Please note that this catalog does **NOT** contain all our products!

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WELDING CONSUMABLES

for the professionals

www.elga.se

CROMAROD
ELGALOY
ELGACORE
CROMACORE

CROMAMIG
ALUMIG
ELGATIG
CROMATIG

MEGAFIL
PROPAC
ALUTIG
ELGAMATIC

WELCOME TO THE ELGA WORLD OF WELDING

Our mission is to provide global and local industries with maximum uptime and excellent weld quality no matter how exacting or demanding the circumstances. We seek new methods, take on any challenge and leave no stone unturned until we find the perfect solution. That's why welding professionals around the world trust us to tackle any application, wherever welding takes them.

Our goal is to keep on working hard to earn that trust, today and tomorrow, as a major supplier and part of global ITW Welding.

www.elga.se

ELGACORE EDGE

METAL-CORED WIRE THAT SAVES YOU TIME AND MONEY

Elgacore Edge metal-cored wire is designed for high-quality welding of carbon steels. Its patented silicon control technology minimizes silicon island deposits, thereby reducing the need for post-weld cleaning. Thanks to its excellent wetting capabilities, less material preparation is needed before welding.

Elgacore Edge provides high deposition rates, allowing for productivity increases of up to 30%. The wetting characteristics help welders create smooth, flat beads with uniform fusion, and the smooth, stable arc is easy to control. This makes the use of anti-spatter spray redundant, saving you time and money. To lower the risk of cracking and associated rework, the wire produces low hydrogen weld deposits.

All-in-all, Elgacore Edge increases welding productivity and quality, saving further time and money. Its unique characteristics and low hydrogen content provide weld beads without slag and minimize the need for post-weld clean-up. It is a forgiving wire that helps welders produce high-quality welds even after short training.

ELGA PROPAC

THE ROBOT'S BEST FRIEND

When shifting to ProPac in your robotised or mechanised welding, downtime for spool changes can be reduced by up to 90% (250 kg ProPac compared to 15 kg standard spool) – time you can use to increase arc time factor and improve productivity.

ProPac also extends the wire feed unit's service life. The force needed to pull out the wire from ProPac is considerably lower than required to rotate a standard spool, which means less strain on the wire feed unit and drive motor.

Significantly fewer spool changes also raises quality thanks to fewer rejects associated with welding process interruptions. The physical properties of the coiled wire in ProPac mean that it always exits the welding torch straight, providing excellent, reliable seam tracking. Unlike wire on spools, the wire in ProPac is always fully protected from moisture, dirt, dust, etc., which can cause welding problems.

And last but not least, ProPac is fully recyclable and can be folded for easy disposal and recycling.

ELGA MEGAFIL

SOLID WELDS YOU CAN TRUST

Elga Megafil is a series of seamless rutile and metal-cored wires that are closed by full penetration welding and totally insensitive to moisture absorption, even under extreme climatic conditions with tropical temperatures and very high relative humidity.

The filling remains dry throughout the entire process of storage and use in welded fabrication, preventing hydrogen induced cracking caused by moisture in the consumable. Elga Megafil cored wires require no special storage conditions. Re-drying prior to use is never necessary.

Elga Megafil is excellent for manual as well as automatic and mechanized welding in all positions. The product range comprises a large selection of wires for effective processing of non-alloy and high-strength, fine-grain structural steels in applications such as offshore, pipelines, shipbuilding, heavy equipment and general fabrication.

MILLER
WELDING EQUIPMENT

Miller® is about building things that matter. The company leads the welding industry in building advanced, solution-focused welding equipment and meeting crucial needs for welding safety and health.

It is also about the partnership and the work. Its products are designed together with users for manufacturing, fabrication, construction, aviation, motorsports, education, agriculture and marine applications. Miller® began with an innovation that responded to customer needs, growing from a one-man operation in 1929 to the world's largest manufacturer of arc welding products. It maintains its industry leadership by setting the standard for reliability, quality and responsiveness and keeps the tradition alive by focusing on its top priority – people.

HOBART SWX 150

VERSATILE FLUX FOR HIGH-QUALITY SUB-ARC WELDING

Hobart SWX 150 provides welds with Arctic strength for the most demanding onshore and offshore applications. It is a flux that lets you sleep at night, especially when it comes to welds at the lowest temperatures.

Hobart SWX 150 is a high basicity, fluoride- basic agglomerated flux for high-strength, creep-resistant applications including CTOD requirements. Its neutral character promotes homogeneous weld chemistry and consistent mechanical properties throughout thick multi-layer welds.

It produces low oxygen weld metal resulting in excellent impact toughness down to -60°C and below. It has very good slag detachability even in narrow gaps, along with a smooth bead finish and tie-in.

No wonder Hobart SWX 150 is the number one choice for welding at the extremes – for applications where nothing can be left to chance and the consequences are severe if something goes wrong. It keeps you in the comfort zone when it comes to weld quality as well as cost efficiency.

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September 2017

Rutile coated electrodes for welding mild and medium tensile steels

P 45S

Classification:

EN ISO 2560-A	E 42 0 RC 11
AWS A5.1	E 6013

Description:
P 45S is a multi-purpose rutile-cellulosic coated electrode suitable for a wide application range in mild steel. The electrode is fully positional, including vertical down and welds with a crisp, steady arc to produce a smooth bead surface with good slag detachability. It is relatively insensitive to rust, dirt and surface coatings. Together with its ability to bridge gaps, the general versatility of P 45S makes it ideal for both shop and site fabrication.

Coating type:
Rutile-cellulosic

Metal recovery:
90%

Welding positions:

Welding current:
DC+/-, AC OCV ≥ 50 V
For root passes: DC-

Redrying temperature:
90 °C, 2h

Chemical composition, wt.%

C	Si	Mn
0,07	0,4	0,5

Mechanical properties

	Typical
Yield strength, Re:	470 MPa
Tensile Strength, Rm:	550 MPa
Elongation, A5	24%
Impact energy, CV:	0 °C • 50 J

Approvals:
CE
BV
LR
MRS
ABS
DNV
GL

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,0	300	40-80	24	0,7	139	0,4
2,5	350	70-100	25	0,7	78	0,8
3,2	350	90-145	25	0,7	48	1,2
4,0	350	120-195	25	0,7	33	1,7
5,0	450	180-270	26	0,75	21	2,3

Maxeta 11

Classification:

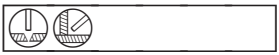
EN ISO 2560-A	E 42 0 RR 73
AWS A5.1	E 7024

Description:
Maxeta 11 is a rutile-coated iron powder electrode with 190% recovery designed for high productivity welding in heavier section mild steel. The electrode is particularly suitable for high speed fillet welding in the downhand and horizontal-vertical positions as well as downhand butt welds. Excellent mitre profile fillets are produced having a smooth transition with the base material. The electrode runs with a smooth stable arc leaving a finely rippled bead surface with self-detaching slag and minimum spatter. It operates equally well on primer-treated material. Maxeta 11 is specially designed to give very low fume emission.

Coating type:
Rutile

Metal recovery:
190%

Welding positions:



Welding current:
AC OCV> 50V, DC+/-

Redrying temperature:
90 °C, 2h

Chemical composition, wt.%

C	Si	Mn
0,08	0,6	0,9

Mechanical properties

	Typical
Yield strength, Re:	500 MPa
Tensile Strength, Rm:	580 MPa
Elongation, A5	24%
Impact energy, CV:	0 °C • 50 J

Approvals:
CE
DNV
GL
LR
MRS
RINA
BV
ABS

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
3,2	450	130-170	28	0,72	20	2,5
4,0	450	150-260	31	0,73	13	3,3
5,0	450	200-390	35	0,72	8	6,7
5,0	700	200-290	33	0,72	5	5,4
6,0	450	300-450	35	0,72	6	7,7
6,0	700	300-380	35	0,73	4	7,2

Basic coated electrodes for welding mild and medium tensile steels

P 47

Classification:

EN ISO 2560-A	E 46 4 B 12 H5
AWS A5.1	E 7016-1

Description:
P 47 is a basic-coated, 105% recovery electrode intended for general welding applications in those cases where a "7016" type is preferred. P 47 has very good positional operability and excellent resistance to porosity in plate coated with primer or contaminated by mill scale and rust. Suitable for shipbuilding, storage tanks and general construction purposes.

Coating type:
Basic;

Metal recovery:
105%

Welding positions:

Welding current:
DC+/-, AC OCV ≥ 60 V
For root passes: DC-

Redrying temperature:
375-400 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S
0,06	0,5	1,1	0,015	0,005

Mechanical properties

	Typical
Yield strength, Re:	490 MPa
Tensile Strength, Rm:	570 MPa
Elongation, A5	26%
Impact energy, CV:	-46 °C • 70 J

Hydrogen content / 100 g weld metal
≤ 5 ml;

Approvals:
CE
BV
DNV
GL
LR
ABS
MRS
NAKS

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	350	60-90	24	0,64	80	0,9
3,2	350	80-160	26	0,66	44	1,2
4,0	450	110-200	24	0,67	22	1,7

P 47D

Classification:

EN ISO 2560-A	E 42 2 B 12 H10
AWS A5.1	E 7016

Description:
P 47D is a basic double coated low hydrogen AC/DC electrode for welding mild and medium tensile steels in all positions except vertical down. It has an exceptionally stable arc making it particularly suitable for root passes. The electrode can be used on small welding transformers with a low OCV and operates with minimal spatter to deposit smooth weld beads featuring easy slag detachability and excellent mitre fillet profile. P 47D is very easy to strike and combines good metallurgical quality with extreme ease of use, making it ideal for general repair and maintenance applications.

Coating type:
Basic

Metal recovery:
98%

Welding positions:

Welding current:
DC+, AC OCV ≥ 55 V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S
0,07	0,7	0,9	0,015	0,015

Mechanical properties

	Typical
Yield strength, Re:	465 MPa
Tensile Strength, Rm:	550 MPa
Elongation, A5	26%
Impact energy, CV:	-20 °C • 60 J

Hydrogen content / 100 g weld metal
≤ 10 ml

Approvals:
DB
TÜV
DNV

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	350	60-90	25	0,65	77	0,8
3,2	450	80-140	25	0,67	36	1,3
3,2	350	80-140	25	0,67	45	1,3
4,0	450	130-200	25	0,69	22	1,7

P 48M

Classification:

EN ISO 2560-A	E 42 5 B 42 H5
AWS A5.1	E 7018-1 H4R*

Description:

P 48M is a basic coated low hydrogen DC+ electrode designed for welding mild and higher strength steels. It is particularly suitable for heavily restrained sections and also steels with higher impurity levels. The electrode operates with a very smooth and stable arc and shows no tendency to "freeze", even on low current.
Root passes can be welded with DC-.
P 48M has very good fracture toughness at temperatures down to -50 °C.

Coating type:
Basic

Metal recovery:
120%

Welding positions:

Welding current:
DC+/(-)

Redrying temperature:
375-400 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S
0,05	0,5	1,4	0,015	0,010

Mechanical properties

	Typical
Yield strength, Re:	480 MPa
Tensile Strength, Rm:	560 MPa
Elongation, A5	28%
Impact energy, CV:	-40 °C • 80 J
	-46 °C • 70 J
	-50 °C • 60 J

Hydrogen content / 100 g weld metal
≤ 4 ml

Approvals:
CE
DNV
LR
GL
RINA
MRS

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,0	300	40-80	23	0,64	112	0,7
2,5	350	70-110	23	0,69	62	0,9
3,2	450	80-145	24	0,71	30	1,3
4,0	450	120-210	25	0,73	20	1,8
5,0	450	200-285	25	0,75	13	2,7

*AWS Suffix R only guaranteed for hermetically sealed or newly redried consumables

P 48S

Classification:

EN ISO 2560-A	E 42 4 B 42 H5
AWS A5.1	E 7018-1H4

Description:
P 48S is a basic-coated, low hydrogen, general purpose electrode for use on DC+ only, for which the outstanding all-round operability has been optimised. The smooth, soft arc, easy slag control, all-positional welding, low spatter and excellent slag release provide maximum welder-appeal. P 48S combines the good running characteristics required for general fabrication work with the exacting operability needs for pipe welding, where the fine spray transfer provides precise weld pool control and ensures an exceptionally regular and smooth root bead.

Coating type:
Basic

Metal recovery:
120%

Welding positions:

Welding current:
DC+/(-)

Redrying temperature:
375-400 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S
0,05	0,60	1,40	0,015	0,01

Mechanical properties

	Typical
Yield strength, Re:	530 MPa
Tensile Strength, Rm:	600 MPa
Elongation, A5	26%
Impact energy, CV:	-40 °C • 60 J
	-46 °C • 40 J

Hydrogen content / 100 g weld metal
≤ 4 ml

Approvals:
CE
TÜV
BV
GL
ABS
DB
DNV
MRS
LR

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
1,6	300	30-60	23	0,65	170	0,5
2,0	300	40-80	23	0,64	115	0,7
2,5	350	80-110	23	0,71	60	1,0
3,2	450	110-155	24	0,72	28	1,6
3,2	350	110-165	24	0,72	36	1,6
4,0	450	140-205	25	0,74	19	2,1
5,0	450	200-285	25	0,75	13	2,9

P 48P

Classification:

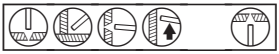
EN ISO 2560-A	E 46 2 B 12 H5
AWS A5.1	E 7018-H8

Description:
P 48P is a basic-coated, low hydrogen, carbon manganese electrode specially designed for pipewelding. The all-positional AC/DC electrode is exceptionally easy to use. P 48P has an extremely stable arc which enables it to be manipulated in the most difficult welding positions without any risk of arc extinction due to freezing. Root beads are even and slightly convex, providing a smooth blend-in with the base material. Operating characteristics are not sensitive to variations in the root gap or edge misalignment. Fill and capping passes fuse flush with the joint edges, minimising the risk of edge defects when using either the stringer bead or weaving technique. The flat-to slightly convex bead profile results in the need for only a bare minimum of grinding and therefore considerable reduction in the associated problems of dust and noise pollution. P 48P combines the special operability needs of the pipe welder with the general requirement for improved productivity.

Coating type:
Basic

Metal recovery:
105%

Welding positions:



Welding current:
DC+/-, AC OCV> 70 V

Redrying temperature:
375-400 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S
0,06	0,60	1,20	0,015	0,010

Mechanical properties

	Typical
Yield strength, Re:	530 MPa
Tensile Strength, Rm:	620 MPa
Elongation, A5	25 %
Impact energy, CV:	-20 °C • 80 J -30 °C • 70 J

Hydrogen content / 100 g weld metal
≤ 5 ml

Approvals:
CE
ABS
LR
GL
TÜV
DNV
BV

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,0	300	45-65	20	0,61	155	0,6
2,5	350	60-85	22	0,62	80	0,6
3,2	450	70-130	23	0,75	30	1,1
3,2	350	70-130	23	0,75	42	1
4,0	450	120-190	24	0,73	23	1,7

P 51

Classification:

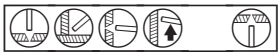
EN ISO 2560-A	E 46 4 B 32 H5
AWS A5.1	E 7018-1H8

Description:
P 51 is a basic-coated low hydrogen AC/DC electrode designed for welding mild and higher strength steels. It combines strength and toughness and is particularly suitable for heavily restrained sections where there can be risk of cracking due to weld stresses. With its excellent general operability and good positional welding characteristics P 51 is often used for pipe welding. It operates without difficulties on both primer-treated and rusty material. The electrode produces a finely rippled bead surface and smooth transition with the base material. This together with the exceptionally good slag detachability, even in root runs, gives P 51 superior radiographic quality.

Coating type:
Basic

Metal recovery:
120%

Welding positions:



Welding current:
DC(+)/-, AC OCV ≥ 70 V
For root passes: DC -

Redrying temperature:
375-400 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S
0,05	0,5	1,35	0,01	0,01

Mechanical properties

	Typical
Yield strength, Re:	560 MPa
Tensile Strength, Rm:	600 MPa
Elongation, A5	25%
Impact energy, CV:	-46 °C • 30 J
	-40 °C • 60 J

Hydrogen content / 100 g weld metal
≤ 5 ml

Approvals:
CE
TÜV
GL
DB
LR
BV
DNV
ABS

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	350	70-110	23	0,68	60	1,0
3,2	450	110-150	24	0,68	30	1,3
3,2	350	110-150	24	0,68	38	1,3
4,0	450	140-200	24	0,72	19	1,8
5,0	450	200-270	24	0,72	13	2,6

P 52T

Classification:

EN ISO 2560-A	E 42 4 B 35 H5
AWS A5.1	E7048-H4

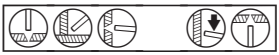
Description:
P 52T is a basic-coated low hydrogen electrode especially designed for tack welding mild and higher strength steels up to 500 MPa. It produces a flat-to-concave weld deposit exhibiting high ductility which minimises the risk of cracking in highly restrained joints. The electrode is easy to use in the vertical -down position, combined with excellent restriking and slag removal characteristics. P 52T has special slag properties that make it highly suitable for tack welding joints prior to using FCAW.

Applications:
Tack welding structural steels used in general fabrication, ship building, bridge construction and heavy plant.

Coating type:
Basic

Metal recovery:
125 %

Welding positions:



Welding current:
DC+, AC OCV> 50 V

Redrying temperature:
375-400 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S
0,06	0,40	0,95	0,015	0,010

Mechanical properties

	Typical
Yield strength, Re:	440 MPa
Tensile Strength, Rm:	540 MPa
Elongation, A5	30 %
Impact energy, CV:	-20 °C • 100 J
	-40 °C • 70 J

Hydrogen content / 100 g weld metal
≤ 5 ml

Approvals:
CE
BV
LR
GL
DNV

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	350	60-110	21	0,76	60	
3,2	350	110-160	25,5	0,76	36	

Maxeta 21

Classification:

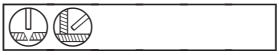
EN ISO 2560-A	E 42 4 B 73 H5
AWS A5.1	E 7028

Description:
Maxeta 21 is a zircon-basic low hydrogen iron powder electrode with 170% recovery, intended for welding heavier sections in construction and ship steels. It is designed for fast and easy welding in the horizontal position and operates well on both AC and DC. Maxeta 21 can be used on primer-treated material without porosity or other problems and gives good mechanical properties.

Coating type:
Zircon-basic

Metal recovery:
170%

Welding positions:



Welding current:
DC+/-, AC OCV> 70 V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S
0,06	0,4	1,25	0,01	0,01

Mechanical properties

	Typical
Yield strength, Re:	460 MPa
Tensile Strength, Rm:	560 MPa
Elongation, A5	24%
Impact energy, CV:	-20 °C • 150 J
	-40 °C • 70 J

Hydrogen content / 100 g weld metal
≤ 5 ml

Approvals:
CE
LR
DNV
GL

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
4,0	450	170-240	30	0,72	14	3,0
5,0	450	225-355	33	0,71	9	4,6

Basic coated low alloy electrodes for welding high tensile, low temperature and creep resisting steels

P 62MR

Classification:

EN ISO 2560-A	~E 46 5 1Ni B 32 H5
AWS A5.5	E7018-G / (E 8018-G)**

Description:
P 62MR is a basic-coated low hydrogen electrode producing a nominal 0.9% Ni weld metal, designed to give excellent fracture toughness at temperatures down to -60 °C. It is an AC/DC electrode with optimised welder-appeal, especially in the vertical up position, producing a finely rippled bead surface and good slag detachability.
Electrode sizes 3,2x350 mm also available with a thin coating, "tc", ideally suited for root pass welding and joints with restricted access. P 62MR conforms to NACE requirements for oil and gas production equipment in sour service and has excellent CTOD values, making it highly suitable for offshore applications.

Coating type:
Basic

Metal recovery:
110-120%

Welding positions:

Welding current:
DC+/-, AC OCV ≥ 70 V, For root passes: DC -

Redrying temperature:
375-400 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S	Ni
0,06	0,3	1,3	0,01	0,005	0,9

Mechanical properties

	Typical
Yield strength, Re:	530 MPa
Tensile Strength, Rm:	610 MPa
Elongation, A5	25%
Impact energy, CV:	-60 °C • 60 J

Hydrogen content / 100 g weld metal
≤ 5 ml

Approvals:
CE
BV
LR
MRS
ABS
DNV

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	350	60-110	22	0,73	71	0,8
3,2 tc	350	80-155	23	0,72	42	1,3
3,2	350	80-150	24	0,71	37	1,4
3,2	450	80-150	24	0,71	28	1,4
4,0	450	140-200	24	0,72	19	1,9
5,0	450	200-270	24	0,72	13	2,6

EN: slight deviation in Mn
** Meets also 8018-G in diameter up to 4,0 mm

P 65MR

Classification:

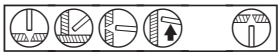
EN ISO 18275	E 50 6 Mn 1 Ni B 32 H5
EN ISO 2560-A	E 50 6 Mn 1 Ni B 32 H5
AWS A5.5	8018-G

Description:
P 65MR is a basic-coated low hydrogen electrode producing a nominal 0.9% Ni weld metal with molybdenum addition, designed for welding steels with a minimum yield strength of 450 MPa e.g. BS 7191-450 EM, BS 4360-55E/F and similar materials, used in offshore fabrication etc.
P 65MR gives a minimum yield strength of 560 MPa, minimum tensile strength of 610 MPa and has excellent fracture toughness down to -60 °C. It is an AC/DC, all-positional electrode producing a finely rippled bead surface and good slag detachability. Electrode sizes 3,2x350 mm also available with a thin coating, "tc", ideally suited for root pass welding and joints with restricted access.

Coating type:
Basic

Metal recovery:
110-120%

Welding positions:



Welding current:
DC+/-, AC OCV ≥ 70 V, For root passes: DC -

Redrying temperature:
375-400 °C, 2h

Chemical composition, wt.%

C	Si	Mn	P	S	Ni	Mo
0,06	0,4	1,6	0,01	0,005	0,8	0,15

Mechanical properties

	Typical
Yield strength, Re:	610 MPa
Tensile Strength, Rm:	650 MPa
Elongation, A5	22%
Impact energy, CV:	-60 °C • 60 J

Hydrogen content / 100 g weld metal
≤ 5 ml

Approvals:
CE
DNV
LR

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	350	60-110	22	0,71	71	0,8
3,2 tc	350	80-155	23	0,74	42	1,3
3,2	450	80-150	24	0,68	31	1,5
4,0	450	140-200	24	0,72	20	1,9

P 110MR

Classification:

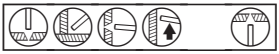
EN ISO 18275	~E 69 6 Mn2NiCrMo B 32 H5
AWS A5.5	E 11018-G

Description:
P 110MR is a basic-coated low hydrogen electrode specially designed for welding high-strength low-alloy quenched and tempered steels with a yield strength of 700 MPa. The weld metal combines very high strength properties with good fracture toughness at temperatures down to -60°C.
P 110MR is an all-positional electrode with strong welder-appeal and produces mechanical properties highly suitable for applications such as mobile jack-up rigs and submarine construction.

Coating type:
Basic

Metal recovery:
120%

Welding positions:



Welding current:
DC+/(-), AC OCV ≥ 70 V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Mo	Cu
0,05	0,40	1,70	0,35	2,2	0,25	0,60

Mechanical properties

	Typical
Yield strength, Rp0.2%:	740 MPa
Tensile Strength, Rm:	790 MPa
Elongation, A5	24%
Impact energy, CV:	-40°C • 80 J -60°C • 70 J

Hydrogen content / 100 g weld metal
≤ 5 ml

Approvals:
CE
LR
ABS

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	350	70-110	22	0,7	66	0,9
3,2	450	100-150	24	0,7	29	1,4
4,0	450	135-200	24	0,72	19	1,9

Electrodes for MMA welding of stainless steels and Ni-base alloys

Cromarod 308L

Classification:

EN ISO 3581-A	E 19 9 L R 12
AWS A5.4	E 308L-17

Description:
Cromarod 308L is a rutile flux coated AC/DC electrode designed for the welding of low carbon 18%Cr / 10%Ni, type 304L, austenitic stainless steels. Operability is excellent with a low spatter arc producing a smooth weld bead surface and self-releasing slag. The electrode is all-positional up to and including 3.2 mm diameter. Cromarod 308L is also suitable for welding stainless steel grade 304 material, as well as Nb or Ti stabilised grades 347 and 321, when resistance to corrosion is primarily required. For structural applications at temperatures above 400 °C, Cromarod 308H is recommended because of its superior strength at elevated temperatures.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni
0,02	0,8	0,7	20,0	10,0

Mechanical properties

	Typical
Yield strength, Rp0.2%:	450 MPa
Tensile Strength, Rm:	580 MPa
Elongation, A5	39%
Impact energy, CV:	-20 °C • 60 J -120 °C • 45 J

Ferrite content:
FN 7 (WRC-92)

Corrosion resistance
Good resistance to general and intergranular corrosion. Also good resistance to oxidising acids and cold reducing acids.

Scaling temperature:
Approx. 850 °C in air.

Approvals:
CE
DB
TÜV
DNV
ABS
GL
CWB

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,0	300	35-60	28	0,62	143	0,7
2,5	300	40-80	28	0,62	91	1,0
3,2	350	80-120	29	0,64	45	1,5
4,0	350	100-160	30	0,64	31	2,0

Cromarod 308LP

Classification:

EN ISO 3581-A	E 19 9 L R 11
AWS A5.4	E 308L-17

Description:
Cromarod 308LP is a fully-positional rutile coated electrode specially designed for applications requiring optimum positional operability. It is intended for stainless steel grades 304L and 304, but can also be used for the stabilised grades 347 and 321. With its exceptionally good arc stability, weld pool control and striking/re-striking characteristics it is highly suitable for the most demanding vertical and overhead pipewelding applications. The relatively thin coating and fast-freezing slag make Cromarod 308LP particularly advantageous to use when welding thinner walled material. For structural applications at temperatures above 400 °C, Cromarod 308H is recommended because of its superior strength properties at elevated temperatures.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni
0,02	0,7	0,6	19,7	9,5

Mechanical properties

	Typical
Yield strength, Rp0.2%:	450 MPa
Tensile Strength, Rm:	580 MPa
Elongation, A5	40%
Impact energy, CV:	0 °C • 60 J
	-60 °C • 50 J

Ferrite content:
FN 5 (WRC-92)

Approvals:
CE

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,0	300	20-45	21	0,67	148	0,7
2,5	300	35-85	21	0,68	91	0,9
3,2	350	40-100	23	0,73	44	1,4

Cromarod 308H

Classification:

EN ISO 3581-A	E 19 9 H R 12
AWS A5.4	E308H-17

Description:
Cromarod 308H is a all-positional rutile flux coated electrode which deposits a 20%Cr / 10%Ni austenitic stainless steel weld metal with controlled carbon content (0.04% - 0.08%). It is designed to weld similar composition steels, used for creep strength and oxidation resistance at temperatures up to 800°C. Exceptionally good arc stability, weld pool control and re-striking characteristics make it particular suitable for pipewelding.
Cromarod 308H is also recommended for welding the controlled carbon stabilised grades 321H and 347H, used for structural applications at temperatures above 400 °C.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni
0,05	0,7	0,8	19,5	10,0

Mechanical properties

	Typical
Yield strength, Rp0.2%:	435 MPa
Tensile Strength, Rm:	585 MPa
Elongation, A5	39%
Impact energy, CV:	20 °C • 75 J

Ferrite content:
FN 4 (WRC-92)

Approvals:
CE

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	300	35-85	21	0,68	95	0,9
3,2	350	40-100	23	0,73	46	1,4
4,0	350	100-160	24	0,65	30	1,6

Cromarod 347

Classification:

EN ISO 3581-A	E 19 9 Nb R 12
AWS A5.4	E 347-17

Description:
Cromarod 347 is a niobium stabilised, rutile flux coated electrode used for welding the Nb or Ti stabilised 18% Cr/ 10% Ni austenitic stainless steel grades 347 and 321. It is also suitable for the unstabilised grades 304 and 304L. Cromarod 347 is primarily intended for use where resistance to intergranular corrosion is required. For welding the controlled carbon material grades 321H and 347H, used for structural applications at temperatures above 400 °C, Cromarod 308H is recommended because of its superior creep strength. The electrode has good positional characteristics and produces low spatter levels and good slag detachability.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Nb
0,03	0,9	0,7	20,0	10,0	0,4

Mechanical properties

	Typical
Yield strength, Rp0.2%:	480 MPa
Tensile Strength, Rm:	620 MPa
Elongation, A5	35%
Impact energy, CV:	-60 °C • 40 J

Ferrite content:
FN 8 (WRC-92)

Corrosion resistance
Good resistance to general and intergranular corrosion particularly at elevated temperatures.

Scaling temperature:
Approx. 850 °C in air.

Approvals:
CE

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	300	50-80	21	0,62	90	1,0
3,2	350	80-110	22	0,64	46	1,3
4,0	350	130-170	22	0,63	31	1,9

Cromarod 316L

Classification:

EN ISO 3581-A	E 19 12 3 L R 12
AWS A5.4	E 316L-17

Description:
Cromarod 316L is a rutile flux coated AC/DC electrode intended for welding the low carbon, molybdenum alloyed, acid resisting austenitic stainless steels of similar composition (316L). Operability is excellent with a smooth low spatter arc producing an exceptionally good weld bead appearance. Fillet welds have a smooth surface, slightly concave profile with excellent toe line blend-in and a self-releasing slag. The electrode is all positional up to and including 3.25 mm diameter. Cromarod 316L is suitable for welding normal carbon 316 type grades and also Nb or Ti stabilised steels, provided service temperatures are below 400 °C. For 316 material grades used at elevated temperatures, Cromarod 318 is recommended.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Mo
0,02	0,8	0,7	18,5	12,0	2,7

Mechanical properties

	Typical
Yield strength, Rp0.2%:	490 MPa
Tensile Strength, Rm:	600 MPa
Elongation, A5	32%
Impact energy, CV:	-20 °C • 55 J
	-120 °C • 45 J

Ferrite content:
FN 6 (WRC-92)

Corrosion resistance
Good resistance to general and intergranular corrosion in the more severe environments e.g. dilute hot acids. Good resistance to chloride pitting corrosion.

Scaling temperature:
Approx. 850 °C in air.

Approvals:
CE
ABS
DB
GL
LR
BV
DNV
TÜV

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
1,6	300	25-45	29	0,53	233	0,5
2,0	300	35-60	29	0,63	137	0,7
2,5	300	40-80	29	0,64	85	1,1
3,2	350	80-120	29	0,64	44	1,5
4,0	350	100-160	30	0,65	30	2,1
5,0	450	170-230	30	0,65	14	2,8

Cromarod 316LP

Classification:

EN ISO 3581-A	E 19 12 3 L R 11
AWS A5.4	E 316L-17

Description:
Cromarod 316LP is a positional rutile flux coated electrode designed specially for welding thin walled (down to 1.5 mm) pipelines found in the chemical process and papermaking industries, where it offers considerably higher productivity than manual TIG. With its exceptionally good arc stability, weld pool control and restriking characteristics it is highly suitable for the most demanding vertical and overhead welding applications in fixed pipework and is ideal for cramped and difficult site conditions. Cromarod 316LP is also recommended for root runs and butt welds in general fabrication of molybdenum alloyed stainless steels in all material thicknesses.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Mo
0,02	0,7	0,8	18,3	12,2	2,7

Mechanical properties

	Typical
Yield strength, Rp0.2%:	480 MPa
Tensile Strength, Rm:	580 MPa
Elongation, A5	32%
Impact energy, CV:	20 °C • 60 J
	-120 °C • 35 J

Ferrite content:
FN 4 (WRC-92)

Corrosion resistance
Good resistance to general and intergranular corrosion in the more severe environments e.g. dilute hot acids. Good resistance to chloride pitting corrosion.

Scaling temperature:
Approx. 850 °C in air.

Approvals:
CE
DNV
TÜV

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
1,6	250	18-35	20	0,68	267	0,5
2,0	300	20-45	21	0,67	145	0,7
2,0	250	20-45	21	0,67	178	0,6
2,5	300	40-85	23	0,68	91	0,9
3,2	350	40-100	23	0,73	44	1,4

Cromarod 309L

Classification:

EN ISO 3581-A	E 23 12 L R 12
AWS A5.4	E 309L-17

Description:
Cromarod 309L is a rutile flux coated electrode which deposits a 23%Cr / 13%Ni austenitic stainless steel weld metal. The high alloy content and ferrite level enable the weld metal to tolerate dilution from mild and low alloy steels without hot cracking or brittle structures.

Applications:
– Dissimilar joints between stainless and mild or low alloy steels.
– Buffer layers on mild and low alloy steels prior to overlaying with Cromarod 308L or Cromarod 347.
– Interface runs in clad steel joints.
– Joining of clad steels and dissimilar joints between stainless and mild or low alloy steels.
– Welding of similar composition 309 type austenitic stainless steels.
– Joining ferritic-martensitic 410 and 430 type stainless steels.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni
0,02	0,8	0,8	23,0	13,0

Mechanical properties

	Typical
Yield strength, Rp0.2%:	470 MPa
Tensile Strength, Rm:	560 MPa
Elongation, A5	34%
Impact energy, CV:	-20 °C • 48 J
	-60 °C • 45 J

Ferrite content:
FN 9 (WRC-92)

Corrosion resistance
As Cromarod 309L is usually used for buffer layers and dissimilar joints, corrosion resistance is of less importance. Two layers on mild steel is about equivalent to 304L type material.

Scaling temperature:
Approx. 1000 °C in air.

Approvals:
LR
DNV
CE
BV
ABS
GL

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	300	40-80	27	0,67	83	0,9
3,2	350	80-120	28	0,67	42	1,4
4,0	350	100-160	29	0,67	28	1,9

Cromarod 309MoL

Classification:

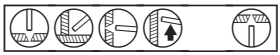
EN ISO 3581-A	E 23 12 2 L R 32
AWS A5.4	E 309MoL-17

Description:
Cromarod 309MoL is a rutile flux coated electrode which deposits a 23% Cr / 12%Ni / 2.5%Mo austenitic stainless steel weld metal. The high alloy content and ferrite level enable the weld metal to tolerate dilution from dissimilar and difficult-to-weld materials without hot cracking or brittle structures.

Applications:
– Dissimilar joints between stainless and mild, low alloy or medium carbon steels.
– Buffer layers on mild and low alloy steels prior to overlaying with Cromarod 316L.
– Interface runs in 316L clad steels.
– Joining of medium carbon hardenable steels e.g. armour plate..

Coating type:
Rutile

Welding positions:



Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Mo
0,02	0,8	0,8	22,8	12,8	2,4

Mechanical properties

	Typical
Yield strength, Rp0.2%:	555 MPa
Tensile Strength, Rm:	680 MPa
Elongation, A5	33%
Impact energy, CV:	-20 °C • 50 J

Ferrite content:
FN 20 (WRC-92)

Corrosion resistance
The corrosion resistance after surfacing carbon steels with two layers of Cromarod 309MoL is about the same as for 316L material.

Scaling temperature:
Approx. 1000 °C in air.

Approvals:
CE
ABS
DNV
DB
RINA
TÜV

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,0	300	35-60	26	0,63	135	0,7
2,5	300	40-80	27	0,64	84	1,1
3,2	350	80-120	28	0,65	43	1,5
4,0	350	100-160	29	0,65	29	2,1

Cromarod 309MoLP

Classification:

EN ISO 3581-A	E 23 12 2 L R 11
AWS A5.4	E 309MoL-17

Description:
Cromarod 309MoLP is a fully-positional rutile flux coated electrode specially designed for applications requiring optimum positional operability. The high alloy content and ferrite level enables the weld metal to tolerate dilution from dissimilar and difficult-to-weld materials without hot cracking.The relatively thin coating and fast-freezing slag makes Cromarod 309MoLP particularly suitable for welding dissimilar joints of differing thicknesses e.g. 4 mm stainless to 7 mm medium carbon steel.

Applications:
- Dissimilar joints between stainless and mild, low or medium cartbon steels.
- Joining of medium carbon hardenable steels, e.g. armour plate.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Mo
0,02	0,7	1,0	23,2	13,0	2,5

Mechanical properties

	Typical
Yield strength, Rp0.2%:	550 MPa
Tensile Strength, Rm:	720 MPa
Elongation, A5	33%
Impact energy, CV:	–20 °C • 50 J

Ferrite content:
FN 20 (WRC-92)

Approvals:
CE

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	300	35-80	23	0,66	98	0,9
3,2	350	40-100	23	0,73	41	1,4

Cromarod 310

Classification:

EN ISO 3581-A	E 25 20 R 12
AWS A5.4	~E 310-17

Description:
Cromarod 310 is a rutile coated electrode primarily intended for welding the 25%Cr / 20%Ni, type 310, fully austenitic stainless steels, used for corrosion and oxidation resistance at elevated temperatures. Cromarod 310 can also be used to join difficult-to-weld steels such as armour plate and ferritic stainless steels, as well as dissimilar steels. Although the weld metal is fully austenitic the composition has been carefully balanced to give good resistance to hot cracking.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni
0,10	0,65	2,5	26,0	21,0

Mechanical properties

	Typical
Yield strength, Rp0.2%:	410 MPa
Tensile Strength, Rm:	600 MPa
Elongation, A5	35%
Impact energy, CV:	-60 °C • 60 J

Ferrite content:
FN 0 (WRC-92)

Corrosion resistance
Cromarod 310 is designed for high temperature oxidation applications and its resistance to wet corrosion is limited.

Scaling temperature:
Approx. 1150 °C in air. Reducing combustion gas, free of sulphur 1080 °C, maximum 2g S/m3 1040 °C.

Approvals:
CE

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	300	50-70	23	0,67	79	0,7
3,2	350	70-110	23	0,67	40	1,1
4,0	350	110-155	25	0,67	27	1,5

Cromarod 312

Classification:

EN ISO 3581-A	E 29 9 R 32
AWS A5.4	E 312-17

Description:
Cromarod 312 is a rutile flux coated electrode which deposits a 29%Cr / 9%Ni austenitic/ferritic stainless steel weld metal with a ferrite content of approximately FN 50. The weld metal exhibits excellent tolerance to dilution from dissimilar and difficult-to-weld materials without hot cracking.

Applications:
– Difficult-to-weld steels e.g. high carbon hardenable tool, die and spring steels, 13% Mn steels, free-cutting steels, high temperature steels (non-structural).
– Dissimilar joints between stainless and high carbon steels.
– Surfacing of metal-to-metal wear areas, hot working tools, furnace components.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni
0,10	1,2	0,8	29,0	9,0

Mechanical properties

	Typical
Yield strength, Rp0.2%:	590 MPa
Tensile Strength, Rm:	760 MPa
Elongation, A5	25%

Ferrite content:
FN 50 (WRC-92)

Corrosion resistance
Good resistance to sulphurous gases at high temperature. Good resistance to wet corrosion up to approximately 300 °C.

Scaling temperature:
Approx. 1100 °C in air.

Approvals:
CE

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	300	40-80	25	0,64	90	1,1
3,2	350	80-120	26	0,64	47	1,5
4,0	350	100-160	27	0,65	31	2,1

Cromarod Duplex

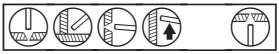
Classification:

EN ISO 3581-A	E 22 9 3 N L R 12
AWS A5.4	~E 2209-17

Description:
Cromarod Duplex is a rutile flux coated electrode which deposits a 24%Cr / 10%Ni / 3%Mo / 0.15%N austenitic-ferritic duplex stainless steel weld metal having a ferrite content of about FN 35. The electrode is easy to use and produces a smooth weld bead finish and good slag detachability. Cromarod Duplex is designed for welding similar composition duplex stainless steels which offer an excellent combination of high strength and very good resistance to chloride induced pitting and stress corrosion cracking. A heat input range of 0.5-2.5 KJ/mm is recommended to maintain a favourable phase balance. Applications include offshore platform pipework, pipelines transporting chloride bearing products or sour gas and process vessels for chloride environments. Where higher fracture toughness at -46 °C is required, use Cromarod Duplex B.

Coating type:
Rutile

Welding positions:



Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Mo	N
0,02	0,9	0,7	23,5	9,5	3,0	0,16

Mechanical properties

	Typical
Yield strength, Rp0.2%:	670 MPa
Tensile Strength, Rm:	840 MPa
Elongation, A5	25%
Impact energy, CV:	-46 °C • 34 J

Ferrite content:
FN 35 (WRC-92)

Corrosion resistance
Very good resistance to pitting corrosion and stress corrosion cracking in chloride and H2S environments. Good resistance to intergranular corrosion. Pitting resistance equivalent, PRE = 36 Critical pitting temp. CPT = 31 °C (ASTM G48).

Scaling temperature:
Approx. 850 °C in air.

Approvals:
LR
GL
TÜV
DNV
BV
CE

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	300	60-90	24	0,62	92	1,1
3,2	350	80-120	25	0,64	45	1,4
4,0	350	130-170	26	0,64	30	2,0

Cromarod Duplex LP

Classification:

EN ISO 3581-A	E 22 9 3 N L R 12
AWS A5.4	~E 2209-17

Description:
Cromarod Duplex LP is a fully positional rutile flux coated electrode designed specially for pipe-welding. It has a thin coating and fast-frezing slag, making it ideal for root runs. The electrode is intended for welding similar composition duplex stainless steels, e.g. 1.4462, UNS 31803. With thicker walled pipe it can be advantageous to use Cromarod Duplex LP for the root plus first passes and then continue with ordinary Cromarod Duplex.

Coating type:
Rutile

Welding positions:

Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Mo	N
0,02	1,0	0,8	23,2	9,2	3,0	0,16

Mechanical properties

	Typical
Yield strength, Rp0.2%:	680 MPa
Tensile Strength, Rm:	800 MPa
Elongation, A5	25%
Impact energy, CV:	-46 °C • 32 J

Ferrite content:
FN 35 (WRC-92)

Corrosion resistance
Typical value: PRE 35
CPT 30°C (ASTM G48)

Approvals:
CE

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,0	300	20-45	21	0,67	145	0,7
2,5	300	35-85	22	0,75	80	1,0
3,2	350	50-110	22	0,71	44	1,2

Cromarod 2507R

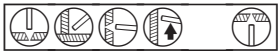
Classification:

EN ISO 3581-A	E 25 9 4 N L R 12
AWS A5.4	E2594-17

Description:
Cromarod 2507R is a rutile flux coated electrode which deposits a 25%Cr/ 9.0%Ni / 4.0%Mo / 0.25%N super dupex type stainless steel weld metal with a ferrite content of approximately FN 57. The electrode is designed for welding similar composition steels e.g. SAF 2507, Uranus 52N, Zeron 100, which offer even higher strength and corrosion resistance levels than the ordinary duplex grades. A heat input range of 0.4-1.5 KJ/mm is recommended to maintain a favourable phase balance in the weld metal and avoid unfavourable precipitation effects in the plate. Applications include offshore platform pipework for seawater cooling systems and firefighting water, as well as pumps, valves and risers. Where good fracture toughness at temperatures down to -40 °C is required, use Cromarod 2507B.

Coating type:
Rutile

Welding positions:



Welding current:
DC+, AC OCV > 39V

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Mo	N
0,02	0,8	0,7	25,0	9,0	4,0	0,23

Mechanical properties

	Typical
Yield strength, Rp0.2%:	700 MPa
Tensile Strength, Rm:	900 MPa
Elongation, A5	22%
Impact energy, CV:	20 °C • 35 J

Ferrite content:
FN 50-55 (WRC-92)

Corrosion resistance
Very good resistance to pitting corrosion and stress corrosion cracking in chloride and H2S environments. Good resistance to intergranular corrosion. Pitting resistance equivalent, PRE = 42. Critical pitting temperature CPT = 45°C (ASTM G48).

Scaling temperature:
Approx. 850°C in air.

Approvals:
CE
DNV

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	300	60-90	22	0,50	110	1,1
3,2	350	80-120	23	0,55	53	1,5
4,0	350	130-170	24	0,55	35	2,3

Cromarod 625

Classification:

EN ISO 14172	E Ni 6625
AWS A5.11	E NiCrMo-3

Description:
Cromarod 625 is a basic flux coated nickel-base electrode intended for welding Inconel 625 and similar composition alloys which are primarily used for their excellent corrosion and oxidation resistance. They exhibit an exceptionally high resistance to pitting corrosion and chloride induced stress corrosion cracking. The electrode is very suitable for a wide range of dissimilar joint combinations between nickel-base alloys, mild and low alloy steels and stainless steels, especially where high temperature service conditions prevail. It can also be used to clad carbon steels with a high strength, highly corrosion resistant surface. Cromarod 625 weld metal gives good fracture toughness at temperatures down to -196 °C and is suitable for welding 5% and 9% nickel steels for cryogenic applications.

Coating type:
Basic

Welding positions:

Welding current:
DC +

Redrying temperature:
350 °C, 2h

Chemical composition, wt.%

C	Si	Mn	Cr	Ni	Mo	Nb
0,03	0,4	0,6	22,0	bal.	9,0	3,4

Mechanical properties

	Typical
Yield strength, Rp0.2%:	530 MPa
Tensile Strength, Rm:	770 MPa
Elongation, A5	36%
Impact energy, CV:	20 °C • 60 J
	-196 °C • 43 J

Ferrite content:
FN 0 (WRC-92)

Corrosion resistance
Very good resistance to general and intergranular corrosion. Maximum resistance (practically immune) to pitting corrosion, crevice corrosion and stress corrosion cracking in chloride bearing environments.

High temperature properties:
Non-scaling in air up to 1150 °C. Very high tensile strength and yield strength up to approx. 850 °C (Rp 0.2% ~400 MPa.

Approvals:
CE

Product data

Diam. mm	Length mm	Current A	Voltage V	Kg weld metal/ kg electrodes	No. of electrodes/ kg weld metal	Kg weld metal/ hour arc time
2,5	300	45-70	25	0,67	80	0,9
3,2	350	60-105	26	0,71	49	1,4
4,0	350	85-130	27	0,71	26	1,7

Electrodes for MMA welding for maintenance and repair

Elgaloy Hard 60

Classification:
EN 14700 E Z Fe2

Description:
Elgaloy Hard 60 produces a martensitic weld metal with a hardness of about 57-60 HRC. The crack-free deposit has good wear resistance under conditions of abrasion and friction coupled with moderate impact. Also available as a self-shielded flux cored wire, Elgaloy Hard R 60.

Applications:
Excavator teeth, bulldozer blades, swing hammers, crusher jaws, scrapers etc.

Coating type:
Basic

Welding positions:

Welding current:
DC+, AC

Product data:

Diam.mm	Current A
3,2x450	110-150
4,0x450	150-190

Chemical composition, wt.%

C	Si	Mn	Cr	Mo	V
0,7	0,8	0,8	8,0	0,5	0,4

Mechanical properties

	Typical
Hardness as welded:	57 - 60 HRC, 640 - 690 HV 10

Elgaloy Hard 100

Classification:
EN 14700 E Fe14

Description:
Elgaloy Hard 100 is a high recovery electrode, producing a weld metal deposit extremely rich in chromium carbides which is highly resistant to abrasion but exhibits limited impact resistance. Ideal for hardsurfacing components used in the mining and quarrying industries. Good wear and corrosion resistance at elevated temperatures. Surface cracking is normal and can be reduced by preheating to 250-450°C. A buffer layer of Elgaloy Mix 18 is recommended for heavy build-ups or surfacing 13% Mn steels to prevent crack propagation into base material. Deposits are not machinable but can be ground. Also available as a self-shielded flux cored wire, Elgaloy Hard R 100 and as a flux coated tubular electrode, Elgaloy Tube 100, designed to give high deposition rates at very low welding currents.

Guide for usage:

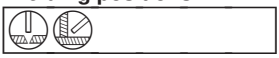
The electrode is preferably to be used with DC+, to create a thick build up also AC is possible to use.

Applications:
Excavator teeth, dredger bucket lips, sizing screens, rollers, screw conveyors, scraper and mixer blades, crusher jaws and hammers, chutes, agricultureimplements, rolling mill guides sinter plant.

Coating type:

Special

Welding positions:



Welding current:
DC+, (AC)

Product data:

Diam.mm	Current A
3,2x350	115-140
4,0x450	140-190

Chemical composition, wt.%

C	Cr
3,5	30

Mechanical properties

	Typical
Hardness as welded:	58-61 HRC, 700 - 740 HV10

Elgaloy Cast-NiFe

Classification:

EN ISO 1071	E C NiFe-1 3
AWS A5.15-90	E NiFe-CI

Description:
Elgaloy Cast-NiFe is designed to produce a higher, matching strength weld metal for joining malleable, nodular and S.G. irons. It is also suitable for joining these to mild, low alloy and stainless steels. Elgaloy Cast-NiFe is less sensitive to hot cracking sometimes caused by impurities in castings, compared to pure nickel type electrodes. Thin sections can be welded cold, but thicker sections may require preheat of approx. 150-300°C. When welding without preheat, use low heat input method. Lightly peen weld beads during welding of thicker sections. On completion allow the workpiece to cool slowly. The deposit is fully machinable.

Applications:
Spheroidal graphite, nodular and ductile cast irons e.g, machine bases, transmission housings, gear boxes, engine blocks and pump bodies.

Coating type:
Special

Welding positions:

Welding current:
DC+/-, AC

Chemical composition, wt.%

C	Ni	Fe
1,0	54	bal.

Mechanical properties

	Typical
Yield strength, Rp0.2%:	320-360 MPa
Tensile Strength, Rm:	400-450 MPa
Elongation, A5	8%
Hardness as welded:	180-200 HV

Product data:

Diam.mm	Current A
2,5x300	50-90
3,2x350	80-120

Cored wires for welding of ferritic steels; Unalloyed

MEGAFIL® 713 R

EN ISO 17632-A: M21: T 46 4 P M21 1 H5
AWS A5.20: E71T-1M-J H4
AWS A5.36: E71T1-M21A4-CS1-H4

CO_2: E71T-1C-J H4
CO_2: E71T1-C1A0-CS1-H4
CO_2: T 46 2 P C1 1 H5

WELDING POSITIONS:

FEATURES	BENEFITS	APPLICATIONS
• Extremely low diffusible hydrogen weld deposit	• Minimized risk of hydrogen-induced cracking	• Automatic and mechanized welding
• Low fumes and spatter	• No re-drying	• Steel structures
• Easy slag removal	• Excellent all position welding	• Offshore structures
• Able to bridge poor fit-up without burn-through	• Resists cracking in severe applications	• Pipelines
	• Reduces clean-up time, minimizes risk of inclusions	• Non-alloy and fine grain steels
• Good impact toughness		• Vessels
• Smooth arc characteristic	• Increases productivity, reduces part rework/ rejection	• General fabrication
		• Heavy equipment
	• Root welding on ceramic backing	• Single and multi-pass welding
	• Automatic root welding on ceramic backing	

WIRE TYPE	Gas shielded rutile flux-cored wire with rapidly solidifying slag
SHIELDING GAS	75-85% Argon (Ar) / Balance Carbon Dioxide (CO_2); 100% Carbon Dioxide (CO_2); Gas flow 12-18 l/min (25-38 cfh)
TYPE OF CURRENT	Direct Current Electrode Positive (DCEP)
STANDARD DIAMETERS	Ø 1.0 - 2.4 mm (0.039 - 3/32“)
TYPICAL DIFFUSIBLE HYDROGEN* RE-DRYING	< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec) Not required due to seamless wire design.
STORAGE	The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undameged packaging

**Measurement technique is the carrier gas method according to AWS and EN ISO*

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO_2)

Carbon (C)	0.05	Nickel (Ni)	-
Manganese (Mn)	1.3	Molybdenum (Mo)	-
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (for mixed gas 82% Ar / 18% CO_2)

Mechanical tests	Typical values MPa (ksi)	EN ISO Specification MPa (ksi)
Tensile Strength Rm	600 (87)	550 - 680 (80 - 99)
Yield strength Rp0.2	530 (77)	> 460 (67)
Expansion A5	26%	22%

CHARPY V-NOTCH IMPACT VALUES (for mixed gas 82% Ar / 18% CO_2)

Mechanical Tests	Typical values [J] (ft.lbf)		EN ISO Specification [J] (ft.lbf)	
	82% Ar / 18% CO_2	100% CO_2	82% Ar / 18% CO_2	100% CO_2
-20 °C	100 (74)	70 (52)	> 47 (35)	> 47 (35)
-40 °C	70 (52)		> 47 (35)	

APPROVALS: TÜV, DB, BV, LR, ABS, CWB, DNV·GL, RINA
Please contact the manufacturer to learn the present scope of approvals

MEGAFIL® 716 R

EN ISO 17632-A: T 46 6 P M21 1 H5
AWS A5.20: E71T-9M-J H4
AWS A5.36: E71T1-M21A8-CS1-H4

WELDING POSITIONS:

FEATURES

- Extremely low diffusible hydrogen weld deposit
- Low fumes and spatter
- Easy slag removal
- Able to bridge poor fit-up without burn-through
- Good impact toughness
- Smooth arc characteristic

BENEFITS

- Minimized risk of hydrogen-induced cracking
- No re-drying
- Excellent all position welding
- Resists cracking in severe applications
- Reduces clean-up time, minimizes risk of inclusions
- Increases productivity, reduces part rework/ rejection
- CTOD tested –20 °C
- Root welding on ceramic backing
- Automatic root welding on ceramic backing

APPLICATIONS

- Automatic and mechanized welding
- Steel structures
- Offshore structures
- Pipelines
- Non-alloy and fine grain steels
- Vessels
- General fabrications
- Heavy equipment
- Single and multi-pass welding

WIRE TYPE	Gas shielded rutile flux-cored wire with rapidly solidifying
SHIELDING GAS	75-85% Argon (Ar) / Balance Carbon Dioxide (CO_2); 100% Carbon Dioxide (CO_2); Gas flow 12-18 l/min (25-38 cfh)
TYPE OF CURRENT	Direct Current Electrode Positive (DCEP)
STANDARD DIAMETERS	Ø 1.2 mm (0.045“)
TYPICAL DIFFUSIBLE HYDROGEN* RE-DRYING	< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec) Not required due to seamless wire design.
STORAGE	The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undameged packaging

**Measurement technique is the carrier gas method according to AWS and EN ISO*

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO_2)

Carbon (C)	0.05	Nickel (Ni)	0.4
Manganese (Mn)	1.3	Molybdenum (Mo)	-
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (for mixed gas 82% Ar / 18% CO_2)

Mechanical tests	Typical values MPa (ksi)	EN ISO Specification MPa (ksi)
Tensile Strength Rm	600 (87)	550 - 670 (80 - 97)
Yield strength Rp0.2	530 (77)	> 460 (67)
Expansion A5	27%	22%

CHARPY V-NOTCH IMPACT VALUES (for mixed gas 82% Ar / 18% CO_2)

Mechanical Tests	Typical values [J] (ft.lbf)		EN ISO Specification [J] (ft.lbf)	
	82% Ar / 18% CO_2	100% CO_2	82% Ar / 18% CO_2	100% CO_2
-40 °C	100 (74)	70 (52)	> 47 (35)	> 47 (35)
-60 °C	70 (52)		> 47 (35)	

APPROVALS: TÜV, DB, DNV·GL
Please contact the manufacturer to learn the present scope of approvals

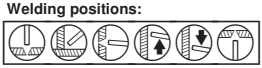
Elgacore 791

FCAW - Flux cored arc welding
Un-alloyed

Description:
Elgacore 791 is a flux-cored wire that is designed for general purpose fabrication, welding in all positions. It can be used with either 100% CO_2 or 75% Ar/25% CO_2 shielding gas, offering a spray type transfer of weld metal. Elgacore 791 provides good impact strength at low temperatures. It also has low spatter levels and the slag is easy to remove.

Applications:
Mild and low alloy steels.

Welding positions:



Welding current:
DC+

Deposition efficiency:
88%

Shielding gas:
M21, 80% Ar+20% CO_2, 17-24 l/min
C1, 100% CO_2, 17-24 l/min

Stick-out:
15-25 mm

Hydrogen content / 100 g weld metal
≤ 5 ml

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min							
Typical	0,022	0,82	1,6	0,014	0,01		
Max	0,12	0,90	1,75	0,03	0,03	0,20	0,50

	Mo	Cu	V	Nb
Min				
Typical				
Max	0,20	0,30	0,08	0,05

Mechanical properties

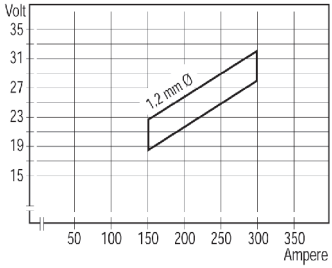
	Specified	Typical
Yield strength, Re:	≥ 420 MPa	572 MPa
Tensile Strength, Rm:	500-640 MPa	618 MPa
Elongation, A5	≥ 22%	26%
Impact energy, CV:	–30°C • 47 J	–30°C • 177 J

Classification:

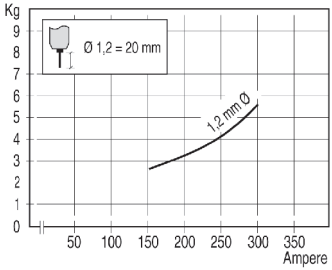
EN ISO 17632-A	T 46 3 P/C M 2 H5
AWS A5.20	E 71T-1C/M; E 71T-9C/M

Approvals:
CE
ABS
BV
GL
DNV
LR

Recommended parameter range:



Deposition rate per hour:



Product data:

Diam.mm	Spool weight
1,2	15 kg BS300
1,2	5 kg D200

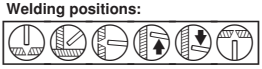
Elgacore 712 M

FCAW - Flux cored arc welding
Un-alloyed

Description:
Elgacore 712M is formulated to allow excellent mechanical toughness properties at lower temperatures in both the as welded and post weld heat treat conditions. All position wire with low hydrogen levels.

Applications:
Single and multiple pass applications with mixed shielding gas

Welding positions:



Welding current:
DC+

Deposition efficiency:
86%

Shielding gas:
M21, 80% Ar + 20% CO_2, 22-25 l/min

Stick-out:
15-25 mm

Hydrogen content / 100 g weld metal
≤ 5 ml

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min							
Typical	0,05	0,5	1,3	0,015	0,008		0,4
Max	0,18	0,90	1,75	0,03	0,03	0,20	0,5

	Mo	Cu	V
Min			
Typical			
Max	0,20	0,30	0,08

Mechanical properties

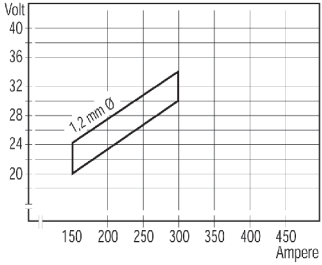
	Specified	Typical
Yield strength, Re:	≥ 420 MPa	482 MPa
Tensile Strength, Rm:	500-640 MPa	544 MPa
Elongation, A5	≥ 20%	25%
Impact energy, CV:	–60 °C • 47 J	–60 °C • 101 J

Classification:

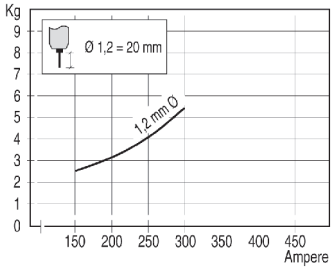
EN ISO 17632-A	T 42 6 P M 2 H5
AWS A5.20	E71T-1MJ-H4

Approvals:
CE

Recommended parameter range:



Deposition rate per hour:



Product data:

Diam.mm	Spool weight
1,2	15 kg BS300
1,2	5 kg D200

MEGAFIL® 710 M

EN ISO 17632-A: T 46 6 P M21 1 H5
AWS A5.20: E71T-9M-J H4
AWS A5.36: E71T1-M21A8-CS1-H4

WELDING POSITIONS

FEATURES	BENEFITS	APPLICATIONS
• Extremely low diffusible hydrogen weld deposit • Good reignition characteristics • Ideal for use of short arc and spray arc • Excellent gap bridging for root welding • High deposition rate and efficiencies • Virtually no slag coverage • Smooth arc characteristic	• Minimized risk of hydrogen-induced cracking • No re-drying • Suitable for robot applications • CTOD tested –20 °C • Reduces clean-up time, improves productivity • Root welding without backing • Automatic root welding possible	• Automatic and mechanized welding • Steel structures • Offshore structures • Pipelines • Non-alloy and fine grain steels • Vessels • General fabrication • Heavy equipment • Single and multi-pass welding

WIRE TYPE	Gas shielded metal-cored wire
SHIELDING GAS	75-85% Argon (Ar) / Balance Carbon Dioxide (CO_2); 100% Carbon Dioxide (CO_2); Gas flow 12-18 l/min (25-38 cfh)
TYPE OF CURRENT	Direct Current Electrode Positive (DCEP)
STANDARD DIAMETERS	Ø 1.0 - 2.4 mm (0.039 - 3/32")
TYPICAL DIFFUSIBLE HYDROGEN* RE-DRYING	< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec) Not required due to seamless wire design.
STORAGE	The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undameged packaging

**Measurement technique is the carrier gas method according to AWS and EN ISO*

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO_2)

Carbon (C)	0.05	Nickel (Ni)	-
Manganese (Mn)	1.3	Molybdenum (Mo)	-
Silicon (Si)	0.7	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (for mixed gas 82% Ar / 18% CO_2)

Mechanical tests	Typical values MPa (ksi)	EN ISO Specification MPa (ksi)
Tensile Strength Rm	600 (87)	550 - 680 (80 - 99)
Yield strength Rp0.2	530 (77)	> 460 (67)
Expansion A5	28%	26%

CHARPY V-NOTCH IMPACT VALUES (for mixed gas 82% Ar / 18% CO_2)

Mechanical Tests	Typical values [J] (ft.lbf)	EN ISO Specification [J] (ft.lbf)
-40 °C	140 (103)	> 47 (35)
-60 °C	100 (74)	> 47 (35)

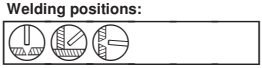
APPROVALS: TÜV, DB, BV, LR, ABS, CWB, DNV·GL, RINA
Please contact the manufacturer to learn the present scope of approvals

Elgacore Matrix

FCAW - Flux cored arc welding
Un-alloyed

Description:
Elgacore Matrix is a revolutionary new metal-cored wire designed to provide maximum performance in automated and robotic applications.
Elgacore Matrix utilizes the most advanced manufacturing technology in the industry to achieve unparalleled consistency. Not only is Elgacore Matrix ultra consistent, it also provides industry leading arc starting, as well as unrivaled feedability. Elgacore Matrix will handle your most difficult feeding applications. Through proprietary chemistry and manufacturing technology, Elgacore Matrix provides superior bead wetting, minimal silicon deposits, and an extremely smooth and stable arc. Elgacore Matrix, all the benefits of metal-core, and more.

Welding positions:



Welding current:
DC+

Deposition efficiency:
95%

Shielding gas:
M21, 80% Ar + 20% CO_2, 22-25 l/min

Stick-out:
15-25 mm

Hydrogen content / 100 g weld metal
≤ 5 ml

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min							
Typical	0,04	0,62	1,30	0,008	0,022		
Max	0,12	0,90	1,75	0,03	0,03	0,20	0,50

	Mo	Cu	V	Nb
Min				
Typical				
Max	0,20	0,30	0,08	0,05

Mechanical properties

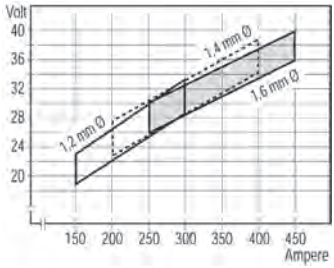
	Specified	Typical
Yield strength, Re:	≥ 460 MPa	516 MPa
Tensile Strength, Rm:	530-680 MPa	573 MPa
Elongation, A5	≥ 20%	25%
Impact energy, CV:	–40°C • 47 J	–40°C • 57 J

Classification:

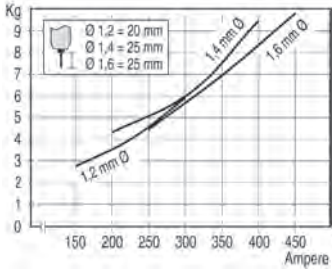
EN ISO 17632-A	T 46 4 M M 3 H5
AWS A5.18	E 70C-6M H4
AWS A5.36	E81T15-M20A2-H4

Approvals:
CE

Recommended parameter range:



Deposition rate per hour:



Product data:

Diam.mm	Spool weight
1,2	15 kg BS300
1,2	250 kg ProPac
1,4	15 kg BS300
1,4	250 kg ProPac

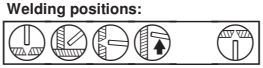
Elgacore Edge

FCAW - Flux cored arc welding
Un-alloyed

Description:
Elgacore Edge is a metal-cored wire with fewer silicon islands than other metal-cored wires. On clean material, weld bead toe lines are almost completely free of silicon deposits. The weld bead face is virtually free from silicon island deposits. Together with exceptional low spatter rates, Edge will save time and money spent cleaning prior to painting, coating, or plating. The recommended shielding gas is a mixture of argon and carbon dioxide, with a minimum of 75% argon and a maximum of 95% argon. Arc characteristics improve with richer argon gases while spatter and fume levels decrease.

Applications:
The wire is recommended for single and multi-pass welding in both the flat and horizontal positions.
Robotic and automated welding, non-alloyed and fine grain steels, heavy equipment, agriculture, transportation, and mining

Welding positions:



Welding current:
DC+

Deposition efficiency:
96%

Shielding gas:
M21, 80% Ar + 20% CO_2, 22-25 l/min

Stick-out:
15-25 mm

Hydrogen content / 100 g weld metal
≤ 5 ml

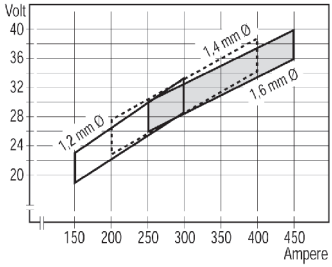
Mechanical properties

	Specified	Typical
Yield strength, Re:	≥ 460 MPa	561 MPa
Tensile Strength, Rm:	530-680 MPa	630 MPa
Elongation, A5	≥ 20%	25%
Impact energy, CV:	–30 °C • 47 J	–30 °C • 54 J

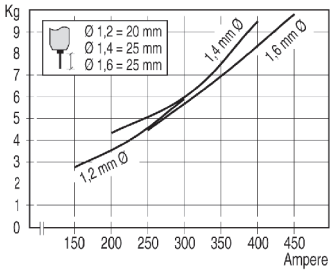
Classification:

EN-ISO 17632-A	T 46 3 M M 3 H5
AWS A5.18	E70C-6M H4

Recommended parameter range:



Deposition rate per hour:



Product data:

Diam.mm	Spool weight
1,2	15 kg BS300
1,2	250 kg ProPac
1,4	15 kg BS300
1,4	250 kg ProPac

Cored wires for welding of ferritic steels; Low alloyed

MEGAFIL® 550 R

EN ISO 18276-A: M21: T 55 6 Mn1,5Ni P M21 1 H5
AWS A5.29: M21: E91T1-K2M-J H4
AWS A5.36: M21: E91T1-M21A8-K2-H4

CO_2: E91T1-K2C-J H4
CO_2: E91T1-C1A8-K2-H4 CO_2:
T 55 6 Mn1,5Ni P C1 1 H5

WELDING POSITIONS:

FEATURES

- Extremely low diffusible hydrogen weld deposit
- Low fumes and spatter
- Easy slag removal
- Able to bridge poor fit-up without burn-through
- Good impact toughness
- Virtually no slag coverage
- Smooth arc characteristic

BENEFITS

- Minimized risk of hydrogen-induced cracking
- No re-drying
- Excellent all position welding
- Resists cracking in severe applications
- Reduces clean-up time, minimizes risk of inclusions
- Increases productivity, reduces part rework/ rejection
- Root welding with ceramic backing
- Automatic root welding with ceramic backing

APPLICATIONS

- Automatic and mechanized welding
- Steel structures
- Offshore structures
- Pipelines
- Non-alloy and fine grain steels
- Vessels
- General fabrication
- Heavy equipment
- Single and multi-pass welding

WIRE TYPE	Gas shielded rutile flux-cored wire with rapidly solidifying slag
SHIELDING GAS	75-85% Argon (Ar) / Balance Carbon Dioxide (CO_2); 100% Carbon Dioxide (CO_2); Gas Flow 12-18 l/min (25-38 cfh)
TYPE OF CURRENT	Direct Current Electrode Positive (DCEP)
STANDARD DIAMETERS	Ø 1.2 mm (0.045“)
TYPICAL DIFFUSIBLE HYDROGEN* RE-DRYING	< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec) Not required due to seamless wire design.
STORAGE	The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undameged packaging

**Measurement technique is the carrier gas method according to AWS and EN ISO*

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar /18% CO_2)

Carbon (C)	0.08	Nickel (Ni)	1.5
Manganese (Mn)	1.5	Molybdenum (Mo)	> 550 (80)
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (for mixed gas 82% Ar /18% CO_2)

Mechanical tests	Typical values MPa (ksi)	EN ISO Specification MPa (ksi)
Tensile Strength Rm	700 (102)	640 - 820 (93 - 119)
Yield strength Rp0.2	620 (90)	> 890 (129)
Expansion A5	24%	15%

CHARPY V-NOTCH IMPACT VALUES (for mixed gas 82% Ar /18% CO_2)

Mechanical Tests	Typical values [J] (ft.lbf)		EN ISO Specification [J] (ft.lbf)	
	82% Ar / 18% CO_2	100% CO_2	82% Ar / 18% CO_2	100% CO_2
-40 °C	120 (89)		>55 (41)	
-60 °C	90 (66)	80 J	> 55 (41)	> 47 J

APPROVALS: LR, DNV, ABS, DNV·GL
Please contact the manufacturer to learn the present scope of approvals

MEGAFIL® 821 R

EN ISO 17632-A: T 50 6 1 Ni P M21 1 H5
AWS A5.29: E81T1-Ni1M-J H4
AWS A5.36: E81T1-M21A8-Ni1-H4

WELDING POSITIONS:

FEATURES

- Extremely low diffusible hydrogen weld deposit
- Low fumes and spatter
- Easy slag removal
- Able to bridge poor fit-up without burn-through
- Good impact toughness
- Smooth arc characteristic

BENEFITS

- Minimized risk of hydrogen-induced cracking
- No re-drying
- Excellent all position welding
- Resists cracking in severe applications
- Reduces clean-up time, minimizes risk of inclusions
- Increases productivity, reduces part rework/rejection
- CTOD tested –20 °C
- Root welding on ceramic backing
- Automatic root welding on ceramic backing

APPLICATIONS

- Automatic and mechanized welding
- Steel structures
- Offshore structures
- Pipelines
- Non-alloy and fine grain steels
- Vessels
- General fabrication
- Heavy equipment
- Single and multi-pass welding

WIRE TYPE	Gas shielded rutile flux-cored wire with rapidly solidifying slag
SHIELDING GAS	75-85% Argon (Ar) / Balance Carbon Dioxide (CO_2); Gas flow 12-18 l/min (25-38 cfh)
TYPE OF CURRENT	Direct Current Electrode Positive (DCEP)
STANDARD DIAMETERS	Ø 1.0 - 1.6 mm (0.039 - 1/16")
TYPICAL DIFFUSIBLE HYDROGEN* RE-DRYING	< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec) Not required due to seamless wire design.
STORAGE	The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undameged packaging

**Measurement technique is the carrier gas method according to AWS and EN ISO*

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO_2)

Carbon (C)	0.05	Nickel (Ni)	0.4
Manganese (Mn)	1.3	Molybdenum (Mo)	-
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (for mixed gas 82% Ar / 18% CO_2)

Mechanical tests	Typical values MPa (ksi)	EN ISO Specification MPa (ksi)
Tensile Strength Rm	620 (90)	550 - 690 (80 - 100)
Yield strength Rp0.2	550 (80)	> 500 (73)
Expansion A5	26%	22%
The specified values apply to the as-welded and stress-relieved condition (580 °C/120 min)		

CHARPY V-NOTCH IMPACT VALUES (for mixed gas 82% Ar / 18% CO_2)

Mechanical Tests	Typical values [J] (ft.lbf)	EN ISO Specification [J] (ft.lbf)
-40 °C	120 (89)	> 47 (35)
-60 °C	90 (66)	> 47 (35)
The specified values apply to the as-welded and stress-relieved condition (580 °C/120 min)		

APPROVALS: TÜV, DB, BV, LR, ABS, CWB, DNV·GL
Please contact the manufacturer to learn the present scope of approvals

MEGAFIL® 690 R

EN ISO 18276-A: T 69 6 Z P M21 1 H5
AWS A5.36: E111T1-M21A4-G-H4

WELDING POSITIONS:

FEATURES	BENEFITS	APPLICATIONS
• Extremely low diffusible hydrogen weld deposit • Low fumes and spatter • Easy slag removal • Able to bridge poor fit-up without burn-through • Good impact toughness • Virtually no slag coverage • Smooth arc characteristic	• Minimized risk of hydrogen-induced cracking • No re-drying • Excellent all position welding • Resists cracking in severe applications • Reduces clean-up time, minimizes risk of inclusions • Increases productivity, reduces part rework/ rejection • Root welding with ceramic backing • Automatic root welding with ceramic backing	• Automatic and mechanized welding • Steel structures • Offshore structures • Pipelines • Non-alloy and fine grain steels • Vessels • General fabrication • Heavy equipment • Single and multi-pass welding

WIRE TYPE	Gas shielded rutile flux-cored wire with rapidly solidifying slag
SHIELDING GAS	75-85% Argon (Ar) / Balance Carbon Dioxide (CO_2); Gas Flow 12-18 l/min (25-38 cfh)
TYPE OF CURRENT	Direct Current Electrode Positive (DCEP)
STANDARD DIAMETERS	Ø 1.2 mm (0.045“)
TYPICAL DIFFUSIBLE HYDROGEN* RE-DRYING	< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec) Not required due to seamless wire design.
STORAGE	The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undameged packaging

**Measurement technique is the carrier gas method according to AWS and EN ISO*

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO_2)

Carbon (C)	0.08	Nickel (Ni)	2.0
Manganese (Mn)	1.7	Molybdenum (Mo)	0.15
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (for mixed gas 82% Ar / 18% CO_2)

Mechanical tests	Typical values MPa (ksi)	EN ISO Specification MPa (ksi)
Tensile Strength Rm	820 MPa (119) (with due regard of the 8/5 time)	770 - 940 MPa (112 - 136)
Yield strength Rp0.2	750 MPa (109) (with due regard of the 8/5 time)	> 690 MPa (100)
Expansion A5	18%	17%

CHARPY V-NOTCH IMPACT VALUES (for mixed gas 82% Ar / 18% CO_2)

Mechanical Tests	Typical values [J] (ft.lbf)	EN ISO Specification [J] (ft.lbf)
-40 °C	80 (59)	> 69 (51)
-60 °C	60 (44)	> 47 (35)

APPROVALS: BV, LR, ABS, DNV-GL, TÜV
Please contact the manufacturer to learn the present scope of approvals

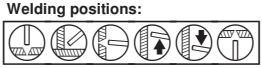
Elgacore 881K2

FCAW - Flux cored arc welding
Low-alloyed

Description:
Elgacore 881K2 is a rutile flux cored wire designed to meet extremely high weld integrity demands in applications such as offshore fabrication. The micro-alloyed design, in combination with the 1.6% Ni alloying level, produces exceptionally good fracture toughness down to –60°C. Impact strength is tolerant to a wide range of heat-input and preheat/interpass conditions. The all-positional wire operates with a smooth but forceful arc to give very good penetration characteristics when welding horizontally, combined with high deposition rates when welding vertically up. CTOD tested at -10°C and exceeds 0,25 mm.

Applications:
Non-alloyed and fine grain steels, Offshore applications, High-strength low-alloy steels, Shipbuilding

Welding positions:



Welding current:
DC+

Deposition efficiency:
88%

Shielding gas:
M21, 80% Ar+20% CO_2, 17-24 l/min
C1, 100% CO_2, 17-24 l/min

Stick-out:
15-22 mm

Hydrogen content / 100 g weld metal
≤ 10 ml

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min			0,50				1,2
Typical	0,06	0,29	1,23	0,009	0,015		1,52
Max	0,15	0,80	1,60	0,03	0,03	0,15	1,8

	Mo	Cu	V	Nb
Min				
Typical	0,01			
Max	0,20	0,30	0,05	0,05

Mechanical properties

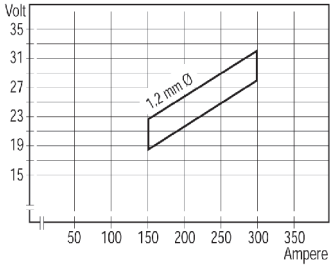
	Specified	Typical
Yield strength, Re:	≥ 470 MPa	562 MPa
Tensile Strength, Rm:	550-680 MPa	610 MPa
Elongation, A5	≥ 20%	25%
Impact energy, CV:	–60°C • 47 J	–60°C • 87 J

Classification:

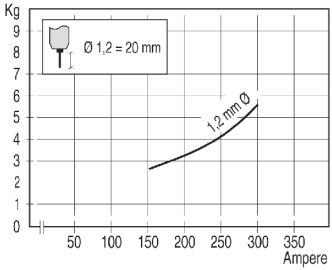
EN ISO 17632-A	T 46 6 1,5 Ni P M 1
AWS A5.29 H5	E81T1-K2M

Approvals:
CE
ABS
BV
DNV
LR

Recommended parameter range:



Deposition rate per hour:



Product data:

Diam.mm	Spool weight
1,2	15 kg BS-300
1,2	5 kg D-200

MEGAFIL® 240 M

EN ISO 17632-A: T 50 6 1Ni M M21 1 H5
AWS A5.28: E80C-Ni1 H4
AWS A5.36: E81T15-M21A8-Ni1-H4

WELDING POSITIONS:

FEATURES

- Extremely low diffusible hydrogen weld deposit
- Good reignition characteristics
- Ideal for use of short arc and spray arc
- Excellent gap bridging for root welding
- High deposition rate and efficiencies
- Virtually no slag coverage
- Smooth arc characteristic

BENEFITS

- Minimized risk of hydrogen-induced cracking
- No re-drying
- Suitable for robot applications
- CTOD tested –20 °C
- Reduces clean-up time, improves productivity
- Root welding without backing
- Automatic root welding possible

APPLICATIONS

- Automatic and mechanized welding
- Steel structures
- Offshore structures
- Pipelines
- Non-alloy and fine grain steels
- Vessels
- General fabrication
- Single and multi-pass welding

WIRE TYPE	Gas shielded metal-cored wire
SHIELDING GAS	75-85% Argon (Ar) / Balance Carbon Dioxide (CO_2); 100% Carbon Dioxide (CO_2); Gas flow 12-18 l/min (25-38 cfh)
TYPE OF CURRENT	Direct Current Electrode Positive (DCEP)
STANDARD DIAMETERS	Ø 1.0 - 1.6 mm (0.039 - 1/16“)
TYPICAL DIFFUSIBLE HYDROGEN* RE-DRYING	< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec) Not required due to seamless wire design.
STORAGE	The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undameged packaging

**Measurement technique is the carrier gas method according to AWS and EN ISO*

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO_2)

Carbon (C)	0.05	Nickel (Ni)	0.9
Manganese (Mn)	1.3	Molybdenum (Mo)	-
Silicon (Si)	0.7	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (for mixed gas 82% Ar / 18% CO_2)

Mechanical tests	Typical values MPa (ksi)	EN ISO Specification MPa (ksi)
Tensile Strength Rm	620 (90)	560 - 720 (81 - 104)
Yield strength Rp0.2	550 (80)	> 500 (73)
Expansion A5	27%	24%

CHARPY V-NOTCH IMPACT VALUES (for mixed gas 82% Ar / 18% CO_2)

Mechanical Tests	Typical values [J] (ft.lbf)	EN ISO Specification [J] (ft.lbf)
-40 °C	120 (89)	> 47 (35)
-60 °C	90 (66)	> 47 (35)

APPROVALS: TÜV, DB, DNV·GL
Please contact the manufacturer to learn the present scope of approvals

MEGAFIL® 742 M

EN ISO 18276-A: T 69 6 Mn2NiCrMo M M21 1 H5
AWS A5.28: E110C-K4 H4
AWS A5.36: E111T15-M21A8-K4-H4

WELDING POSITIONS:

FEATURES	BENEFITS	APPLICATIONS
• Extremely low diffusible hydrogen weld deposit • Good reignition characteristics • Ideal for use of short arc and spray arc • Excellent gap bridging for root welding • High deposition rate and efficiencies • Virtually no slag coverage • Smooth arc characteristic	• BWB-WIWEB Approval • Minimized risk of hydrogen-induced cracking • No re-drying • Suitable for robot applications • Reduces clean-up time, improves productivity • Root welding without any backing • Automatic root welding possible	• Automatic and mechanized welding • Steel structures • Offshore structures • Pipelines • Non-alloy and fine grain steels • Vessels • General fabrication • Heavy equipment • Single and multi-pass welding

WIRE TYPE	Gas shielded metal-cored wire
SHIELDING GAS	75-85% Argon (Ar) / Balance Carbon Dioxide (CO_2); Gas Flow 12-18 l/min (25-38 cfh)
TYPE OF CURRENT	Direct Current Electrode Positive (DCEP)
STANDARD DIAMETERS	Ø 1.0 - 1.2 mm (0.039 - 0.045“)
TYPICAL DIFFUSIBLE HYDROGEN* RE-DRYING	< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec) Not required due to seamless wire design.
STORAGE	The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undameged packaging

**Measurement technique is the carrier gas method according to AWS and EN ISO*

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO_2)

Carbon (C)	0.05	Nickel (Ni)	2.2
Manganese (Mn)	1.6	Molybdenum (Mo)	0.5
Silicon (Si)	0.4	Chromium (Cr)	0.5
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (for mixed gas 82% Ar / 18% CO_2)

Mechanical tests	Typical values MPa (ksi)	EN ISO Specification MPa (ksi)
Tensile Strength Rm	820 (119) (with due regard of the 8/5 time)	770 - 940 (112 - 136)
Yield strength Rp0.2	750 (109) (with due regard of the 8/5 time)	> 690 (100)
Expansion A5	20%	17%

CHARPY V-NOTCH IMPACT VALUES (for mixed gas 82% Ar / 18% CO_2)

Mechanical Tests	Typical values [J] (ft.lbf)	EN ISO Specification [J] (ft.lbf)
-40 °C	110 (81)	> 47 (35)
-60 °C	80 (59)	> 47 (35)

APPROVALS: TÜV, LR, DNV·GL, ABS, RINA
Please contact the manufacturer to learn the present scope of approvals

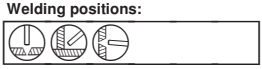
Cored wires for welding of stainless steels

Cromacore 308LT0

FCAW - Flux cored arc welding
Stainless Steel

Description:
Cromacore 308LT0 is a rutile flux cored wire designed for welding the 18% Cr / 10% Ni type stainless steels. Suitable also for stabilised grades 347 and 321 if service temperature is below 400°C. The wire operates with a very stable, spatter free arc producing a bright, smooth weld bead surface and self-releasing slag. Cromacore 308LT0 is used mainly for horizontal-vertical welding and is ideal for standing fillets.

Welding positions:



Welding current:
DC+

Deposition efficiency:
87%

Shielding gas:
M21, 80% Ar + 20% CO_2, 22-25 l/min

Stick-out:
15-20 mm

Ferrite content:
FN 8

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min			0,5			18,0	9,0
Typical	0,028	0,53	1,62	0,026	0,008	19,5	10,0
Max	0,04	1,0	2,0	0,030	0,025	21,0	11,0

	Mo	Cu
Min		
Typical	0,07	0,15
Max	0,3	0,5

Mechanical properties

	Specified	Typical
Yield strength, Rp0.2%:		407 MPa
Tensile Strength, Rm:	≥ 520 MPa	566 MPa
Elongation, A5	≥ 35%	40%
Impact energy, CV:		–20°C • 46 J

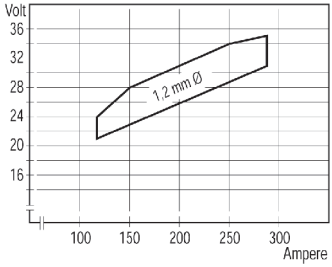
Classification:

EN ISO 17633-A	T 19 9 L R M 3
AWS A5.22	E308LT0-4

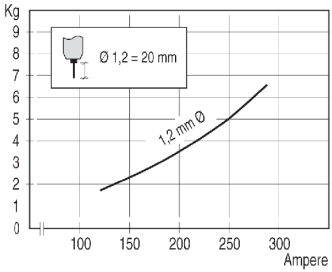
Approvals:

CE
TÜV

Recommended parameter range:



Deposition rate per hour:



Product data:

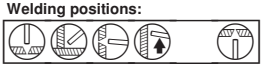
Diam.mm	Spool weight
1,2	15 kg BS300
1,2	5 kg D200

Cromacore 308LT1

FCAW - Flux cored arc welding
Stainless Steel

Description:
Cromacore 308LT1 is a rutile flux cored wire intended for welding 18% Cr / 10% Ni type stainless steels. The wire has been specially designed for fully positional welding at high welding currents. Suitable also for stabilised grades 347 and 321 if service temperature is below 400°C. Cromacore 308LT1 operates with a very stable, spatter free arc and produces a bright, smooth weld bead surface and self-releasing slag. Ideal for high productivity welding in the vertical position.

Welding positions:



Welding current:
DC+

Deposition efficiency:
87%

Shielding gas:
M21, 80% Ar + 20% CO_2, 22-25 l/min

Stick-out:
15-20 mm

Ferrite content:
FN 9

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min			0,5			18,0	9,0
Typical	0,023	0,70	1,60	0,022	0,009	19,65	10,10
Max	0,04	1,0	2,0	0,030	0,025	21,0	11,0

	Mo	Cu
Min		
Typical		
Max	0,3	0,5

Mechanical properties

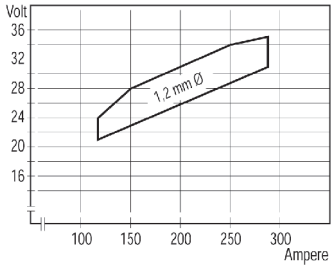
	Specified	Typical
Yield strength, Rp0.2%:		374 MPa
Tensile Strength, Rm:	≥ 520 MPa	575 MPa
Elongation, A5	≥ 35%	42%
Impact energy, CV:		–20°C • 50 J

Classification:

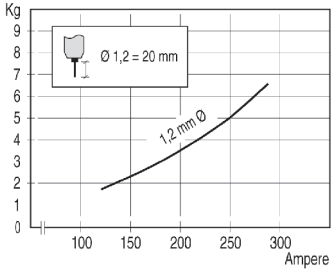
EN ISO 17633-A	T 19 9 L P M 1
AWS A5.22	E 308LT1-4

Approvals:
CE
TÜV
LR

Recommended parameter range:



Deposition rate per hour:



Product data:

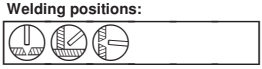
Diam.mm	Spool weight
1,2	15 kg BS300
1,2	5 kg D200

Cromacore 316LT0

FCAW - Flux cored arc welding
Stainless Steel

Description:
Cromacore 316LT0 is a rutile flux cored wire designed for welding the 19% Cr / 12% Ni / 3% Mo type stainless steels. Suitable also for related stabilised grades if service temperature is below 400°C. The wire operates with a very stable, spatter free arc producing a bright, smooth weld bead surface and self-releasing slag. Cromacore 316LT0 is used mainly for horizontal-vertical welding and is ideal for standing fillets.

Welding positions:



Welding current:
DC+

Deposition efficiency:
87%

Shielding gas:
M21, 80% Ar + 20% CO_2, 22-25 l/min

Stick-out:
15-20 mm

Ferrite content:
FN 9

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min			0,5			17,0	11,0
Typical	0,027	0,71	1,52	0,025	0,010	18,7	12,18
Max	0,04	1,0	2,0	0,030	0,025	20,0	13,0

	Mo	Cu
Min	2,0	
Typical	2,79	0,07
Max	3,0	0,5

Mechanical properties

	Specified	Typical
Yield strength, Rp0.2%:		403 MPa
Tensile Strength, Rm:	≥ 510 MPa	580 MPa
Elongation, A5	≥ 30%	37%
Impact energy, CV:		–20°C • 43 J

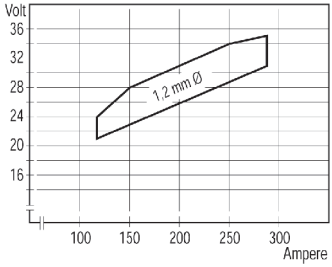
Classification:

EN ISO 17633-A	T 19 12 3 L R M 3
AWS A5.22	E316LT0-4

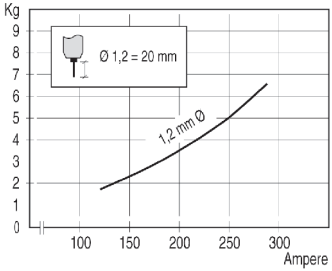
Approvals:

CE
TÜV

Recommended parameter range:



Deposition rate per hour:



Product data:

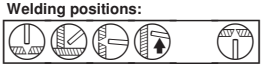
Diam.mm	Spool weight
1,2	15 kg BS300
1,2	5 kg D200

Cromacore 316LT1

FCAW - Flux cored arc welding
Stainless Steel

Description:
Cromacore 316LT1 is a rutile flux cored wire intended for welding the 19% Cr / 12% Ni / 3% Mo type stainless steels. The wire has been specially designed for fully positional welding at high welding currents. Suitable also for related stabilised grades if service temperature is below 400°C. Cromacore 316LT1 operates with a very stable, spatter free arc and produces a bright, smooth weld bead surface and self-releasing slag. Ideal for high productivity welding in the vertical position.

Welding positions:



Welding current:
DC+

Deposition efficiency:
87%

Shielding gas:
M21, 80% Ar + 20% CO_2, 20-25 l/min

Stick-out:
15-20 mm

Ferrite content:
FN 9

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min			0,5			17,0	11,0
Typical	0,026	0,68	1,40	0,027	0,010	18,95	12,52
Max	0.04	1,0	2,0	0,030	0,025	20,0	13,0

	Mo	Cu
Min	2,50	
Typical	2,80	
Max	3,00	0,5

Mechanical properties

	Specified	Typical
Yield strength, Rp0.2%:		497 MPa
Tensile Strength, Rm:	≥ 510 MPa	656 MPa
Elongation, A5	≥ 30%	36%
Impact energy, CV:		–20°C • 52 J

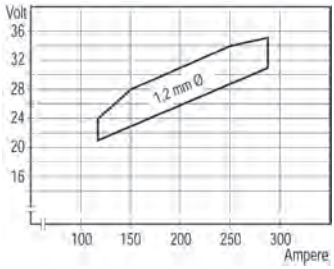
Classification:

EN ISO 17633-A	T 19 12 3 L P M 1
AWS A5.22	E 316LT1-4

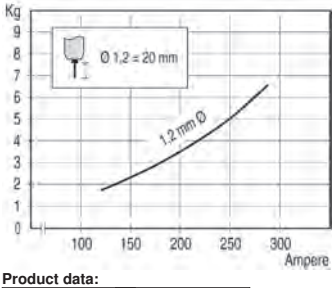
Approvals:

CE
TÜV
LR

Recommended parameter range:



Deposition rate per hour:



Product data:

Diam.mm	Spool weight
1,2	15 kg BS300
1,2	5 kg D200

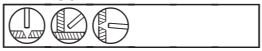
Cromacore 309LT0

FCAW - Flux cored arc welding
Stainless Steel

Description:
Cromacore 309LT0 is a rutile flux cored wire which deposits a low carbon 24% Cr / 13% Ni stainless steel weld metal with a ferrite content of about FN 14. The wire operates with a very stable, spatter free arc producing a bright, smooth weld bead surface and self-releasing slag. Cromacore 309LT0 is used mainly for horizontal-vertical welding and is ideal for standing fillets.

Applications:
Dissimilar joints between stainless and mild or low alloy steels.
Buffer layers on mild and low alloy steels prior to overlaying with Cromacore 308 or 347.
Interface runs on clad steel joints.
Welding of similar composition, 309 type, stainless steels.
Joining of ferritic-martensitic stainless steels.

Welding positions:



Welding current:
DC+

Deposition efficiency:
87%

Shielding gas:
M21, 80% Ar + 20% CO_2, 22-25 l/min

Stick-out:
15-20 mm

Ferrite content:
FN 12

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min			0,5			22,0	12,0
Typical	0,026	0,66	1,51	0,025	0,009	23,80	13,20
Max	0,04	1,0	2,5	0,030	0,025	25,0	14,0

	Mo	Cu
Min		
Typical	0,07	0,13
Max	0,30	0,50

Mechanical properties

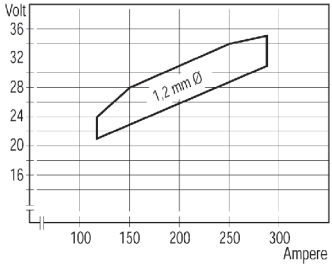
	Specified	Typical
Yield strength, Rp0.2%:		428 MPa
Tensile Strength, Rm:	≥ 520 MPa	568 MPa
Elongation, A5	≥ 30%	34%
Impact energy, CV:		–20°C • 37 J

Classification:

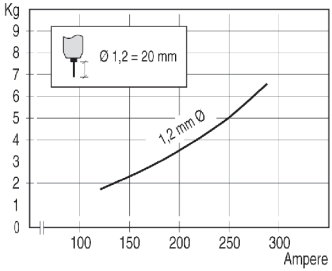
EN ISO 17633-A	T 23 12 L R M 3
AWS A5.22	E309LT0-4

Approvals:
CE
TÜV

Recommended parameter range:



Deposition rate per hour:



Product data:

Diam.mm	Spool weight
1,2	15 kg BS300
1,2	5 kg D200

Cromacore 309LT1

FCAW - Flux cored arc welding
Stainless Steel

Description:
Cromacore 309LT1 is a fully positional rutile flux cored wire which deposits a low carbon 24% Cr / 13% Ni stainless steel weld metal with a ferrite content of about FN 14. Cromacore 309LT1 operates with a very stable, spatter free arc producing a bright, smooth weld bead surface and self-releasing slag. Ideal for high productivity welding in the vertical position.

Applications:
Dissimilar joints between stainless and mild or low alloy steels.
Buffer layers on mild and low alloy steels prior to overlaying with Cromacore 308 or 347.
Interface runs on clad steel joints.
Welding of similar composition, 309 type, stainless steels.
Joining of ferritic-martensitic stainless steels.

Welding positions:

Welding current:
DC+

Deposition efficiency:
87%

Shielding gas:
M21, 80% Ar + 20% CO_2, 22-25 l/min

Stick-out:
15-20 mm

Ferrite content:
FN 14

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min			0,5			22,0	12,0
Typical	0,025	0,72	1,58	0,022	0,008	24,02	12,48
Max	0,04	1,0	2,5	0,030	0,025	25,0	14,0

	Mo	Cu
Min		
Typical	0,17	
Max	0,3	0,5

Mechanical properties

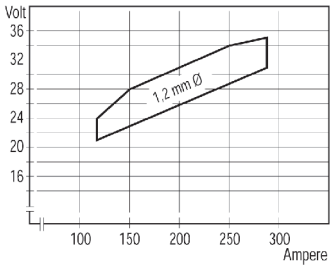
	Specified	Typical
Yield strength, Rp0.2%:		430 MPa
Tensile Strength, Rm:	≥ 520 MPa	579 MPa
Elongation, A5	≥ 30%	38%
Impact energy, CV:		–20 °C • 49 J

Classification:

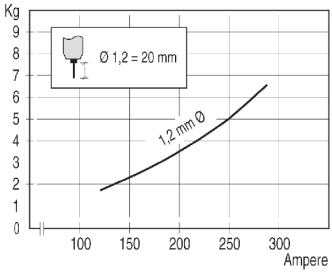
EN ISO 17633-A	T 23 12 L P M 1
AWS A5.22	E 309LT1-4

Approvals:
CE
TÜV
LR

Recommended parameter range:



Deposition rate per hour:



Product data:

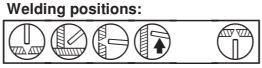
Diam.mm	Spool weight
1,2	15 kg BS300
1,2	5 kg D200

Cromacore 2209T1

FCAW - Flux cored arc welding
Stainless Steel

Description:
Cromacore 2209T1 is suitable for welding duplex stainless steel such as UNS S31803 (Alloy 2205). Excellent pitting corrosion resistance, stress corrosion resistance and crack resistance. It is suitable for welding of heat exchanger, chemical equipment and pipes.

Welding positions:



Welding current:
DC+

Deposition efficiency:
87%

Shielding gas:
M21, 80% Ar + 20% CO_2, 22-25 l/min

Stick-out:
15-20 mm

Ferrite content:
FN 37

Corrosion resistance
Pitting resistance equivalent, PRE = 36

Chemical composition, wt.%

	C	Si	Mn	P	S	Cr	Ni
Min			0,5			21,0	7,5
Typical	0,027	0,5	0,97	0,027	0,007	22,2	9,0
Max	0,04	1,0	2,0	0,030	0,025	24,0	10,0

	Mo	Cu	N
Min	2,5		0,08
Typical	3,2	0,08	0,14
Max	4,0	0,50	0,20

Mechanical properties

	Specified	Typical
Yield strength, Rp0.2%:	≥ 500 MPa	715 MPa
Tensile Strength, Rm:	≥ 700 MPa	803 MPa
Elongation, A5	≥ 20%	27%
Impact energy, CV:	–20°C • 27 J	–20°C • 61 J

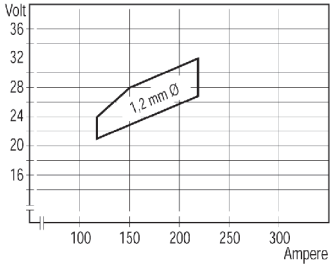
Classification:

EN ISO 17633-A	T 22 9 3 N L P M 1
AWS A5.22	E2209T1-4

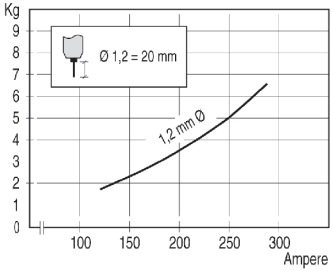
Approvals:

CE
TÜV

Recommended parameter range:



Deposition rate per hour:



Product data:

Diam.mm	Spool weight
1,2	15 kg BS300
1,2	5 kg D200

Solid wires for gas shielded welding of ferritic steels

Elgamatic 100

Classification:

EN ISO 14341-A	G 42 2 (C) M G3Si1
AWS A5.18	ER70S-6

Description:
Elgamatic 100 is a copper coated, manganese-silicon double deoxidised mild steel wire for use with a CO_2 or Ar/CO_2 gas shield. The carefully controlled wire metallurgy and surface finish ensure high quality welds and reliable wire feed for mechanised welding systems. Elgamatic 100 is suitable for all general engineering and structural steels.

Welding current:
DC+

Shielding gas:
C1, CO_2, 7-12 l/min
M21, 80% Ar + 20% CO_2, 7-12 l/min

Wire composition, wt.%

C	Si	Mn
0,08	0,85	1,45

Mechanical properties

	Typical
Yield strength, Re:	470 MPa
Tensile Strength, Rm:	550 MPa
Elongation, A5	26%
Impact energy, CV:	–20°C • 85 J
	–29°C • 50 J

Approvals:
TÜV
DB
MRS
DNV
GL
LR
CE

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
0,8	Contact Elga/ITW	50-90	16-18	120-160	22-26
1,0	Contact Elga/ITW	80-150	17-20	180-230	24-30
1,2	Contact Elga/ITW	110-180	18-22	240-300	26-33

Elgamatic 103

Classification:

EN ISO 14341-A	G 46 2 (C) M G4Si1
AWS A5.18	ER70S-6

Description:
Elgamatic 103 is a copper coated, manganese-silicon double deoxidised wire of the SG3 type, for use with a CO_2 or Ar/CO_2 gas shield. The increased Mn content produces a higher weld metal strength level and better notch toughness compared to SG2 type wire. Elgamatic 103 is suitable for all general engineering and structural steels.

Welding current:
DC+
Shielding gas:
100% CO_2, 7-12 l/min
80% Ar + 20% CO_2, 7-12 l/min

Wire composition, wt.%

C	Si	Mn
0,09	0,9	1,7

Mechanical properties

	Typical
Yield strength, Re:	510 MPa
Tensile Strength, Rm:	610 MPa
Elongation, A5	24%
Impact energy, CV:	–20°C • 90 J
	–40°C • 60 J

Approvals:
DB
TÜV
CE

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
0,8	Contact Elga/ITW	50-90	16-18	120-160	22-26
1,0	Contact Elga/ITW	80-150	17-20	180-230	24-30
1,2	Contact Elga/ITW	110-180	18-22	240-300	26-33

Elgamatic 135

Classification:

EN ISO 16834	G 69 4 Mn3Ni1CrMo
AWS A5.28	ER100S-G

Description:
Elgamatic 135 is a copper coated wire for use with the MIG/MAG process, which deposits a 1.5% Ni / 0.3% Mo / 0.2% Cr weld metal. It is intended for welding the high tensile quenched and tempered steels such as Weldox 700, BSC RQT 701, N-A-XTRA 70 and USS T1. Elgamatic 135 can be welded with either an Ar/20% CO_2 or CO_2 gas shield, but the Ar mixture gives better fracture toughness at low temperature and higher strength levels.

Welding current:
DC+

Shielding gas:
C1, CO_2, 7-12 l/min
M21, 80% Ar + 20% CO_2, 7-12 l/min

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo	V
0,10	0,55	1,60	0,35	1,35	0,30	0,10

Mechanical properties

	Typical
Yield strength, Re:	725 MPa
Tensile Strength, Rm:	810 MPa
Elongation, A5	20%
Impact energy, CV:	–40°C • 55 J

Approvals:
DB
TÜV
CE

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
0,8	15 kg BS300	50-90	16-18	120-160	22-26
1,0	15 kg BS300	80-150	17-20	180-230	24-30
1,2	15 kg BS300	110-180	18-22	240-300	26-33

Elgamatic 162

Classification:

EN ISO 14341-A	G 46 6 M G3Ni1
AWS A5.28	ER80S-Ni1

Description:
Elgamatic 162 is a copper coated wire depositing a nominal 0.9% Ni weld metal. It has a guaranteed Ni content of 1% maximum, ensuring conformance to NACE requirements for oil and gas production equipment in sour service. The wire is primarily intended for GMAW but is equally suitable for use in mechanised GTAW eg. orbital TIG process (see Elgatig 162 for mechanical properties). Elgamatic 162 gives very good fracture toughness at temperatures down to –60°C and is intended for offshore pipework and similar high integrity applications.

Welding current:
DC+
Shielding gas:
C1, 100% CO_2, 7-10 l/min
M21, 80% Ar+20% CO_2, 7-10 l/min

Wire composition, wt.%

C	Si	Mn	Ni
0,09	0,60	1,10	0,90

Mechanical properties

	Typical
Yield strength, Re:	490 MPa
Tensile Strength, Rm:	600 MPa
Elongation, A5	26%
Impact energy, CV:	–60°C • 60 J

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
1,0	15 kg BS300	80-150	17-20	180-230	24-30

Solid wires for gas shielded welding of stainless steels and Ni-base alloys

Cromamig 308LSi

Classification:

EN ISO 14343	G 19 9 LSi
AWS A5.9	ER308LSi

Description:
Cromamig 308LSi is primarily intended for welding the low carbon 18% Cr / 10% Ni type 304 L austenitic stainless steels. Suitable also for welding normal carbon grade 304 and Nb or Ti stabilised steels (347, 321) provided service temperatures are below 400°C. The higher silicon content gives better arc stability and weld metal flow which improves bead appearance, particularly when dip transfer welding.

Welding current:
DC+

Shielding gas:
M12, Ar + 2% CO_2, 16-21 l/min
M13, Ar + 1-3% O_2, 16-21 l/min

Wire composition, wt.%

C	Si	Mn	Cr	Ni
0,02	0,80	1,75	20,0	10,0

Approvals:
DB
TÜV
CE

Mechanical properties

	Typical
Yield strength, Rp0.2%:	400 MPa
Tensile Strength, Rm:	590 MPa
Elongation, A5	40%
Impact energy, CV:	20°C • 120 J
	-196°C • 50 J

Ferrite content:
FN 9

Corrosion resistance
Good resistance to general and intergranular corrosion. Also good resistance to oxidising acids and cold reducing acids.

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
0,8	15 kg BS300	60-100	18-21	150-170	24-26
1,0	15 kg BS300	75-140	18-21	170-200	26-28
1,2	15 kg BS300	130-160	18-21	175-250	26-28

Cromamig 347Si

Classification:

EN ISO 14343	G 19 9 Nb Si
AWS A5.9	ER347Si

Description:
Cromamig 347Si is primarily intended for welding the Nb or Ti stabilised 18% Cr/ 10% Ni austenitic stainless steel grades 347 and 321. It is also suitable for the unstabilised grades 304 and 304L. For structural applications at temperatures above 400°C, Cromamig 308H is recommended because of its superior strength at elevated temperatures. The higher silicon content gives better arc stability and weld metal flow which improves bead appearance, particularly when dip transfer welding.

Welding current:
DC+

Shielding gas:
M12, Ar + 2% CO_2, 16-21 l/min
M13, Ar + 1.3% O_2, 16-21 l/min

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Nb
0,04	0,8	1,3	19,5	9,7	

Mechanical properties

	Typical
Yield strength, Rp0.2%:	400 MPa
Tensile Strength, Rm:	620 MPa
Elongation, A5	30%
Impact energy, CV:	20°C • 110 J
	-196°C • 30 J

Ferrite content:
FN 8

Corrosion resistance
Good resistance to general and intergranular corrosion particularly at elevated temperatures.

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
1,0	15 kg BS300	75-140	18-21	170-200	26-28
1,2	15 kg BS300	130-160	18-21	175-250	26-28

Cromamig 316LSi

Classification:

EN ISO 14343	G 19 12 3 LSi
AWS A5.9	ER316LSi

Description:
Cromamig 316LSi is primarily intended for welding the low carbon, molybdenum alloyed, acid resisting 316L austenitic stainless steels of similar composition. Suitable also for welding 304L type steels as well as normal carbon 316 grades and Nb or Ti stabilised steels provided service temperatures are below 400°C. The higher silicon content gives better arc stability and weld metal flow which improves bead appearance, particularly when dip transfer welding.

Welding current:
DC+

Shielding gas:
M12, Ar + 2% CO_2, 16-21 l/min
M13, Ar + 1-3% O_2, 16-21 l/min

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo
0,015	0,85	1,75	18,5	12,0	2,7

Approvals:
DB
TÜV
CE

Mechanical properties

	Typical
Yield strength, Rp0.2%:	400 MPa
Tensile Strength, Rm:	600 MPa
Elongation, A5	40%
Impact energy, CV:	20 °C • 120 J
	–196 °C • 50 J

Ferrite content:
FN 8

Corrosion resistance
Good resistance to general and intergranular corrosion in the more severe environments e.g. hot dilute acids. Good resistance to chloride pitting corrosion.

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
0,8	15 kg BS300	60-100	18-21	150-170	24-26
1,0	15 kg BS300	75-140	18-21	150-170	26-28
1,2	15 kg BS300	130-160	18-21	175-250	26-28
0,8	5 kg D200	60-100	18-21	150-170	24-26
1,0	5 kg D200	75-140	18-21	150-170	26-28
1,0	220 kg AUTOPAC	75-140	18-21	150-170	26-28
1,2	220 kg AUTOPAC	130-160	18-21	175-250	26-28

Cromamig 309LSi

Classification:

EN ISO 14343	G 23 12 LSi
AWS A5.9	ER309LSi

Description:
Cromamig 309LSi deposits a 23% Cr / 13% Ni austenitic stainless steel weld metal with a ferrite content of about FN 11. The high alloy level and high ferrite content enables the weld metal to tolerate dilution from carbon and low alloy steels without hot cracking. The higher silicon content gives better arc stability and weld metal flow which improves bead appearance, particularly when dip transfer welding.

APPLICATIONS:
– Buffer layers on mild and low alloy steels prior to overlaying with MIG/TIG 308L.
– Joining of clad steels and dissimilar joints between stainless and mild or low alloy steels.
– Welding of similar composition, 309L type, stainless steels.
– Joining of ferritic-martensitic stainless steels.

Welding current:
DC+

Shielding gas:
M12, Ar + 2% CO_2, 16-21 l/min
M13, Ar + 1-3% O_2, 16-21 l/min

Wire composition, wt.%

C	Si	Mn	Cr	Ni
0,02	0,8	1,8	23,5	13,5

Approvals:
TÜV

Mechanical properties

	Typical
Yield strength, Rp0.2%:	450 MPa
Tensile Strength, Rm:	650 MPa
Elongation, A5	35%
Impact energy, CV:	20°C • 130 J
	–120°C • 60 J

Ferrite content:
FN 11

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
0,8	15 kg BS300	60-100	18-21	150-170	24-26
1,0	15 kg BS300	75-140	18-21	170-200	26-28
1,2	15 kg BS300	130-160	18-21	175-250	26-28

Cromamig 309MoL

Classification:

EN ISO 14343	G 23 12 2
AWS A5.9	~ER309MoL

Description:
Cromamig 309MoL deposits a 23% Cr / 12% Ni / 2.5% Mo austenitic stainless steel weld metal. The high alloy content and ferrite level enable the weld metal to tolerate dilution from dissimilar and difficult-to-weld materials without hot cracking.

APPLICATIONS:
– Buffer layers on mild and low alloy steels prior to overlaying with Cromarod 316L.
– Joining of 316L clad steels and dissimilar joints between stainless and mild or medium carbon steels.
– Joining of medium carbon hardenable steels.

Welding current:
DC+

Shielding gas:
M12, Ar+2% CO_2
M13, Ar+1-3% O_2

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo
0,015	0,50	1,5	22,0	14,5	2,6

Mechanical properties

	Typical
Yield strength, Rp0.2%:	470 MPa
Tensile Strength, Rm:	680 MPa
Elongation, A5	30%
Impact energy, CV:	20 °C • 80 J

Ferrite content:
FN 12

Corrosion resistance
The corrosion resistance after surfacing carbon steels with two layers of Cromamig 309 MoL is about the same as for 316L material.

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
1,0	15 kg BS300	75-140	18-21	170-200	26-28
1,2	15 kg BS300	130-160	18-21	175-250	26-28

Cromamig 307Si

Classification:

EN ISO 14343	G 18 8 Mn
AWS A5.9	~ER307

Description:
Cromamig 307Si produces a tough, ductile, 19% Cr / 9% Ni / 7% Mn austenitic stainless weld metal which is highly crack resistant. It is intended for joining hardenable steels, armour plate, 13% Mn steels and difficult-to-weld steels, without the need for preheat. It is also recommended for dissimilar joints between stainless and mild or medium carbon steels. Welds produced with Cromamig 307Si can be PWHT without risk of sigma-phase formation and consequent loss of ductility. The deposit work hardens from 200 HV to 450 HV.

APPLICATIONS: Buffer layers on 13% Mn steels used in rock crushing and earth moving equipment, prior to hardfacing. Reclaiming 13% Mn steels. Surfacing of rails, rail crossings, frogs etc. Buffer layers in highly restrained repair work.

Welding current:
DC+

Shielding gas:
M12, Ar + 1-3% O_2, 16-21 l/min
M13, Ar + 2% CO_2, 16-21 l/min

Wire composition, wt.%

C	Si	Mn	Cr	Ni
0,08	0,85	7,0	19,0	9,0

Mechanical properties

	Typical
Yield strength, Rp0.2%:	380 MPa
Tensile Strength, Rm:	600 MPa
Elongation, A5	40%
Impact energy, CV:	20 °C • 100 J

Approvals:
DB
TÜV
CE

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
0,8	15 kg BS300	60-100	18-21	150-170	24-26
1,0	15 kg BS300	75-140	18-21	170-200	26-28
1,2	15 kg BS300	130-160	18-21	175-250	26-28

Cromamig Duplex

Classification:

EN ISO 14343	G 22 9 3 N L
AWS A5.9	ER2209

Description:
Cromamig Duplex deposits a 23% Cr / 9% Ni / 3% Mo / N austenitic/ferritic duplex stainless steel weld metal with a ferrite content of about FN 35.
It is intended for welding similar composition duplex stainless steels which offer an excellent combination of much higher strength and very good resistance to pitting and stress corrosion cracking, compared to standard austenitic stainless steels.

Welding current:
DC+

Shielding gas:
M12, Ar + 2% CO_2, 16-21 l/min
I3, Ar + <30% He, 20-25 l/min

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo	N
0,015	0,40	1,8	22,5	9,0	3,0	0,18

Approvals:
TÜV
DNV
DB
CE

Mechanical properties

	Typical
Yield strength, Rp0.2%:	620 MPa
Tensile Strength, Rm:	800 MPa
Elongation, A5	30%
Impact energy, CV:	20 °C • 120 J
	-60 ° • 65 J

Ferrite content:
FN 35

Corrosion resistance
Very good resistance to pitting corrosion and stress corrosion cracking in chloride and H2S environments. Good resistance to intergranular corrosion. Pitting resistance equivalent, PRE = 35.

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
0,8	15 kg BS300	60-100	18-21	150-170	24-26
1,0	15 kg BS300	75-140	18-21	170-200	26-28
1,2	15 kg BS300	130-160	18-21	175-250	26-28

Cromamig 625

Classification:

EN ISO 18274	S Ni 6625 (NiCr22Mo9Nb)
AWS A5.14	ERNiCrMo-3

Description:

Cromamig 625 is primarily intended for welding Inconel 625 and similar composition nickel base alloys which are used for their excellent corrosion and oxidation resistance combined with an exceptionally high resistance to pitting corrosion and chloride induced stress corrosion cracking. Very suitable for a wide range of dissimilar joint combinations between nickel base alloys, mild and low alloy steels and stainless steels, especially where high temperature service conditions prevail.

Applications:

Suitable for welding the nickel base alloys 625 and 825 but also 6 Mo steels (ASTM S31254) and 9% Ni steels for cryogenic applications.
Overlay welding of carbon or low alloy steels and dissimilar joints.

Welding current:
DC+

Shielding gas:
I3, Ar + <30% He, 20-25 l/min

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo	Nb[2]
0,01	0,10	0,05	22,0	64,0	9,0	3,6

[2] Nb + Ta

Approvals:
TÜV
CE

Mechanical properties

	Typical
Yield strength, Rp0.2%:	480 MPa
Tensile Strength, Rm:	780 MPa
Elongation, A5	40%
Impact energy, CV:	20°C • 110 J
	–196°C • 60 J

Corrosion resistance
Very good resistance to general and intergranular corrosion. Maximum resistance (practically immune) to pitting corrosion, crevice corrosion and stress corrosion cracking in chloride bearing environments.

Scaling temperature:
The weld metal is resistant to oxidation in air up to 1150°C. (Very high tensile strength and yield strength up to approx. 850°C. Rp 0.2%=300 MPa, Rm=400 MPa)

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
0,8	15 kg BS300	60-100	18-21	150-170	24-26
1,0	15 kg BS300	75-140	18-21	170-200	26-28
1,2	15 kg BS300	130-160	18-21	175-250	26-28

Wires for gas shielded welding of aluminium alloys

Alumig Si5

Classification:

EN ISO 18273	S Al 4043A (AlSi5)
AWS A5.10	ER 4043

Description:
Aluminium MIG wire containing 5% Silicon for welding Al / Si and Al / Mg / Si material. The medium strength weld metal has excellent resistance to hot cracking. Not suitable where good colour match is required after anodising. Melting range 570-630°C.

Welding current:
DC+

Shielding gas:
I1, Argon 16-20 l/min
I2, Helium 16-20 l/min
I3, Argon/Helium 16-20 l/min

Mechanical properties

	Typical
Yield strength, Rp0.2%:	55 MPa
Tensile Strength, Rm:	140 MPa
Elongation, A5	10%

Wire composition, wt.%

Si	Mn	Al	Zn	Fe
5,0	0,01	bal.	0,01	0,2

Approvals:
TÜV
DB
CE

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
1,0	6 kg D300	N/A	N/A	100-150	18-22
1,2	6 kg D300	N/A	N/A	140-210	19-25
1,6	6 kg D300	N/A	N/A	170-320	20-26

Alumig Mg5

Classification:

EN ISO 18273	S Al 5356 (AlMg5Cr)
AWS A5.10	ER 5356

Description:
Aluminium MIG wire containing 5% Magnesium for welding similar composition Al-Mg and Al-Mg-Si materials. The high strength weld metal has very good corrosion resistance in marine environments. Excellent colour match with material to be anodised. The most versatile and universally used aluminium filler material. Melting range 560-630°C.

Welding current:
DC+

Shielding gas:
I1, Argon 16-20 l/min
I2, Helium 16-20 l/min
I3, Argon/Helium 16-20 l/min

Mechanical properties

	Typical
Yield strength, Rp0.2%:	125 MPa
Tensile Strength, Rm:	255 MPa
Elongation, A5	24%

Wire composition, wt.%

Si	Mn	Al	Mg	Fe
0,05	0,15	bal.	5,0	0,15

Approvals:
TÜV
DNV
DB
CE
BV

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
1,0	6 kg D300	N/A	N/A	100-150	18-22
1,2	6 kg D300	N/A	N/A	140-210	19-25

Alumig Mg4.5 Mn

Classification:

EN ISO 18273	S Al 5183 (AlMg4.5Mn)
AWS A5.10	ER 5183

Description:
Aluminium MIG wire containing a nominal 4.9% Magnesium and 0.8% Manganese to produce a higher strength weld metal than the standard 5% Mg alloy.

Welding current:
DC+

Shielding gas:
I1, Argon 16-20 l/min
I2, Helium 16-20 l/min
I3, Argon/Helium 16-20 l/min

Mechanical properties

	Typical
Yield strength, Rp0.2%:	145 MPa
Tensile Strength, Rm:	275 MPa
Elongation, A5	24%

Wire composition, wt.%

Si	Mn	Al	Mg	Fe
0,08	0,7	bal.	4,9	0,2

Approvals:
DB
GL
TÜV
DNV
CE

Product data:

Diam. mm	Spool weight	Dip Current A	Dip Voltage V	Spray Current A	Spray Voltage V
1,0	6 kg D300	N/A	N/A	100-150	18-22
1,2	6 kg D300	N/A	N/A	140-210	19-25
1,6	6 kg D300	N/A	N/A	170-320	20-26

TIG rods for welding of ferritic steels

Elgatig 100

Classification:

EN ISO 636-A	W 46 2 W3Si1
AWS A5.18	ER70S-6

Description:
Elgatig 100 is a silicon, manganese double deoxidised welding wire suitable for high integrity TIG welding of mild and medium tensile steels. It is recommended for Si-killed materials.

Welding current:
DC-

Shielding gas:
I1, Argon, 7-10 l/min

Stamping
F ER70S-6

Wire composition, wt.%

C	Si	Mn
0,08	0,90	1,50

Product data:

Ø x Length mm	Packet weight
1,6 x 1000	5 kg
2,0 x 1000	5 kg
2,4 x 1000	5 kg
3,0 x 1000	5 kg

Mechanical properties

	Typical
Yield strength, Re:	500 MPa
Tensile Strength, Rm:	620 MPa
Elongation, A5	26%
Impact energy, CV:	–20 °C • 100 J
	–46 °C • >60 J

Approvals:
DB
TÜV
CE

Elgatig 101

Classification:

EN ISO 636-A	W 42 2 W2Si
AWS A5.18	ER70S-3

Description:
Elgatig 101 is a silicon , manganese double deoxidised welding wire suitable for high integrity TIG welding of mild and medium tensile steels. It is recommended for Si-killed materials. It has lower levels of Si and Mn than Elgatig 100.

Welding current:
DC-

Shielding gas:
I1, Ar 99.99%, 7-10 l/min

Stamping
F ER70S-3

Wire composition, wt.%

C	Si	Mn
0,09	0,65	1,10

Product data:

Ø x Length mm	Packet weight
1,6 x 1000	5 kg
2,0 x 1000	5 kg
2,4 x 1000	5 kg
3,0 x 1000	5 kg

Mechanical properties

	Typical
Yield strength, Re:	460 MPa
Tensile Strength, Rm:	560 MPa
Elongation, A5	26%
Impact energy, CV:	–20°C • 100 J

Approvals:
CE

Elgatig 115

Classification:

EN ISO 636	W 42 2 W2Ti
AWS A5.18	ER70S-2

Description:
Elgatig 115 is a triple deoxidised (silicon, manganese, aluminium) copper-coated TIG welding wire. It is recommended for high quality pipe welding of mild and medium tensile steels and is ideal for root passes in thick walled material.

Welding current:
DC-

Shielding gas:
I1, Argon, 7-10 l/min

Stamping
F ER70S-2

Wire composition, wt.%

C	Si	Mn
0,05	0,6	1,2

Product data:

Ø x Length mm	Packet weight
1,6 x 1000	5 kg
2,0 x 1000	5 kg
2,4 x 1000	5 kg
3,0 x 1000	5 kg

Mechanical properties

	Typical
Yield strength, Re:	460 MPa
Tensile Strength, Rm:	540 MPa
Elongation, A5	26%
Impact energy, CV:	–20°C • 80 J

Approvals:
TÜV
CE

Elgatig 162

Classification:

EN ISO 636-A	W 46 6 W3Ni1
AWS A5.28	ER80S-Ni1

Description:
Elgatig 162 is a low alloy TIG rod depositing a nominal 0.9% Ni weld metal. It has a guaranteed Ni content of 1% maximum ensuring conformance to NACE requirements for oil and gas production equipment in sour service. Elgatig 162 has very good fracture toughness at temperatures down to –60°C and is designed for offshore pipework and similar high integrity applications.

Welding current:
DC-

Shielding gas:
I1, Argon, 7-10 l/min

Stamping
F ER80S-Ni1

Wire composition, wt.%

C	Si	Mn	P	S	Ni
0,09	0,60	1,10	0,01	0,01	0,90

Product data:

Ø x Length mm	Packet weight
1,6 x 1000	5 kg
2,0 x 1000	5 kg
2,4 x 1000	5 kg

Mechanical properties

	Typical
Yield strength, Re:	490 MPa
Tensile Strength, Rm:	600 MPa
Elongation, A5	28%
Impact energy, CV:	–46°C • 90 J
	–60°C • 80 J

Approvals:
MRS
CE

TIG rods for welding of stainless steels and Ni-base alloys

Cromatig 308LSi

Classification:

EN ISO 14343	W 19 9 LSi
AWS A5.9	ER308LSi

Description:
Cromatig 308LSi is is primarily intended for welding the low carbon 18% Cr / 10% Ni, type 304L, austenitic stainless steels. It is also suitable for stainless steel grade 304 material and the Nb or Ti stabilised grades 347 and 321, provided service temperatures for structural work are below 400°C. The higher silicon content provides a more fluid weld pool which may be preferred for certain welding applications.

Welding current:
DC-

Shielding gas:
I1, Ar 99.99%, 6-12 l/min

Stamping
Elga, AWS, Wst, EN, Batch

Wire composition, wt.%

C	Si	Mn	Cr	Ni
0,02	0,8	1,75	20,0	10,0

Mechanical properties

	Typical
Yield strength, Rp0.2%:	400 MPa
Tensile Strength, Rm:	590 MPa
Elongation, A5	40%
Impact energy, CV:	20 °C • 120 J –196 °C • 50 J

Ferrite content:
FN 9

Corrosion resistance
Good resistance to general and intergranular corrosion. Also good resistance to oxidising acids and cold reducing acids.

Approvals:
DB
TÜV
CE

Product data:

Ø x Length mm	Packet weight
1,0 x 1000	5 kg
1,2 x 1000	5 kg
1,6 x 1000	5 kg
2,0 x 1000	5 kg
2,4 x 1000	5 kg
3,2 x 1000	5 kg

Cromatig 316LSi

Classification:

EN ISO 14343	W 19 12 3 LSi
AWS A5.9	ER316LSi

Description:
Cromatig 316LSi is primarily intended for welding the low carbon, molybdenum alloyed, acid resisting 316L austenitic stainless steels of similar composition. It is also suitable for grade 316 material and the Nb or Ti stabilised grades 347 and 321, provided service temperatures for structural work are below 350°C. The higher silicon content provides a more fluid weld pool which may be preferred for certain welding applications.

Welding current:
DC-

Shielding gas:
I1, 99.99% Ar, 6-12 l/min

Stamping
Elga, AWS, Wst, EN, Batch

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo
0,015	0,85	1,75	18,5	12,0	2,7

Mechanical properties

	Typical
Yield strength, Rp0.2%:	400 MPa
Tensile Strength, Rm:	600 MPa
Elongation, A5	40%
Impact energy, CV:	20 °C • 120 J –196 °C • 50 J

Ferrite content:
FN 8

Corrosion resistance
Good resistance to general and intergranular corrosion in the more severe environments e.g. hot dilute acids. Good resistance to chloride pitting corrosion.

Approvals:
DB
TÜV
DNV
CE

Product data:

Ø x Length mm	Packet weight
1,0 x 1000	5 kg
1,2 x 1000	5 kg
1,6 x 1000	5 kg
2,0 x 1000	5 kg
2,4 x 1000	5 kg
3,2 x 1000	5 kg

Cromatig 309LSi

Classification:

EN ISO 14343	W 23 12 LSi
AWS A5.9	ER309LSi

Description:
Cromatig 309LSi deposits a 24% Cr / 13% Ni austenitic stainless steel weld metal with a nominal ferrite content of FN 10. The relatively high alloy and ferrite levels enable the weld metal to tolerate dilution from mild or low alloyed steels without hot cracking. The higher silicon content provides a more fluid weld pool which may be preferred for certain welding applications.

Applications:
- Buffer layers on mild and low alloy steels prior to overlaying with MIG/TIG 308L.
- Joining of clad steels and dissimilar joints between stainless and mild or low alloy steels.
- Welding of similar composition, 309L type, stainless steels.
- Joining of ferritic-martensitic stainless steels.

Welding current:
DC-

Shielding gas:
I1, Ar 99.99%, 6-12 l/min

Stamping
Elga, AWS, Wst, EN, Batch

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo
0,02	0,8	1,8	23,5	13,5	0,10

Product data:

Ø x Length mm	Packet weight
1,6 x 1000	5 kg
2,0 x 1000	5 kg
2,4 x 1000	5 kg

Mechanical properties

	Typical
Yield strength, Rp0.2%:	450 MPa
Tensile Strength, Rm:	650 MPa
Elongation, A5	35%
Impact energy, CV:	20 °C • 130 J -120 °C • 65 J

Ferrite content:
FN 11

Approvals:
TÜV

Cromatig Duplex

Classification:

EN ISO 14343	W 22 9 3 N L
AWS A5.9	ER2209

Description:
Cromatig Duplex deposits a 23% Cr / 9% Ni / 3% Mo / N austenitic/ferritic duplex stainless steel weld metal with a ferrite content of about FN 35. It is intended for welding similar composition Duplex stainless steels which offer an excellent combination of much higher strength and very good resistance to pitting and stress corrosion cracking, compared to standard austenitic stainless steels.

Welding current:
DC-

Shielding gas:
I1, 99.99% Ar, 6-12 l/min

Stamping
Elga, AWS, Wst, EN, Batch

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo	N
0,015	0,4	1,8	22,5	9,0	3,0	0,18

Mechanical properties

	Typical
Yield strength, Rp0.2%:	620 MPa
Tensile Strength, Rm:	800 MPa
Elongation, A5	30%
Impact energy, CV:	-46°C • 100 J
	-60°C • 85 J

Ferrite content:
FN 35

Corrosion resistance
Very good resistance to pitting corrosion and stress corrosion cracking in chloride and H2S environments. Good resistance to intergranular corrosion. Pitting resistance equivalent, PRE = 35.

Approvals:
DNV
DB
TÜV
CE

Product data:

Ø x Length mm	Packet weight
1,6 x 1000	5 kg
2,0 x 1000	5 kg
2,4 x 1000	5 kg

Cromatig 2507

Classification:

EN ISO 14343	W 25 9 4 N L
AWS A5.9	ER2594

Description:
Cromatig 2507 deposits a 25%Cr/10%Ni/4%Mo/0.25% N super duplex type weld metal with a ferrite level of approximately FN 55. It is designed for welding similar composition steels e.g. SAF 2507, Uranus 52N, Zeron 100, which offer even higher strength and corrosion resistance levels than the ordinary duplex grades. Cromatig 2507 may also be used for welding standard duplex steels when higher corrosion resistance in the weld metal is required. A heat input range of 0.4-1.5 KJ/mm is recommended to maintain a favourable phase balance in the weld metal and avoid deleterious precipitation effects in the plate. Applications include offshore platform pipework for seawater cooling systems and firefighting water, as well as pumps, valves and risers. The weld metal has excellent fracture toughness at temperatures down to –40°C.

Welding current:
DC-

Shielding gas:
I1, 99.99% Ar, 6-12 l/min

Stamping
Elga, AWS, Wst, EN, Batch

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo	N
0,015	0,3	0,4	25	9,5	4,0	0,25

Mechanical properties

	Typical
Yield strength, Rp0.2%:	640 MPa
Tensile Strength, Rm:	850 MPa
Elongation, A5	25%
Impact energy, CV:	20°C • 135 J
	–40°C • 60 J

Ferrite content:
FN 55

Corrosion resistance
Very good resistance to pitting corrosion and stress corrosion cracking in chloride and H2S environments. Good resistance to intergranular corrosion. Pitting resistance equivalent, PRE = 42. Critical pitting temperature CPT = 40°C (ASTM G48).

Scaling temperature:
Approx. 850°C in air.

Product data:

Ø x Length mm	Packet weight
1,6 x 1000	5 kg
2,0 x 1000	5 kg
2,4 x 1000	5 kg

Cromatig 625

Classification:

EN ISO 18274	S Ni 6625 (NiCr22Mo9Nb)
AWS A5.14	ERNiCrMo-3

Description:
Cromatig 625 is primarily intended for welding Inconel 625 and similar composition nickel base alloys which are used for their excellent corrosion and oxidation resistance combined with an exceptionally high resistance to pitting corrosion and chloride induced stress corrosion cracking. Very suitable for a wide range of dissimilar joint combinations between nickel base alloys, mild and low alloy steels and stainless steels, especially where high temperature service conditions prevail. Can be used to clad carbon steels with a high strength, highly corrosion resistant surface.

Applications:
Suitable for welding the nickel base alloys 625 and 825 but also 6 Mo steels (ASTM S31254) and 9% Ni steels for cryogenic applications..
Overlay welding of carbon or low alloy steels and dissimilar joints.

Welding current:
DC-

Shielding gas:
I1, 99.99% Ar, 6-12 l/min

Stamping
Elga, AWS, Wst, EN, Batch

Wire composition, wt.%

C	Si	Mn	Cr	Ni	Mo
0,01	0,10	0,05	22,0	64,5	9,0

Mechanical properties

	Typical
Yield strength, Rp0.2%:	480 MPa
Tensile Strength, Rm:	780 MPa
Elongation, A5	35%
Impact energy, CV:	–196°C • 80 J

Corrosion resistance
Very good resistance to general and intergranular corrosion. Maximum resistance (practically immune) to pitting corrosion, crevice corrosion and stress corrosion cracking in chloride bearing environments.

Scaling temperature:
The weld metal is resistant to oxidation in air up to 1150°C. (Very high tensile strength and yield strength up to approx. 850°C. Rp 0.2%=300 MPa, Rm=400 MPa)

Approvals:
CE

Product data:

Ø x Length mm	Packet weight
2,0 x 1000	5 kg
2,4 x 1000	5 kg

TIG rods for welding of aluminium alloys

Alutig Si5

Classification:

EN ISO 18273	S Al 4043A (AlSi5)
AWS A5.10	ER 4043

Description:
Aluminium TIG wire containing 5% Silicon for welding Al / Si and Al / Mg / Si material. The medium strength weld metal has excellent resistance to hot cracking. Not suitable where good colour match is required after anodising. Melting range 570-630°C.

Welding current:
AC

Shielding gas:
I1, Argon 5-10 l/min
I2, Helium 8-16 l/min
I3, Argon/Helium 5-10 l/min

Stamping
Si5

Mechanical properties

	Typical
Yield strength, Rp0.2%:	55 MPa
Tensile Strength, Rm:	140 MPa
Elongation, A5	10%

Approvals:
DB
CE

Wire composition, wt.%

Si	Mn	Al	Zn	Fe
5,0	0,01	bal.	0,01	0,2

Product data:

Ø x Length mm	Packet weight
1,6 x 1000	2,5 kg
2,0 x 1000	2,5 kg
2,4 x 1000	2,5 kg
3,2 x 1000	2,5 kg

Alutig Mg3

Classification:

EN ISO 18273	S Al 5754 (AlMg3)
AWS A5.10	ER 5754

Description:
Aluminium TIG wire containing 3.2% Magnesium for welding similar composition materials. The medium strength weld metal has good composition resistance in marine environments. Excellent colour match with material to be anodised. Melting range 590-650°C.

Welding current:
AC

Shielding gas:
I1, Argon 5-10 l/min
I2, Helium 8-16 l/min
I3, Argon/Helium 5-10 l/min

Stamping
Mg3

Mechanical properties

	Typical
Yield strength, Rp0.2%:	120 MPa
Tensile Strength, Rm:	230 MPa
Elongation, A5	22%

Wire composition, wt.%

Si	Mn	Al	Mg	Fe
0,15	0,20	bal.	3,2	0,25

Product data:

Ø x Length mm	Packet weight
2,0 x 1000	2,5 kg
2,4 x 1000	2,5 kg
3,2 x 1000	2,5 kg

Alutig Mg5

Classification:

EN ISO 18273	S Al 5356 (AlMg5Cr)
AWS A5.10	ER 5356

Description:
Aluminium TIG wire containing 5% Magnesium for welding similar composition Al / Mg and Al / Mg / Si materials. The high strength weld metal has very good corrosion resistance in marine environments. Excellent colour match with material to be anodised. The most versatile and universally used aluminium filler material. Melting range 560-630°C.

Welding current:
AC

Shielding gas:
I1, Argon 5-10 l/min
I2, Helium 8-16 l/min
I3, Argon/Helium 5-10 l/min

Stamping
Mg5

Wire composition, wt.%

Si	Mn	Al	Mg	Fe
0,05	0,15	bal.	5,0	0,15

Product data:

Ø x Length mm	Packet weight
1,6 x 1000	2,5 kg
2,0 x 1000	2,5 kg
2,4 x 1000	2,5 kg
3,2 x 1000	2,5 kg

Mechanical properties

	Typical
Yield strength, Rp0.2%:	125 MPa
Tensile Strength, Rm:	255 MPa
Elongation, A5	24%

Approvals:
DB
TÜV
CE

Other products

Elga
Gouging Electrode

Description:
Elga Gouging Electrode is a copper coated carbon-graphite electrode used for air carbon-arc cutting and gouging. The arc is used to progressively melt the base material which is subsequently blown away by high velocity jets of compressed air. Because the process is physical rather than dependent on oxidation it can be used on most metals. The process leaves a clean surface free from slag and further surface preparation is not usually necessary. Applications include weld joint preparation, cutting and perforating and removal of weld and material defects.

Inner carton: 50 pcs
Outer carton: 250 pcs

Welding current:
DC+

Product data

Diam. mm	Length mm
4	305
5	305
6	305
8	305
10	305
13	355

Ceramic backing

Elga Ceramic Backing is used to provide root pass support when welding from one side only and is an extremely effective way to rationalise welding procedures and reduce production costs. Welding of root passes is normally the most critical part of the weld and hence the most costly. By using Elga ceramic backing, you can reduce production costs substantially.

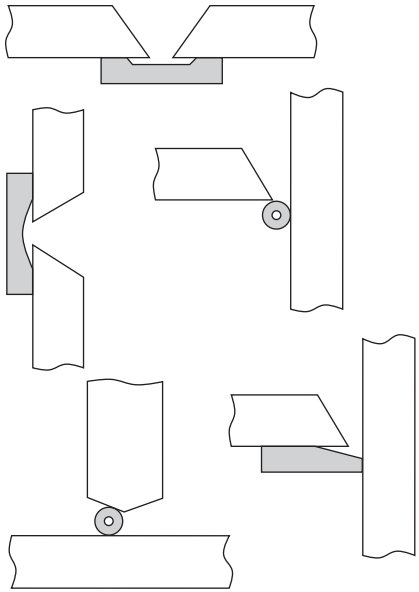
Benefits with Elga Ceramic Backing

Reduced production costs:

- Eliminates the need for back-gouging, grinding and rewelding operations on the reverse side.
- Significant savings in costs associated with turning large and heavy plates or structures in order to weld the second side in the flat position.
- Increased productivity when welding root runs in position 1G/PA, 2G/PC and 3G/PF.
- Simpler joint preparation and reduced set-up time because tolerances for the root gap are greater.
- Use of higher welding currents, which means higher deposition rates and increased productivity.

Quality improvements:

- Smooth, even root bead with slightly convex profile and excellent blend-in with base material.
- The ceramic material does not emit fumes and contains no moisture. Ideal for low-hydrogen applications.
- When welding in enclosed spaces the working environment is not polluted by fumes from arc-air gouging, grinding and rewelding operations.



Typical examples of ceramic backing applications.

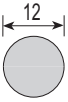
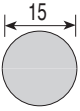
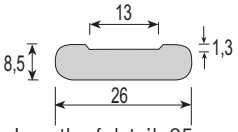
Useful tips when using Elga Ceramic Backing

- Use relatively low current/welding speed. For Elgacore < 200A and < 200 mm/min, for Cromacore < 160A.
- Dirt, mill scale, coatings and other contamination to be removed from the joint faces before welding.
- End craters should be fully ground out.
- Maximum 1 m root run at a time, before next pass applied.

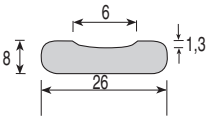
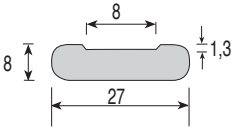
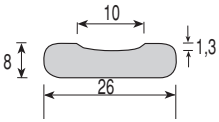
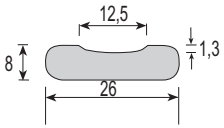
Elga ceramic backing

Valid for all ceramic backing from Elga:
Grey ceramic backing on Alu-tape
Welding positions: PA, PC, PF

Base material: stainless and mild or low alloy steels
Length per piece: 600 mm

 Length of detail: 30 mm	**Art. nr: 86640600** Joint preparation: X and K-joints Welding consumable: Rutile and metal cored wire Root gap: 3-5 mm	Diameter: 6,0 mm Length per individual tile: 30 mm Pieces per box: 40 Pieces per pallet: 4480
 Length of detail: 30 mm	**Art. nr: 86650600** Joint preparation: X and K-joints Welding consumable: Rutile and metal cored wire Root gap: 4-6 mm	Diameter: 8,0 mm Length per individual tile: 30 mm Pieces per box: 40 Pieces per pallet: 4480
 Length of detail: 30 mm	**Art. nr: 86660600** Joint preparation: X and K-joints Welding consumable: Rutile and metal cored wire Root gap: 5-7 mm	Diameter: 10 mm Length per individual tile: 30 mm Pieces per box: 40 Pieces per pallet: 4480
 Length of detail: 30 mm	**Art. nr: 86670600** Joint preparation: X and K-joints Welding consumable: Rutile and metal cored wire Root gap: 7-10 mm	Diameter:12 mm Length per individual tile: 30 mm Pieces per box: 30 Pieces per pallet: 3360
 Length of detail: 30 mm	**Art. nr: 86680600** Groove type: X and K-grooves. Consumable type: Flux cored and metal cored wires. Welding position: PA, PC, PF. Materials: Mild and stainless steels. Root gap:10-12 mm.	Mat Grey ceramic backing Diameter: 15mm Length of detail: 30 mm Pieces per box: 20 Pieces per pallet: 2240
 Length of detail: 25 mm	**Art. nr: 86800600** Joint preparation: V-joints Welding consumable: Rutile flux cored wire Root gap: 3-8 mm Tile width: 26 mm Tile height: 8,5 mm	Groove depth: 1,3 mm Groove width: 13 mm Length per individual tile: 25 mm Pieces per box: 30 Pieces per pallet: 3360

Please visit www.elga.se to see our updated range of Elga ceramic backing!

 Length of detail: 25 mm	**Art. nr: 86980600** Joint preparation: V-joints Welding consumable: Metal cored wire and solid wire Root gap: 3-5 mm Tile width: 26 mm Tile height: 8 mm Groove depth: 1,3 mm Groove width: 6 mm Length per individual tile: 25mm Pieces per box: 30 Pieces per pallet: 3360
 Length of detail: 25 mm	**Art. nr: 86960600** Groove type: V-grooves. Consumable type: Flux cored wire. Welding position: PA, PC, PF. Root gap: 3-7 mm. Materials: Mild and stainless steels. Grey ceramic backing Tile width: 27 mm Tile height: 8 mm Groove depth: 1,3 mm Groove width: 8,0 mm Length of detail: 12,5 mm Ceramic backing on Alu-tape Length pr. piece: 600 mm Pieces pr. box: 30 Pieces pr. palllet: 3360
 Length of detail: 25 mm	**Art. nr: 86970600** Groove type: V-grooves. Consumable type: Flux cored wire. Welding position: PA, PC, PF. Root gap: 3-7 mm. Materials: Mild and stainless steels. Grey ceramic backing Tile width: 26 mm Tile height: 8 mm Groove depth: 1,3 mm Groove width: 10,0 mm Length of detail: 25 mm Ceramic backing on Alu-tape Length pr. piece: 600 mm Pieces pr. box: 30 Pieces pr. palllet: 3360
 Length of detail: 25 mm	**Art. nr: 86990600** Joint preparation: V-joints Welding consumable: Rutile flux cored wire Root gap: 3-7 mm Tile width: 26 mm Tile height: 8 mm Groove depth: 1,3 mm Groove width: 12,5 mm Length per individual tile: 25 mm Pieces per box: 30 Pieces per pallet: 3360

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Technical information contents

Storage and handling of welding consumables

Storage and handling of welding consumables consist of the following parts:

- Hydrogen induced cracking
- Coated electrodes
- Flux Cored Wires
- Submerged arc welding fluxes

Hydrogen induced cracking

Hydrogen in welded joints in ferritic materials can give rise to hydrogen induced cracking, also known as cold cracking and delayed cracking

The major factors which influence the risk of this type of cracking are chemical composition of the steel (Carbon Equivalent factor CE), cooling rate and hydrogen content of the weld metal.

The most common sources of hydrogen are:

- Moisture in electrode coatings or SAW flux
- Drawing lubricants on cored wires
- Moisture in the atmosphere or shielding gas
- Condensation, rust, oil, paint or primer in the weld joint area

Moisture, lubricant etc. decomposes in the arc during welding to give hydrogen,(H), which is readily dissolved in the weld pool. On cooling this (H) tries to escape via diffusion because it is less soluble in the solid weld metal compared to the molten weld pool. Any (H) that remains trapped in the joint can cause hydrogen induced cracking. Cracks generally form in the coarse-grained, HAZ of the base material but for very high strength weld metals cracks can also arise in the weld metal itself. By following the recommended storage and handling procedures for welding consumables, moisture levels can be minimised, along with the associated hydrogen induced cracking risk.

Storage and handling of coated electrodes

Coated electrodes always contain a certain amount of moisture in the coating, even after the final drying operation during manufacture. This moisture decomposes in the arc during welding to give hydrogen, (H), and consequential risk for hydrogen induced cracking.

The moisture is bound in the crystalline structure of some of the minerals in the coating and requires a relatively high temperature to remove it. Basic-coated electrodes are designed to be dried at high temperatures, resulting in a low coating moisture level, and are often referred to as “low hydrogen electrodes”.

Coated electrodes can be divided into:

1) Non-alloy C-Mn, rutile or acid-rutile coated electrodes , with H>15 ml/100g weld metal.

2) Non-alloy C-Mn and low alloy, basic-coated electrodes, with H<10 or <5 ml/100g weld metal.

3) High alloy austenitic stainless steel electrodes, rutile or basic coated, where hydrogen diffusion does not occur because hydrogen is soluble in the austenitic atomic structure, even at room temperature.

Of the above listed groups, it is only types 1 and 2 which can give rise to hydrogen induced cracking. For steel grades with a yield strength > 355MPa the use of type 2 electrodes is recommended. Type 3 electrodes are also dried at high temperature, but this is to minimise the risk of porosity, also caused by moisture in the coating.

Unfortunately, electrode coatings are hygroscopic, i.e. they pick up moisture from the surrounding atmosphere if freely exposed to it. Suitable coating formulation design can minimise this effect but not eliminate it. For this reason it is necessary to ensure that electrodes are not able to absorb moisture (by correct choice of packaging, storage and handling) or, alternatively, to re-dry them before use.

Types of packaging
Elga's non-alloy and low alloy electrodes are supplied in two different types of packaging, depending on the required level of resistance to moisture pick-up from the atmosphere in the unopened condition.

A) Cardboard box with shrink plastic wrapping. This is the most common packaging for electrode type 1 and type 2 non-alloy C-Mn electrodes.
B) Hermetically sealed steel can or aluminium-laminated plastic foil vacuum pack (DryPac). This is the most common packaging for type 3 stainless electrodes and type 2 low alloy electrodes.

Of these two packaging forms, it is only for type B that Elga guarantees low moisture content at point of opening. Products delivered in packaging type A are guaranteed to have been tested to comply with low moisture content following final baking in the factory, but no guarantee can be given that they have not subsequently picked up moisture during delivery to, or storage at, the customer. Electrodes in type A packaging must therefore be re-dried before use if low hydrogen weld metal is specified.

Points to consider when handling and storing unopened packaging

Storage
In general, moisture pick-up of electrodes depends on the temperature and humidity of the surrounding atmosphere, which can be measured as the relative humidity (RH) at a given temperature.
However, moisture pick-up occurs relatively slowly with storage under the following conditions:

5-15 °C	<60% RH
15-25 °C	<50% RH
>25 °C	<40% RH

Electrodes in **packaging type A** must be stored with the plastic wrapping unbroken in a climatically controlled environment according to the above. If low hydrogen weld metal is specified then electrodes in packaging type A must be re-dried before use, following the instructions in the data sheet or on the label.

Electrodes in **packaging type B** are completely moisture diffusion-proof and do not therefore require any special storage instructions. Electrodes taken directly from newly opened packaging of this type do not require re-drying before use.
To avoid condensation forming on electrodes that have been stored at a lower temperature than ambient, unopened packaging should be allowed to reach ambient temperature before being opened, independent of packaging type.

Type 2 and 3 electrodes from opened packaging can be stored in a storage cabinet held at 105-150 °C without the risk of moisture pick-up. It is important here that these electrodes are not mixed together with type 1 electrodes in the same cabinet, because the latter can transfer moisture to the former.

Handling in the workshop
Elga's type 2 and 3 electrodes are manufactured according to the MR-design concept (Moisture Resistant) which ensures low initial moisture content together with a slow moisture pick-up rate.

For electrodes in type B packaging the following exposure times are valid for conditions of 26.7 °C and 80% RH, in order to guarantee low hydrogen level in the weld metal or sufficiently low moisture content in the coating (stainless electrodes).

Condition of packaging	Max. storage time
Unbroken	Unlimited
Opened but electrodes left in packet	12 h
Electrodes exposed outside the packet	4 h

For type 2 electrodes in type A packaging the following recommendation is given:
During the working period, keep the electrodes in heated portable canisters at a minimum temperature of 70 °C. After the work period, store the remaining electrodes in a heated storage cabinet. This recommendation is also valid for electrodes in opened package type B, if the electrodes are not likely to be consumed within the times specified above.

Re-drying

Rutile electrodes, type 1, which show any signs of damage from moisture pick-up (poor arc stability, heavy spatter, poor slag detachability) can be re-dried at around 90 °C for 1 h in order to restore welding characteristics.
Basic coated C-Mn and low alloy electrodes (type 2) are normally re-dried at a temperature of around 350 °C for 1-2 h, in order to reach a hydrogen content of the level 4-10ml/100g weld metal as given in the data sheet. The guiding rule is to follow the re-drying instructions in the data sheet or on the label. Re-drying should be limited to 5 cycles.
To obtain an extremely low hydrogen level, i.e. <4ml/100g, it is possible in certain cases to re-dry at higher temperatures than 350 °C. However, under these circumstances Elga must be contacted first for detailed instructions, otherwise there is a risk that the coating can be damaged. Normally this will reduce the maximum allowed number of re-drying cycles.
5-15°C <60% RH
15-25°C <50% RH
> 25°C <40% RH

Storage and handling of Elga cored wires.

Storage:

1. Cored wires shall be stored in their original, undamaged packaging under properly maintained climatic conditions of 10-30°C and relative humidity as low as possible, maximum 80%.
2. Packaging shall not be placed directly on the floor, but on a wooden pallet or equivalent, at a distance of at least 10 cm from the ground and outside wall.
3. Transportation to and from the storage place shall be carried out in covered vehicles and direct exposure to rain and snow avoided.

Storage of cored wires outside the original packaging.

When the wire has been taken out of the original packaging, it can be stored in normal heated premises, (workshop etc.), for up to 5 days.

Handling

- If welding is conducted in an environment that is subject to snow, rain, marine conditions or dust, covered wire feed units should be used.
- During outdoor usage, or when used in unheated workshops or premises, the wire should be moved to a dry, heated storage area when not in use for a period of 8 hours or more.
- If the wire is to be put back in storage, the spool shall be protected with its plastic bag, or equivalent.

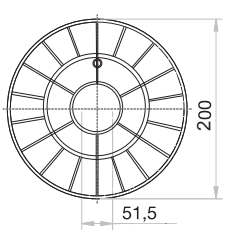
Scrapping

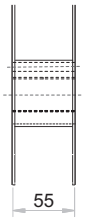
- If traces of rust/corrosion are found on the wire surface, this indicates that the wire has not been stored or handled correctly. A wire with rust traces should be scrapped.

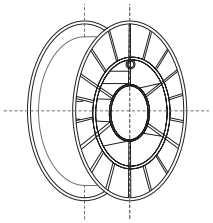
If there is any suspicion that the wire has not been stored correctly, Elga recommends that the wire be SCRAPPED.

Spool types

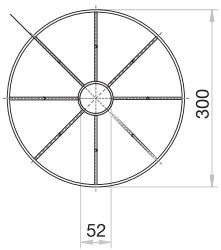
Plastic or wire basket spools

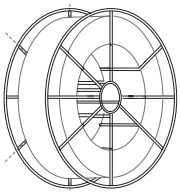




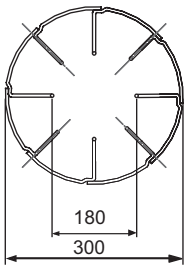


Plastic spool D 200
Diameter: 200 mm
Width: 55 mm
Suitable for a 50 mm hub



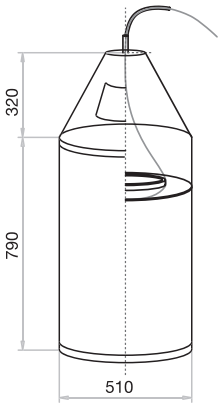


Basket spool S 300 & BS 300
Diameter: 300 mm
Width: 108 mm
Suitable for a 50 mm hub

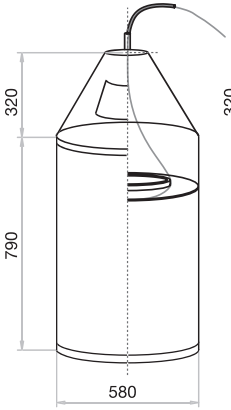


Basket rim K 300 (B 300)
Diameter: 300 mm
Width: 100 mm
Suitable for a 50 mm hub, but an adaptor is needed.

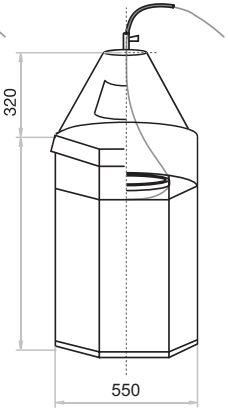
Drums



200-250 kg



350 kg



250 kg

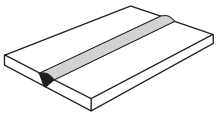
AutoPac
Diameter: 510 or 580 mm

ProPac
Diameter: 550 mm

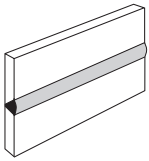
Accessories
Elga bulk pack options can be supplied with a complete set of wire dispensing equipment, from the drum dolly, wire conduit, quick connectors to drum cones. Please contact Elga for more information.

Welding Positions, ASME and EN Standards

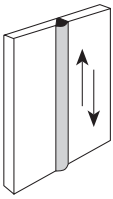
Butt welds



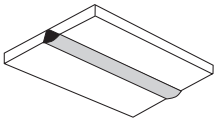
ASME: 1G
EN: PA



ASME: 2G
EN: PC

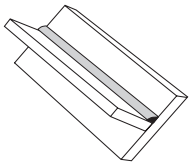


ASME: 3G
EN: PG (down)
PF (up)

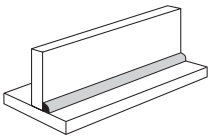


ASME: 4G
EN: PE

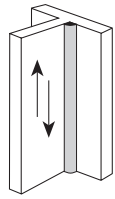
Fillet welds



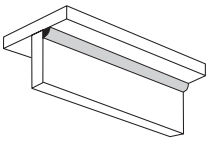
ASME: 1F
EN: PA



ASME: 2F
EN: PB

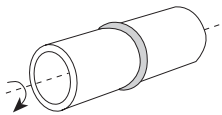


ASME: 3F
EN: PG (down)
PF (up)

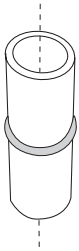


ASME: 4F
EN: PD

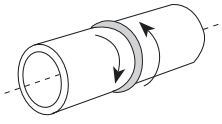
Pipe welds



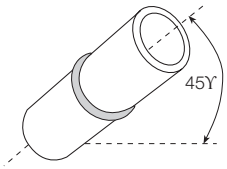
ASME: 1G
EN: PA



ASME: 2G
EN: PC

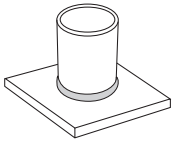


ASME: 5G
EN: PG (down)
PF (up)

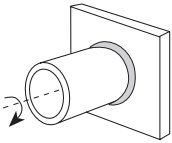


ASME: 6G
EN: J-LO45 (down)H-LO45
(up)

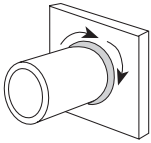
Fillet welds



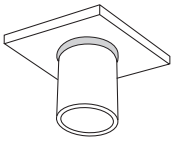
ASME: 2F
EN: PB



ASME: 2F
EN: PB



ASME: 5F
EN: PG (down)
PF (up)



ASME: 4F
EN: PD

Guide to EN ISO 2560-A: MMA electrodes for non-alloyed and fine grain steels

Symbol	Tensile Strength MPa	Yield Strength min. MPa	Elongation min. %
35	440-570	355	22
38	470-600	380	20
42	500-640	420	20
46	530-680	460	20
50	560-720	500	18

Symbol	Welding position
1	All positions
2	All positions, except vertical down
3	Flat butt weld, flat fillet weld, horizontal-vertical fillet weld
4	Flat butt weld, flat fillet weld
5	Vertical down and positions according to symbol 3

Symbol	Metal recovery, %	Type of current
1	≤105	AC +DC
2	≤105	DC
3	105≤125	AC +DC
4	105≤125	DC
5	125≤160	AC +DC
6	125≤160	DC
7	>160	AC +DC
8	>160	DC

E 46 3 1Ni B 5 4 H5

Covered electrode for manual metal arc welding.

Symbol	Coating type
A	Acid
B	Basic
C	Cellulosic
R	Rutile
RR	Rutile (thick coated)
RC	Rutile-Cellulosic
RA	Rutile-Acid
RB	Rutile-Basic

Symbol	Hydrogen content, ml/100 g deposited weld metal, max.
H5	5
H10	10
H15	15

Symbol	Impact Energy Charpy-V Temp °C for 47J min.
Z	No requirements
A	+20
0	0
2	–20
3	–30
4	–40
5	–50
6	–60

Symbol	Chemical composition of all-weld metal , % *		
	Mn	Mo	Ni
No symbol	2.0	–	–
Mo	1.4	0.3 - 0.6	–
MnMo	1.4 - 2.0	0.3 - 0.6	–
1Ni	1.4	–	0.6 - 1.2
2Ni	1.4	–	1.8 - 2.6
3Ni	1.4	–	2.6 - 3.8
Mn1Ni	1.4 - 2.0	–	0.6 - 1.2
1NiMo	1.4	0.3 - 0.6	0.6 - 1.2
Z	Any other agreed composition		

* If not specified Mo <0.2, Ni <0.3, Cr <0.2, V <0.05, Nb <0.05, Cu <0.3
Single values shown in the table mean maximum values.

Guide to EN ISO 18275-A: MMA electrodes for high strength steels

Symbol	Yield Strength min. N/mm²	Tensile Strength N/mm²	Elongation min. %
55	550	610-780	18
62	620	690-890	18
69	690	760-960	17
79	790	880-1080	16
89	890	980-1180	15

Symbol	Welding position
1	All positions
2	All positions, except vertical down
3	Flat butt weld, flat fillet weld, horizontal-vertical fillet weld
4	Flat butt weld, flat fillet weld
5	Vertical down and positions according to symbol 3

Symbol	Metal recovery, %	Type of current
1	≤105	AC +DC
2	≤105	DC
3	>105≤125	AC +DC
4	>105≤125	DC
5	>125≤160	AC +DC
6	>125≤160	DC
7	>160	AC +DC
8	>160	DC

Indicates mechanical properties after stress relief treatment.

E 62 7 MnNi B 3 4 H5 T

Covered electrode/ manual metal arc welding.

Only basic electrode covering.

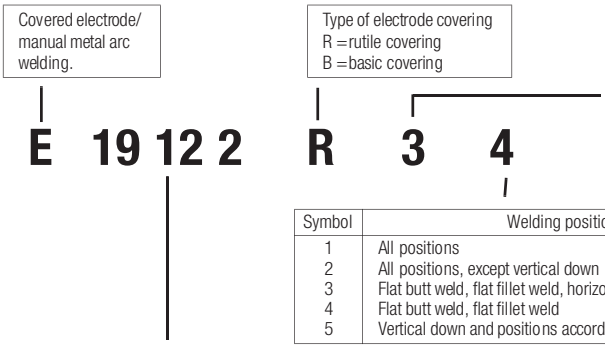
Symbol	Hydrogen content, ml/100 g deposited weld metal, max.
H5	5
H10	10
H15	15

Symbol	Impact Energy Charpy-V Temp °C for 47J min.
Z	No requirements
A	+20
0	0
2	–20
3	–30
4	–40
5	–50
6	–60
7	–70
8	–80

Symbol	Chemical composition of all-weld metal , % *			
	Mn	Ni	Cr	Mo
MnMo	1.4 - 2.0	–	–	0.3 - 0.6
Mn1Ni	1.4 - 2.0	0.6 - 1.2	–	–
1NiMo	1.4	0.6 - 1.2	–	0.3 - 0.6
1.5NiMo	1.4	1.2 - 1.8	–	0.3 - 0.6
2NiMo	1.4	1.8 - 2.6	–	0.3 - 0.6
Mn1NiMo	1.4 - 2.0	0.6 - 1.2	–	0.3 - 0.6
Mn2NiMo	1.4 - 2.0	1.8 - 2.6	–	0.3 - 0.6
Mn2NiCrMo	1.4 - 2.0	1.8 - 2.6	0.3 - 0.6	0.3 - 0.6
Mn2Ni1CrMo	1.4 - 2.0	1.8 - 2.6	0.6 - 1.0	0.3 - 0.6
Z	Any other agreed composition			

* If not specified C 0.03-0.10, Ni <0.3, Cr <0.2, Mo <0.2, V <0.05, Nb <0.05, Cu <0.3, P <0.025, S <0.020, Si <0.80.
Single values shown in the table are maximum values.

Guide to EN ISO 3581-A: MMA electrodes for stainless and heat resisting steels



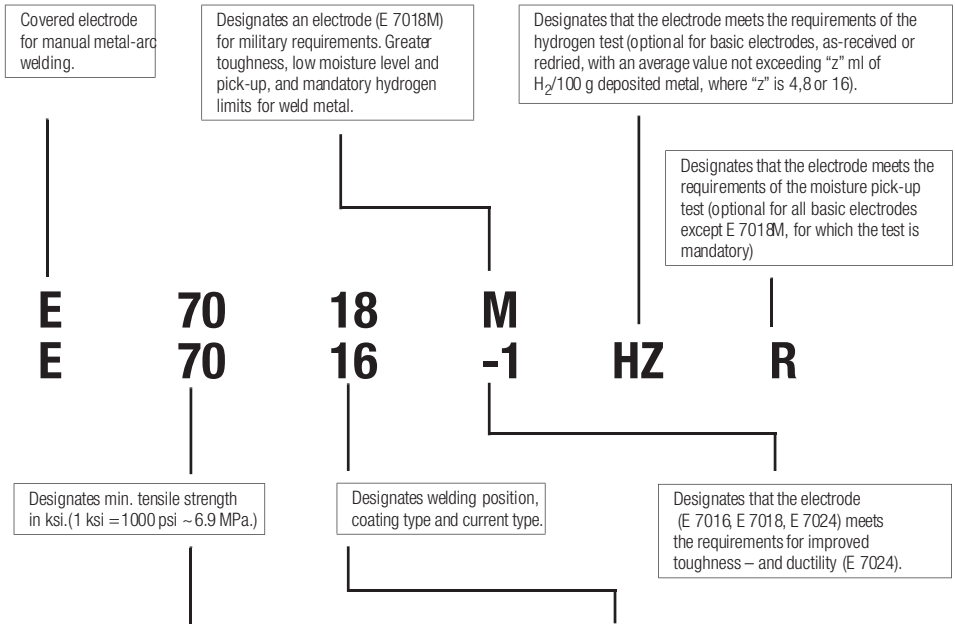
Symbol	Metal recovery, %	Type of current
1	≤105	AC + DC
2	≤105	DC
3	>105 ≤125	AC + DC
4	>105 ≤125	DC
5	>125 ≤160	AC + DC
6	>125 ≤160	DC
7	>160	AC + DC
8	>160	DC

Symbol	Welding position
1	All positions
2	All positions, except vertical down
3	Flat butt weld, flat fillet weld, horizontal-vertical fillet weld
4	Flat butt weld, flat fillet weld
5	Vertical down and positions according to symbol 3

Alloy Symbol	Chemical composition of all-weld metal , % *								
	C	Si	Mn	P	S	Cr	Ni	Mo	Other elements
Martensitic/ferritic									
13	0.12	1.0	1.5	0.030	0.025	11.0-14.0	0.60	0.75	Cu 0.75
13 4	0.06	1.0	1.5	0.030	0.025	11.0-14.5	3.0-5.0	0.4-1.0	Cu 0.75
17	0.12	1.0	1.5	0.030	0.025	16.0-18.0	0.60	0.75	Cu 0.75
Austenitic									
19 9	0.08	1.2	2.0	0.030	0.025	18.0-21.0	9.0-11.0	0.75	Cu 0.75
19 9 L	0.04	1.2	2.0	0.030	0.025	18.0-21.0	9.0-11.0	0.75	Cu 0.75
19 9 Nb	0.08	1.2	2.0	0.030	0.025	18.0-21.0	9.0-11.0	0.75	Cu 0.75, Ta+Nb 8 x C < 1.1
19 12 2	0.08	1.2	2.0	0.030	0.025	17.0-20.0	10.0-13.0	2.0-3.0	Cu 0.75
19 12 3 L	0.04	1.2	2.0	0.030	0.025	17.0-20.0	10.0-13.0	2.5-3.0	Cu 0.75
19 12 3 Nb	0.08	1.2	2.0	0.030	0.025	17.0-20.0	10.0-13.0	2.5-3.0	Cu 0.75, Ta+Nb 8 x C < 1.1
19 13 4 N L	0.04	1.2	1.0-5.0	0.030	0.025	17.0-20.0	12.0-15.0	3.0-4.5	Cu 0.75, N 0.20
Austenitic-ferritic. High corrosion resistance.									
22 9 3 N L	0.04	1.2	2.5	0.030	0.025	21.0-24.0	7.5-10.5	2.5-4.0	Cu 0.75, N 0.08-0.20
25 7 2 N L	0.04	1.2	2.0	0.035	0.025	24.0-28.0	6.0-8.0	1.0-3.0	Cu 0.75, N 0.20
25 9 3 Cu N L	0.04	1.2	2.5	0.030	0.025	24.0-27.0	7.5-10.5	2.5-4.0	N 0.10-0.25, Cu 1.5-3.5
25 9 4 N L	0.04	1.2	2.5	0.030	0.025	24.0-27.0	8.0-11.0	2.5-4.5	N 0.20-0.30, Cu 1.5, W 1.0
Fully austenitic. High corrosion resistance.									
18 15 3 L	0.04	1.2	1.0-4.0	0.030	0.025	16.5-19.5	14.0-17.0	2.5-3.5	Cu 0.75
18 16 5 N L	0.04	1.2	1.0-4.0	0.035	0.025	17.0-20.0	15.5-19.0	3.5-5.0	Cu 0.75, N 0.20
20 25 5 Cu N L	0.04	1.2	1.0-4.0	0.030	0.025	19.0-22.0	24.0-27.0	4.0-7.0	Cu 1.0-2.0, N 0.25
20 16 3 Mn N L	0.04	1.2	5.0-8.0	0.035	0.025	18.0-21.0	15.0-18.0	2.5-3.5	Cu 0.75, N 0.20
25 22 2 N L	0.04	1.2	1.0-5.0	0.030	0.025	24.0-27.0	20.0-23.0	2.0-3.0	Cu 0.75, N 0.20
27 31 4 Cu L	0.04	1.2	2.5	0.030	0.025	26.0-29.0	30.0-33.0	3.0-4.5	Cu 0.6-1.5
Special types									
18 8 Mn	0.20	1.2	4.5-7.5	0.035	0.025	17.0-20.0	7.0-10.0	0.75	Cu 0.75
18 9 Mn Mo	0.04-0.14	1.2	3.0-5.0	0.035	0.025	18.0-21.5	9.0-11.0	0.5-1.5	Cu 0.75
20 10 3	0.10	1.2	2.5	0.030	0.025	18.0-21.0	9.0-12.0	1.5-3.5	Cu 0.75
23 12 L	0.04	1.2	2.5	0.030	0.025	22.0-25.0	11.0-14.0	0.75	Cu 0.75
23 12 Nb	0.10	1.2	2.5	0.030	0.025	22.0-25.0	11.0-14.0	0.75	Cu 0.75, Ta+Nb 8 x C < 1.1
23 12 2 L	0.04	1.2	2.5	0.030	0.025	22.0-25.0	11.0-14.0	2.0-3.0	Cu 0.75
29 9	0.15	1.2	2.5	0.035	0.025	27.0-31.0	8.0-12.0	0.75	Cu 0.75
Heat resisting types									
16 8 2	0.08	0.6	2.5	0.030	0.025	14.5-16.5	7.5-9.5	1.5-2.5	Cu 0.75
19 9 H	0.04-0.08	1.2	2.0	0.03	0.025	18.0-21.0	9.0-11.0	0.75	Cu 0.75
25 4	0.15	1.2	2.5	0.030	0.025	24.0-27.0	4.0-6.0	0.75	Cu 0.75
22 12	0.15	1.2	2.5	0.030	0.025	20.0-23.0	10.0-13.0	0.75	Cu 0.75
25 20	0.06-0.20	1.2	1.0-5.0	0.030	0.025	23.0-27.0	18.0-22.0	0.75	Cu 0.75
25 20 H	0.35-0.45	1.2	2.5	0.030	0.025	23.0-27.0	18.0-22.0	0.75	Cu 0.75
18 36	0.25	1.2	2.5	0.030	0.025	14.0-18.0	33.0-37.0	0.75	Cu 0.75

* Single values shown in the table are maximum values.

Guide to AWS A5.1: Carbon steel electrodes for SMAW



AWS Classifi-cation	Tensile Strength min.		Yield Strength min.		Elongation min. %	Impact Energy Charpy-V J/°C	Welding Position	Type of coating	Type of Current	
	ksi	MPa	ksi	MPa					AC	DC
E 6010	60	430	48	330	22	27 / –30	1	Cellulosic	–	+pol
E 6011	60	430	48	330	22	27 / –30	1	Cellulosic	x	+pol
E 6012	60	430	48	330	17	Not spec.	1	Rutile	x	– pol
E 6013	60	430	48	330	17	Not spec..	1	Rutile	x	+/– pol
E 6019	60	430	48	330	22	27 / –20	1	Rutile/Acid	x	+/– pol
E 6020	60	430	48	330	22	Not spec.	2	Acid	x	c) +/– pol
E 6022	60	430	Not spec.	Not spec.	Not spec.	Not spec.	2	Acid	x	– pol
E 6027	60	430	48	330	22	27 / –30	2	Acid, high recovery	x	c) +/– pol
E 7014	70	490	58	400	17	Not spec.	1	Rutile	x	+/– pol
E 7015	70	490	58	400	22	27 / –30	1	Basic	–	+pol
E 7016	70	490	58	400	22	27 / –30	1	Basic	x	+pol
E 7018	70	490	58	400	22	27 / –30	1	Basic	x	+pol
E 7018 M	a)	490	b)	b)	24	67 / –30	1	Basic	–	+pol
E 7024	70	490	58	400	17	Not spec.	2	Rutile, high recovery	x	+/– pol
E 7027	70	490	58	400	22	27 / –30	2	Acid, high recovery	x	c) +/– pol
E 7028	70	490	58	400	22	27 / –20	2	Basic, high recovery	x	+pol
E 7048	70	490	58	400	22	27 / –30	4	Basic	x	+pol

a) Nominal value 70 ksi (490 MPa)
b) Limits are 53-72 ksi (365-496 MPa)
For Ø 2,4 mm the limit is max. 77 ksi (530 MPa)
c) H-V fillets: – pol

In addition there are requirements on:
- Chemical composition of the weld metal
- Radiographic tests

Code	Welding position
1	All positions except vertical-down
2	Flat and H-V fillets
4	All positions but in the vertical, V-down only

Guide to AWS A5.4: Stainless steel electrodes för SMAW

Covered electrode for manual metal-arc welding.

E 308 -17_

Indicates Compositional type.

Suffix	Coating type and usability characteristics
-15	For use with DC+ only. Usually basic coating. All positions.
-16	For use with DC+ and AC. Rutile coating. All positions.
-17	As for -16, but higher silica content in coating gives following: • More of a spray arc and finer rippled bead surface in H-V fillets. • Slower freezing slag permits improved handling with a drag technique. • Mitre to slight concave H-V fillets • When making vertical-up fillets the slower freezing slag requires slight weave to produce flat profile.
-25	Same coating and type as for -15 but with a mild steel core wire. Flat and horizontal positions only.
-26	Same coating and type as for -16 but with a mild steel core wire. Flat and horizontal positions only.

AWS Classification	Chemical composition of undiluted weld metal											
	C	Cr	Ni	Mo	Nb + Ta	Mn	Si	P	S	N	Cu	Other elements
E209-xx	0.06	20.5-24.0	9.5-12.0	1.5-3.0	–	4.0-7.0	1.00	0.04	0.03	0.10-0.30	0.75	V 0.1-0.3
E219-xx	0.06	19.0-21.5	5.5-7.0	0.75	–	8.0-10.0	1.00	0.04	0.03	0.10-0.30	0.75	
E240-xx	0.06	17.0-19.0	4.0-6.0	0.75	–	10.5-13.5	1.00	0.04	0.03	0.10-0.30	0.75	
E307-xxx	0.04-0.14	18.0-21.5	9.0-10.7	0.5-1.5	–	3.30-4.75	1.00	0.04	0.03	–	0.75	
E308-xx	0.08	18.0-21.0	9.0-11.0	0.75	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E308H-xx	0.04-0.08	18.0-21.0	9.0-11.0	0.75	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E308L-xx	0.04	18.0-21.0	9.0-11.0	0.75	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E308Mo-xx	0.08	18.0-21.0	9.0-12.0	2.0-3.0	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E308LMo-xx*	0.04	18.0-21.0	9.0-12.0	2.0-3.0	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E309-xx	0.15	22.0-25.0	12.0-14.0	0.75	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E309H-xx	0.04-0.15	22.0-25.0	12.0-14.0	0.75	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E309L-xx	0.04	22.0-25.0	12.0-14.0	0.75	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E309Nb-xx	0.12	22.0-25.0	12.0-14.0	0.75	0.70-1.00	0.5-2.5	1.00	0.04	0.03	–	0.75	
E309Mo-xx	0.12	22.0-25.0	12.0-14.0	2.0-3.0	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E309LMo-xx*	0.04	22.0-25.0	12.0-14.0	2.0-3.0	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E310-xx	0.08-0.20	25.0-28.0	20.0-22.5	0.75	–	1.0-2.5	0.75	0.03	0.03	–	0.75	
E310H-xx	0.35-0.45	25.0-28.0	20.0-22.5	0.75	–	1.0-2.5	0.75	0.03	0.03	–	0.75	
E310Nb-xx	0.12	25.0-28.0	20.0-22.0	0.75	0.70-1.00	1.0-2.5	0.75	0.03	0.03	–	0.75	
E310Mo-xx	0.12	25.0-28.0	20.0-22.0	2.0-3.0	–	1.0-2.5	0.75	0.03	0.03	–	0.75	
E312-xx	0.15	28.0-32.0	8.0-10.5	0.75	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E316-xx	0.08	17.0-20.0	11.0-14.0	2.0-3.0	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E316H-xx	0.04-0.08	17.0-20.0	11.0-14.0	2.0-3.0	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E316L-xx	0.04	17.0-20.0	11.0-14.0	2.0-3.0	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E316LMn-xx	0.04	18.0-21.0	15.0-18.0	2.5-3.5	–	5.0-8.0	0.9	0.04	0.03	0.10-0.25	0.75	
E317-xx	0.08	18.0-21.0	12.0-14.0	3.0-4.0	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E317L-xx	0.04	18.0-21.0	12.0-14.0	3.0-4.0	–	0.5-2.5	1.00	0.04	0.03	–	0.75	
E318-xx	0.08	17.0-20.0	11.0-14.0	2.0-3.0	6xC≤1.00	0.5-2.5	1.00	0.04	0.03	–	0.75	
E320-xx	0.07	19.0-21.0	32.0-36.0	2.0-3.0	8xC≤1.00	0.5-2.5	0.60	0.04	0.03	–	3.0-4.0	
E320LR-xx	0.03	19.0-21.0	32.0-36.0	2.0-3.0	8xC≤0.40	1.50-2.50	0.30	0.020	0.015	–	3.0-4.0	
E330-xx	0.18-0.25	14.0-17.0	33.0-37.0	0.75	–	1.0-2.5	1.00	0.04	0.03	–	0.75	
E330H-xx	0.35-0.45	14.0-17.0	33.0-37.0	0.75	–	1.0-2.5	1.00	0.04	0.03	–	0.75	
E347-xx	0.08	18.0-21.0	9.0-11.0	0.75	8xC≤1.00	0.5-2.5	1.00	0.04	0.03	–	0.75	
E349-xx	0.13	18.0-21.0	8.0-10.0	0.35-0.65	0.75-1.20	0.5-2.5	1.00	0.04	0.03	–	0.75	V 0.1-0.3,Ti≤0.15, W1.25-1.75
E383-xx	0.03	26.5-29.0	30.0-33.0	3.2-4.2	–	0.5-2.5	0.90	0.02	0.02	–	0.6-1.5	
E385-xx	0.03	19.5-21.5	24.0-26.0	4.2-5.2	–	1.0-2.5	0.90	0.03	0.02	–	1.2-2.0	
E409Nb-xx	0.12	11.0-14.0	0.6	0.75	0.50-1.50	1.0	1.00	0.04	0.03	–	0.75	
E410-xx	0.12	11.0-13.5	0.7	0.75	–	1.0	0.90	0.04	0.03	–	0.75	
E410NiMo-xx	0.06	11.0-12.5	4.0-5.0	0.40-0.70	–	1.0	0.90	0.04	0.03	–	0.75	
E430-xx	0.10	15.0-18.0	0.6	0.75	–	1.0	0.90	0.04	0.03	–	0.75	
E430Nb-xx	0.10	15.0-18.0	0.6	0.75	0.50-1.50	1.0	1.00	0.04	0.03	–	0.75	
E630-xx	0.05	16.00-16.75	4.5-5.0	0.75	0.15-0.30	0.25-0.75	0.75	0.04	0.03	–	3.25-4.00	
E16-8-2-xx	0.10	14.5-16.5	7.5-9.5	1.0-2.0	–	0.5-2.5	0.60	0.03	0.03	–	0.75	
E2209-xx	0.04	21.5-23.5	8.5-10.5	2.5-3.5	–	0.5-2.0	1.00	0.04	0.03	0.08-0.20	0.75	
E2553-xx	0.06	24.0-27.0	6.5-8.5	2.9-3.9	–	0.5-1.5	1.00	0.04	0.03	0.10-0.25	1.5-2.5	
E2593-xx	0.04	24.0-27.0	8.5-10.5	2.9-3.9	–	0.5-1.5	1.00	0.04	0.03	0.08-0.25	1.5-3.0	
E2594-xx	0.04	24.0-27.0	8.0-10.5	3.5-4.5	–	0.5-2.0	1.00	0.04	0.03	0.20-0.30	0.75	
E2595-xx	0.04	24.0-27.0	8.0-10.5	2.5-4.5	–	2.5	1.2	0.03	0.025	0.20-0.30	0.4-1.5	W 0.4-1.0
E3155-xx	0.10	20.0-22.5	19.0-21.0	2.5-3.5	0.75-1.25	1.0-2.5	1.00	0.04	0.03	–	0.75	Co 18.5-21.0, W 2.0-3.0
E33-31-xx	0.03	31.0-35.0	30.0-32.0	1.0-2.0	–	2.5-4.0	0.9	0.02	0.01	0.3-0.5	0.4-0.8	

* Earlier E308MoL-xx and E309MoL-xx

Guide to AWS A5.5: Low alloy steel electrodes for SMAW

Covered electrode for manual metal-arc welding.

Designates welding position, coating type and current type.

E 80 16 -D3

Designates min. tensile strength in ksi. (1 ksi = 1000 psi ~ 6.9 MPa)

Designates chemical composition of weld metal.

AWS Classification	Welding Position	Type of coating	Type of Current	
			AC	DC
E xx10	1	Cellulosic	–	+pol
E xx11	1	Cellulosic	x	+pol
Exx13	1	Rutile	x	+/– pol
E xx15	1	Basic	–	+pol
Exx16	1	Basic	x	+pol
E xx18	1	Basic, iron powder	x	+pol
E xx20	2	Acid	x	c) +/– pol
E xx27	2	Acid, high recovery	x	c) +/– pol

c) Kälsvets liggande endast -pol

Code	Welding position
1	All positions except vertical-down
2	Flat and H-V fillets

AWS Classification	Tensile Strength min. MPa	Yield Strength min. MPa
E 70xx-x	490	390
E 70xx-BL2	520	390
E 70xx-P1	490	415
E 70xx-W1	490	415
E 80xx-x	550	460
E 80xx-C3	550	470-550
E 90xx-x	620	530
E 90xx-M	620	540-620
E 100xx-x	690	600
E 100xx-M	690	610-690
E 110xx-x	760	670
E 110xx-M	760	680-760
E 120xx-x	830	740
E 120xx-M	830	745-830
E 120xx-M1	830	745-830

Suffix	Alloying system	Nominal values, wt%
-A1	C / Mo	~0.1/ 0.5
-B1	Cr / Mo	~0.5/ 0.5
-B2	Cr / Mo	~1.3/ 0.5
-B2L*	Cr / Mo	~1.3/ 0.5
-B3	Cr / Mo	~2.3/ 1.0
-B3L*	Cr / Mo	~2.3/ 1.0
-B4L*	Cr / Mo	~2.0/ 0.5
-B5	Cr / Mo / V	~0.5 / 1.0 / 0.05
-C1	Ni	~2.5
-C1L*	Ni	~25
-C2	Ni	~3.5
-C2L*	Ni	~35
-C3	Ni / Cr / Mo / V	~1.0 / 0.1 / 0.3 / 0.05
-NM	Ni / Mo	~1.0/ 0.5
-D1	Mn / Mo	~1.5/ 0.3
-D2	Mn / Mo	~1.8/ 0.3
-D3	Mn / Mo	~1.5/ 0.5
-G/-M/-W	All other low alloy steel electrodes	

* C max. 0.05%

AWS Classification	Impact Energy	
	min. J	°C
E 7010-P1	27	–30
E 8010-P1	27	–30
E 8018-P2	27	–30
E 8045-P2	27	–30
E 9010-P1	27	–30
E 9018-P2	27	–30
E 9045-P2	27	–30
E 10045-P2	27	–30
E 8018-NM1	27	–40
E 8016-C3	27	–40
E 8018-C3	27	–40
E 7018-C3L	27	–50
E 8016-C4/D3	27	–50
E 8018-C4/D3	27	–50
E 9015-D1	27	–50
E 9018-D1/D3	27	–50
E 10015-D2	27	–50
E 10016-D2	27	–50
E 10018-D2	27	–50
E 9018-M	27	–50
E 10018-M	27	–50
E 11018-M	27	–50
E 12018-M	27	–50
E 12018-M1	67	–20
E 7018-W1	27	–20
E 8018-W2	27	–20
E 8016-C1	27	–60
E 8018-C1	27	–60
E 7015-C1L	27	–75
E 7016-C1L	27	–75
E 7018-C1L	27	–75
E 8016-C2	27	–75
E 8018-C2	27	–75
E 7015-C2L	27	–100
E 7016-C2L	27	–100
E 7018-C2L	27	–100
E 9015-C5L	27	–115
EXXXX-A1/BX/BXL	Not spec.	Not spec.
E(X)XX-G	Not spec.	Not spec.

Guide to EN ISO 14341: Wire electrodes and deposits for gas shielded metal arc welding of non-alloy and fine grain steels

Symbol	Yield Strength min. MPa	Tensile Strength MPa	Elongation min. %
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

Symbol	Shielding gas
M	EN ISO 14175 Mixed gas without helium
C	EN ISO 14175 Carbon dioxide

G 46 3 M G3Si1

Wire electrode and /or deposit/ gas shielded metal arc welding.

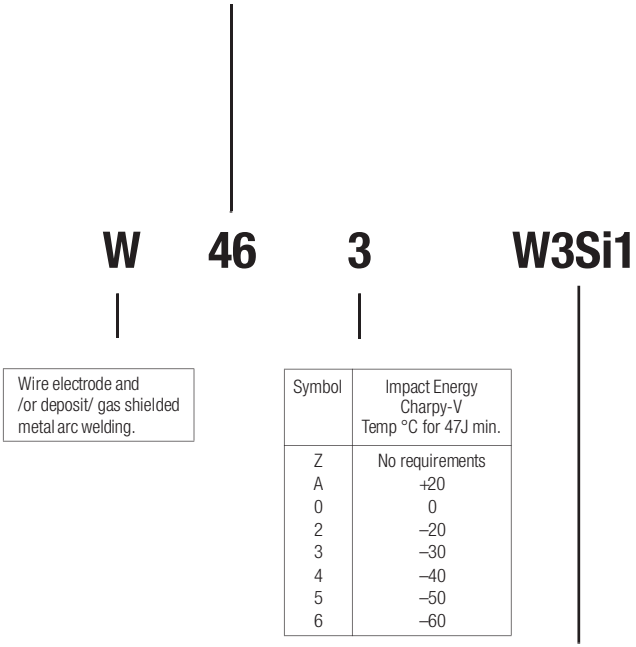
Symbol	Impact Energy Charpy-V Temp °C for 47J min.
Z	No requirements
A	+20
0	0
2	–20
3	–30
4	–40
5	–50
6	–60

Symbol	Chemical composition of wire electrodes *								
	C	Si	Mn	P	S	Ni	Mo	Al	Ti +Zr
G2Si	0.06 - 0.14	0.50 - 0.80	0.90 - 1.30	0.025	0.025	0.15	0.15	0.02	0.15
G3Si1	0.06 - 0.14	0.70 - 1.00	1.30 - 1.60	0.025	0.025	0.15	0.15	0.02	0.15
G4Si1	0.06 - 0.14	0.80 - 1.20	1.60 - 1.90	0.025	0.025	0.15	0.15	0.02	0.15
G3Si2	0.06 - 0.14	1.00 - 1.30	1.30 - 1.60	0.025	0.025	0.15	0.15	0.02	0.15
G2Ti	0.04-0.14	0.40-0.80	0.90-1.40	0.025	0.025	0.15	0.15	0.05-0.20	0.05-0.25
G3Ni1	0.06-0.14	0.50-0.90	1.00-1.60	0.020	0.020	0.80-1.50	0.15	0.02	0.15
G2Ni2	0.06-0.14	0.40-0.80	0.80-1.40	0.020	0.020	2.10-2.70	0.15	0.02	0.15
G2Mo	0.08-0.12	0.30-0.70	0.90-1.30	0.020	0.020	0.15	0.40-0.60	0.02	0.15
G4Mo	0.06-0.14	0.50-0.80	1.70-2.10	0.025	0.025	0.15	0.40-0.60	0.02	0.15
G2Al	0.08-0.14	0.30-0.50	0.90-1.30	0.025	0.025	0.15	0.15	0.35-0.75	0.15

* If not specified Cr $\leq$ 0.15, Cu $\leq$ 0.35, V $\leq$ 0.03. Residual copper content in the steel plus any coating shall not exceed 0.35%
Single values shown in the table mean maximum values.

Guide to EN ISO 636-A: Rods, wires and deposits for tungsten inert gas welding of non-alloy and fine grain steels

Symbol	Yield Strength min. MPa	Tensile Strength MPa	Elongation min. %
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



Symbol	Impact Energy Charpy-V Temp °C for 47J min.
Z	No requirements
A	+20
0	0
2	–20
3	–30
4	–40
5	–50
6	–60

Symbol	Chemical composition of wire electrodes *								
	C	Si	Mn	P	S	Ni	Mo	Al	Ti + Zr
W2Si	0.06 - 0.14	0.50 - 0.80	0.90 - 1.30	0.025	0.025	0.15	0.15	0.02	0.15
W3Si1	0.06 - 0.14	0.70 - 1.00	1.30 - 1.60	0.025	0.025	0.15	0.15	0.02	0.15
W4Si1	0.06 - 0.14	0.80 - 1.20	1.60 - 1.90	0.025	0.025	0.15	0.15	0.02	0.15
W3Si2	0.06 - 0.14	1.00 - 1.30	1.30 - 1.60	0.025	0.025	0.15	0.15	0.02	0.15
W2Ti	0.04-0.14	0.40-0.80	0.90-1.40	0.025	0.025	0.15	0.15	0.05-0.20	0.05-0.25
W3Ni1	0.06-0.14	0.50-0.90	1.00-1.60	0.020	0.020	0.80-1.50	0.15	0.02	0.15
W2Ni2	0.06-0.14	0.40-0.80	0.80-1.40	0.020	0.020	2.10-2.70	0.15	0.02	0.15
W2Mo	0.08-0.12	0.30-0.70	0.90-1.30	0.020	0.020	0.15	0.40-0.60	0.02	0.15
W4Mo	0.06-0.14	0.50-0.80	1.70-2.10	0.025	0.025	0.15	0.40-0.60	0.02	0.15
W2Al	0.08-0.14	0.30-0.50	0.90-1.30	0.025	0.025	0.15	0.15	0.35-0.75	0.15

* If not specified Cr $\leq$ 0.15, Cu $\leq$ 0.35, V $\leq$ 0.03. Residual copper content in the steel plus any coating shall not exceed 0.35%
Single values shown in the table mean maximum values.

Guide to EN ISO 16834-A: Wire electrodes, wires, rods and deposits for gas-shielded arc welding of high strength steels

Symbol	Yield Strength min. MPa	Tensile Strength MPa	Elongation min. %
55	550	640-820	18
62	620	700-890	18
69	690	770-940	17
79	790	880-1080	16
89	890	940-1180	15

Symbol	Shielding gas
M	ISO 14175-M21 Mixed gas without helium
C	ISO 14175-C1 Carbon dioxide
A	Ar +1-5% O_2

G 62 6 M G4Ni1Mo

Wire electrode and /or deposit/ gas shielded metal arc welding.

Symbol	Impact Energy Charpy-V Temp °C for 47J min.
Z	No requirements
A	+20
0	0
2	–20
3	–30
4	–40
5	–50
6	–60

Symbol	Chemical composition of wire electrodes *									
	C	Si	Mn	P	S	Ni	Cr	Mo	Cu	Total other
Mn3NiCrMo	0.14	0.60-0.80	1.30-1.80	0.015	0.018	0.50-0.65	0.40-0.65	0.15-0.30	0.30	0.25
Mn3Ni1CrMo	0.12	0.40-0.70	1.30-1.80	0.015	0.018	1.20-1.60	0.20-0.40	0.20-0.30	0.35	0.25 **
Mn3Ni1Mo	0.12	0.40-0.80	1.30-1.90	0.015	0.018	0.80-1.30	0.15	0.25-0.65	0.30	0.25
Mn3Ni1,5Mo	0.08	0.20-0.60	1.30-1.80	0.015	0.018	1.40-2.10	0.15	0.25-0.55	0.30	0.25
Mn3Ni1Cu	0.12	0.20-0.60	1.20-1.80	0.015	0.018	0.80-1.25	0.15	0.20	0.30-0.65	0.25
Mn3Ni1MoCu	0.12	0.20-0.60	1.20-1.80	0.015	0.018	0.80-1.25	0.15	0.20-0.55	0.30-0.65	0.25
Mn3Ni2,5CrMo	0.12	0.40-0.70	1.30-1.80	0.015	0.018	2.30-2.80	0.20-0.60	0.30-0.65	0.30	0.25
Mn4Ni1Mo	0.12	0.50-0.80	1.60-2.10	0.015	0.018	0.80-1.25	0.15	0.20-0.55	0.30	0.25
Mn4Ni2Mo	0.12	0.25-0.60	1.60-2.10	0.015	0.018	2.00-2.60	0.15	0.30-0.65	0.30	0.25
Mn4Ni1,5CrMo	0.12	0.50-0.80	1.60-2.10	0.015	0.018	1.30-1.90	0.15-0.40	0.30-0.65	0.30	0.25
Mn4Ni2CrMo	0.12	0.60-0.90	1.60-2.10	0.015	0.018	1.80-2.30	0.20-0.45	0.45-0.70	0.30	0.25
Mn4Ni2,5CrMo	0.13	0.50-0.80	1.60-2.10	0.015	0.018	2.30-2.80	0.20-0.60	0.30-0.65	0.30	0.25

* If not specified Ti ≤ 0.10, Zr ≤ 0.10, Al ≤ 0.12, V ≤ 0.03. Residual copper content in the steel plus any coating shall comply with stated value.
Single values shown in the table mean maximum values.
** V = 0.05-0.013

Guide to EN ISO 17632-A: Cored wires for non-alloy and fine grain steels

Symbol	Yield Strength min. MPa	Tensile Strength MPa	Elongation min. %
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

Symbol	Welding position
1	All positions
2	All positions, except vertical down
3	Flat butt weld, flat fillet weld, horizontal-vertical fillet weld
4	Flat butt weld, flat fillet weld
5	Vertical down and positions according to symbol 3

Tubular cored electrode/ metal arc welding

Symbol	Impact Energy Charpy-V Temp °C for 47J min.
Z	No requirements
A	+20
0	0
2	–20
3	–30
4	–40
5	–50
6	–60

Symbol	Shielding gas
M	EN ISO 14175 Mixed gas without helium
C	EN ISO 14175 Carbon dioxide

T 46 3 1Ni B M 4 H5

Symbol	Chemical composition of all-weld metal , % *		
	Mn	Ni	Mo
No symbol	2.0	–	–
Mo	1.4	–	0.3 - 0.6
MnMo	1.4 - 2.0	–	0.3 - 0.6
1Ni	1.4	0.6 - 1.2	–
1.5Ni	1.6	1.2 - 1.8	–
2Ni	1.4	1.8 - 2.6	–
3Ni	1.4	2.6 - 3.8	–
Mn1Ni	1.4 - 2.0	0.6 - 1.2	–
1NiMo	1.4	0.6 - 1.2	0.3 - 0.6
Z	Any other agreed composition		

* If not specified Mo<0.2 Ni <0.5, Cr < 0.2, V <0.08, Nb <0.05, Cu < 0.3 and for electrodes witout a gas shield Al<2.0
Single values shown in the table are maximum values.

Symbol	Hydrogen content, ml/100 g deposited weld metal, max.
H5	5
H10	10
H15	15

Symbol	Characteristics	Types of weld		Shielding gas
		Singel-pass	Multiple-pass	
R	Rutile, slow freezing slag	X	X	Required
P	Rutile, fast freezing slag	X	X	Required
B	Basic	X	X	Required
M	Metal powder	X	X	Required
V	Rutile or basic/fluoride	X		Not required
W	Basic/fluoride, slow freezing slag	X	X	Not required
Y	Basic/fluoride, fast freezing slag	X	X	Not required
Z	Other types			

Guide to EN ISO 17633-A: Cored wires for stainless steels

Tubular cored electrode/metal arc welding

Symbol	Type of electrode core
R	Rutile, slow freezing slag
P	Rutile, fast freezing slag
M	Metal powder
U	Selfshielding
Z	Other types

Symbol	Shielding gas
M	ISO 14175-M2 Mixed gas without helium
C	ISO 14175-C1 Carbon dioxide
N	Without a gas shield

T 19 12 3L R M 4

Symbol	Welding position
1	All positions
2	All positions, except vertical down
3	Flat butt weld, flat fillet weld, horizontal-vertical fillet weld
4	Flat butt weld, flat fillet weld
5	Vertical down and positions according to symbol 3

Alloy Symbol	Chemical composition of all-weld metal, % *								
	C	Si	Mn	P	S	Cr	Ni	Mo	Other elements
Martensitic/ferritic									
13	0.12	1.0	1.5	0.030	0.025	11.0-14.0	0.3	0.3	Cu 0.5
13 Ti	0.10	1.0	0.80	0.030	0.030	10.5-13.0	0.3	0.3	Cu 0.5, 10 x C - 1.5
13 4	0.06	1.0	1.5	0.030	0.025	11.0-14.5	3.0-5.0	0.4-1.0	Cu 0.5
17	0.12	1.0	1.5	0.030	0.025	16.0-18.0	0.3	0.3	Cu 0.5
Austenitic									
19 9 L	0.04	1.2	2.0	0.030	0.025	18.0-21.0	9.0-11.0	0.3	Cu 0.5
19 9 Nb	0.08	1.2	2.0	0.030	0.025	18.0-21.0	9.0-11.0	0.3	Cu 0.5, Nb 8 x C- 1.1
19 12 3 L	0.04	1.2	2.0	0.030	0.025	17.0-20.0	10.0-13.0	2.5-3.0	Cu 0.5
19 12 3 Nb	0.08	1.2	2.0	0.030	0.025	17.0-20.0	10.0-13.0	2.5-3.0	Cu 0.5, Nb 8 x C-1 .1
19 13 4 N L	0.04	1.2	1.0-5.0	0.030	0.025	17.0-20.0	12.0-15.0	3.0-4.5	Cu 0.5, N 0.08-0.20
Austenitic-ferritic. High corrosion resistance.									
22 9 3 N L	0.04	1.2	2.5	0.030	0.025	21.0-24.0	7.5-10.5	2.5-4.0	Cu 0.5, N 0.08-0.20
Fully austenitic. High corrosion resistance.									
18 16 5 N L	0.03	1.0	1.0-4.0	0.03	0.02	17.0-20.0	16.0-19.0	3.5-5.0	Cu 0.5, N 0.10-0.20
Special types									
18 8 Mn	0.20	1.2	4.5-7.5	0.035	0.025	17.0-20.0	7.0-10.0	0.3	Cu 0.5
20 10 3	0.08	1.2	2.5	0.035	0.025	19.5-22.0	9.0-11.0	2.0-4.0	Cu 0.5
23 12 L	0.04	1.2	2.5	0.030	0.025	22.0-25.0	11.0-14.0	0.3	Cu 0.5
23 12 2 L	0.04	1.2	2.5	0.030	0.025	22.0-25.0	11.0-14.0	2.0-3.0	Cu 0.5
29 9	0.15	1.2	2.5	0.035	0.025	27.0-31.0	8.0-12.0	0.3	Cu 0.5
Heat resisting types									
22 12 H	0.15	1.2	2.5	0.030	0.025	20.0-23.0	10.0-13.0	0.3	Cu 0.5
25 20	0.06-0.20	1.2	1.0-5.0	0.030	0.025	23.0-27.0	18.0-22.0	0.3	Cu 0.5

* Single values shown in the table are maximum values.

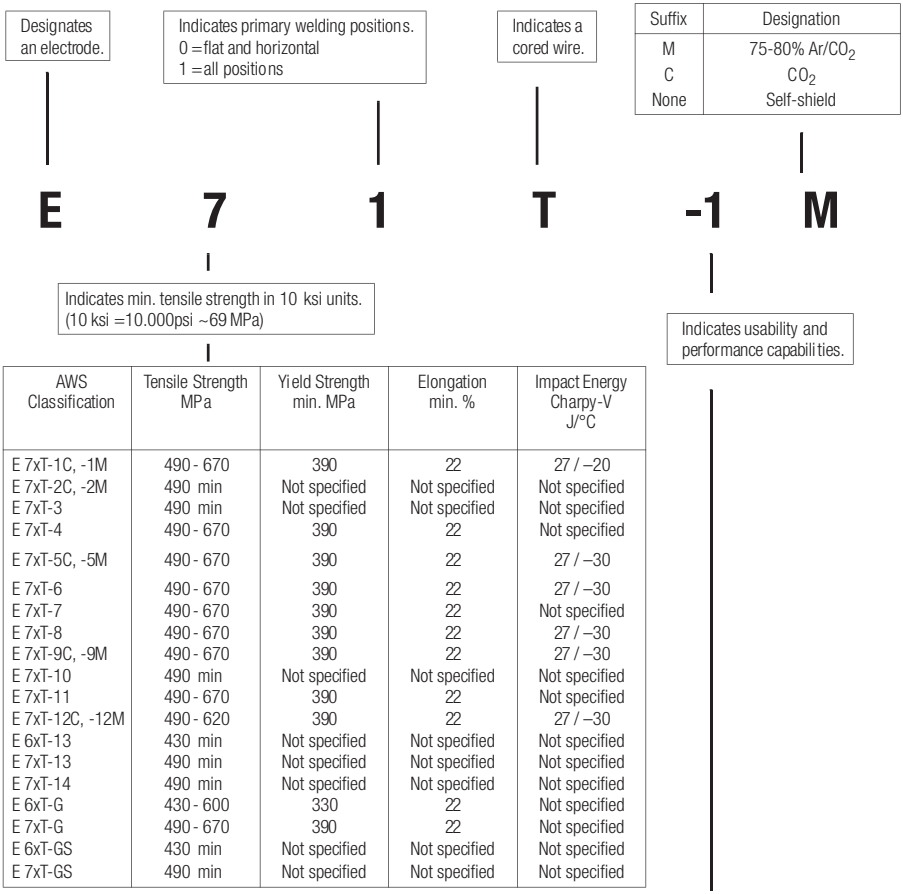
Guide to AWS A5.18: Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding

AWS Classification	Chemical composition of solid wire or rod, wt % *					
	C	Mn	Si	P	S	Cu
ER70S-2	≤0.07	0.90-1.40	0.40-0.70	≤0.025	≤0.035	≤0.50
ER70S-3	0.06-0.15	0.90-1.40	0.45-0.70	≤0.025	≤0.035	≤0.50
ER70S-4	0.06-0.15	1.00-1.50	0.65-0.85	≤0.025	≤0.035	≤0.50
ER70S-6	0.06-0.15	1.40-1.85	0.80-1.15	≤0.025	≤0.035	≤0.50
ER70S-7	0.07-0.15	1.50-2.00	0.50-0.80	≤0.025	≤0.035	≤0.50
ER70S-G	Not spec.	Not spec.	Not spec.	Not spec.	Not spec.	≤0.50
* Single values shown in the table are maximum values.						

AWS Classification **	Chemical composition of weld metal from metal cored wire, wt % *					
	C	Mn	Si	P	S	Cu
E70C-3X	0.12	1.75	0.90	0.03	0.03	0.50
E70C-6X	0.12	1.75	0.90	0.03	0.03	0.50
E70C-G(X)	Not spec.	Not spec.	Not spec.	Not spec.	Not spec.	Not spec.
E70C-GS(X)	Not spec.	Not spec.	Not spec.	Not spec.	Not spec.	Not spec.
* Single values shown in the table are maximum values. ** The final X shown in the classification represents a "C" or "M" which corresponds to the shielding gas with which the electrode is classified. The use of "C" designates 100% CO_2 shielding, "M" designates 75-80% Ar/balance CO_2.						

AWS Classification *	Mechanical Properties of weld metal				
	Tensile Strength min. MPa	Yield Strength min. MPa (0.2% proof)	Elongation min. %	Impact Energy Charpy-V J/°C	Shielding gas
ER70S-2	480	400	22	27 / –30	CO_2 or Ar / CO_2
ER70S-3	480	400	22	27 / –20	CO_2 or Ar / CO_2
ER70S-4	480	400	22	Not required	CO_2 or Ar / CO_2
ER70S-6	480	400	22	27 / –30	CO_2 or Ar / CO_2
ER70S-7	480	400	22	27 / –30	CO_2 or Ar / CO_2
ER70S-G	480	400	22	As agreed	CO_2 or Ar / CO_2
E70C-3X	480	400	22	27 / –20	CO_2 or 75-80%Ar / bal. CO_2
E70C-6X	480	400	22	27 / –30	CO_2 or 75-80%Ar / bal. CO_2
E70C-G(X)	480	400	22	As agreed	As agreed
E70C-GS(X)	480	Not spec.	Not spec.	Not required	As agreed
* The final X shown in the classification represents a "C" or "M" which corresponds to the shielding gas with which the electrode is classified. The use of "C" designates 100% CO_2 shielding, "M" designates 75-80% Ar/balance CO_2.					

Guide to AWS A5.20: Carbon steel wires for FCAW



AWS Classification	Tensile Strength MPa	Yield Strength min. MPa	Elongation min. %	Impact Energy Charpy-V J/°C
E 7xT-1C, -1M	490 - 670	390	22	27 / –20
E 7xT-2C, -2M	490 min	Not specified	Not specified	Not specified
E 7xT-3	490 min	Not specified	Not specified	Not specified
E 7xT-4	490 - 670	390	22	Not specified
E 7xT-5C, -5M	490 - 670	390	22	27 / –30
E 7xT-6	490 - 670	390	22	27 / –30
E 7xT-7	490 - 670	390	22	Not specified
E 7xT-8	490 - 670	390	22	27 / –30
E 7xT-9C, -9M	490 - 670	390	22	27 / –30
E 7xT-10	490 min	Not specified	Not specified	Not specified
E 7xT-11	490 - 670	390	22	Not specified
E 7xT-12C, -12M	490 - 620	390	22	27 / –30
E 6xT-13	430 min	Not specified	Not specified	Not specified
E 7xT-13	490 min	Not specified	Not specified	Not specified
E 7xT-14	490 min	Not specified	Not specified	Not specified
E 6xT-G	430 - 600	330	22	Not specified
E 7xT-G	490 - 670	390	22	Not specified
E 6xT-GS	430 min	Not specified	Not specified	Not specified
E 7xT-GS	490 min	Not specified	Not specified	Not specified

Suffix	Shielding gas	Multiple-pass	Single-pass	Flux type
-1	X	X	X	DC + pol
-2	X		X	DC + pol
-3			X	DC + pol
-4		X	X	DC + pol
-5	X	X	X	DC +/– pol
-6		X	X	DC + pol
-7		X	X	DC – pol
-8		X	X	DC – pol
-9	X	X	X	DC + pol
-10			X	DC – pol
-11		X	X	DC – pol
-12	X	X	X	DC + pol
-13			X	DC – pol
-14			X	DC – pol
-G	Not specified	X	X	Not specified
-GS	Not specified		X	Not specified

Guide to AWS A5.28: Low-alloy Steel Electrodes and Rods for Gas Shielded Arc Welding

AWS Classification	Chemical composition of solid wire or rod, wt % *													
	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	Other elements total
ER70S-A1	0.12	1.30	0.3-0.70	0.025	0.025	0.20	–	0.40-0.65	–	–	–	–	0.35	0.50
ER80S-B2	0.07-0.12	0.40-0.70	0.40-0.70	0.025	0.025	0.20	1.20-1.50	0.40-0.65	–	–	–	–	0.35	0.50
ER70S-B2L	0.05	0.40-0.70	0.40-0.70	0.025	0.025	0.20	1.20-1.50	0.40-0.65	–	–	–	–	0.35	0.50
ER90S-B3	0.07-0.12	0.40-0.70	0.40-0.70	0.025	0.025	0.20	2.30-2.70	0.90-1.20	–	–	–	–	0.35	0.50
ER80S-B3L	0.05	0.40-0.70	0.40-0.70	0.025	0.025	0.20	2.30-2.70	0.90-1.20	–	–	–	–	0.35	0.50
ER80S-B6	0.10	0.40-0.70	0.50	0.025	0.025	0.6	4.50-6.00	0.45-0.65	–	–	–	–	0.35	0.50
ER80S-B8	0.10	0.40-0.70	0.50	0.025	0.025	0.5	8.00-10.5	0.8-1.2	–	–	–	–	0.35	0.50
ER90S-B9	0.07-0.13	1.20	0.15-0.50	0.010	0.010	0.80	8.00-10.50	0.85-1.20	0.15-0.30			0.04	0.20	0.50
ER80S-Ni1	0.12	1.25	0.40-0.80	0.025	0.025	0.80-1.10	0.15	0.35	0.05	–	–	–	0.35	0.50
ER80S-Ni2	0.12	1.25	0.40-0.80	0.025	0.025	2.00-2.75	–	–	–	–	–	–	0.35	0.50
ER80S-Ni3	0.12	1.25	0.40-0.80	0.025	0.025	3.00-3.75	–	–	–	–	–	–	0.35	0.50
ER80S-D2	0.7-0.12	1.60-2.10	0.50-0.80	0.025	0.025	0.15	–	0.40-0.60	–	–	–	–	0.5	0.50
ER90S-D2	0.7-0.12	1.60-2.10	0.50-0.80	0.025	0.025	0.15	–	0.40-0.60	–	–	–	–	0.5	0.50
ER100S-1	0.08	1.25-1.80	0.20-0.55	0.010	0.010	1.40-2.10	0.30	0.25-0.55	0.05	0.10	0.10	0.10	0.25	0.50
ER110S-1	0.09	1.40-1.80	0.20-0.55	0.010	0.010	1.90-2.60	0.50	0.25-0.55	0.04	0.10	0.10	0.10	0.25	0.50
ER120S-1	0.10	1.40-1.80	0.25-0.60	0.010	0.010	2.00-2.80	0.60	0.30-0.65	0.03	0.10	0.10	0.10	0.25	0.50
ERXXS-G	Not specified													

* Single values shown in the table are maximum values.

AWS Classification	Chemical composition of weld metal from metal cored wire, wt % *													
	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	Other elements total
E80C-B2	0.05-0.12	0.40-1.00	0.25-0.60	0.025	0.030	0.20	1.00-1.50	0.40-0.65	0.03	–	–	–	-	0.50
E70C-B2L	0.05	0.40-1.00	0.25-0.60	0.025	0.030	0.20	1.00-1.50	0.40-0.65	0.03	–	–	–	0.35	0.50
E90C-B3	0.05-0.12	0.40-1.00	0.25-0.60	0.025	0.030	0.20	2.00-2.50	0.90-1.20	0.03	–	–	–	0.35	0.50
E80C-B3L	0.05	0.40-1.00	0.25-0.60	0.025	0.030	0.20	2.00-2.50	0.90-1.20	0.03	–	–	–	0.35	0.50
E80C-B6	0.10	0.40-1.00	0.25-0.60	0.025	0.025	0.60	4.50-6.00	0.45-0.65	0.03	–	–	–	0.35	0.50
E80C-B8	0.10	0.40-1.00	0.25-0.60	0.025	0.025	0.20	8.00-10.50	0.80-1.20	0.03	–	–	–	0.35	0.50
E90C-B9	0.08-0.13	1.20**	0.50	0.020	0.015	0.80**	8.00-10.50	0.85-1.20	0.15-0.30	–	–	0.04	0.20	0.50
E80C-Ni1	0.12	1.50	0.90	0.025	0.030	0.80-1.10	–	0.30	0.03	–	–	–	0.35	0.50
E70C-Ni2	0.08	1.25	0.90	0.025	0.030	1.75-2.75	–	–	0.03	–	–	–	0.35	0.50
E80C-Ni2	0.12	1.50	0.90	0.025	0.030	1.75-2.75	–	–	0.03	–	–	–	0.35	0.50
E80C-Ni3	0.12	1.50	0.90	0.025	0.030	2.75-3.75	–	–	0.03	–	–	–	0.35	0.50
E90C-D2	0.12	1.00-1.90	0.90	0.025	0.030	–	–	0.40-0.60	0.03	–	–	–	0.35	0.50
E90C-K3	0.15	0.75-2.25	0.80	0.025	0.025	0.50-2.50	0.15	0.25-0.65	0.03	–	–	–	0.35	0.50
E100C-K3	0.15	0.75-2.25	0.80	0.025	0.025	0.50-2.50	0.15	0.25-0.65	0.03	–	–	–	0.35	0.50
E110C-K3	0.15	0.75-2.25	0.80	0.025	0.025	0.50-2.50	0.15	0.25-0.65	0.03	–	–	–	0.35	0.50
E110C-K4	0.15	0.75-2.25	0.80	0.025	0.025	0.50-2.50	0.15-0.65	0.25-0.65	0.03	–	–	–	0.35	0.50
E120C-K4	0.15	0.75-2.25	0.80	0.025	0.025	0.50-2.50	0.15-0.65	0.25-0.65	0.03	–	–	–	0.35	0.50
E80C-W2	0.12	0.50-1.30	0.35-0.80	0.025	0.030	0.40-0.80	0.45-0.70	–	0.03	–	–	–	0.30-0.75	0.50
EXXC-G	Not specified													

* Single values shown in the table are maximum values. ** Max 1.50% of Mn and Ni in total.

Guide to AWS A5.28: Low-alloy Steel Electrodes and Rods for Gas Shielded Arc Welding

AWS Classification	Mechanical Properties of weld metal				
	Tensile Strength min. MPa	Yield Strength min. MPa (0.2% proof)	Elongation min. %	Impact Energy Charpy-V J/°C	Testing condition
ER70S-B2L/A1	515	400	19	Not required	*1)
ER80S-B2	550	470	19	Not required	*1)
ER80S-B3L	550	470	17	Not required	*2)
ER90S-B3	620	540	17	Not required	*2)
ER80S-B6/B8	550	470	17	Not required	*3)
ER90S-B9	620	410	16	Not required	*4)
ER80S-Ni1	550	470	24	27 / –46	As-Welded
ER80S-Ni2	550	470	24	27 / –62	*1)
ER80S-Ni3	550	470	24	27 / –73	*1)
ER80S-D2	550	470	17	27 / –29	As-Welded
ER90S-D2	620	540	17	27 / -29	As-Welded
ER100S-1	690	610	16	68 / –51	As-Welded
ER110S-1	760	660	15	68 / –51	As-Welded
ER120S-1	830	730	14	68 / –51	As-Welded
ER70S-G	490	Not specified	Not specified	As agreed	As agreed
ER80S-G	550	Not specified	Not specified	As agreed	As agreed
ER90S-G	620	Not specified	Not specified	As agreed	As agreed
ER100S-G	690	Not specified	Not specified	As agreed	As agreed
ER110S-G	760	Not specified	Not specified	As agreed	As agreed
ER120S-G	830	Not specified	Not specified	As agreed	As agreed
E70C-B2L	515	400	19	Not required	*1)
E80C-B2	550	470	19	Not required	*1)
E80C-B3L	550	470	17	Not required	*2)
E90C-B3	620	540	17	Not required	*2)
E80C-B6/B8	550	470	17	Not required	*3)
E90C-B9	620	410	16	Not required	*4)
E70C-Ni2	490	400	24	27 / -62	*1)
E80C-Ni1	550	470	24	27 / -46	As-Welded
E80C-Ni2	550	470	24	27 / -62	*1)
E80C-Ni3	550	470	24	27 / -73	*1)
E90C-D2	620	540	17	27 / -29	As-Welded
E90C-K3	620	540	18	27 / -51	As-Welded
E100C-K3	690	610	16	27 / -51	As-Welded
E100C-K3/K4	760	680	15	27 / -51	As-Welded
E120C-K4	830	750	15	27 / -51	As-Welded
E80C-W2	550	470	22	27 / -29	As-Welded
E70C-G	490	Not specified	Not specified	As agreed	As agreed
E80C-G	550	Not specified	Not specified	As agreed	As agreed
E90C-G	620	Not specified	Not specified	As agreed	As agreed
E100C-G	690	Not specified	Not specified	As agreed	As agreed
E110C-G	760	Not specified	Not specified	As agreed	As agreed
E120C-G	830	Not specified	Not specified	As agreed	As agreed

*1) PWHT 620 +/-15°C *2) PWHT 690 +/-15°C *3) PWHT 745 +/-15°C *4) PWHT 760 +/-15°C

AWS A5.36: Welding consumables

Specification for carbon and low-alloy steel flux cored electrodes for flux cored arc welding and metal cored electrodes for gas metal arc welding (extract)

Example:

MEGAFIL® 1100 M

E 13 1 T15 M21 A 4 K4 H4

Designates use as an electrode (E)

Welding positions	
0	flat & horizontal
1	**All positions**

Designator of the heat treatment condition, in which the tests were conducted	
A	**as welded**
P	heat treated

Shielding gas		
Symbol	Oxidizing Components	
	$\%CO_2$	$\%O_2$
C1	100	—
M12	$0.5 \le CO_2 \le 5$	—
M13	—	$0.5 \le CO_2 \le 3$
M14	$0.5 \le CO_2 \le 5$	$0.5 \le CO_2 \le 3$
M20	$5 \le CO_2 \le 15$	—
M21	**$15 \le CO_2 \le 25$**	**—**
M22	—	$3 \le CO_2 \le 10$
M23	$0.5 \le CO_2 \le 5$	$3 \le CO_2 \le 10$

Test				
Impact Designator	Max. test Temperature (°F)	Max. test Temperature (°C)	Minimum Average Energy Level [J]	(ftlbf)
Y	+68	+20		
0	0	-18		
2	-20	-29		
4	**-40**	**-40**	**27**	**(20)**
5	-50	-46		
6	-60	-51		
8	-80	-40		

Diffusible hydrogen in weld metal	
Hydrogen Designato	Average Diffusible Hydrogen; Maximum mL/100g Deposited Metal
H16	16
H8	8
H4	**4**
H2	2

Tension Test Requirements

Tensile Strength Designator	Tensile Strength ksi	Minimum Yield Strength ksi	Minimum Percent Elongation %	Tensile Strength MPa	Minimum Yield Strength MPa	Minimum Percent Elongation %
6	60-80	48	22	430-550	330	22
7	70-95	58	22	490-660	400	22
8	80-100	68	19	550-690	470	19
9	90-110	78	17	620-760	540	17
10	100-120	88	16	690-830	610	16
11	110-130	98	15	760-900	680	15
12	120-140	108	14	830-970	740	14
13	**130-150**	**118**	**14**	**900-1040**	**810**	**14**

Weld Metal Chemical Composition Requirements

Weld Metal Designation	C	Mn	Si	S	P	Ni	Cr	Mo	V	Al	Cu	Other
K1	0.15	0.80-1.40	0.80	0.030	0.030	0.80-1.10	0.15	0.20-0.65	0.05	—	—	—
K2	0.15	0.50-1.75	0.80	0.030	0.030	1.00-2.00	0.15	0.35	0.05	1.8[h]	—	—
K3	0.15	0.75-2.25	0.80	0.030	0.030	1.25-2.60	0.15	0.25-0.65	0.05	—	—	—
K4	**0.15**	**1.20-2.25**	**0.80**	**0.030**	**0.030**	**1.75-2.60**	**0.20-0.60**	**0.20-0.65**	**0.03**	**—**	**—**	**—**
K5	0.10-0.25	0.60-1.60	0.80	0.030	0.030	0.75-2.00	0.20-0.70	0.15-0.55	0.05	—	—	—
K6	0.15	0.50-1.50	0.80	0.030	0.030	0.40-1.00	0.20	0.15	0.05	1.8[h]	—	—
K7	0.15	1.00-1.75	0.80	0.030	0.030	2.00-2.75	—	—	—	—	—	—
K8	0.15	1.00-2.00	0.40	0.030	0.030	0.50-1.50	0.20	0.20	0.05	1.8[h]	—	—
K9	0.07	0.50-1.50	0.60	0.015	0.015	1.30-3.75	0.20	0.50	0.05	—	0.06	—

Single values are maximums

[h] Applicable to self-shielded electrodes only

Electrode Usability Characteristics

Electrode Usability Designator	Process	General Description of Electrode Type	Typical Positions of Welding	Polarity
T1	FCAW-G	Flux cored electrodes of this type are gas shielded and have a rutile base slag. They are characterized by a spray transfer, low spatter loss, and a moderate volume of slag which completely covers the weld bead.	H, F, VU & OH	DCEP
T5	FCAW-G	Flux cored electrodes of this type are gas shielded and are characterized by a globular transfer, slightly convex bead contour, and a thin slag that may not completely cover the weld bead. They have a lime-fluoride slag system and develop improved impact properties and better cold cracking resistance than typically exhibited by the ´T1´ type electrodes.	H, F, VU & OH	DCEP od. DCEN
T15	**FCAW-G**	**Electrodes of this type are gas shielded composite stranded or metal cored electrodes. The core ingredients are primarily metallic. The nonmetallic components in the core typically total less than 1% of the total electrode weight. These electrodes are characterized by a spray arc and excellent bead wash capabilities. Applications are similar in many ways to solid GMAW electrodes.**	**H, F, VU & OH**	**DCEP od. DCEN**

Notes

Notes

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