials	S185 - E360 | S235JR - S355JR | S235J0 - S355J0 | S235J2 - S355J2 | S275N - S420N | S275NL - S420NL | S275M - S420M | S275ML - S420ML | P275N - P355N | P275NL1 - P355NL1 | P275NL2 - P355NL2 | P355M - P420M | P355ML2 - P420ML2 | P355Q | P355QL1
	ASTM: A36 | A106 grades A/B/C | A139 | A210 grades A1/C | A214 | A216 grades WCA/WCB/WCC | A234 grade WPB | A334
	API: 5L grades X42-X60

- Unalloyed TIG welding rod
- Copper-plated and stamped
- High chemical purity
- For single-pass and multi-pass welding
- Semi-fluid weld pool, good controllability
- Good wetting properties, flat weld surface
- Very stable arc at high welding currents
- Welding of steels with a yield strength of 460 MPa

- **Fields of application:**
  - Shipbuilding, pressure vessel and boiler construction

Chemical analysis (in %)

C	Si	Mn
0.09	0.87	1.47

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-003489-10010
Package	Package	5 kg	1.6 mm	1000 mm	097-003489-10016
Package	Package	5 kg	2 mm	1000 mm	097-003489-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003489-10024
Package	Package	5 kg	3 mm	1000 mm	097-003489-10030
Package	Package	5 kg	5 mm	1000 mm	097-003489-10050

TR 70S G4

Standards	DIN EN ISO 636-A - W 50 5 4Si1
	AWS A-5.18 - ER 70S-6
Material number	1.5130
Welding positions	PA / PB / PC / PE / PF
Polarity	DC-
Yield strength	≥500 MPa
Tensile strength, Rm	≥560 MPa
Expansion, A5	≥18 %
Impact energy, Av	20 °C: ≥ 100 J
	-50 °C: ≥ 80 J
Approvals	CE
Base materials	S185 - E360 | S235JR - S355JR | S235J0 - S450J0 | S235J2 - S355J2 | S275N - S460N | S275M - S460M | S460Q | S460QL | P275N - P460N | P275NL1 - P460NL1 | P355M - P460M | P355ML1 - P460ML1 | P355Q - P460Q | P355QL1 - P460QL1

- Unalloyed TIG welding rod
- Copper-plated and stamped
- High chemical purity
- For single-pass and multi-pass welding
- Suitable for welding rolling scale and slightly rusty metal surfaces thanks to multiple deoxidisation
- Semi-fluid weld pool, good controllability
- Good wetting properties, flat weld surface
- Very stable arc at high welding currents
- Welding of steels with a yield strength of 460 MPa

- **Fields of application:**
  - Shipbuilding, pressure vessel and boiler construction

Chemical analysis (in %)

C	Si	Mn
0.09	0.95	1.67

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-003574-10016
Package	Package	5 kg	2 mm	1000 mm	097-003574-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003574-10024
Package	Package	5 kg	3 mm	1000 mm	097-003574-10030

TR 80S Mo

Standards	DIN EN ISO 21952-A - W MoSi
	DIN EN ISO 636-A - W 46 4 2Mo
	AWS A-5.28 - ER 70S-A1 (ER 80S-G)
Material number	1.5424
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Yield strength	≥460 MPa
Tensile strength, Rm	≥560 MPa
Expansion, A5	>22 %
Impact energy, Av	20 °C: ≥ 60 J
	-40 °C: ≥ 47 J
Approvals	CE / TÜV / DB
Base materials	Similarly alloyed creep-resistant steels and cast steel
	S355 | P235G1TH - P255G1TH | P310GH | L320 | L360NB - L415NB | 16Mo3
	ASTM: A182/A336 grade F1 | A204 grades A/B/C | A209/A250 grade T1 | A217 grade WC1 | A335 grade P1 | A352 grade LC

- Low-alloy TIG welding rod
- Copper-plated and stamped
- Low-spatter thanks to high chemical purity
- Mainly for welding creep-resistant 0.5% Mo steels
- Maximum operating temperature 500 °C

- **Fields of application:**
  - Boiler, container, pressure vessel and pipeline construction

Chemical analysis (in %)

C	Si	Mn	Mo
0.1	0.6	1.15	0.52

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-003487-10016
Package	Package	5 kg	2 mm	1000 mm	097-003487-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003487-10024
Package	Package	5 kg	3 mm	1000 mm	097-003487-10030

TR 80S CrMo1

Standards	DIN EN ISO 21952-A - W CrMo1Si
	AWS A-5.28 - ER 80S-G
Material number	1.7339
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Yield strength	≥355 MPa
Tensile strength, Rm	≥510 MPa
Expansion, A5	≥20 %
Impact energy, Av	20 °C: ≥ 100 J
	-40 °C: ≥ 47 J
Approvals	CE / TÜV / DB
Base materials	13CrMo 4-4 | 13CrMo 4-5 | 16CrMo 4-4 | G-17CrMo 5-5
	ASTM: A182 grades F11/F12 | A199/A200 grade T11 | A217 grades WC6/WC11 | A234 grades WP11/WP12 | A335 grades P11/P12 | A387 grades 11/12

- Low-alloy TIG welding rod
- Copper-plated and stamped
- High chemical purity
- For welding creep-resistant, ferritic 1.25 % Cr - 0.5 % Mo steels
- For operating temperatures up to max. 550°C
- Low Bruscato factor (X<10ppm) = insensitive to temper embrittlement or 500°C embrittlement

- **Fields of application:**
  - Pressure pipe, turbine and boiler construction, as well as for the chemical and petrochemical industry

Chemical analysis (in %)

C	Si	Mn	Cr	Mo
0.1	0.6	1	1.2	0.52

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-003500-10016
Package	Package	5 kg	2 mm	1000 mm	097-003500-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003500-10024
Package	Package	5 kg	3 mm	1000 mm	097-003500-10030

TR 90S CrMo2

Standards	DIN EN ISO 21952-A - W CrMo2Si
	AWS A-5.28 - ER 90S-G
Material number	1.7384
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Yield strength	≥400 MPa
Tensile strength, Rm	≥520 MPa
Expansion, A5	≥18 %
Impact energy, Av	20 °C: ≥ 100 J
	-40 °C: ≥ 47 J
Base materials	10CrMo 9-10 | G-17CrMo 9-10
	ASTM: A182 grade F22 | A199/A200 grades T21/T22 | A213 grade T22 | A217 grade WC9 | A234 grade WP22 | A335 grade P22 | A387 grades 21/22

- Low-alloy TIG welding rod, creep-resistant
- Copper-plated and stamped
- Low-spatter thanks to high chemical purity
- For operating temperatures up to max. 600°C
- Low Bruscato factor (X<10ppm) = insensitive to temper embrittlement or 500°C embrittlement
- For welding creep-resistant, ferritic 2.25% Cr - 1% Mo steels

- **Fields of application:**
  - Power plant, turbine, boiler and pressure line construction, as well as for chemicals and petrochemicals

Chemical analysis (in %)

C	Si	Mn	Cr	Mo
0.08	0.6	0.92	2.45	1

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	2.4 mm	1000 mm	097-003541-10024

TR CrMo5

Standards	DIN EN ISO 21952-A - W CrMo5 Si
	AWS A-5.28 - ER 80S-B6
Material number	1.7373
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Yield strength	≥450 MPa
Tensile strength, Rm	≥550 MPa
Expansion, A5	≥18 %
Impact energy, Av	20 °C: ≥ 100 J
Base materials	ASTM: A182/A336 F5 | A199/A213 T5 | A217 C5 | A234 WP5 | A335 P5 | A387 5
	X12CrMo5 | GX12CrMo5

- Low-alloy TIG welding rod, creep-resistant
- Copper-plated and stamped
- For 5% Cr - 0.5% Mo alloyed, creep-resistant, ferritic steels of the same type
- For operating temperatures up to max. 600°C

- **Fields of application:**
  - Chemical and petrochemical industry and heat exchanger, boiler, pipeline and pressure vessel construction

Chemical analysis (in %)

C	Si	Mn	Mo	Cr
0.08	0.35	0.55	0.65	6

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	2.4 mm	1000 mm	097-003585-10024
Package	Package	5 kg	3 mm	1000 mm	097-003585-10032

TR 80S Ni1

Standards	DIN EN ISO 636-A - W 46 6 3Ni1
	AWS A-5.28 - ER 80S-Ni1
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Yield strength	≥470 MPa
Tensile strength, Rm	≥550 MPa
Expansion, A5	≥20 %
Impact energy, Av	20 °C: ≥ 100 J
	-60 °C: 47 J
Base materials	Nickel-alloyed, low-temperature tough steels
	11MnNi5-3 | 13MnNi6-3 | S275NL - S460NL | S275ML - S460ML | P275NL2 - P460NL2 | P355ML2 - P460ML2
	ASTM: A333/A334 grades 1/6 | A350 grades LF2/LF6 | A352 grades LCB
	API: 5L X65

- Low-alloy TIG welding rod, low-temperature tough
- Copper-plated and stamped
- Low-spatter thanks to high chemical purity
- Semi-fluid weld pool, good controllability
- For welding low-temperature tough steels
- Low temperature requirements down to - 60°C

- **Fields of application:**
  - Oil and gas industry, offshore sector and steel construction

Chemical analysis (in %)

C	Si	Mn	Ni
0.09	0.5	1.05	0.9

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-003618-10016
Package	Package	5 kg	2.4 mm	1000 mm	097-003618-10024
Package	Package	5 kg	3 mm	1000 mm	097-003618-10030

TR 307 Si XQ

Standards	DIN EN ISO 14343-A - W 18 8 Mn
	AWS A-5.9 - ER 307 Si
Material number	1.4370
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
Tensile strength, Rm	600 MPa
Expansion, A5	35 %
Impact energy, Av	20 °C: 120 J
Approvals	CE
Hardness	190 BHN
Base materials	Claddings, buffer layers for hardfacing, high carbon and difficult-to-weld steels, manganese high carbon steel (e.g. 1.3401)
	Dissimilar steels (black-and-white joints)

- High-alloy TIG welding rod, creep-resistant
- Stamped
- Suitable for dissimilar joints and buffer layers
- For welding heat-resistant Cr and CrNi steels, as well as austenitic stainless steels containing Mn
- Scale resistant up to approx. 850°C
- Strain-hardening

- **Fields of application:**
  - Exhaust system construction (e.g. exhaust systems), spring technology, repair of shafts

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	S	P	Mo
max. 0.12	5 - 8	0.65 - 1	17 - 20	7.5 - 9	max. 0.03	max. 0.03	max. 0.3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-005371-10010
Package	Package	5 kg	1.2 mm	1000 mm	097-005371-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-005371-10016
Package	Package	5 kg	2 mm	1000 mm	097-005371-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-005371-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-005371-10032

TR 308 LSi XQ

Standards	DIN EN ISO 14343-A - W 19 9 L Si
	AWS A-5.9 - ER 308 L Si
Material number	1.4316
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Shielding gas	I1
	M13
Tensile strength, Rm	600 MPa
Expansion, A5	35 %
Impact energy, Av	20 °C: 120 J
	-196 °C: 50 J
Approvals	CE / TÜV / DB
Hardness	190 BHN
Base materials	304 | 304L
	1.4301 | 1.4306

- High-alloy TIG welding rod, stainless
- Stamped
- Good resistance to intergranular and atmospheric corrosion
- Excellent welding properties (better seam appearance) due to higher Si content
- For welding stabilised and non-stabilised CrNi steels
- For operating temperatures up to approx. +350°C, low-temperature tough down to -196°C

- **Fields of application:**
  - Chemical and food industry, as well as pipeline and boiler construction

Chemical analysis (in %)

C	Si	Mn	P	S	Cr	Ni	Mo
max. 0.03	0.65 - 1	1 - 2.5	max. 0.03	max. 0.02	19.5 - 21	9 - 11	max. 0.3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-005392-10010
Package	Package	5 kg	1.6 mm	1000 mm	097-005392-10016
Package	Package	5 kg	2 mm	1000 mm	097-005392-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-005392-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-005392-10032

TR 309 L Si XQ

Standards	DIN EN ISO 14343-A - W 23 12 L Si
	AWS A-5.9 - ER 309 L Si
Material number	1.4332
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Shielding gas	I1
	M13
Tensile strength, Rm	590 MPa
Expansion, A5	35 %
Impact energy, Av	20 °C: 120 J
	-196 °C: 48 J
Approvals	CE / TÜV
Hardness	178 BHN
Base materials	Austenite-ferrite joints (dissimilar), cladding, corrosion-resistant layers on non-alloyed construction steels, buffer layers

- High-alloy TIG welding rod, stainless
- Stamped
- Very good corrosion and scale resistance
- Excellent welding properties (better seam appearance) due to higher Si content
- The weld metal is resistant to hot cracking
- Suitable for dissimilar joints and buffer layers
- Heat and scale resistant up to approx. +950°C
- For operating temperatures up to approx. +300°C

- **Fields of application:**
  - Industrial furnaces and boiler parts, annealing chambers, heat exchangers, processing plants

Chemical analysis (in %)

C	Mn	Si	P	S	Cr	Ni	Mo
max. 0.03	1 - 2.5	0.65 - 1	max. 0.03	max. 0.02	23 - 25	12 - 14	max. 0.3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-005420-10010
Package	Package	5 kg	1.2 mm	1000 mm	097-005420-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-005420-10016
Package	Package	5 kg	2 mm	1000 mm	097-005420-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-005420-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-005420-10032

TR 309 H

Standards	DIN EN ISO 14343-A - W 22 12 H
	AWS A-5.9 - ER 309 Si
Material number	1.4829
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Tensile strength, Rm	≥600 MPa
Expansion, A5	≥25 %
Impact energy, Av	20 °C: 130 J
Base materials	1.4828 | 1.4826 | 1.4833 | 1.4713 | 1.4724 | 1.4742 | 1.4710 | 1.4740 | 1.4829 | 1.4832 | 1.4878 | 1.4713

- High-alloy TIG welding rod
- Not prone to hot crack formation due to high delta-ferrite content
- Joint welding and surfacing of heat-resisting CrSi, CrAl and CrNiSi steels
- For similar heat- and scale-resistant steels
- Scale-resistant up to 950 °C

Chemical analysis (in %)

C	Si	Mn	Ni	Cr	Mo	Cu
0.08 - 0.12	0.65 - 1.2	1 - 2.5	12 - 14	22 - 24	≤0.5	≤0.5

- **Fields of application:**
  - Industrial furnaces and boiler parts

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.2 mm	1000 mm	097-004879-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-004879-10016
Package	Package	5 kg	2 mm	1000 mm	097-004879-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-004879-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-004879-10032

TR 310 XQ

Standards	DIN EN ISO 14343-A - G 25 20
	AWS A-5.9 - ER 310
Material number	1.4842
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Shielding gas	I1
	M13
Tensile strength, Rm	590 MPa
Expansion, A5	35 %
Impact energy, Av	20 °C: 150 J
Hardness	175 BHN
Base materials	1.4710 | 1.4713 | 1.4726 | 1.4745 | 1.4823 | 1.4832 | 1.4837 | 1.4840 | 1.4841 | 1.4845 | 1.4846 |1.4848 | 1.4849

- High-alloy TIG welding rod, heat-resistant
- Excellent corrosion resistance
- For welding heat-resistant steels
- Scale resistant up to 1150°C
- Not resistant to hot cracking

- **Fields of application:**
  - Industrial furnaces, boiler construction, heat exchangers

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	S	P	Mo
0.08 - 0.15	1 - 2.5	0.3 - 0.65	25 - 27	20 - 22	max. 0.02	max. 0.03	max. 0.75

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-005395-10010
Package	Package	5 kg	1.2 mm	1000 mm	097-005395-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-005395-10016
Package	Package	5 kg	2 mm	1000 mm	097-005395-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-005395-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-005395-10032

TR 312 XQ

Standards	DIN EN ISO 14343-A - W 29 9
	AWS A-5.9 - ER 312
Material number	1.4337
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Shielding gas	I1
	M13
Tensile strength, Rm	720 MPa
Expansion, A5	25 %
Impact energy, Av	20 °C: 45 J
Hardness	210 BHN
Base materials	Difficult-to-weld steel, manganese high carbon steel, spring steel, tool steel
	Corrosion-resistant analogue steel and cast steel (e.g. 1.4762, 1.4085)

- High-alloy TIG welding rod, creep-resistant
- The weld metal has a ferritic-austenitic structure
- Suitable for dissimilar joints and buffer layers
- Good scale resistance
- High hot crack resistance

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	S	P	Mo
max. 0.15	1 - 2.5	0.3 - 0.65	28 - 32	8 - 11	max. 0.03	max. 0.03	max. 0.3

- **Fields of application:**
  - Offshore industry

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-005403-10010
Package	Package	5 kg	1.2 mm	1000 mm	097-005403-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-005403-10016
Package	Package	5 kg	2 mm	1000 mm	097-005403-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-005403-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-005403-10032

TR 316 LSi XQ

Standards	DIN EN ISO 14343-A - W 19 12 3 LSi
	AWS A-5.9 - ER 316 LSi
Material number	1.4430
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Shielding gas	I1
	M13
Tensile strength, Rm	600 MPa
Expansion, A5	40 %
Impact energy, Av	20 °C: 110 J
	-196 °C: 40 J
Approvals	CE / TÜV / DB
Hardness	190 BHN
Base materials	1.4401 | 1.4404 | 1.4406 | 1.4408 | 1.4429 | 1.4435 | 1.4436 | 1.4541 | 1.4550 | 1.4571 | 1.4580 | 1.4581 | 1.4583

- High-alloy TIG welding rod, creep-resistant
- Stamped
- Excellent corrosion resistance in acidic media and chlorinated solutions
- Excellent welding properties (better seam appearance) due to higher Si content
- For welding stabilised and non-stabilised austenites of similar types
- For operating temperatures up to + 400°C, low-temperature tough down to - 196°C

- **Fields of application:**
  - Chemical and food industry (containers, pipes, pumps)

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	S	P	Mo
max. 0.03	1 - 2.5	0.65 - 1	18 - 20	11 - 14	max. 0.02	max. 0.03	2 - 3

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-005373-10010
Package	Package	5 kg	1.2 mm	1000 mm	097-005373-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-005373-10016
Package	Package	5 kg	2 mm	1000 mm	097-005373-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-005373-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-005373-10032

TR 318 Si

Standards	DIN EN ISO 14343-A - W 19 12 3 Nb Si
	AWS A-5.9 - ER 318 Si
Material number	1.4576
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Tensile strength, Rm	620 MPa
Expansion, A5	35 %
Impact energy, Av	20 °C: 135 J
	-196 °C: 40 J
Approvals	CE / TÜV / DB
Base materials	1.4401 | 1.4404 | 1.4408 | 1.4420 | 1.4435 | 1.4436 | 1.4571 | 1.4573 | 1.4580 | 1.4581 | 1.4583

- High-alloy TIG welding rod, creep-resistant
- Stamped
- Good resistance to intergranular and pitting corrosion
- Excellent welding properties (better seam appearance) due to higher Si content
- For welding stabilised austenites of similar types
- For operating temperatures up to + 400°C, low-temperature tough down to - 196°C

- **Fields of application:**
  - For chemical apparatus and container construction

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	Mo	Cu	Nb
max. 0.08	1 - 2.5	0.65 - 1	18 - 20	11 - 14	2.5 - 3.5	>0.5	min.10 xC

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-003493-10010
Package	Package	5 kg	1.2 mm	1000 mm	097-003493-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-003493-10016
Package	Package	5 kg	2 mm	1000 mm	097-003493-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003493-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-003493-10032

TR 347 XQ

Standards	DIN EN ISO 14343-A - W 19 9 Nb
	AWS A-5.9 - ER 347
Material number	1.4551
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
Tensile strength, Rm	610 MPa
Expansion, A5	35 %
Impact energy, Av	20 °C: 110 J
	-196 °C: 30 J
Hardness	190 BHN

- High-alloy TIG welding rod, creep-resistant
- Stamped
- Good resistance to intergranular corrosion
- For welding stabilised austenites of similar types
- Heat and scale resistant up to approx. 700°C
- For operating temperatures up to + 400°C, low-temperature tough down to - 196°C

Chemical analysis (in %)

C	Si	Cr	Ni	Mn	P	Mo	S
max. 0.08	0.65 - 1	19 - 21	9 - 11	1 - 2.5	max. 0.03	max. 0.3	max. 0.02

- **Fields of application:**
  - Chemical plant engineering

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-005379-10010
Package	Package	5 kg	1.2 mm	1000 mm	097-005379-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-005379-10016
Package	Package	5 kg	2 mm	1000 mm	097-005379-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-005379-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-005379-10032

TR 2209 Duplex XQ

Standards	DIN EN ISO 14343-A - W22 9 3 NL
	AWS A-5.9 - ER 2209
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
	M13
Tensile strength, Rm	800 MPa
Expansion, A5	35 %
Impact energy, Av	20 °C: 120 J
	-80 °C: 40 J
Approvals	CE / TÜV
Hardness	220 BHN
Base materials	1.4462 | 1.4417 | 1.4460 | 1.4362

- High-alloy TIG welding rod
- Good resistance to pitting and stress corrosion cracking, even in media containing chloride
- For joining austenitic-ferritic stainless steels and all other lean duplex steels
- Suitable for black/white joints
- Use in the temperature range from -80°C to approx. 300°C

- **Fields of application:**
  - Offshore (e.g. pipeline construction), pulp and paper industry

Chemical analysis (in %)

C	Mn	Mo	Cr	Ni	S	P	N
max. 0.03	0.5 - 2	2.5 - 3.5	21.5 - 23.5	7.5 - 9.5	max. 0.02	max. 0.03	0.08 - 0.2

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1 mm	1000 mm	097-005381-10010
Package	Package	5 kg	1.2 mm	1000 mm	097-005381-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-005381-10016
Package	Package	5 kg	2 mm	1000 mm	097-005381-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-005381-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-005381-10032

TR 2594 Super Duplex XQ

Standards	DIN EN ISO 14343-A - W 25 9 4 N L
	AWS A-5.9 - ER 2594
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
Tensile strength, Rm	810 MPa
Expansion, A5	22 %
Impact energy, Av	-40 °C: 130 J
Approvals	auf Anfrage
Base materials	Austenitic-ferritic super duplex steels such as 1.4410

- High-alloy TIG welding rod
- Excellent resistance to pitting, air gap and stress corrosion cracking in chloride-containing environments
- Suitable for surfacing on steels in particularly aggressive environments
- For welding duplex and super-duplex steels

- **Fields of application:**
  - Chemical and petrochemical industry (chloride environment)

Chemical analysis (in %)

C	Mn	Mo	Cr	Ni	S
max. 0.03	2.5	2.5 - 4.5	24 - 27	8 - 10.5	max. 0.02

P	N	Si	W	Cu
max. 0.03	0.2 - 0.3	max. 1	max. 1	max. 1.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.2 mm	1000 mm	097-005422-10012
Package	Package	5 kg	1.6 mm	1000 mm	097-005422-10016
Package	Package	5 kg	2 mm	1000 mm	097-005422-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-005422-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-005422-10032

TR Tool 45 T

Standards	DIN EN 14700 - S Fe 3-45-st
	DIN 8555 - WSG 3-GZ-45 T
Material number	1.2567
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
Hardness	41 - 45 HRC
Base materials	Creep-resistant, tough TIG surfacing on hot-work steels of the same or a similar type, as well as low-alloy and unalloyed steels

- TIG welding rod for deposits on highly stressed moulds made of hot-work steel
- Hard and tough, creep-resistant deposits on similar or analogue hot-work steels and their welds for fabricating purposes
- Up to 45 HRC
- Very good resistance to thermal shock
- Operating temperatures up to 550 °C

- **Fields of application:**
  - Repair and production welding on swaging tools, press punches and press dies

Chemical analysis (in %)

C	Si	Mn	Cr	W	V	Fe
0.25 - 0.35	0.6	0.2 - 0.4	2.2 - 2.5	4 - 4.5	0.5 - 0.7	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-004876-10016
Package	Package	5 kg	2 mm	1000 mm	097-004876-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-004876-10024

TR Tool 55 T

Standards	DIN EN 14700 - S Fe 3-55-st
	DIN 8555 - WSG 6-GZ-55 ST
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
Hardness	50 - 56 HRC
Base materials	Creep-resistant applications against pressure and abrasion on hot-work tool steels with high hardness

- TIG welding rod for deposits on hot-work steels
- For wear-resistant applications on hot-working tools that are subject to high abrasion and pressure and moderate impact loads
- Suitable for new fabrication of hot-work tools
- Up to 55 HRC
- Suitable for surface and edge application
- Operating temperatures up to 550 °C

- **Fields of application:**
  - Applications on clamshell sprockets, rollers, punching knives

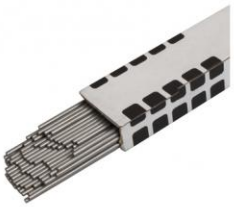
Chemical analysis (in %)

C	Si	Mn	Cr	Mo	Ti	Fe
0.4	0.6	0.9 - 1.5	6.5 - 7.5	2 - 2.5	0.4	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-004877-10016
Package	Package	5 kg	2 mm	1000 mm	097-004877-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-004877-10024

TR Stelloy 21

Standards	DIN EN 14700 - R Co1
	AWS A-5.21 - ERCCoCr-E
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
Hardness	33 - 47 HRC



- Cobalt-based TIG welding rod
- Good sliding properties, stamped
- Very good resistance to corrosion, frictional wear and impact stress
- Good toughness and insensitivity to thermal shocks and alternating stresses
- Particularly suitable for high operating temperatures in conjunction with impact or shock loads
- Temperature resistant up to max. 800°C

- **Fields of application:**
  - Applications on components that are exposed to a combination of impact stress, abrasion, high pressure and corrosion at temperatures of up to 900°C, such as valve seats and guides for large water or high-pressure fittings, forging hammers, pump shafts, etc.
  - Hot work tools with alternating thermal loads, e.g. extruder screws, combustion engines, earth drills, etc.

Chemical analysis (in %)

C	Mn	Si	Cr	Ni	Mo	Fe	Co
0.25	1	1	28.5	3	5.5	4	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	3.2 mm	1000 mm	097-123625-10032

TR Corolit T 21

Standards	DIN EN 14700 - R Co1
	DIN 8555 - G 20-GO-300-CKTZ
	AWS A-5.21 - ER CoCr E
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Hardness	30 - 32 HRC

- Cobalt-based TIG welding rod
- Good sliding properties, stamped
- Very good resistance to corrosion, abrasion, oxidation and impact stress
- Good toughness and insensitivity to thermal shocks and alternating stresses
- Temperature resistant up to max. 800°C

- **Fields of application:**
  - Hot work tools, outlet valves and vapour and acid-proof fittings

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Mo	Fe	Co
0.15 - 0.45	max. 1.5	max. 1.5	25 - 30	1.5	4.5 - 7.5	<3	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	3.2 mm	1000 mm	097-205182-10032

TR NiCr82

Standards	DIN EN ISO 18274 - Ni 6082 – NiCr20Mn3Nb
	AWS-SFA-5.14 - ER NiCr 3
Material number	2.4806
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
Tensile strength, Rm	670 MPa
Expansion, A5	40 %
Impact energy, Av	20 °C: 160 J
	-196 °C: 80 J
Base materials	1.4558 | 1.4859 | 1.4861 | 1.4876 | 1.4877 | 1.4885 | 1.4958 | 1.4968 | 2.4669 | 2.4694 | 2.4816 | 2.4817 | 2.4867 | 2.4867 | 2.4869 | 2.4951 | 2.4952

- High-alloy TIG welding rod made from nickel-based alloy
- Good resistance to stress and intergranular corrosion
- Suitable for nickel-based alloys, dissimilar joints and surfacing
- Scale-resistant up to 1,000 °C
- Cold tough up to -196 °C

Chemical analysis (in %)

C	Si	Mn	Cr	Ni
≤0.05	≤0.1	2.5 - 3.5	18 - 22	≥67

Cu	Ti	Fe	(Nb + Ta)
≤0.5	≤0.7	≤3	2 - 3

- **Fields of application:**
  - Petrochemicals and offshore technology (e.g. furnace systems)

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-003608-10016
Package	Package	5 kg	2 mm	1000 mm	097-003608-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003608-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-003608-10032

TR 625

Standards	DIN EN ISO 18274 - Ni 6625 – NiCr22Mo9Nb
	AWS A-5.14 - ER NiCrMo3
Material number	2.4831
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I3
Tensile strength, Rm	670 MPa
Expansion, A5	40 %
Impact energy, Av	20 °C: 160 J
	-196 °C: 80 J
Approvals	TÜV
Base materials	1.4529 | 1.4539 | 1.4558 | 1.4876 | 1.5680 | 1.5681 | 1.5662 | 2.4605 | 2.4618 | 2.4856 | 2.4858 | 2.4951 | 2.4952
	High-molybdenum, corrosion-resistant steels, low-temperature tough nickel steels, alloy 625, Alloy 800

- High-alloy TIG welding rod made from nickel-based alloy
- Very good corrosion resistance to hydrochloric, sulphuric and nitric acid
- Very good resistance to pitting, air gap and intergranular corrosion
- Suitable for nickel-based alloys, dissimilar joints up to 300°C and surfacing
- Can be used in temperature range from -196°C to 550°C

- **Fields of application:**
  - High-temperature applications, marine and offshore environments, pipework systems, reactor components

Chemical analysis (in %)

C	Si	Mn	Cr	Ni
≤0.03	≤0.5	≤1	21 - 23	≥60

Mo	Cu	Fe	(Nb + Ta)
8.5 - 9.5	≤0.5	≤1	3.2 - 4

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-003537-10016
Package	Package	5 kg	2 mm	1000 mm	097-003537-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003537-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-003537-10032

TR ML 1450 Al99,5Ti

Standards	DIN EN ISO 18273 - S AL 1450 (Al99,5Ti)
	AWS A-5.10 - ER 1450
Material number	3.0805
Welding positions	PA / PB / PC / PF
Polarity	AC
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥65 MPa
Expansion, A5	35 %
Approvals	auf Anfrage
Base materials	Al99,0 | Al99,5 | Al99,7 | E-Al

- TIG welding rod, aluminium
- High strength due to titanium content
- High corrosion resistance
- Resistant to hot cracks
- Well suited to welding
- For welding pure aluminium alloys

- **Fields of application:**
  - Chemical and food industry (containers, pipes, pumps)

Chemical analysis (in %)

Si	Fe	Cu	Mn	Zn	Mg	Ti	Al
<0.25	<0.4	<0.05	<0.05	<0.07	0.05	0.1 - 0.2	≥99.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-580017-10016
Package	Package	5 kg	2 mm	1000 mm	097-580017-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-580017-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-580017-10032
Package	Package	5 kg	4 mm	1000 mm	097-580017-10040

TR ML 3103 AlMn1

Standards	DIN EN ISO 18273 - S AL 3103 (AlMn1)
	AWS A-5.10 - ER 3103
Material number	3.0516
Welding positions	PA / PB / PC / PF
Polarity	AC
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥105 N/mm²
Expansion, A5	29 %
Approvals	auf Anfrage
Base materials	Similar materials

- TIG welding rod, aluminium
- Seawater resistant
- Resistant to hot cracks
- Well suited to welding

- **Fields of application:**
  - Shipbuilding, chemical plant construction, pipeline construction, vehicle construction (coolers)

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<0.5	<0.3	<0.1	0.9 - 1.5	<0.3

Cr	Zn	Ti+Zr	Al
<0.1	<0.1	<0.1	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-580019-10016
Package	Package	5 kg	2 mm	1000 mm	097-580019-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-580019-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-580019-10032
Package	Package	5 kg	4 mm	1000 mm	097-580019-10040

TR ML 4043 AlSi5

Standards	DIN EN ISO 18273 - S Al 4043 (AlSi5(A))
	AWS A-5.10 - ER 4043
Material number	3.2245
Welding positions	PA / PB / PC / PF
Polarity	AC
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥130 MPa
Expansion, A5	5 %
Approvals	CE / DB / TÜV
Base materials	AlMgSi0,5 | AlMgSi0,8 | AlMgSi1 | AlZnMg | AlCuMg

- TIG welding rod, aluminium
- High corrosion resistance
- Resistant to hot cracks
- Very good flow and wetting properties
- Bright and virtually dirt-free weld seams
- Not suitable for anodising

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<4.5 - 6	<0.8	<0.3	<0.05	<0.05

Zn	Ti	Al	Others
<0.1	<0.2	Remainder	<0.15 -

- **Fields of application:**
  - Bicycles, trucks, trailers and aluminium constructions

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-580015-10016
Package	Package	5 kg	2 mm	1000 mm	097-580015-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-580015-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-580015-10032
Package	Package	5 kg	4 mm	1000 mm	097-580015-10040

TR ML 4047 AlSi12

Standards	DIN EN ISO 18273 - S AL 4047A (AlSi12(A))
	AWS A-5.10 - ER 4047
Material number	3.2585
Welding positions	PA / PB / PC / PF
Polarity	AC
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥130 N/mm²
Expansion, A5	5 %
Approvals	CE / DB
Base materials	G-AlSi10Mg | G-AlSi11 | G-AlSi12(Cu) | G-AlSi7Mg | G-AlSi6Cu4 | AlMgSi0,8 | AlMgSi1

- TIG welding rod, aluminium
- Shaved several times
- High corrosion resistance, low distortion
- Resistant to hot cracks
- Very good flow and wetting properties
- Bright and virtually dirt-free weld seams
- Suitable for welding and brazing aluminium alloys and cast aluminium alloys
- Not suitable for anodising

- **Fields of application:**
  - Brazing of sheet metal and extruded profiles from cast workpieces

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg	Zn	Al	Others
11 - 13	<0.8	<0.3	<0.15	<0.1	<0.2	<Remainder	0.15

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-580016-10016
Package	Package	5 kg	2 mm	1000 mm	097-580016-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-580016-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-580016-10032
Package	Package	5 kg	4 mm	1000 mm	097-580016-10040

TR ML 5087

Standards	DIN EN ISO 18273 - S AL 5087 (AlMg4,5MnZr)
	AWS A-5.10 - ER 5087
Material number	3.3546
Welding positions	PA / PB / PC / PF
Polarity	AC
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥275 MPa
Expansion, A5	17 %
Approvals	CE / DNV-GL / ABS / DB / TÜV / Bureau Veritas
Base materials	AlMg4,5Mn | AlZnMgCu1,5 | AlMg5Mn | AlMg3 | AlMg5 | AlMgMn | AlZn | Mg1 | G-AlMg3Si | G-AlMg10 | AlMgSi0,7

- TIG welding rod, aluminium
- Improved seawater and corrosion resistance as well as tensile strength due to Zr content
- Insensitive to hot cracking (with low dilution)
- Mainly for welding Al-Mg alloys with max. 5% Mg
- Not suitable for anodising

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg	Cr
<0.25	<0.4	<0.05	0.7 - 1.1	4.5 - 5.2	0.05 - <0.25

Zn	Ti	Zr	Al	Others
<0.25	<0.15	0.1 - 0.2	Remainder	<0.15

- **Fields of application:**
  - Shipbuilding, offshore, automotive industry, rail transport

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-580010-10016
Package	Package	5 kg	2 mm	1000 mm	097-580010-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-580010-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-580010-10032
Package	Package	5 kg	4 mm	1000 mm	097-580010-10040

TR ML 5183 AlMg4,5Mn0,7

Standards	DIN EN ISO 18273 - S AL 5183 (AlMg4,5Mn0,7)
	AWS A-5.10 - ER 5183
Material number	3.3548
Welding positions	PA / PB / PC / PF
Polarity	AC
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥275 MPa
Expansion, A5	17 %
Approvals	CE / DNV-GL / ABS / LR / DB / TÜV / KR (Korean Register) / BWB / Bureau Veritas
Base materials	AlMg4,5Mn | AlMg5 | AlMg2Mn0,8 | AlZnMg1 | AlZnMgCu0,5 | AlMgSi0,5 | AlMgSi1 | G-AlMg10 | G-AlMg5 | G-AlMg3Si | G-AlMg5Si

- TIG welding rod, aluminium
- Very high resistance to seawater and corrosion
- Higher tensile strength
- For welding high tensile Al alloys
- Mainly for welding Al-Mg alloys with max. 5% Mg
- Suitable for anodising

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<0.4	<0.4	<0.1	<0.5 - 1	<4.3 - 5.2
Cr	**Zn**	**Ti**	**Al**	**Others**
<0.05 - <0.25	<0.25	<0.15	Remainder	<0.15

- **Fields of application:**
  - Shipbuilding, offshore, automotive industry, rail transport

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-580012-10016
Package	Package	5 kg	2 mm	1000 mm	097-580012-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-580012-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-580012-10032
Package	Package	5 kg	4 mm	1000 mm	097-580012-10040

TR ML 5356 AlMg5Cr

Standards	DIN EN ISO 18273 - S AL 5356 (AlMg5Cr)
	AWS A-5.10 - ER 5356
Material number	3.3556
Welding positions	PA / PB / PC / PE / PF
Polarity	AC
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥240 MPa
Expansion, A5	17 %
Approvals	CE / DNV-GL / ABS / DB / TÜV / Bureau Veritas
Base materials	AlMg5 | AlMg3 | AlZnMg1 | AlZnMgCu0,5 | AlMgSi0,7 | AlMg1SiCu | G-AlMg10 | G-AlMg3Si | G-AlMg5Si

- TIG welding rod, aluminium
- Shaved several times
- High strength and significantly improved seawater resistance
- Mainly for welding Al-Mg alloys with max. 5% Mg
- Suitable for anodising
- Not resistant to stress corrosion cracking at >65°C

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<0.25	<0.4	<0.1	<0.05 - 0.2	<4.5 - 5.5

Cr	Zn	Ti	Al	Others
<0.05 - 0.2	<0.1	0.06 - 0.2	Remainder	<0.015

- **Fields of application:**
  - Shipbuilding, offshore, automotive industry, rail transport

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-580011-10016
Package	Package	5 kg	2 mm	1000 mm	097-580011-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-580011-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-580011-10032
Package	Package	5 kg	4 mm	1000 mm	097-580011-10040

TR ML 5754 AlMg3

Standards	DIN EN ISO 18273 - S Al 5754 (AlMg3)
	AWS A-5.10 - ER 5754
Material number	3.3536
Welding positions	PA / PB / PC / PF
Polarity	AC
Shielding gas	I1
	I2
	I3
Tensile strength, Rm	≥190 MPa
Expansion, A5	20 %
Approvals	auf Anfrage
Base materials	AlMgMn | AlMg1 | AlMg2,7Mn | AlMg3 | AlMg3,5 | AlMgSi0,5 | AlMgSi0,8 | G-AlMg3Si

- TIG welding rod, aluminium
- High corrosion resistance (against seawater) and strength
- Mainly for welding Al-Mg alloys with max. 3% Mg
- Suitable for anodising

- **Fields of application:**
  - Shipbuilding, plant engineering, construction

Chemical analysis (in %)

Si	Fe	Cu	Mn	Mg
<0.4	<0.4	<0.1	<0.5	2.6 - 3.6
Cr	**Ti**	**Zn**	**Al**	**Others**
<0.3	<0.15	<0.2	Remainder	<0.15

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	1.6 mm	1000 mm	097-580013-10016
Package	Package	5 kg	2 mm	1000 mm	097-580013-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-580013-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-580013-10032
Package	Package	5 kg	4 mm	1000 mm	097-580013-10040

TR CuSi3

Standards	DIN EN ISO 24373 - CuSi3Mn (Cu 6560)
	AWS A-5.7 - ER CuSi-A
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
Tensile strength, Rm	350 MPa
Expansion, A5	40 %
Impact energy, Av	20 °C: 60 J
Hardness	80 HB
Base materials	CuZn5 | CuZn10 | CuZn15 | CuSi2Mn | CuSi3Mn

- TIG welding rod made of Cu-Si alloy
- Stamped
- Good resistance to wear and abrasion
- Excellent flow characteristics
- Suitable for joint welding, brazing and surfacing
- Ideal for MIG brazing of galvanised, thin sheets

- **Fields of application:**
  - Galvanised body panels, heating construction, ventilation construction
  - Applications on unalloyed and low-alloy steels and cast iron

Chemical analysis (in %)

Si	Mn	Cu	Others
2.8 - 2.95	0.75 - 0.95	Remainder	max. 0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	2 mm	1000 mm	097-003540-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003540-10024

TR CuSn1

Standards	DIN EN ISO 24373 - CuSn1 (Cu 1898)
	AWS A-5.7 - ER Cu
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Shielding gas	I1
Tensile strength, Rm	220 MPa
Expansion, A5	30 %
Impact energy, Av	20 °C: 75 J
Hardness	60 HB
Base materials	OF-Cu | SE-Cu | SW-Cu | SF-Cu | CuZn0,5

- TIG welding rod made of copper-tin alloy
- Stamped
- The weld metal is corrosion-resistant and wear-resistant
- Non-porous weld seams
- Very good welding properties
- Suitable for highly stressed welded joints on oxygen-free copper / Cu materials
- For joint welding and surfacing on pure copper and copper alloys

- **Fields of application:**
  - Vehicle/vehicle body construction, air conditioning and ventilation system construction and container construction

Chemical analysis (in %)

Sn	Mn	Si	P	Cu	Others
0.75 - 0.9	0.15 - 0.3	0.15 - 0.25	0.005 - 0.02	Remainder	max. 0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	2.4 mm	1000 mm	097-003609-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-003609-10032

TR CuSn6

Standards	DIN EN ISO 24373 - S Cu 5180A (CuSn6P)
	AWS A-5.7 - ER CuSn-A
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	DC-
Tensile strength, Rm	260 MPa
Expansion, A5	20 %
Impact energy, Av	20 °C: 32 J
Hardness	80 HB
Base materials	OF-Cu | SE-Cu | SW-Cu | SF-Cu | CuZn0,5

- TIG welding rod made of copper-tin alloy
- Stamped
- The weld metal is corrosion-resistant and wear-resistant
- Very good strength
- Very good welding properties
- For joint welding and surfacing on pure copper and CuSn alloys
- Suitable for welding copper materials
- Typical area of application: Furnace brazing

Chemical analysis (in %)

Sn	P	Cu	Others
6 - 6.6	0.2 - 0.25	Remainder	max. 0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	2 mm	1000 mm	097-003613-10020
Package	Package	5 kg	2.4 mm	1000 mm	097-003613-10024
Package	Package	5 kg	3.2 mm	1000 mm	097-003613-10032
Package	Package	5 kg	4 mm	1000 mm	097-003613-10040

TR CuAl8

Standards	DIN EN ISO 24373 - CuAl7 (Cu 6100)
	AWS A-5.7 - ER CuAl-A1
Welding positions	PA / PB / PC / PE / PF
Polarity	DC-
Shielding gas	I1
Tensile strength, Rm	≥430 MPa
Expansion, A5	≥40 %
Impact energy, Av	20 °C: ≥ 100 J
Hardness	100 HB
Base materials	CuAl5 | CuAl8 | CuAl9 | CuZn20Al

- TIG welding rod made of Cu-Al alloy
- Stamped
- The weld metal is corrosion-resistant, seawater-resistant and wear-resistant
- Suitable for joint welding, brazing and surfacing
- Excellent for GMAW brazing of galvanised and aluminised thin sheets
- Surfacing on unalloyed and low-alloy steels and cast iron
- Joint welding of Cu materials and various steel sheets

- **Fields of application:**
  - Vehicle/vehicle body construction, air conditioning and ventilation system construction and container construction

Chemical analysis (in %)

Al	Mn	Ni	Cu	Others
7.5 - 8	0.1 - 0.3	0.1 - 0.5	Remainder	max. 0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	10 kg	1.6 mm	1000 mm	097-003682-10016
Package	Package	10 kg	2 mm	1000 mm	097-003682-10020
Package	Package	10 kg	2.4 mm	1000 mm	097-003682-10024
Package	Package	10 kg	3.2 mm	1000 mm	097-003682-10032
Package	Package	10 kg	4 mm	1000 mm	097-003682-10040

EWM description	Material number	DIN EN ISO	AWS	Approvals	Page
unalloyed					
GFR R60	1.6215		R60	CE / TÜV / DB	111

GFR R60

	AWS A-5.2 - R60
Material number	1.6215
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	DC-
Yield strength	≥310 MPa
Tensile strength, Rm	≥400 MPa
Expansion, A5	≥22 %
Impact energy, Av	20 °C: ≥ 47 J
Approvals	CE / TÜV / DB
Base materials	Steels with a yield strength of up to 275 MPa
	S185-E295 | S235JR-S275JR
	ASTM: A36 | A106 grades A/B/C | A139 grade A | A210 grades A1/C | A216 grades WCA/WCB/WCC | A234 grade WPB

- Oxyacetylene welding rod
- Copper-plated and stamped
- Semi-fluid weld pool, good controllability
- Recommended for seal welds

Chemical analysis (in %)

C	Si	Mn	Ni
0.08	0.1	1.1	0.4

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Package	Package	5 kg	2 mm	1000 mm	097-003488-10020
Package	Package	5 kg	2.5 mm	1000 mm	097-003488-10025
Package	Package	5 kg	3 mm	1000 mm	097-003488-10030
Package	Package	5 kg	4 mm	1000 mm	097-003488-10040

EWM description	Material number	DIN EN ISO	AWS	Approvals	Page
unalloyed					
SE 6013 RC blue		Phoenix blue	E 6013	CE / TÜV / DB	113
SE 6013 RC		OVERCORD	E 6013	CE / TÜV / DB / DNV-GL	114
SE 6013 RR		E42 0 RR 12	E 6013	CE / TÜV / DB	115
SE 6013 RRB		E42 0 RB 12	E 6013	CE / TÜV / DB / LR / DNV-GL	116
SE 7016 BR		E 42 3 B 12 H10	E 7016	CE / TÜV / DB	117
SE 7018 BH5		E 46 4 Z B 42 H5	E 7018-1	CE / TÜV / DB / LR / DNV-GL	118
Low-alloy					
SE 7018 Mo		E Mo B 42	E 7018-A1	CE / TÜV	119
SE 8018 CrMo1		E CrMo1 B 42	E 8018-B2	CE / TÜV / DB	120
High-alloy					
SE 307	1.4370	E 18 8 Mn R 12	E 307-16		121
SE 308 L	1.4316	E 19 9 LR 12	E 308 L-16	CE / TÜV / DB	122
SE 309 L	1.4332	E 23 12 LR 32	E 309 L-16		123
SE 309 MoL	1.4459	E 23 12 2 LR 32	E 309 Mo-16	CE / TÜV / DB	124
SE 310	1.4842	E 25 20 R 12	E 310-16		125
SE 312	1.4337	E 29 9 R 12	E 312-16	CE / DB	126
SE 316-L		E 19 12 3 LR	ASME SFA5.4 E316L-16	CE / TÜV / DB	127
SE 318	1.4576	E 19 12 3 Nb R 32	E 318-16	CE / TÜV / DB	128
SE 347	1.4551	E 19 9 Nb R 12	E 347-16		129
Hardfacing					
SE Hard 300 P					130
SE Hard 60	1.4718				131
Nickel-based					
SE Ni		E C Ni-Cl 1	E Ni-Cl		132
SE NiFe		E C NiFe 1 1	E NiFeCl		133

SE 6013 RC blue

Standards	DIN EN ISO 2560-A - Phoenix blue
	AWS A-5.1 - E 6013
Coating type	Rutile cellulose
Welding positions	PA / PB / PC / PE / PF / PG
Polarity	AC | DC-
Yield strength	≥430 MPa
Tensile strength, Rm	520 MPa - 600 MPa
Expansion, A5	>24 %
Impact energy, Av	-10 °C: > 70 J
Approvals	CE / TÜV / DB
Base materials	S235 - S355 | P195 - P355 | L210 - L360 | GE 200, GE240, GP240, GE21Mn5 | BSt 420, BSt 500
	Shipbuilding steels A, B, D, A32/36, D32/36

- Rutile/cellulose coated stick electrode
- Suitable for primed and rusted or galvanised sheet metal
- Very good ignition and reignition characteristics
- Can be welded in any position, including vertically down
- Perfect for roots
- Easy slag removal, medium spatter tendency
- High mechanical quality

Chemical analysis (in %)

C	Si	Mn
0.07	0.3	0.6

- **Fields of application:**
  - Assembly, workshop and repair welding

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 packages/covering package	Package	1.6 kg	2 mm	250 mm	097-005507-20250
3 packages/covering package	Package	4.8 kg	2.5 mm	350 mm	097-005507-25350
3 packages/covering package	Package	4.8 kg	3.25 mm	350 mm	097-005507-32350
3 packages/covering package	Package	4.8 kg	4 mm	350 mm	097-005507-40350
3 packages/covering package	Package	6 kg	5 mm	450 mm	097-005507-50450

SE 6013 RC

Standards	DIN EN ISO 2560-A - OVERCORD
	AWS A-5.1 - E 6013
Coating type	Rutile cellulose
Welding positions	PA / PB / PC / PE / PF / PG
Polarity	AC | DC-
Yield strength	>380 MPa
Tensile strength, Rm	510 MPa - 560 MPa
Expansion, A5	>22 %
Impact energy, Av	0 °C: > 60 J
Approvals	CE / TÜV / DB / DNV-GL
Base materials	S235 - S355 | P195 - P275 | L210 - L245 | GE200, GE240 | BSt 420
	Shipbuilding steels A, B, D, A32/36, D32/36

- Rutile/cellulose coated stick electrode
- Suitable for primed and rusted or galvanised sheet metal
- Very good ignition and reignition characteristics
- Can be welded in any position, including vertically down
- Good slag removal characteristics, medium spatter tendency
- Perfect for roots
- High mechanical quality

- **Fields of application:**
  - Machine, steel, ship and pipeline construction

Chemical analysis (in %)

C	Si	Mn
0.08	0.3	0.6

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 packages/covering package	Package	1.6 kg	2 mm	250 mm	097-005502-20250
3 packages/covering package	Package	4.8 kg	2.5 mm	350 mm	097-005502-25350
3 packages/covering package	Package	5 kg	3.25 mm	350 mm	097-005502-32350
3 packages/covering package	Package	5 kg	4 mm	350 mm	097-005502-40350
3 packages/covering package	Package	6.5 kg	5 mm	450 mm	097-005502-50450

SE 6013 RR

Standards	DIN EN ISO 2560-A - E42 0 RR 12
	AWS A-5.1 - E 6013
Coating type	Phoenix green
Welding positions	PA / PB / PC / PE / PF
Polarity	AC | DC-
Yield strength	>450 MPa
Tensile strength, Rm	510 MPa - 610 MPa
Expansion, A5	>22 %
Impact energy, Av	0 °C: > 60 J
Approvals	CE / TÜV / DB
Base materials	S235 - S355, S275 - S355 | P195, P355 | L210, L360 | GE200, GE240, GP240, G21Mn5 | BSt 420, BSt 500
	Shipbuilding steels A32/36, D32/36, A40, D40

- Thick rutile-coated stick electrode
- Self-removing slag, very low spatter tendency
- Excellent ignition and reignition characteristics
- Very good welding properties, easy handling
- Can be welded in any position except vertical down
- Excellent mechanical quality values

- **Fields of application:**
  - Vehicle, container, boiler, pipeline, ship, steel and mechanical engineering

Chemical analysis (in %)

C	Si	Mn
0.08	0.4	0.6

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 packages/covering package	Package	1.7 kg	2 mm	250 mm	097-005500-20250
3 packages/covering package	Package	4.6 kg	2.5 mm	350 mm	097-005500-25350
3 packages/covering package	Package	4.6 kg	3.25 mm	350 mm	097-005500-32350
3 packages/covering package	Package	6 kg	4 mm	450 mm	097-005500-40450
3 packages/covering package	Package	6 kg	5 mm	450 mm	097-005500-50450

SE 6013 RRB

Standards	DIN EN ISO 2560-A - E42 0 RB 12
	AWS A-5.1 - E 6013
Coating type	Rutile/basic
Welding positions	PA / PB / PC / PE / PF
Polarity	AC | DC- | DC+
Yield strength	≥440 MPa
Tensile strength, Rm	510 MPa - 560 MPa
Expansion, A5	>22 %
Impact energy, Av	0 °C: > 60 J
Approvals	CE / TÜV / DB / LR / DNV-GL
Base materials	S235 - S355 | S275 - S355 | P195 - P355 | L210 - L360 | GE200, GE240, GP240, G21Mn5 | BSt 420, BSt 500
	Shipbuilding steels A, B, D, A32/36, D32/36

- Thick rutile/basic coated stick electrode
- Very good ignition and reignition characteristics
- Fine-flaked and smooth seam appearance
- Good slag removal characteristics, medium spatter tendency
- Good controllability in positional welding
- Can be welded in any position except vertical down
- Excellent gap bridging
- Excellent mechanical quality values

- **Fields of application:**
  - Pipeline, boiler, container and ship construction

Chemical analysis (in %)

C	Si	Mn
0.1	0.25	0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 packages/covering package	Package	4.6 kg	2.5 mm	350 mm	097-005501-25350
3 packages/covering package	Package	4.6 kg	3.25 mm	350 mm	097-005501-32350
3 packages/covering package	Package	4.6 kg	4 mm	350 mm	097-005501-40450

SE 7016 BR

Standards	DIN EN ISO 2560-A - E 42 3 B 12 H10
	AWS A-5.1 - E 7016
Coating type	Basic/rutile
Welding positions	PA / PB / PC / PE / PF
Polarity	AC | DC+
Yield strength	≥430 MPa
Tensile strength, Rm	>490 MPa
Expansion, A5	≥25 %
Impact energy, Av	-30 °C: ≥ 60 J
Approvals	CE / TÜV / DB
Base materials	S235 - S355 | S275 - S355 | P195 - P355 | L210 - L360 | GE200, GE240, GP 240, G20Mo5, G21Mn5 | BSt 420, BSt 500
	Shipbuilding steels A32/36, D32/36, E32/36, A50, D40

- Basic rutile-coated stick electrode
- Very good weldability on alternating current
- Excellent for positional welding
- Can be welded in any position except vertical down
- Stable arc, low spatter formation

- **Fields of application:**
  - Universal electrode for assembly and repair welding of unalloyed and low-alloy steels

Chemical analysis (in %)

C	Si	Mn
0.08	0.5	1.1

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 packages/covering package	Package	4.3 kg	2.5 mm	350 mm	097-005504-25350
3 packages/covering package	Package	4.3 kg	3.25 mm	350 mm	097-005504-32350
3 packages/covering package	Package	5.6 kg	4 mm	450 mm	097-005504-40450

SE 7018 BH5

Standards	DIN EN ISO 2560-A - E 46 4 Z B 42 H5
	AWS A-5.1 - E 7018-1
Coating type	Basic
Welding positions	PA / PB / PC / PE / PF
Polarity	AC | DC-
Yield strength	>490 MPa
Tensile strength, Rm	570 MPa - 620 MPa
Expansion, A5	>24 %
Impact energy, Av	-40 °C: > 100 J
Approvals	CE / TÜV / DB / LR / DNV-GL
Base materials	S275 - S355 | S275 - S460 | P195 - P460 | L210 - L450 | GE200, GE240, GP240, G21Mn5 | BSt 420, BSt 500
	Schiffbaustähle A32/36, D32/36, E32/36, F32/36, A/D/E/F40

- Basic-coated moisture-resistant stick electrode
- Very good ignition characteristics
- Excellent for positional welding
- Can be welded in any position except vertical down
- Low H2 content and good crack resistance
- Suitable for low-temperature tough, fine-grained structural steels down to -60°C

- **Fields of application:**
  - Steel construction, pipeline construction, shipbuilding, offshore

Chemical analysis (in %)

C	Si	Mn	Ni
0.07	0.45	1.35	0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 packages/covering package	Package	4.6 kg	2.5 mm	350 mm	097-005503-25350
3 packages/covering package	Package	-	3.25 mm	350 mm	097-005503-32350
3 packages/covering package	Package	-	4 mm	450 mm	097-005503-40450
3 packages/covering package	Package	-	5 mm	450 mm	097-005503-50450

SE 7018 Mo

Standards	DIN EN ISO 3580-A - E Mo B 42
	AWS A-5.5 - E 7018-A1
Coating type	Basic
Welding positions	PA / PB / PC / PE / PF
Polarity	DC+
Yield strength	≥450 MPa
Tensile strength, Rm	540 MPa - 590 MPa
Expansion, A5	>24 %
Impact energy, Av	-10 °C: > 80 J
Approvals	CE / TÜV
Base materials	S275 - S355 | S275 - S460 | P195 - P460, 16Mo3 | L210 - L450 | GP 240, G20Mo5

- Basic-coated, moisture-resistant stick electrode
- Particularly suitable for welding 16Mo3
- Very good welding properties, easy handling
- Can be welded in any position except vertical down
- Low H2 weld metal (hydrogen content below 5%)
- Operating temperature up to 520°C
- Excellent mechanical quality values

Chemical analysis (in %)

C	Si	Mn	Mo
0.08	0.4	1	0.5

- **Fields of application:**
  - Pipeline and boiler construction

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 packages/covering package	Package	4.3 kg	2.5 mm	350 mm	097-005506-25350
3 packages/covering package	Package	4.8 kg	3.25 mm	350 mm	097-005506-32350
3 packages/covering package	Package	4.7 kg	4 mm	350 mm	097-005506-40350

SE 8018 CrMo1

Standards	DIN EN ISO 3580-A - E CrMo1 B 42
	AWS A-5.5 - E 8018-B2
Coating type	Basic
Welding positions	PA / PB / PC / PE / PF
Polarity	DC+
Yield strength	>400 MPa
Tensile strength, Rm	510 MPa - 650 MPa
Expansion, A5	>20 %
Impact energy, Av	20 °C: > 80 J
Approvals	CE / TÜV / DB
Base materials	1.7218 | 1.7218 | 1.7254 | 1.7258 | 1.7262 | 1.7335 | 1.7337 | 1.7350 | 1.7354
	25 CrMo 4 | G 25 CrMo 4 | 20 CrMo 4 | 24 CrMo5 | 15 CrMo 5 | 13 CrMo 4-5 | 16 CrMo 4-4 | 22 CrMo 4-4 | G22 CrMo5-4

- Basic-coated, moisture-resistant stick electrode
- Very good welding properties, easy handling
- Can be welded in any position except vertical down
- Low H2 weld metal (hydrogen content below 5%)
- Welding of creep-resistant and pressurised hydrogen-resistant steels
- Joint welding and surfacing of similar alloyed steels
- For operating temperatures up to max. 550°C

- **Fields of application:**
  - Pipeline, boiler, steam plant and container construction

Chemical analysis (in %)

C	Si	Mn	Cr	Mo
0.08	0.4	1	1	0.5

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 packages/covering package	Package	4.3 kg	2.5 mm	350 mm	097-005505-25350
3 packages/covering package	Package	4.8 kg	3.25 mm	350 mm	097-005505-32350
3 packages/covering package	Package	4.8 kg	4 mm	350 mm	097-005505-40350

SE 307

Standards	DIN EN ISO 3581-A - E 18 8 Mn R 12
	AWS A-5.4 - E 307-16
Material number	1.4370
Coating type	Rutile/basic
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	AC | DC+
Tensile strength, Rm	>600 MPa
Expansion, A5	>40 %
Impact energy, Av	20 °C: ≥ 70 J
Base materials	Dissimilar steels (dissimilar joints), high-carbon and difficult-to-weld steel, manganese high carbon steel e.g. X 120 Mn 12 (1.3401)
	Buffer layers for hardfacing

- Rutile basic coated, high-alloy stick electrode
- Self-removing slag, very low spatter tendency
- Excellent ignition and reignition characteristics
- Resistant to seawater and diluted acids
- Suitable for dissimilar joints and buffer layers
- For welding high-carbon and difficult-to-weld steels, as well as austenitic manganese steels
- Strain-hardening
- For operating temperatures up to approx. +300°C

- **Fields of application:**
  - Industrial furnaces, boiler construction, heat exchangers

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Fe
max. 0.2	max. 1.2	4.5 - 7.5	17 - 20	7 - 10	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	4 kg	2.5 mm	300 mm	097-005069-25300
3 quivers/covering box	Quiver	5 kg	3.25 mm	350 mm	097-005069-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005069-40350
3 quivers/covering box	Quiver	5 kg	5 mm	350 mm	097-005069-50350

SE 308 L

Standards	DIN EN ISO 3581-A - E 19 9 LR 12
	AWS A-5.4 - E 308 L-16
Material number	1.4316
Coating type	Rutile/basic
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	AC | DC+
Tensile strength, Rm	550 MPa
Expansion, A5	35 %
Impact energy, Av	20 °C: 70 J
Approvals	CE / TÜV / DB
Base materials	1.4300 | 1.4301 | 1.4303 | 1.4306 | 1.4308 | 1.4311 | 1.4312 | 1.4371 | 1.4541 | 1.4543 | 1.4550 | 1.4552

- Rutile basic coated, high-alloy stick electrode
- Self-removing slag, very low spatter tendency
- Good ignition characteristics
- Good resistance to intergranular corrosion
- Can be welded in any position except vertical down
- Welding of non-stabilised Cr-Ni steels with a particularly low carbon content
- For operating temperatures up to approx. +350°C

- **Fields of application:**
  - Chemical and food industry, as well as pipeline and boiler construction

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Fe
max. 0.04	max. 1.2	max. 2	18 - 21	9 - 11	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	4 kg	2 mm	300 mm	097-005062-20300
3 quivers/covering box	Quiver	4 kg	2.5 mm	300 mm	097-005062-25300
3 quivers/covering box	Quiver	5 kg	2.5 mm	350 mm	097-005062-25350
3 quivers/covering box	Quiver	5 kg	3.2 mm	350 mm	097-005062-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005062-40350
3 quivers/covering box	Quiver	6 kg	5 mm	450 mm	097-005062-50450

SE 309 L

Standards	DIN EN ISO 3581-A - E 23 12 LR 32
	AWS A-5.4 - E 309 L-16
Material number	1.4332
Coating type	Rutile/basic
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	AC | DC+
Tensile strength, Rm	550 MPa
Expansion, A5	30 %
Impact energy, Av	20 °C: 55 J
Base materials	1.4541 | 1.4550 | 1.4710 | 1.4712 | 1.4727 | 1.4729 | 1.4740 | 1.4742 | 1.4780 | 1.4825 | 1.4826 | 1.4828 | 1.4878

- Rutile basic coated, high-alloy stick electrode
- Self-removing slag, very low spatter tendency
- Good ignition characteristics
- Can be welded in any position except vertical down
- Good resistance to oxidation and intergranular corrosion
- Joint welds on heat-resistant, similar or lower alloyed Cr-Ni steels
- For dissimilar joints and buffer layers
- Surfacing on unalloyed steels if an 18/8 Cr-Ni alloy is to be achieved in the first layer
- Heat-resistant up to 1050°C

- **Fields of application:**
  - Chemical and food industry, as well as pipeline and boiler construction

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Fe
max. 0.04	max. 1.2	max. 2.5	22 - 25	11 - 14	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	4 kg	2 mm	300 mm	097-005063-20300
3 quivers/covering box	Quiver	4 kg	2.5 mm	300 mm	097-005063-25300
3 quivers/covering box	Quiver	5 kg	3.2 mm	350 mm	097-005063-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005063-40350

SE 309 MoL

Standards	DIN EN ISO 3581-A - E 23 12 2 LR 32
	AWS A-5.4 - E 309 Mo-16
Material number	1.4459
Coating type	Rutile/basic
Welding positions	PA / PB / PC / PD / PE / PF
Tensile strength, Rm	650 MPa
Expansion, A5	30 %
Impact energy, Av	20 °C: 55 J
Approvals	CE / TÜV / DB
Base materials	1.4401 | 1.4404 | 1.4406 | 1.4410 | 1.4437 | 1.4571 | 1.4580

- Rutile basic coated, high-alloy stick electrode
- Self-removing slag, very low spatter tendency
- Good ignition characteristics
- Very good corrosion and scale resistance
- For dissimilar joints and buffer layers
- Surfacing on unalloyed steels if an 18/8/2 Cr-Ni-Mo alloy is to be achieved in the first layer
- Welding of unalloyed, low-alloy and difficult-to-weld steels with high-alloy steels
- Heat-resistant up to 1050°C
- For operating temperatures up to approx. +300°C

- **Fields of application:**
  - Chemical and food industry, as well as pipeline and boiler construction

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Mo	Fe
max. 0.04	max. 1.2	max. 2.5	22 - 25	11 - 14	2 - 3	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	4 kg	2 mm	300 mm	097-005064-20300
3 quivers/covering box	Quiver	4 kg	2.5 mm	300 mm	097-005064-25300
3 quivers/covering box	Quiver	5 kg	3.25 mm	350 mm	097-005064-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005064-40350
3 quivers/covering box	Quiver	6 kg	5 mm	450 mm	097-005064-50450

SE 310

Standards	DIN EN ISO 3581-A - E 25 20 R 12
	AWS A-5.4 - E 310-16
Material number	1.4842
Coating type	Rutile/basic
Welding positions	PA / PB / PC / PD / PE / PF
Tensile strength, Rm	570 MPa
Expansion, A5	20 %
Impact energy, Av	20 °C: 40 J
Base materials	1.4832 | 1.4840 | 1.4841 | 1.4845 | 1.4846 | 1.4849 | 1.4713 | 1.4726 | 1.4710 | 1.4745 | 1.4823

- Rutile-basic coated, high-alloy stick electrode, heat-resistant
- Self-removing slag, very low spatter tendency
- Excellent ignition and reignition characteristics
- Weld metal made of fully austenitic chrome nickel steel
- For welding heat-resistant Cr and CrNi steels
- Heat and scale resistant up to 1000°C
- Not sufficiently resistant in sulphurous atmospheres

- **Fields of application:**
  - Industrial furnaces, boiler construction, heat exchangers

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Fe
0.06 - 0.2	max. 1.2	1 - 5	23 - 27	18 - 22	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	4 kg	2.5 mm	300 mm	097-005065-25300
3 quivers/covering box	Quiver	5 kg	3.25 mm	350 mm	097-005065-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005065-40350
3 quivers/covering box	Quiver	5 kg	5 mm	350 mm	097-005065-50350

SE 312

Standards	DIN EN ISO 3581-A - E 29 9 R 12
	AWS A-5.4 - E 312-16
Material number	1.4337
Coating type	Rutile/basic
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	AC | DC+
Tensile strength, Rm	750 MPa
Expansion, A5	20 %
Impact energy, Av	20 °C: 40 J
Approvals	CE / DB
Base materials	Corrosion-resistant analogue steel and cast steel (e.g. 1.4762, 1.4085)
	Difficult-to-weld steel, manganese high carbon steel, spring steel, tool steel

- Rutile-basic coated, high-alloy stick electrode, creep-resistant
- Excellent ignition and reignition characteristics
- The weld metal has a ferritic-austenitic structure
- Fine-flaked and smooth seam appearance
- Good slag removal characteristics, low spatter tendency
- Can be welded in any position except vertical down
- Suitable for dissimilar joints, surfacing and buffer layers
- Can also be used for welding galvanised sheet metal
- Scale-resistant up to 1,000 °C
- High hot crack resistance

- **Fields of application:**
  - Construction, spring, tool and heat-treated steels. High manganese steels, galvanised sheet metal

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Fe
max. 0.15	max. 1.2	max. 2.5	27 - 31	8 - 12	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	4 kg	2 mm	300 mm	097-005070-20300
3 quivers/covering box	Quiver	4 kg	2.5 mm	300 mm	097-005070-25300
3 quivers/covering box	Quiver	5 kg	3.25 mm	350 mm	097-005070-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005070-40350

SE 316-L

Standards	DIN EN ISO 3581-A - E 19 12 3 LR
	AWS A-5.4 - ASME SFA5.4 E316L-16
Coating type	Phoenix green
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	AC | DC- | DC+
Tensile strength, Rm	557 MPa
Expansion, A5	45.2 %
Approvals	CE / TÜV / DB
Base materials	1. 4401 | 1.4404 | 1.4406 | 1.4408 | 1.4420 | 1.4435 | 1.4436 | 1.4571 | 1.4573 | 1.4580 | 1.4581 | 1.4583

- Rutile-coated, high-alloy stick electrode, creep-resistant
- Self-removing slag, very low spatter tendency
- Good resistance to intergranular corrosion
- Scale and moisture resistant
- Can be welded in any position except vertical down
- Welding of stabilised and non-stabilised austenites
- For CrNi and CrNiMo steels, as well as for dissimilar joints

- **Fields of application:**
  - Textile, paper and chemical finishing industry

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Mo
0.02	0.75	0.95	18.5	12.7	2.7

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
4 packages/covering package	Package	2.5 kg	2 mm	300 mm	097-005426-20300
4 packages/covering package	Package	2.5 kg	2.6 mm	300 mm	097-005426-26300
4 packages/covering package	Package	2.5 kg	3.2 mm	350 mm	097-005426-32350
4 packages/covering package	Package	2.5 kg	4 mm	350 mm	097-005426-40350
4 packages/covering package	Package	2.5 kg	5 mm	350 mm	097-005426-50350

SE 318

Standards	DIN EN ISO 3581-A - E 19 12 3 Nb R 32
	AWS A-5.4 - E 318-16
Material number	1.4576
Coating type	Rutile/basic
Welding positions	PA / PB / PC / PD / PE / PF / PG
Polarity	AC | DC+
Tensile strength, Rm	600 J
Expansion, A5	30 %
Impact energy, Av	20 °C: 70 J
Approvals	CE / TÜV / DB
Base materials	1.4401 | 1.4404 | 1.4408 | 1.4420 | 1.4435 | 1.4436 | 1.4571 | 1.4573 | 1.4580 | 1.4581 | 1.4583

- Rutile-basic coated, high-alloy stick electrode, creep-resistant
- Self-removing slag, very low spatter tendency
- Excellent ignition and reignition characteristics
- Fine-flaked and smooth seam appearance
- Good resistance to intergranular and pitting corrosion
- Scale resistant up to 1100 °C
- Maximum operating temperature 400 °C
- Primarily for welding stabilised CrNiMo and CrNi steels
- Low-temperature tough up to 120°C

- **Fields of application:**
  - Chemical apparatus and container construction

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Mo	Nb	Fe
max. 0.08	max. 1.2	max. 2	17 - 20	10 - 13	2.5 - 3	max. 0.64	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	4 kg	2 mm	300 mm	097-005066-20300
3 quivers/covering box	Quiver	4 kg	2.5 mm	300 mm	097-005066-25300
3 quivers/covering box	Quiver	5 kg	3.25 mm	350 mm	097-005066-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005066-40350
3 quivers/covering box	Quiver	6 kg	5 mm	450 mm	097-005066-50450

SE 347

Standards	DIN EN ISO 3581-A - E 19 9 Nb R 12
	AWS A-5.4 - E 347-16
Material number	1.4551
Coating type	Rutile/basic
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	AC | DC+
Tensile strength, Rm	600 MPa
Expansion, A5	30 %
Impact energy, Av	20 °C: 65 J
Base materials	1.4301 | 1.4303 | 1.4306 | 1.4308 | 1.4310 | 1.4312 | 1.4319 | 1.4541 | 1.4550 | 1.4552

- Rutile-basic coated, high-alloy stick electrode, creep-resistant
- Excellent ignition and reignition characteristics
- Fine-flaked and smooth seam appearance
- Good resistance to intergranular corrosion
- Good slag removal characteristics, low spatter tendency
- Primarily for welding stabilised CrNi steels
- Can be welded in any position except vertical down
- Maximum operating temperature 400 °C

- **Fields of application:**
  - Chemical apparatus, container and pipeline construction

Chemical analysis (in %)

C	Si	Mn	Cr	Ni	Nb	Fe
max. 0.08	max. 1.2	max. 2	18 - 21	9 - 11	max. 0.64	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	4 kg	2 mm	300 mm	097-005067-20300
3 quivers/covering box	Quiver	4 kg	2.5 mm	300 mm	097-005067-25300
3 quivers/covering box	Quiver	5 kg	3.25 mm	350 mm	097-005067-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005067-40350
3 quivers/covering box	Quiver	6 kg	5 mm	450 mm	097-005067-50450

SE Hard 300 P

Standards	DIN EN 14700 - E Fe 1-300-p
	DIN 8555 - E1-UM-300 P
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	AC | DC+
Hardness	300 HB

- Basic coated stick electrode
- 120% metal recovery
- Welding of wear-resistant applications
- Crack-free and impact-resistant applications
- The weld metal consists of Cr-Mn steel

- **Fields of application:**
  - Applications on rollers, bearing surfaces, cable winches, running wheels

Chemical analysis (in %)

C	Si	Mn	Cr	Fe
0.1 - 0.15	max. 1.3	1.5	2.5 - 3	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	5 kg	2.5 mm	350 mm	097-004806-25350
3 quivers/covering box	Quiver	5 kg	3.2 mm	350 mm	097-004806-32350
3 quivers/covering box	Quiver	6 kg	4 mm	450 mm	097-004806-40450
3 quivers/covering box	Quiver	6 kg	5 mm	450 mm	097-004806-50450

SE Hard 60

Standards	DIN EN 14700 - E Fe 8-55-gpt
	DIN 8555 - E 6-UM-60
Material number	1.4718
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	AC | DC+
Hardness	54 - 60 HRC

- Basic coated stick electrode
- For very hard surfacing
- Very high wear resistance
- High resistance to frictional wear and impact loads
- The weld metal consists of Cr-Mn-V steel

- **Fields of application:**
  - Applications on rollers, bearing surfaces, cable winches, running wheels, excavator parts, clamping jaws

Chemical analysis (in %)

C	Si	Mn	Cr	Mo	V	Fe
0.5 - 0.8	max. 0.6	0.8	7 - 10	0.5 - 0.7	1 - 1.2	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	5 kg	2.5 mm	350 mm	097-005071-25350
3 quivers/covering box	Quiver	5 kg	3.2 mm	350 mm	097-005071-32350
3 quivers/covering box	Quiver	6 kg	4 mm	450 mm	097-005071-40450
3 quivers/covering box	Quiver	6 kg	5 mm	450 mm	097-005071-50450
3 quivers/covering box	Quiver	6 kg	6 mm	450 mm	097-005071-60450

SE Ni

Standards	DIN EN ISO 1071 - E C Ni-CI 1
	AWS - E Ni-CI
Coating type	Basic-graphitic
Welding positions	PA / PB / PC / PD / PE / PF
Hardness	160 HB
Base materials	EN 1561: EN-GJL-100 (GG 10) - EN-GJL-350 (GG 35)
	EN 1562: EN-GJMB-350 (GTS 35) - EN-GJMB-550 (GTS 55) | EN-GJMW-350 (GTW 35) - EN-GJMW-550 (GTW 55)

- Basic graphite-coated stick electrode
- Good slag removal characteristics, low spatter tendency
- Soft, low spatter arc
- Cold welding of grey and malleable cast iron
- Graphitic separation of the carbon in the weld metal

- **Fields of application:**
  - Repair and servicing of cast parts, e.g. engine blocks, pump housings, gearboxes, foundry defects

Chemical analysis (in %)

C	Si	Mn	Cu	Fe	Ni
max. 2	max. 4	max. 2.5	max. 2.5	max. 8	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	5 kg	2.5 mm	350 mm	097-005068-25350
3 quivers/covering box	Quiver	5 kg	3.25 mm	350 mm	097-005068-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005068-40350

SE NiFe

Standards	DIN EN ISO 1071 - E C NiFe 1 1
	AWS A-5.15 - E NiFeCI
Coating type	Basic-graphitic
Welding positions	PA / PB / PC / PD / PE / PF
Polarity	AC | DC+
Hardness	200 HB
Base materials	EN 1561: EN-GJL-100 (GG 10) - EN-GJL-350 (GG 35)
	EN 1562: EN-GJMB-350 (GTS 35) - EN-GJMB-550 (GTS 55) | EN-GJMW-350 (GTW 35) - EN-GJMW-550 (GTW 55)
	EN1563: EN-GJS-400 (GGG 40) - EN-GJS-700 (GGG 70)

- Basic graphite-coated stick electrode
- Good slag removal characteristics, low spatter tendency
- Soft, low spatter arc
- Cold welding of grey cast iron, malleable cast iron and spheroidal cast iron
- Graphitic separation of the carbon in the weld metal

- **Fields of application:**
  - Repair and servicing of cast parts, e.g. engine blocks, pump housings, gearboxes, foundry defects

Chemical analysis (in %)

C	Si	Mn	Ni	Cu	Fe
max. 2	max. 4	max. 2.5	50 - 60	max. 4	Remainder

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
3 quivers/covering box	Quiver	5 kg	2.5 mm	300 mm	097-005074-25300
3 quivers/covering box	Quiver	5 kg	3.25 mm	350 mm	097-005074-32350
3 quivers/covering box	Quiver	5 kg	4 mm	350 mm	097-005074-40350

SMA S2

Standards	DIN EN ISO 14171-A - S2
	AWS A-5.17 - EM12
Material number	1.0494
Welding positions	PA / PB / PC
Polarity	DC-/+
Approvals	TÜV / DB
Base materials	Shipbuilding, pressure vessel construction and steel construction, S185–E360 | S235JR–S355JR | S235J0–S355J0 | S235J2–S355J2 | S275N–S355N | S275M–S355M | P235GH–P355GH | P275N—P355N | P355M | P355Q
	Pipeline steels L210–360, shipbuilding steels A–E, AH36, DH36
	ASTM: A36 | A106 grades A/B/C | A139 | A210 grades A1/C | A216 grades WCA/WCB/WCC | A234 grades WPB | A266 grades 1/2/4 | A283 grades A/B/C/D | A285 grades A/B/C | A299 grades A/B | A515 grades 60 | A516 grades 55 | A656 grades 50
	API: 5L grades X42-X56

- Submerged arc welding wire for welding unalloyed and low-alloy construction steels
- Copper-plated, layer wound
- Also suitable for welding fine-grained construction steels
- Optimised for oxygen applications

- **Fields of application:**
  - Offshore industry

Chemical analysis (in %)

C	Si	Mn
0.09	0.12	1.05

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	K 415	25 kg	2 mm	-	097-003700-02520
Basket spool	K 415	25 kg	2.5 mm	-	097-003700-02525
Basket spool	K 415	25 kg	3 mm	-	097-003700-02530
Basket spool	K 415	25 kg	4 mm	-	097-003700-02540

SMA S3Si

Standards	DIN EN ISO 14171-A - S3Si
	AWS A-5.17 - EH12K
Material number	1.0479
Welding positions	PA / PB / PC
Polarity	DC-/+
Base materials	Welding of unalloyed and low-alloy steels with a yield strength of up to ~460 MPa (65ksi)
	S355J0 | S355J2 | S355N-S460N | S355NL-S460NL | S355M-S460M | S355ML-S460ML | S460Q | S460QL | P355GH | P355N-P460N | P355NL2-P460NL2 | P355M-P460M |
	ASTM: A36 | A106 grades A/B/C | A139 | A210 grades A1/C | A216 grades WCA/WCB/WCC | A234 grade WPB | A266 grades 1/2/4 | A283 grades A/B/C/D | A285 grades A/B/C | A299 grades A/B | A515 grades 60/65/70 | A516grades 55-70 | A656 grade
	API: 5L grades X42-X56

- Submerged arc welding wire for welding unalloyed and low-alloy construction steels
- Copper-plated, layer wound
- Very good mechanical properties

- **Fields of application:**
  - Shipbuilding, pressure vessel and steel construction

Chemical analysis (in %)

C	Si	Mn
0.11	0.3	1.72

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Basket spool	K 415	25 kg	2 mm	-	097-004839-02520
Basket spool	K 415	25 kg	2.5 mm	-	097-004839-02525
Basket spool	K 415	25 kg	3 mm	-	097-004839-02530
Basket spool	K 415	25 kg	4 mm	-	097-004839-02540

BF 10

Standards	DIN EN ISO 14174 - S A FB 1 55 AC H5
Welding positions	PA / PB / PC
Polarity	AC | DC- | DC+
Grain size	2 - 20
Base materials	Thick-walled workpieces up to 420 MPa yield strength
	Off-shore structures up to 460 MPa yield strength on steels such as ASTM A 516 Grade 70 or BS 4360 Grade 50 D and S355 J2G3 in accordance with DIN EN 10025
	Low-temperature tough steels with notched impact strength at -60°C or lower
	High tensile fine-grain construction steels such as S690QL1 and N-A-XTRA 70
	Boiler construction steels such as 16Mo3/A204 Grade A, 13CrMo4-5/A387 Grade 12 or 10 CrMo9-10/A387 Grade 22

- Highly basic, agglomerated welding flux
- Low oxygen values in the weld metal
- Good mechanical properties and high toughness at low temperatures
- Suitable for welding on direct and/or alternating current
- Suitable for single and multi-wire welding

- **Fields of application:**
  - Offshore structures, pipeline construction, container and boiler construction

Chemical analysis (in %)

SiO2 + TiO2	Al2O3 + MnO	CaO + MgO	CaF2
15	20	40	25

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Sack	-	25 kg	-	-	097-004840-00000

FW AB 1 67

Standards	DIN EN ISO 14174 - S A AB 1 67 AC H5
Welding positions	PA / PB / PC
Polarity	AC | DC- | DC+
Approvals	TÜV
Grain size	3 - 20
Base materials	Construction steels up to 420 N/mm² yield strength, fine-grained steels up to 460 N/mm² upper yield strength
	Pressure vessel steels up to P 355 N/mm²
	Creep-resistant steels such as 16Mo3, tube steels up to L480 or X 70, high tensile shipbuilding steels up to EH36

- Neutral, medium-basic agglomerated welding flux
- Suitable for fillet and joint welding of low-alloy steels, fine-grained and boiler steels
- Constant metallurgical behaviour
- Good weld forming ability and self-detaching slag
- Constant grades and low-temperature ductility in connection with Mo, Ni or NiMo alloy wires
- Very low hydrogen contents (H2diff. <4 ml/100 g) in the weld metal
- Good weld forming ability and self-detaching slag
- Constant grades and low-temperature ductility in connection with Mo, Ni or NiMo alloy wires
- Very low hydrogen content (H2diff. <5 ml/100g) in the weld metal

- **Fields of application:**
  - Pipeline, ship and boiler construction

Chemical analysis (in %)

SiO2 + TiO2	Al2O3 + MnO	CaO + MgO	CaF2
20	30	30	15

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Sack	-	25 kg	-	-	097-003711-00025

FW CS 1 63 DC

Standards	DIN EN ISO 14174 (stainless steels) - S F CS 2 5742 DC
	DIN EN ISO 14174 (unalloyed/low-alloy steels) - S F CS 1 63 DC

Welding positions	PA / PB / PC
Polarity	AC | DC- | DC+
Grain size	1 - 16
Base materials	Creep-resistant CrMo steels such as 12 CrMo 19 5/A378 gr. 5 or X 20 CrMoWV 12 1/A351 for boiler, container and pipe construction
	Martensitic (soft martensite) and ferritic Cr(NiMo) steels in acc. w. DIN EN 10088 and austenitic CrNi(Mo) steels in acc. w. DIN EN 10088
	Low-temperature tough and heat-resisting high-alloy CrNi(Mo) steels, dissimilar joints and nickel-base alloys

- Molten neutral welding flux
- Suitable for high-alloy stainless steels, Ni-based alloys and low-alloy steels
- Especially crack-resistant in connection with similar or over-alloyed wire electrodes (solid or flux cored wire)
- For welding low-alloy, creep-resistant steels and high-alloy Cr, CrNi and CrNiMo steels
- Also suitable for joint welding of nickel alloys
- Can be used for surfacing and dissimilar joints
- Self-dissolving slag
- Good seam deformation capacity
- Particularly crack-resistant in conjunction with similar or over-alloyed wire electrodes (solid or flux-cored wire types)

- **Fields of application:**
  - Pipeline, container and boiler construction

Chemical analysis (in %)

SiO2	Al2O3 + MnO	CaO + MgO	CaF2
30	5	35	20

Sales packing drum	Packing drum	Weight	Ø	Length	Item no.
Sack	-	15 kg	-	-	097-004848-00015

Notizen / Notes