

NEW EDITION 2026

Elga®

WE BUILD™
with you

WELDING CONSUMABLES

for the professionals

www.elgawelding.com

CROMAROD
ELGALOY
ELGACORE
CROMACORE









CROMAMIG
ALUMIG
ELGATIG
CROMATIG









MEGAFIL
PROPAC
ALUTIG
ELGAMATIC



WE BUILD
with you

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.elgawelding.com



P 47D SPEZIAL

COVERED STICK ELECTRODES (SMAW) UNALLOYED

P 47D SPEZIAL is a basic double-coated AC/DC electrode for welding mild and medium tensile steels in all positions except vertical down. It has exceptional arc stability and weldability, delivering high-quality weld deposits with reliable notch toughness to -40°C.

What makes P 47D SPEZIAL stand out?

- **Unique Twin Coating Extrusion Process:**
  All arc stabilizing elements are concentrated in the inner coating, providing significantly improved arc stability and control for all applications.

- **Ease of Use:**
  Very easy to strike / restrike, making it ideal for general repair and maintenance applications.





ELGA® CROMAROD®

WHY CHOOSE ELGA® CROMAROD®?

In the quest for welding excellence, the CROMAROD® Standard Series by ELGA® stands out from the crowd. Why? Because each electrode in our lineup offers a unique set of features designed to meet the highest demands of the welding profession. From ensuring full traceability with a batch number on each stick to delivering a perfect weld with easy slag removal and a smooth, clean, and bright bead appearance, CROMAROD® sets the standard. Less heat, lower welding parameters, and minimal spatter mean more efficiency and lower costs for you.

Discover the ELGA® CROMAROD® Standard Series – the embodiment of excellence in welding:

- **Full traceability** – Every stick boasts a batch number.
- **Superior bead appearance** – Stand out with a clean, bright bead.
- **Effortless slag removal** – For a smoother workflow.
- **Optimized welding parameters** – Achieve perfect welds with less heat and reduced costs.

The CROMAROD® LP Series – Precision in every position

The CROMAROD® LP Series redefines positional welding with fully positional stainless steel electrodes that offer unmatched control, ease of strike, and an excellent bead shape. Tailored for precision and efficiency, the LP Series is perfect for tackling the most challenging welding positions.

The LP Series stands out with:

- **Fully Positional Welds** – Perfect for any angle.
- **Control and Ease** – Low amps, easy strike, and beautiful bead shapes.


Miller
CROMAROD

ELGAMATIC NEO – BRONZE-COATED WELDING WIRE

PRECISION, PERFORMANCE, RELIABILITY

ELGAMATIC NEO is a premium bronze-coated, mild steel welding wire engineered for superior welding performance with CO_2 or Ar/CO_2 shielding gases. Its advanced bronze coating ensures **exceptional arc stability, smooth bead appearance**, and **consistent quality**, even under demanding conditions.

Designed for high-speed robotic and mechanized welding, ELGAMATIC NEO delivers unmatched reliability at very high amperages, making it the ideal choice for automated production lines.
ELGAMATIC NEO ensures low contact wear, reducing downtime and improving precision. Thanks to its precisely controlled metallurgy and flawless surface finish, you can count on optimal wire feeding, minimal downtime, and high-integrity welds every time.



Available Product Range:

ELGAMATIC NEO 100 (G3Si1)
ELGAMATIC NEO 103 (G4Si1)

Applications:

- **Perfect for structural steel fabrication**
- **transportation**
- **heavy equipment manufacturing**
- **agricultural machinery, and earth-moving applications —where productivity and quality matter most.**


Digital Elite
Miller

ELGACORE® MATRIX

WHY CHOOSE ELGACORE® MATRIX?

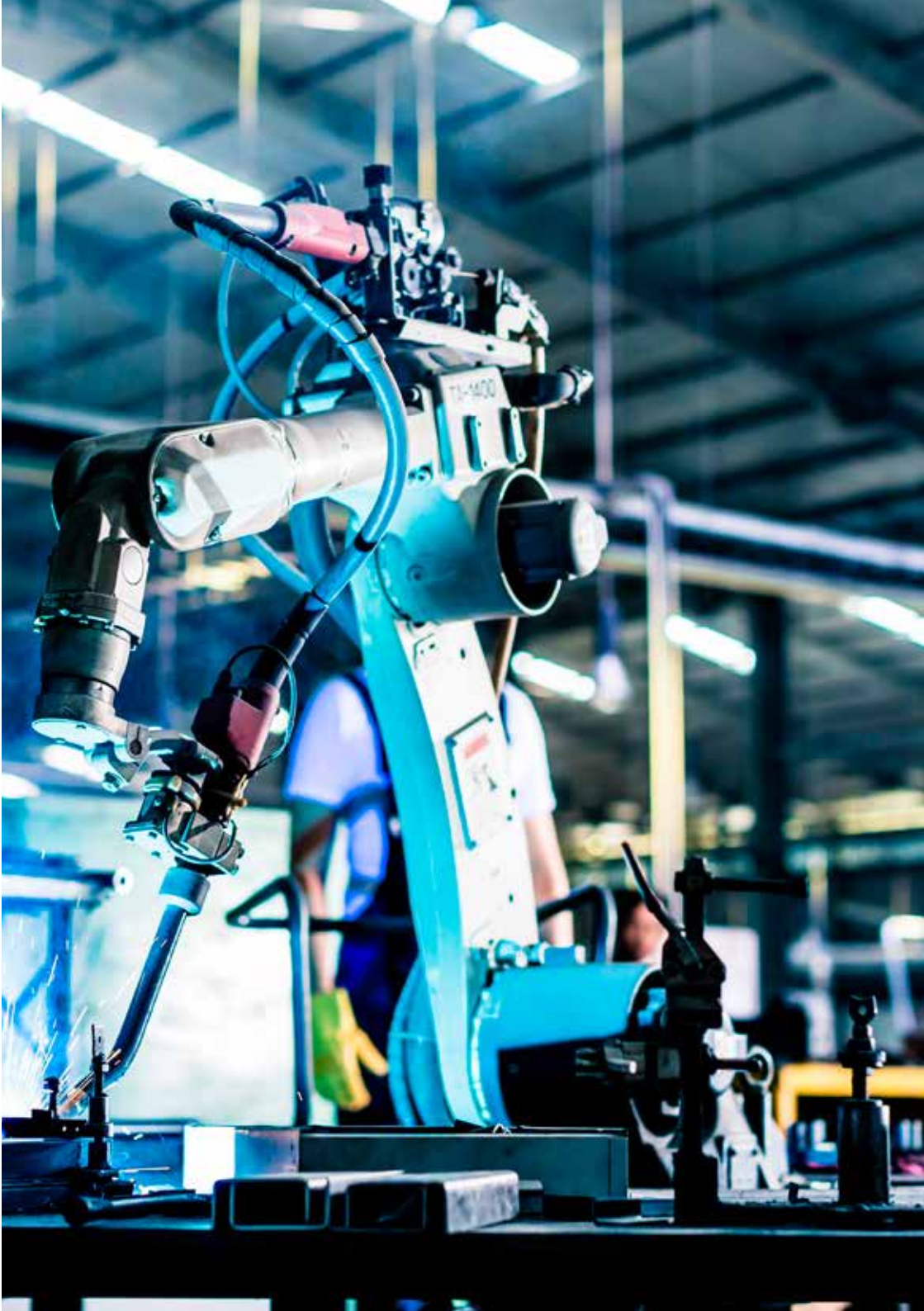
ELGACORE® MATRIX is a revolutionary new metal-cored welding wire manufactured in our factory in Germany designed to provide maximum performance in both semi-automatic and automation/robot applications. The wire is manufactured with the most advanced technology in the industry to achieve unparalleled consistency.

ELGACORE® MATRIX provides industry leading arc starting, as well as unrivaled feedability, good impact toughness at -40°C, superior metal-wetting ability, reduced silicon islands and an extremely stable arc. The wire is suitable for welding with M21 type shielding gas.

Applications:

- Heavy equipment (earth moving, mining, agriculture, etc.)
- Infrastructure (bridge, building, etc.)
- Transportation
- General fabrication





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.



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Welding Consumables
ELGA Product Range

Un&Low Alloyed Stick Electrodes

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
P 43	EN ISO 2560-A	E 42 0 R 12	AWS A5.1	E 6013
P 45S	EN ISO 2560-A	E 42 0 RC 11	AWS A5.1	E 6013
P 47	EN ISO 2560-A	E 46 4 B 12 H5	AWS A5.1	E 7016-1
P 47D SPEZIAL	EN ISO 2560-A	E 42 4 B 12 H10	AWS A5.1	E 7016
P 48S	EN ISO 2560-A	E 42 4 B 42 H5	AWS A5.1	E 7018-1H4
P 48M	EN ISO 2560-A	E 42 5 B 42 H5	AWS A5.1	E 7018-1 H4R
P 48P	EN ISO 2560-A	E 46 2 B 12 H5	AWS A5.1	E 7018
P 51	EN ISO 2560-A	E 46 4 B 32 H5	AWS A5.1	E 7018-1
P 52T	EN ISO 2560-A	E 42 4 B 35 H5	AWS A5.1	E 7048-H4
P 62MR	EN ISO 2560-A	~E 46 5 1Ni B 32 H5	AWS A5.5	E7018-G H4R / (E8018-G H4R)
P 81CR	EN ISO 3580-A	E Mo B 42 H5	AWS A5.5	E 7018-A1
MAXETA® 5	EN ISO 2560-A	E 42 2 RA 73	AWS A5.1	E 7027
MAXETA® 10	EN ISO 2560-A	E 42 0 RR 53	AWS A5.1	E 7024
MAXETA® 11	EN ISO 2560-A	E 42 0 RR 73	AWS A5.1	E 7024
MAXETA® 16	EN ISO 2560-A	E 42 0 RR 73	AWS A5.1	E 7024

Un&Low Alloyed TIG Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
ELGATIG® 100	EN ISO 636-A	W 46 5 W3Si1	AWS A5.18	ER70S-6
ELGATIG® 101	EN ISO 636-A	W 42 2 2Si	AWS A5.18	ER70S-3
ELGATIG® 115	EN ISO 636	W 42 2 W2Ti	AWS A5.18	ER70S-2
ELGATIG® 162	EN ISO 636-A	W 46 6 W3Ni1	AWS A5.28	ER80S-Ni1
ELGATIG® 135	EN ISO 16834	W 69 4 Mn3Ni1CrMo	AWS A5.28	ER100S-G
ELGATIG® 181CR	EN ISO 21952-A	W MoSi	AWS A5.28	ER70S-A1
ELGATIG® 183CR	EN ISO 21952	W CrMo1Si	AWS A5.28	ER80 S-G

Welding Consumables
ELGA Product Range

Un&Low Alloyed MAG Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
ELGAMATIC® 100	EN ISO 14341-A	G 42 2 M21 3Si1	AWS A5.18	ER70S-6
ELGAMATIC® 103	EN ISO 14341-A	G 46 4 M21 4Si1	AWS A5.18	ER70S-6
ELGAMATIC® NEO 100	EN ISO 14341-A	G 42 4 M21 3Si1	AWS A5.18	ER70S-6
ELGAMATIC® NEO 103	EN ISO 14341-A	G 46 5 M21 4Si1	AWS A5.18	ER70S-6
ELGAMATIC® 135	EN ISO 16834-A	G 69 4 M21 Mn3Ni1CrMo	AWS A5.28	ER100S-G
ELGAMATIC® 140	EN ISO 14341-A	G 50 4 M21 Z	AWS A5.28	ER80S-G
ELGAMATIC® 162	EN ISO 14341-A	G 46 6 M21 G3Ni1	AWS A5.28	ER80S-Ni1
ELGAMATIC® 147	EN ISO 16834-A	G Mn3NiCrMo	AWS A5.28	ER100S-G
ELGAMATIC® 181CR	EN ISO 21952-A	G MoSi	AWS A5.28	ER70S-A1
ELGAMATIC® 183CR	EN ISO 21952-A	CrMo1Si	–	–

Un&Low Alloyed Cored Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
ELGACORE® MATRIX®	EN ISO 17632-A	T 46 4 M M21 3 H5	AWS A5.18	E 70C-6M H4
MEGAFIL® 710M	EN ISO 17632-A	T 46 6 M M21 1 H5	AWS A5.18	E70C-6M H4
MEGAFIL® 240M	EN ISO 17632-A	T 50 6 1Ni M M21 1 H5	AWS A5.28	E80C-Ni1 H4
MEGAFIL® 281M	EN ISO 17632-A	T 46 6 Z M M21 1 H5	AWS A5.28	E80C-W2 H4
MEGAFIL® 940M	EN ISO 18276-A	T 55 6 Mn2,5Ni M M21 1 H5	–	–
MEGAFIL® 742M	EN ISO 18276-A	T 69 6 Mn2NiCrMo M M21 1 H5	AWS A5.28	E110C-K4 H4
MEGAFIL® 1100M	EN ISO 18276-A	T 89 4 ZMn2NiCrMo M M21 1H5	AWS A5.28	E120C-G H4
MEGAFIL® 235M	EN ISO 17634-A	T Mo M M21 1 H5	AWS A5.28	E80C-G H4
MEGAFIL® 236M	EN ISO 17634-A	T CrMo1 M M21 1 H5	AWS A5.28	E80C-B2 H4
MEGAFIL® 237M	EN ISO 17634-A	T CrMo2 M M21 1 H5	AWS A5.28	E90C-B3 H4
MEGAFIL® 713R	EN ISO 17632-A	T 46 4(2) P M21(C1) 1 H5	AWS A5.20	E71T-1M(C)-J H4
MEGAFIL® 716R	EN ISO 17632-A	T 46 6 P M21 1 H5	AWS A5.20	E71T-9M-J H4
MEGAFIL® 819R	EN ISO 17632-A	T 50(46) 6(4) 1Ni P M21(C1) H5	AWS A5.29	E81T1-Ni1M-J H4
MEGAFIL® 821R	EN ISO 17632-A	T 50 6 1Ni P M21 1 H5	AWS A5.29	E81T1-Ni1M-J H4
MEGAFIL® 781R	EN ISO 17632-A	T 46 5 Z P M21 1 H5	AWS A5.29	E81T1-GM H4
MEGAFIL® 610R	EN ISO 18276-A	T 62 4 Mn1Ni P M21 1 H5	AWS A5.29	E 81T1-Ni1 M J-H4
MEGAFIL® 690R	EN ISO 18276-A	T 69 6 Z P M21 1 H5	–	–
MEGAFIL® 825R	EN ISO 17634-A	T MoL P M21 1 H5	AWS A5.29	E81T1-A1M H4
MEGAFIL® 731B	EN ISO 17632-A	T 46 6 B M21 3 H5	AWS A5.20	E70T-5M(C)-J H4
MEGAFIL® 742B	EN ISO 18276-A	T 69 6 Mn2NiCrMo B M21 3 H5	AWS A5.29	E110T5-K4M H4
MEGAFIL® 735B	EN ISO 17634-A	T Mo B M21 3 H5	AWS A5.29	E80T5-G H4
MEGAFIL® 736B	EN ISO 17634-A	T CrMo1 B M21 3 H5	AWS A5.29	E80T5-B2M H4

Stainless Stick Electrodes

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
CROMAROD® 308L	EN ISO 3581-A	E 19 9 L R 12	AWS A5.4	E308L-17
CROMAROD® 308LP	EN ISO 3581-A	E 19 9 L R 11	AWS A5.4	E308L-17
CROMAROD® B308L	EN ISO 3581-A	E 19 9 L B 42	AWS A5.4	E 308L-15
CROMAROD® 316L	EN ISO 3581-A	E 19 12 3 L R 12	AWS A5.4	E 316L-17
CROMAROD® 316LP	EN ISO 3581-A	E 19 12 3 L R 11	AWS A5.4	E 316L-17
CROMAROD® B316L	EN ISO 3581-A	E 19 12 3 L B 42	AWS A5.4	E316L-15
CROMAROD® 309L	EN ISO 3581-A	E 23 12 L R 12	AWS A5.4	E309L-17
CROMAROD® 309MoL	EN ISO 3581-A	E 23 12 2 L R 32	AWS A5.4	E309MoL-17
CROMAROD® 309MoLP	EN ISO 3581-A	E 23 12 2 L R 11	AWS A5.4	E309MoL-17
CROMAROD® 310	EN ISO 3581-A	E 25 20 R 12	AWS A5.4	~E310-17
CROMAROD® Duplex	EN ISO 3581-A	E 22 9 3 N L R 12	AWS A5.4	~E2209-17
CROMAROD® Duplex LP	EN ISO 3581-A	E22 9 3 N L R 11	AWS A5.4	~E2209-17
CROMAROD® Duplex B	EN ISO 3581-A	E 22 9 3 NL B 42	AWS A5.4	E 2209-15
CROMAROD® 2507R	EN ISO 3581-A	E 25 9 4 N L R 12	AWS A5.4	E2594-17
CROMAROD® 308H	EN ISO 3581-A	E 19 9 R 12	AWS A5.4	E308H-17
CROMAROD® 347	EN ISO 3581-A	E 19 9 Nb R 12	AWS A5.4	E 347-17
CROMAROD® 385	EN ISO 3581-A	E 20 25 5 Cu N L R 12	AWS A5.4	~E385-17
CROMAROD® 383	EN ISO 3581-A	E 27 31 4 Cu L R 12	AWS A5.4	~E383-17
CROMAROD® 253	–	–	–	–
CROMAROD® 312	EN ISO 3581-A	~ E 29 9 R 32	AWS A5.4	~E 312-17
CROMAROD® 82	EN ISO 14172	E Ni 6182	AWS A5.11	E NiCrFe-3
CROMAROD® 625	EN ISO 14172	E Ni 6625	AWS A5.11	E NiCrMo-3

Welding Consumables
ELGA Product Range

Stainless TIG Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
CROMATIG 308L	EN ISO 14343-A	W 19 9 L	AWS A5.9	ER308L
CROMATIG 308LSi	EN ISO 14343-A	W 19 9 L Si	AWS A5.9	ER308LSi
CROMATIG 316L	EN ISO 14343-A	W 19 12 3 L	AWS A5.9	ER316L
CROMATIG 316LSI	EN ISO 14343-A	W 19 12 3 L Si	AWS A5.9	ER316LSi
CROMATIG 309L	EN ISO 14343-A	W 23 12 L	AWS A5.9	ER309 L
CROMATIG 309LSi	EN ISO 14343-A	W 23 12 L Si	AWS A5.9	ER309LSi
CROMATIG 310	EN ISO 14343-A	W 25 20	AWS A5.9	ER310
CROMATIG Duplex	EN ISO 14343-A	W 22 9 3 N L	AWS A5.9	ER2209
CROMATIG 2507	EN ISO 14343	W 25 9 4 N L	AWS A5.9	ER2594
CROMATIG 308H	EN ISO 14343-A	W 19 9 H	AWS A5.9	ER308H
CROMATIG 318Si	EN ISO 14343-A	W 19 12 3 Nb Si	AWS A5.9	~ER318
CROMATIG 385	EN ISO 14343-A	W 20 25 5 Cu L	AWS A5.9	ER385
CROMATIG 307Si	EN ISO 14343-A	W 18 8 Mn	–	–
CROMATIG 82	EN ISO 18274	S Ni 6082 (NiCr20Mn3Nb)	AWS A5.14	ERNiCr-3
CROMATIG 625	EN ISO 18274	S Ni 6625 (NiCr22Mo9Nb)	AWS A5.14	ERNiCrMo-3

Stainless MIG Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
CROMAMIG 308LSi	EN ISO 14343-A	G 19 9 L Si	AWS A5.9	ER308LSi
CROMAMIG 316LSi	EN ISO 14343-A	G 19 12 3 L Si	AWS A5.9	ER316LSi
CROMAMIG 309LSi	EN ISO 14343-A	G 23 12 L Si	AWS A5.9	ER309LSi
CROMAMIG 309MOL	EN ISO 14343-A	G 23 12 2 L	AWS A5.9	~ER309MoL
CROMAMIG 310	EN ISO 14343-A	G 25 20	AWS A5.9	ER310
CROMAMIG Duplex	EN ISO 14343-A	G 22 9 3 N L	AWS A5.9	ER2209
CROMAMIG 2507	EN ISO 14343-A	G 22 9 4 N L	AWS A5.9	ER2594
CROMAMIG 347Si	EN ISO 14343-A	G 19 9 Nb Si	AWS A5.9	ER347Si
CROMAMIG 318Si	EN ISO 14343-A	G 19 12 3 Nb Si	AWS A5.9	~ER318
CROMAMIG 385	EN ISO 14343-A	G 20 25 5 Cu LN	AWS A5.9	ER385
CROMAMIG 307Si	EN ISO 14343-A	G 18 8 Mn	AWS A5.9	~ER307
CROMAMIG 312	EN ISO 14343-A	G 29 9	AWS A5.9	ER312
CROMAMIG 625	EN ISO 18274	S Ni 6625 (NiCr22Mo9Nb)	AWS A5.14	ERNiCrMo-3

Welding Consumables
ELGA Product Range

Stainless Cored Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
CROMACORE 308L	EN ISO 17633-A	T 19 9 L R M21 3 / T 19 9 L R C1 3	AWS A5.22	E308LT0-1/-4
CROMACORE 308LP	EN ISO 17633-A	T 19 9 L P M21 1 / T 19 9 L P C1 1	AWS A5.22	E 308LT1-1/-4
CROMACORE 316L	EN ISO 17633-A	T 19 12 3 L R M21 3 / T 19 12 3 L R C1 3	AWS A5.22	E316LT0-1/-4
CROMACORE 316LP	EN ISO 17633-A	T 19 12 3 L P M21 1 / T 19 12 3 L P C1 1	AWS A5.22	E 316LT1-1/-4
CROMACORE 309L	EN ISO 17633-A	T 23 12 L R M21 3 / T 23 12 L R C1 3	AWS A5.22	E309LT0-1/-4
CROMACORE 309LP	EN ISO 17633-A	T 23 12 L P M21 1 / T 23 12 L P C1 1	AWS A5.22	E 309LT1-1/-4

Cast Iron and Hardfacing Electrodes and Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
ELGALOY Cast-Ni	EN ISO 1071	E C Ni-CI 3	AWS A5.15	E Ni-CI
ELGALOY Cast-NiFe	EN ISO 1071	E C NiFe-1 3	AWS A5.15	E NiFe-CI
ELGALOY HARD 60	EN ISO 14700	E Z Fe2	–	–
ELGALOY HARD 100	EN ISO 14700	E Fe14	–	–
ELGALOY HARD M60	EN ISO 14700	S Fe8	–	–
MEGAFIL® A 730M	EN ISO 14700	T Fe1	–	–
MEGAFIL® A 740M	EN ISO 14700	T Z Fe2	–	–
MEGAFIL® A 750M	EN ISO 14700	T Z Fe2	–	–
MEGAFIL® A 760M	EN ISO 14700	T Fe2	–	–
MEGAFIL® A 762M	EN ISO 14700	T Fe8	–	–
MEGAFIL® A 765M	EN ISO 14700	T Fe8	–	–
MEGAFIL® A 864M	EN ISO 14700	T Fe13	–	–
MEGAFIL® A 867M	EN ISO 14700	T Z Fe13	–	–
MEGAFIL® A 864M	EN ISO 14700	T Fe13	–	–

Welding Consumables
ELGA Product Range

Aluminium TIG Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
ALUTIG Si5	EN ISO 18273	S Al 4043A (AlSi5)	AWS A5.10	ER 4043
ALUTIG Mg3	EN ISO 18273	S Al 5754 (AlMg3)	AWS A5.10	ER 5754
ALUTIG Mg5	EN ISO 18273	S Al 5356 (AlMg5Cr (A))	AWS A5.10	ER 5356
ALUTIG Mg4,5Mn	EN ISO 18273	S Al 5183	AWS A5.10	ER 5183

Aluminium MIG Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification
ALUMIG Si5	EN ISO 18273	S Al 4043A (AlSi5)	AWS A5.10	ER 4043
ALUMIG Mg3	EN ISO 18273	S Al 5754 (AlMg3)	AWS A5.10	ER 5754
ALUMIG Mg5	EN ISO 18273	S Al 5356 (AlMg5Cr (A))	AWS A5.10	ER 5356
ALUMIG Mg4,5Mn	EN ISO 18273	S Al 5183	AWS A5.10	ER 5183

Un and Low Alloyed Stick Electrodes

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification	Page
P 43	EN ISO 2560-A	E 42 0 R 12	AWS A5.1	E 6013	**24**
P 45S	EN ISO 2560-A	E 42 0 RC 11	AWS A5.1	E 6013	**25**
P 47	EN ISO 2560-A	E 46 4 B 12 H5	AWS A5.1	E 7016-1	**26**
P 47D SPEZIAL	EN ISO 2560-A	E 42 4 B 12 H10	AWS A5.1	E 7016	**27**
P 48S	EN ISO 2560-A	E 42 4 B 42 H5	AWS A5.1	E 7018-1H4	**28**
P 48M	EN ISO 2560-A	E 42 5 B 42 H5	AWS A5.1	E 7018-1 H4R	**29**
P 48P	EN ISO 2560-A	E 46 2 B 12 H5	AWS A5.1	E 7018	**30**
P 51	EN ISO 2560-A	E 46 4 B 32 H5	AWS A5.1	E 7018-1	**31**
P 52T	EN ISO 2560-A	E 42 4 B 35 H5	AWS A5.1	E 7048-H4	**32**
P 62MR	EN ISO 2560-A	~E 46 5 1Ni B 32 H5	AWS A5.5	E7018-G H4R / (E8018-G H4R)	**33**
P 81CR	EN ISO 3580-A	E Mo B 42 H5	AWS A5.5	E 7018-A1	**34**
MAXETA 5	EN ISO 2560-A	E 42 2 RA 73	AWS A5.1	E 7027	**35**
MAXETA 10	EN ISO 2560-A	E 42 0 RR 53	AWS A5.1	E 7024	**36**
MAXETA 11	EN ISO 2560-A	E 42 0 RR 73	AWS A5.1	E 7024	**37**
MAXETA 16	EN ISO 2560-A	E 42 0 RR 73	AWS A5.1	E 7024	**38**

P 43

Rutile Electrodes SMAW Unalloyed

Classifications EN ISO 2560-A E 42 0 R 12
AWS A5.1 E 6013

P 43 is a medium-coated rutile electrode intended for welding light to medium sections in mild steel. The electrode operates with a very smooth arc and is suitable for all positions except vertical down. It is easy to strike and restrike and produces a self-detaching slag leaving a finely rippled bead appearance. With its excellent bead surface and smooth transition with the base material P 43 is ideal for butt and fillet welding of sheet metal work.

Redrying temperature 90 °C, 2h

Metal recovery 95%

Welding Current AC OCV > 50V DC+ DC-

Diffusible Hydrogen

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,4	0,5	0,015	0,015				0,02

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	0	50
Tensile Strength, Rm	550	MPa			
Elongation A5	24	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X			2 m	2			

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x350	55-100	23	0,62	81	0,8	50
3,2x350	75-140	23	0,67	48	1,2	54
4x450	110-190	25	0,64	26	1,7	81

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Rutile-cellulosic Electrodes

P 45S

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

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.

Redrying temperature 90 °C, 2h
Metal recovery 90%
Welding Current AC OCV > 50V DC+ DC-
Diffusible Hydrogen

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,4	0,5	0,015	0,015				0,02

Notes :

Mechanical properties **Welding Conditions :** As Welded

Typical values			T °C	Typical (J)
Yield Strength, Re	470 MPa	Impact energy, CV	0	50
Tensile Strength, Rm	550 MPa			
Elongation A5	24 %			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x			2Y m	2Y	2 Y	2	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2x300	40-80	24	0,7	139	0,4	40
2,5x350	70-100	25	0,7	78	0,8	48
3,2x350	90-145	25	0,7	48	1,2	49
4x350	120-195	25	0,7	33	1,7	58
5x450	180-270	26	0,75	21	2,3	64

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P 47

Basic Electrodes SMAW Unalloyed

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

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.

Redrying temperature	350 °C, 2h	**Welding Current**	AC OCV > 60V DC+ DC- (root)
Metal recovery	105%	**Diffusible Hydrogen**	< 5 ml/100g

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,06	0,5	1,1	0,015	0,005				

Notes :
Core Wire :
S ≤ 0.015%
P ≤ 0.015%
N ≤ 0.008%

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	490	MPa	Impact energy, CV	-46	70
Tensile Strength, Rm	570	MPa			
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X			3Y m H5	3 Y H5	3 Y HH	4YQ420 H5	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x350	60-90	24	0,64	80	0,9	50
3,2x350	80-160	26	0,66	44	1,2	65
4x450	110-200	24	0,67	22	1,7	86

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P 47D SPEZIAL

Basic Electrodes SMAW Unalloyed

Classifications EN ISO 2560-A E 42 4 B 12 H10
AWS A5.1 E 7016

P 47D SPEZIAL is a basic double coated AC/DC electrode for welding mild and medium tensile steels in all positions except vertical down. It has an exceptional arc stability and weldability and delivers high quality weld deposits with reliable notch toughness to -40°C. P 47D SPEZIAL is manufactured using a unique twin coating extrusion process, which means all the arc stabilizing elements are concentrated in the inner coating. This delivers significantly improved arc stability and control for all applications.P 47D SPEZIAL is very easy to strike/restrike and offers extreme ease of use, making it ideal for general repair and maintenance applications.

Redrying temperature	350°C, 2h	**Welding Current**	AC OCV > 45V DC+
Metal recovery	100%	**Diffusible Hydrogen**	< 10 ml/100gr

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,42	1,16	0,013	0,006				

Notes :

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	460	MPa	Impact energy, CV	-20	130
Tensile Strength, Rm	560	MPa		-40	110
Elongation A5	28	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X		4Ym H10	3 Y H10			

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x350	60-90		0,62	82	0,7	55
3,2x450	90-135		0,62	50	1,1	65
4,0x450	140-240		0,60	24	1,7	89

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P 48S

Basic Electrodes SMAW Unalloyed

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

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.

Redrying temperature	350°C, 2h	**Welding Current**	DC+ DC- (root)
Metal recovery	120%	**Diffusible Hydrogen**	< 4 ml/100g

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,60	1,20	0,015	0,01				

Notes :
Core wire:
S ≤ 0.015%
P ≤ 0.015%
N ≤ 0.008%

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	530	MPa	Impact energy, CV	-40	120
Tensile Strength, Rm	600	MPa		-46	100
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	10.042.01	3Y m H5	3 Y H5	3 Y HH	3 Y	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
1,6x300	30-60	23	0,65	170	0,5	46
2x300	40-80	23	0,64	115	0,7	43
2,5x350	80-110	23	0,71	60	1	54
3,2x450	110-155	24	0,72	28	1,6	76
3,2x350	110-165	24	0,72	36	1,6	57
4x450	140-205	25	0,74	19	2,1	82
5x450	200-285	25	0,75	13	2,9	91

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Basic Electrodes SMAW Unalloyed

P 48M

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

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.

Redrying temperature	350°C, 2h	**Welding Current**	DC+ DC- (root)
Metal recovery	120%	**Diffusible Hydrogen**	< 4 ml/100g

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,5	1,4	0,015	0,010				

Notes :
Core wire:
S ≤ 0.015%
P ≤ 0.015%
N ≤ 0.008%

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	-40	80
Tensile Strength, Rm	560	MPa		-46	70
Elongation A5	28	%		-50	60

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X			4 Y M 42	4 Y 40 H5			3 Y H5

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2x300	40-80	23	0,64	112	0,7	43
2,5x350	70-110	23	0,69	62	0,9	58
3,2x450	80-145	24	0,71	30	1,3	85
4x450	120-210	25	0,73	20	1,8	90

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P 48P

Basic Electrodes SMAW Unalloyed

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

P 48P is a basic-coated, low hydrogen, carbon manganese electrode specially designed for pipewelding. The allpositional 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.

Redrying temperature	350°C, 2h	**Welding Current**	AC OCV > 70V DC+ DC- (root)
Metal recovery	105%	**Diffusible Hydrogen**	< 5 ml/100g

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,06	0,60	1,20	0,015	0,010				

Notes :
Core wire:
S ≤ 0.015%
P ≤ 0.015%
N ≤ 0.008%

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	530	MPa	Impact energy, CV	-20	80
Tensile Strength, Rm	620	MPa		-30	70
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X		3Y m H5	3 Y H5	3 Y HH	3 Y	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2x300	40-80	23	0,64	112	0,7	43
2,5x350	70-110	23	0,69	62	0,9	58
3,2x450	80-145	24	0,71	30	1,3	85
4x450	120-210	25	0,73	20	1,8	90
5x450	200-285	25	0,75	13	2,7	93

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P 51

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

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.

Redrying temperature	350°C, 2h	**Welding Current**	AC OCV > 70V DC+ DC- (root)
Metal recovery	120%	**Diffusible Hydrogen**	< 5 ml/100g

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,5	1,35	0,01	0,01				

Notes :
Core wire:
S ≤ 0.015%
P ≤ 0.015%
N ≤ 0.008%

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	560	MPa	Impact energy, CV	-40	60
Tensile Strength, Rm	600	MPa		-46	30
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X		3 Y H5	3 Y HH	3 Y	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x350	70-110	23	0,68	60	1	55
3,2x450	110-150	24	0,68	30	1,3	82
3,2x350	110-150	24	0,68	38	1,3	64
4x450	140-200	24	0,72	19	1,8	94
4x350	140-200	24	0,72	25	1,8	74
5x450	200-270	24	0,72	13	2,6	100

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P 52T

Basic Electrodes SMAW Unalloyed

Classifications EN ISO 2560-A E 42 4 B 35 H5
AWS A5.1 E 7048-H4

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

Redrying temperature	350°C, 2h	**Welding Current**	AC OCV > 50V DC+
Metal recovery	125%	**Diffusible Hydrogen**	< 4 ml/100g

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,06	0,40	0,95	0,015	0,01				

Notes :
Core wire:
S ≤ 0.015%
P ≤ 0.015%
N ≤ 0.008%

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	440	MPa	Impact energy, CV	-20	100
Tensile Strength, Rm	540	MPa		-40	70
Elongation A5	30	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x				3 Y H5	3 Y HH		

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x350	60-110	21	0,76	60		
3,2x350	110-160	25,5	0,76	36		

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P 62MR

Basic Electrodes SMAW Low Alloyed

Classifications EN ISO 2560-A ~E 46 5 1Ni B 32 H5
AWS A5.5 E7018-G H4R / (E8018-G H4R)

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.

Redrying temperature	350-400 °C,1-2h	**Welding Current**	AC OCV > 70V DC+ DC- (root)
Metal recovery	110-120%	**Diffusible Hydrogen**	< 4ml/100g

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,06	0,3	1,3	0,01	0,005		0,9		

Notes :
PWHT: 620°C, 2h: -20°C 150J, -46°C 70J, -60°C 40J
CTOD -10°C > 0.25 mm
Part no. -3250: thin coating.

EN: slight deviation in Mn
** Meet also 8018-G H4R in dia up to 4,0 mm
Core wire:
S ≤ 0.015%
P ≤ 0.015%
N ≤ 0.008%

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	530	MPa	Impact energy, CV	-60	60
Tensile Strength, Rm	610	MPa			
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X				5Y46 H5	3 Y HH	3 Y	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x350	60-110	22	0,73	71	0,8	54
3,2 tcx350	80-155	23	0,72	42	1,3	54
3,2x350	80-150	24	0,71	37	1,4	58
3,2x450	80-150	24	0,71	28	1,4	82
4x450	140-200	24	0,72	19	1,9	89
5x450	200-270	24	0,72	13	2,6	100

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P 81CR

Basic Electrodes SMAW Low Alloyed

Classifications EN ISO 3580-A E Mo B 42 H5
AWS A5.5 E 7018-A1

P 81CR is a basic-coated, low hydrogen electrode which deposits a 0.5% Mo type weld metal. It is primarily intended for welding similar composition steels, used where creep rupture strength and ductility at service temperatures up to 550°C are required e.g. EN 16Mo3 and ASTM A335 Grade P1. The Mo content confers some resistance to hydrogen attack in chemical process plant applications. P 81CR is also suitable for ordinary C-Mn steels when higher tensile strength weld metal is required. Preheat and interpass temperature of 100-150°C is recommended. Post-weld heat treat at 620°C.

Redrying temperature	350 °C, 2h	**Welding Current**	DC+
Metal recovery	110%	**Diffusible Hydrogen**	< 5ml/100g

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,4	0,80	0,01	0,01	0,02	0,03	0,55	0,02

Notes :

Core wire:
S ≤ 0.015%
P ≤ 0.015%
N ≤ 0.008%

Mechanical properties **Welding Conditions :** PWHT 620°C, 1h

Typical values			T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	-20	130
Tensile Strength, Rm	590	MPa			
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
	X						

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x350	65-100	22	0,72	71	0,8	55
3,2x350	95-150	23	0,73	37	1,4	62
4x350	130-200	24	0,73	19	1,8	92
5x450	160-265	25	0,73	12	2,6	103

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MAXETA 5

Acid-rutile Electrodes SMAW Unalloyed

Classifications EN ISO 2560-A E 42 2 RA 73
AWS A5.1 E7027

MAXETA 5 is an acid-rutile iron powder electrode with 160% recovery, intended for the welding of general construction steels in the horizontal and horizontal-vertical positions. The electrode is designed to give a fast burn-off rate enabling the user to make extended run lengths and thereby produce small fillet welds at high deposition rates. It is particularly recommended for plate where the surface has been treated with primer or contaminated by rust, mill scale, paint etc. Both the weld appearance and transition with the base material are exceptionally smooth and consistent, making MAXETA 5 a suitable choice when demands on fatigue resistance of the joint are high.

Redrying temperature	90 °C, 2h	**Welding Current**	AC OCV > 65V DC+ DC-
Metal recovery	160%	**Diffusible Hydrogen**	

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,2	0,9	0,02	0,01	0,03	0,04	0,005	0,02

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	-20	70
Tensile Strength, Rm	540	MPa			
Elongation A5	24	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X	10.042.06	3Ym	3Y	3 Y	3	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
3,2x450	110-170	32	0,73	22	1,9	77
4x450	150-240	35	0,71	15	2,9	78
5x450	200-360	37	0,71	9	4,8	75
5x700	200-330	37	0,73	6	5	118
6x450	280-440	37	0,71	7	5,5	90

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MAXETA 10

Rutile Electrodes SMAW Unalloyed

Classifications EN ISO 2560-A E 42 0 RR 53
AWS A5.1 E 7024

MAXETA 10 is rutile-coated iron powder electrode with 135% recovery intended for welding medium thick sections in general construction steels. The electrode design has been optimised to produce fillet welds with good mitre profile and throat thickness in the 3.5-4.0 mm range. MAXETA 10 produces a finely rippled bead surface, minimum spatter and a self-detaching slag.

Redrying temperature 90 °C, 2h
Metal recovery 135%
Welding Current AC OCV > 65V DC+ DC-
Diffusible Hydrogen

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,7	0,6	0,02	0,01	0,03	0,04	0,005	0,02

Notes :

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	470	MPa	Impact energy, CV	0	50
Tensile Strength, Rm	570	MPa			
Elongation A5	24	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X				2Y	2 Y	2	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x350	90-125	28	0,7	45	1,6	46
3,2x450	130-160	29	0,73	23	2,2	61
4x450	140-220	30	0,65	17	2,6	73
4,5x600	160-230	29	0,7	10	2,9	130
5x450	190-310	31	0,66	11	3,7	78

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MAXETA 11

Rutile Electrodes SMAW Unalloyed

Classifications EN ISO 2560-A E 42 0 RR 73
AWS A5.1 E7024

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.

Redrying temperature 90 °C, 2h

Metal recovery 190%

Welding Current AC OCV > 50V DC+ DC-

Diffusible Hydrogen

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,08	0,6	0,9	0,015	0,01	0,03	0,04	0,005	0,02

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	500	MPa	Impact energy, CV	0	50
Tensile Strength, Rm	580	MPa			
Elongation A5	24	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x			2Ym	2Y	2	2	2 Y

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
3,2x450	130-170	28	0,72	20	2,5	67
4x450	150-260	31	0,73	13	3,3	76
4,5x450	170-335	34	0,73	11	5,3	60
5x450	200-390	35	0,72	8	6,7	61
5x700	200-290	33	0,72	5	5,4	119
6x450	300-450	35	0,72	6	7,7	71
6x700	300-380	35	0,73	4	7,2	

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MAXETA 16

Rutile Electrodes SMAW Unalloyed

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

MAXETA 16 is a rutile-coated iron powder electrode with 160% recovery intended for horizontal and fillet welding of heavier section construction steels. The electrode has been specially designed to achieve the highest possible productivity when depositing fillet welds with a throat thickness in the 3.0-4.0 mm range. Fillet welds can be made in primer-treated material without porosity or fusion problems along the top edge. As with the other high recovery electrodes in Elga's programme, MAXETA 16 has excellent slag detachability and very low fume emission.

Redrying temperature 90 °C, 2h
Metal recovery 160%
Welding Current AC OCV > 50V DC+ DC-
Diffusible Hydrogen

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,5	0,7	0,02	0,01	0,03	0,04	0,005	0,02

Notes :

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	470	MPa	Impact energy, CV	0	50
Tensile Strength, Rm	560	MPa			
Elongation A5	24	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X	0	2Ym	2Y	2 Y	2	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
3,2x450	130-160	28	0,72	21	2,2	72
4x450	150-235	31	0,71	14	3	78
5x450	200-320	31	0,71	9	4,1	86

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Un and Low Alloyed TIG and MAG Solid Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification	Page
ELGATIG 100	EN ISO 636-A	W 46 5 W3Si1	AWS A5.18	ER70S-6	**40**
ELGATIG 101	EN ISO 636-A	W 42 2 2Si	AWS A5.18	ER70S-3	**41**
ELGATIG 115	EN ISO 636	W 42 2 W2Ti	AWS A5.18	ER70S-2	**42**
ELGATIG 162	EN ISO 636-A	W 46 6 W3Ni1	AWS A5.28	ER80S-Ni1	**43**
ELGATIG 135	EN ISO 16834	W 69 4 Mn3Ni1Cr-Mo	AWS A5.28	ER100S-G	**44**
ELGATIG 181CR	EN ISO 21952-A	W MoSi	AWS A5.28	ER70S-A1	**45**
ELGATIG 183CR	EN ISO 21952	W CrMo1Si	AWS A5.28	ER80 S-G	**46**
ELGAMATIC 100	EN ISO 14341-A	G 42 2 M21 3Si1	AWS A5.18	ER70S-6	**47**
ELGAMATIC 103	EN ISO 14341-A	G 46 4 M21 4Si1	AWS A5.18	ER70S-6	**48**
ELGAMATIC NEO 100	EN ISO 14341-A	G 42 4 M21 3Si1	AWS A5.18	ER70S-6	**49**
ELGAMATIC NEO 103	EN ISO 14341-A	G 46 5 M21 4Si1	AWS A5.18	ER70S-6	**50**
ELGAMATIC 135	EN ISO 16834-A	G 69 4 M21 Mn3Ni1CrMo	AWS A5.28	ER100S-G	**51**
ELGAMATIC 140	EN ISO 14341-A	G 50 4 M21 Z	AWS A5.28	ER80S-G	**52**
ELGAMATIC 162	EN ISO 14341-A	G 46 6 M21 G3Ni1	AWS A5.28	ER80S-Ni1	**53**
ELGAMATIC 147	EN ISO 16834-A	G Mn3NiCrMo	AWS A5.28	ER100S-G	**54**
ELGAMATIC 181CR	EN ISO 21952-A	G MoSi	AWS A5.28	ER70S-A1	**55**
ELGAMATIC 183CR	EN ISO 21952-A	CrMo1Si	–	–	**56**

ELGATIG 100

GTAW Unalloyed

Classifications EN ISO 636-A W 46 5 W3Si1
AWS A5.18 ER70S-6

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.

Shielding Gas I1, Ar 99.99%, 7-10 l/min **Welding Current** DC-

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,08	0,9	1,5	0,01	0,015	0,03	0,02	0,02	0,05

Notes :
Stamping:
F ER70S-6

Mechanical properties **Welding Conditions :** As welded

Typical values				T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	-50	60
Tensile Strength, Rm	580	MPa			
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X					

Available diameters : 1.6 - 3.0mm

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ELGATIG 101

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

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.

Shielding Gas I1, Ar 99.99%, 7-10 l/min **Welding Current** DC-

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,09	0,65	1,10	0,015	0,013				0,05

Notes :
Stamping:
F ER70S-3

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	460	MPa	Impact energy, CV	-20	100
Tensile Strength, Rm	560	MPa			
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Available diameters : 1.6 - 3.0mm

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ELGATIG 115

GTAW Unalloyed

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

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.

Shielding Gas	I1, Ar 99.99%, 7-10 l/min	**Welding Current**	DC-

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,6	1,2	0,01	0,01	0,03	0,02	0,02	0,05

Notes :
Stamping:
F ER70S-2

Mechanical properties **Welding Conditions :** As welded

Typical values				T °C	Typical (J)
Yield Strength, Re	460	MPa	Impact energy, CV	-20	80
Tensile Strength, Rm	540	MPa			
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.6 - 2.4mm

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ELGATIG 162

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

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.

Shielding Gas I1, Ar 99.99%, 7-10 l/min **Welding Current** DC-

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,09	0,6	1,1	0,01	0,01		0,9		

Notes :
Stamping:
F ER80S-Ni1

-All 500 mm rods are colour coded.

Mechanical properties **Welding Conditions :** As welded

Typical values				T °C	Typical (J)
Yield Strength, Re	490	MPa	Impact energy, CV	-46	90
Tensile Strength, Rm	600	MPa			
Elongation A5	28	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Available diameters : 1.6 - 3.0mm

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ELGATIG 135

GTAW Low Alloyed

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

ELGATIG 135 is a 1.5% Ni / 0.5% Mo / 0.2% Cr alloyed wire intended for TIG welding the high tensile quenched and tempered steels such as Weldox 700, BSC RQT 701, N-A-XTRA 70 and USST1. The weld deposit has good fracture toughness at temperatures down to -40°C.

Shielding Gas	I1, Ar 99.99%, 7-10 l/min	**Welding Current**	DC-

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,1	0,55	1,65	0,012	0,013	0,35	1,35	0,25	0,06

Mechanical properties

Welding Conditions : As welded

Typical values				T °C	Typical (J)
Yield Strength, Re	700	MPa	Impact energy, CV	-40	55
Tensile Strength, Rm	790	MPa			
Elongation A5	20	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Available diameters : 2.4mm

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ELGATIG 181CR

Classifications EN ISO 21952-A W MoSi
AWS A5.28 ER70S-A1

ELGATIG 181CR is a 0.5% Mo alloyed wire intended for TIG welding similar composition steels, used where creep rupture strength and ductility at service temperatures up to 550°C are required, e.g. DIN 15 Mo3, BS 3059 Grade 243 and ASTM A335 Grade P1. The Mo content confers some resistance to hydrogen attack in chemical process plant applications. ELGATIG 181CR is also suitable for ordinary C-Mn steels when higher tensile strength weld metal is required. Preheat and interpass temperature of 100-150°C is recommended. Stress relieve at 620°C.

Shielding Gas	I1, Ar 99.99%, 7-10 l/min	**Welding Current**	DC-

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,10	0,60	1,10	0,015	0,01			0,50	

Notes :
Stamping:
F SG Mo

Mechanical properties **Welding Conditions :** PWHT 620°C - 1h

Typical values				T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	-20	75
Tensile Strength, Rm	580	MPa		-30	45
Elongation A5	24	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	42.042.05					

Available diameters : 1.6 - 3.0mm

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ELGATIG 183CR

GTAW Low Alloyed

Classifications EN ISO 21952 W CrMo1Si
AWS A5.28 ER80 S-G

ELGATIG 183CR is a 1.25% Cr/0.5% Mo alloyed wire intended for TIG welding creep resisting steels of similar composition, used in power generation plant operating at temperatures up to 570°C, e.g. DIN 13 CrMo 44, GS-17 CrMo 55, BS 3604 Grades 620 and 621 etc. Also suitable for use in the chemical and petrochemical industries where resistance to hydrogen attack, corrosion from sulphur bearing crude oil and stress corrosion cracking in sour environments is required. Preheat and interpass temperature of 150-200°C is recommended. Post-weld heat treat at 690°C.

Shielding Gas	I1, Ar 99.99%, 7-10 l/min	**Welding Current**	DC-

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,11	0,65	1	0,006	0,006	1,2	0,05	0,5	0,15

Notes :
Stamping:
F CrMo1.

Mechanical properties **Welding Conditions :** PWHT 660°C - 700°C, 1h

Typical values				T °C	Typical (J)
Yield Strength, Re	520	MPa	Impact energy, CV	+20	80
Tensile Strength, Rm	620	MPa			
Elongation A5	22	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.6 - 2.4mm

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ELGAMATIC 100

Classifications EN ISO 14341-A G 42 2 M21 3Si1
AWS A5.18 ER70S-6

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.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

C1, 100% CO2, 12-18 l/min

Welding Current DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,08	0,85	1,45	0,01	0,015				0,05

Notes :
The typical values are based on M21 Also available in AUTOPAC, a twist-free pay-off pack. For more information about Part no, type of spool and winding, please study the price list.

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	470	MPa	Impact energy, CV	-20	85
Tensile Strength, Rm	550	MPa			
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X	X		X			

Available diameters : 0.6 - 1.2mm

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ELGAMATIC 103

GMAW Unalloyed

Classifications EN ISO 14341-A G 46 4 M21 4Si1
AWS A5.18 ER70S-6

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.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

C1, 100% CO2, 12-18 l/min

Welding Current DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,09	0,9	1,7	0,015	0,01	0,03	0,02	0,02	0,05

Notes :
Also available in AUTOPAC, a twist-free pay-off pack. For more information about Part no, type of spool and winding, please study the price list.

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	510	MPa	Impact energy, CV	-40	60
Tensile Strength, Rm	610	MPa			
Elongation A5	24	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X	X					

Available diameters : 0.8 - 1.2mm

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ELGAMATIC NEO 100

Classifications EN ISO 14341-A G 42 4 M21 3Si1 / G 38 3 C1 3Si1
AWS A5.18 ER70S-6

ELGAMATIC NEO 100 is a premium bronze-coated, manganese-silicon, G3Si1 type mild steel wire engineered for superior welding performance with CO_2 or Ar/CO_2 shielding gases. Its advanced bronze coating ensures exceptional arc stability, smooth bead appearance, and consistent quality, even under demanding conditions. Designed for high-speed robotic and mechanized welding, ELGAMATIC NEO 100 delivers unmatched reliability at very high amperages, making it the ideal choice for automated production lines. Thanks to its precisely controlled metallurgy, it offers consistent mechanical properties and thoughness at -40°C. Applications: Perfect for structural steel fabrication, transportation, heavy equipment manufacturing, agricultural machinery, and earth-moving applications – where productivity and quality matter most.

Shielding Gas M21, 80% Ar + 20% CO2,12-18 l/min
C1, 100% CO2,12-18 l/min

Welding Current DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,8	1.43	0,02	0,02	0,01	0,01	0,01	

Notes :
Also available in AUTOPAC, a twist-free pay-off pack. For more information about Part no, type of spool and winding, please study the price list.

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	450	MPa	Impact energy, CV	-40	60
Tensile Strength, Rm	560	MPa			
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X	X		X			

Available diameters : 1.0 - 1.2mm

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ELGAMATIC NEO 103

Solid wire Gas Metal
Arc Solid Wires

Classifications EN ISO 14341-A G 46 5 M21 4Si1 / G 42 3 C1 4Si1
AWS A5.18 ER70S-6

ELGAMATIC NEO 103 is a premium bronze-coated, manganese-silicon, G4Si1 type mild steel wire engineered for superior welding performance with CO_2 or Ar/CO_2 shielding gases. Its advanced bronze coating ensures exceptional arc stability, smooth bead appearance, and consistent quality, even under demanding conditions. Designed for high-speed robotic and mechanized welding, ELGAMATIC NEO 103 delivers unmatched reliability at very high amperages, making it the ideal choice for automated production lines. Thanks to its precisely controlled metallurgy , it offers higher strength and impact properties than G3Si1 wire type. Applications: Perfect for structural steel fabrication, transportation, heavy equipment manufacturing, agricultural machinery, and earth-moving applications—where productivity and quality matter most.

Shielding Gas M21, 80% Ar + 20% CO2,12-18 l/min
C1, 100% CO2,12-18 l/min

Welding Current DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,9	1,65	0,02	0,02	0,01	0,01	0,01	

Notes :
Also available in AUTOPAC, a twist-free pay-off pack. For more information about Part no, type of spool and winding, please study the price list.

Mechanical properties Welding Conditions : As Welded (M21)

Typical values				T °C	Typical (J)
Yield Strength, Re	490	MPa	Impact energy, CV	-50	72
Tensile Strength, Rm	530	MPa			
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X	X		X			

Available diameters : 1.0 - 1.2mm

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ELGAMATIC 135

Classifications EN ISO 16834-A G 69 4 M21 Mn3Ni1CrMo
AWS A5.28 ER100S-G

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.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,10	0,55	1,60	0,01	0,01	0,35	1,35	0,25	0,10

Notes :
Typical values are based on M21.

Mechanical properties **Welding Conditions :** As welded

Typical values				T °C	Typical (J)
Yield Strength, Re	725	MPa	Impact energy, CV	-40	55
Tensile Strength, Rm	810	MPa			
Elongation A5	20	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	42.042.08					

Available diameters : 0.8 - 1.2mm

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ELGAMATIC 140

GMAW Low Alloyed

Classifications EN ISO 14341-A G 50 4 M21 Z
AWS A5.28 ER80S-G

ELGAMATIC 140 is a copper coated wire for use with the MIG/MAG process, which deposits a 0.8% Ni / 0.4% Cu weld metal having improved corrosion resistance to that of mild steel when exposed to environments containing salt and sulphurous gases. It is primarily intended for welding weather resisting steels such as Cor-Ten, but is also suitable for higher tensile, low temperature use steels.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,08	0,75	1,40	0,01	0,01	0,30	0,70		0,40

Notes :
Typical values are based on M21.

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	530	MPa	Impact energy, CV	-40	70
Tensile Strength, Rm	620	MPa			
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Available diameters : 0.8 - 1.2mm

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ELGAMATIC 162

Classifications EN ISO 14341-A G 46 6 M21 G3Ni1
AWS A5.28 ER80S-Ni1

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 -50°C and is intended for offshore pipework and similar high integrity applications.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,09	0,60	1,10	0,010	0,010		0,90		

Notes :
- Typical values are based on M21.

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	490	MPa	Impact energy, CV	-60	60
Tensile Strength, Rm	600	MPa			
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Available diameters : 1.0 - 1.2mm

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ELGAMATIC 147

Classifications EN ISO 16834-A G Mn3NiCrMo
AWS A5.28 ER100S-G

ELGAMATIC 147 is a copper coated, low alloyed wire for use with the MIG process and deposits a 0.5% Ni, 0.5% Cr, 0.25% Mo weld metal. It is intended for welding high strength steels and provides an excellent combination of high strength and good fracture toughness at low temperatures. The wire is suitable for steel types N-A-XTRA, RQT, USS T1, BS.4360 Grade 55C etc. Typical applications are the fabrication of heavy machinery and plant for cranes, earth moving and mining equipment.

Shielding Gas M21, 80% Ar + 20% CO2, 7-12 l/min

C1, 100% CO2, 7-12 l/min

Welding Current DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,08	0,7	1,4	0,010	0,012	0,5	0,5	0,25	0,06

Notes :
Typical values are based on M21.

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	690	MPa	Impact energy, CV	-40	60
Tensile Strength, Rm	750	MPa		-20	70
Elongation A5	20	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 1.0 - 1.2mm

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ELGAMATIC 181CR

Classifications EN ISO 21952-A G MoSi
AWS A5.28 ER70S-A1

ELGAMATIC 181CR is a copper coated wire for use with the MIG/MAG process, which deposits a 0.5% Mo type weld metal. It is primarily intended for welding similar composition steels, used where creep rupture strength and ductility at service temperatures up to 550°C are required, e.g. DIN 15 Mo3, BS 3059 Grade 243 and ASTM A335 Grade P1. The Mo content confers some resistance to hydrogen attack in chemical process plant applications.
ELGAMATIC 181CR is also suitable for ordinary C-Mn steels when higher tensile strength weld metal is required. Preheat and interpass temperature of 100-150°C is recommended. Stress relieve at 620°C.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

C1, 100% CO2, 12-18 l/min

Welding Current DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,1	0,6	1,1	0,015	0,01	0,05	0,05	0,5	0,15

Notes :
-The values are based on M21.

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	510	MPa	Impact energy, CV	-20	65
Tensile Strength, Rm	620	MPa			
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X	X					

Available diameters : 1.0 - 1.2mm

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ELGAMATIC 183CR

GMAW Low Alloyed

Classifications EN ISO 21952-A CrMo1Si

ELGAMATIC 183Cr is a 1.25% Cr/0,5% Mo alloyed wire intended for welding creep resisting steels of similar composition, used in power generation plant operating at temperatures up to 570°C, e.g DIN 13 CrMo 44, GS-17 CrMo 55, BS 3604 Grades 620 and 621 etc. Also suitable for use in the chemical and petrochemical industries where resistance to hydrogen attack, corrosion from sulphur bearing crude oil and stress corrosion cracking in sour environments is required. Preheat and interpass temperature of 150-200°C is recommended. Post-weld heat treat at 690°C.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,11	0,65	1	0,015	0,01	1,2	0,05	0,5	0,15

Notes :
-Typical values are based on M21.

Mechanical properties **Welding Conditions :** 660 - 700°C, 1h

Typical values				T °C	Typical (J)
Yield Strength, Re	460	MPa	Impact energy, CV	+20	80
Tensile Strength, Rm	570	MPa			
Elongation A5	23	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X						

Available diameters : 1.0 - 1.2mm

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Un and Low Alloyed Cored Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification	Page
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MEGAFIL® 710M	EN ISO 17632-A	T 46 6 M M21 1 H5	AWS A5.18	E70C-6M H4	**59**
MEGAFIL® 240M	EN ISO 17632-A	T 50 6 1Ni M M21 1 H5	AWS A5.28	E80C-Ni1 H4	**60**
MEGAFIL® 281M	EN ISO 17632-A	T 46 6 Z M M21 1 H5	AWS A5.28	E80C-W2 H4	**61**
MEGAFIL® 940M	EN ISO 18276-A	T 55 6 Mn2,5Ni M M21 1 H5	–	–	**62**
MEGAFIL® 742M	EN ISO 18276-A	T 69 6 Mn2NiCrMo M M21 1 H5	AWS A5.28	E110C-K4 H4	**63**
MEGAFIL® 1100M	EN ISO 18276-A	T 89 4 ZMn2NiCrMo M M21 1H5	AWS A5.28	E120C-G H4	**64**
MEGAFIL® 235M	EN ISO 17634-A	T Mo M M21 1 H5	AWS A5.28	E80C-G H4	**65**
MEGAFIL® 236M	EN ISO 17634-A	T CrMo1 M M21 1 H5	AWS A5.28	E80C-B2 H4	**66**
MEGAFIL® 237M	EN ISO 17634-A	T CrMo2 M M21 1 H5	AWS A5.28	E90C-B3 H4	**67**
MEGAFIL® 713R	EN ISO 17632-A	T 46 4(2) P M21(C1) 1 H5	AWS A5.20	E71T-1M(C)-J H4	**68**
MEGAFIL® 716R	EN ISO 17632-A	T 46 6 P M21 1 H5	AWS A5.20	E71T-9M-J H4	**69**
MEGAFIL® 819R	EN ISO 17632-A	T 50(46) 6(4) 1Ni P M21(C1) 1 H5	AWS A5.29	E81T1-Ni1M-J H4	**70**
MEGAFIL® 821R	EN ISO 17632-A	T 50 6 1Ni P M21 1 H5	AWS A5.29	E81T1-Ni1M-J H4	**71**
MEGAFIL® 781R	EN ISO 17632-A	T 46 5 Z P M21 1 H5	AWS A5.29	E81T1-GM H4	**72**
MEGAFIL® 610R	EN ISO 18276-A	T 62 4 Mn1Ni P M21 1 H5	AWS A5.29	E 81T1-Ni1 M J-H4	**73**
MEGAFIL® 690R	EN ISO 18276-A	T 69 6 Z P M21 1 H5	–	–	**74**
MEGAFIL® 825R	EN ISO 17634-A	T MoL P M21 1 H5	AWS A5.29	E81T1-A1M H4	**75**
MEGAFIL® 731B	EN ISO 17632-A	T 46 6 B M21 3 H5	AWS A5.20	E70T-5M(C)-J H4	**76**
MEGAFIL® 742B	EN ISO 18276-A	T 69 6 Mn2NiCrMo B M21 3 H5	AWS A5.29	E110T5-K4M H4	**77**
MEGAFIL® 735B	EN ISO 17634-A	T Mo B M21 3 H5	AWS A5.29	E80T5-G H4	**78**
MEGAFIL® 736B	EN ISO 17634-A	T CrMo1 B M21 3 H5	AWS A5.29	E80T5-B2M H4	**79**

ELGACORE® MATRIX®

MCAW Unalloyed

Classifications EN ISO 17632-A T 46 4 M M21 3 H5
AWS A5.18 E 70C-6M H4

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.

Shielding Gas M21, 80% Ar + 20% CO2, 15 - 25 l/min

Welding Current DC+

Diffusible Hydrogen

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,6	1,3	0,01	0,02				

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	515	MPa	Impact energy, CV	-20	100
Tensile Strength, Rm	575	MPa		-40	60
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	x	x					

Available diameters : 1.2 - 1.6mm

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MCAW Unalloyed Seamless

MEGAFIL® 710M

Classifications EN ISO 17632-A T 46 6 M M21 1 H5
AWS A5.18 E70C-6M H4

MEGAFIL® 710 M is a seamless metal cored wire with remarkable stable arc and no spatters. Excellent for use in automated welding applications such as orbital Mag or robotic welding. This wire offers a complete third party approvals coverage that enables you to use only one wire to cover more procedures up to 460 MPa yield strength steels. MEGAFIL® 710M can also be used for constructions that needs post weld heat treatment after welding and still offers techanical properties confirming 5Y46 class. Due to the seamless production process the hydrogen content is below 3 ml / 100 g weld metal even after long storage in unconditioned areas. Applications: steel construction, shipbuilding, pressure vessels, mechanical engineering, pipe work, offshore, crane building, heavy transport, lifting equipment, etc.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+ DC-
	C1, 100% CO2, 12-20 l/min	**Diffusible Hydrogen**	< 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,7	1,3	0,015	0,015				

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	530	MPa	Impact energy, CV	-40	140
Tensile Strength, Rm	600	MPa		-60	100
Elongation A5	28	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA	CWB
x	x	x	x	x	x	x	x	x

Available diameters : 1.0 - 1.6mm

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MEGAFIL® 240M

MCAW Low Alloyed Seamless

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

MEGAFIL® 240M is is a seamless metal cored wire designed for welding low alloy steels with around a 1% Ni deposit and applications where low temperature toughness down to -60ºC is required. The low level of diffusible hydrogen typically below 3 ml / 100 g weld metal minimizes the risk of hydrogen-induced cracking. CTOD tested at -20°C. Can also be used in some weathering steel applications where color match is not critical. Applications: automatic and mechanized welding, heavy equipment, shipbuilding, structural and bridge fabrication, pressure vessels etc.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
		Diffusible Hydrogen	< 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,7	1,3	0,015	0,015		0,9		

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	550	MPa	Impact energy, CV	-40	120
Tensile Strength, Rm	620	MPa		-60	90
Elongation A5	27	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA	CWB
x	x	x		x				x

Available diameters : 1.2 - 1.6mm

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MCAW Low Alloyed Seamless

MEGAFIL® 281M

Classifications EN ISO 17632-A T 46 6 Z M M21 1 H5
AWS A5.28 E80C-W2 H4

MEGAFIL® 281M is a seamless metal cored wire for which deposits 0,7%Ni/0,5%Cr/0,5%Cu weld metal designed for weather-resisting steels similar to Cor-Ten. Diffusible hydrogen levels will be less than 4ml/100g of deposited weld metal giving it more resistance to cracking. Suitable for robot applications and ideal for use in short and spray arc. Excellent impact toughness properties down to -60°C. Applications: weathering steels, steel structure, general fabrication, offshore etc.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,7	1,2	0,015	0,015	0,5	0,7		0,5

Mechanical properties

Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	550	MPa	Impact energy, CV	-20	100
Tensile Strength, Rm	630	MPa		-60	70
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Available diameters : 1.2mm

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MEGAFIL® 940M

MCAW Low Alloyed Seamless

Classifications EN ISO 18276-A T 55 6 Mn2,5Ni M M21 1 H5

MEGAFIL® 940M is a metal-cored seamless wire which deposits a 2,5%Ni type weld metal. It is intended for welding High Strengh Steels > 550MPa such as HY 80. MEGAFIL® 940M offers consistent impact properties down to -60°C. MEGAFIL® 940M is WIWEB approved. Diffusible hydrogen levels will be less than 4ml/100g of deposited weld metal giving it more resistance to cracking. Applications: spezialized shipbuilding, submarines, heavy equipment, offshore.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
		Diffusible Hydrogen	< 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,6	1,4	0,010	0,010		2,2		

Mechanical properties

Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	600	MPa	Impact energy, CV	-40	120
Tensile Strength, Rm	690	MPa		-60	100
Elongation A5	23	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA	WIWeB
x								x

Available diameters : 1.2mm

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MCAW Low Alloyed Seamless

MEGAFIL® 742M

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

MEGAFIL® 742M is a high performance metal cored wire for high strength steels with SMYS exceeding 690MPa. Suitable for robot applications automatic root welding without backing possible. The low diffusible hydrogen levels and the excellent values of impact properties down to -60°C makes this wire ideal for application in extreme climatic conditions. Applications: HSLA steels, specialized shipbuilding, heavy equipment, offshore etc.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,4	1,6	0,015	0,015	0,5	2,2	0,5	

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	750	MPa	Impact energy, CV	-40	120
Tensile Strength, Rm	820	MPa		-60	90
Elongation A5	20	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA	WIWeB
X	X		X	X	X	X		x

Available diameters : 1.2mm

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MEGAFIL® 1100M

MCAW Low Alloyed Seamless

Classifications EN ISO 18276-A T 89 4 ZMn2NiCrMo M M21 1 H5
AWS A5.28 E120C-G H4

MEGAFIL® 1100M is a high performance metal cored wire for high strength steels with SMYS exceeding 800MPa, such as ASTM 514, HY-100 and T1 steels. Diffusible hydrogen levels will be less than 4ml/100g of deposited weld metal giving it more resistance to cracking. Suitable for robot applications and ideal for use in short and spray arc. Excellent impact toughness properties down to -40°C. Can be used out of position with pulse-capable welding. Applications: HSLA steels, heavy equipment, offshore, pressure vessels.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
		Diffusible Hydrogen	< 3ml/100g

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,5	1,5	0,015	0,015	0,5	2,6	0,55	

Notes :
Typical Mechanical values are depending on T8/5 time

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	950	MPa	Impact energy, CV	-40	55
Tensile Strength, Rm	1010	MPa			
Elongation A5	17	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.2mm

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MCAW Low Alloyed Seamless

MEGAFIL® 235M

Classifications EN ISO 17634-A T Mo M M21 1 H5
AWS A5.28 E80C-G H4

MEGAFIL® 235M is a metal-cored seamless wire which deposits a 0,5% Mo type weld metal. It is primarily intended for similar composition steels, used where creep rupture strength and ductility operating at service temperatures up to 500°C are required. Wire suitable also for ordinary C-Mn steels when higher tensile strength is required. Diffusible hydrogen levels will be less than 4ml/100g of deposited weld metal giving it more resistance to cracking. Applications: vessels (Mo steels up to 500°C (932°F)), chemical plant, automatic and mechanized welding, steel structures, single and multi-pass welding, general fabrication etc.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,7	1,1	0,015	0,015	0,5			

Mechanical properties

Welding Conditions : 600°C/60min

Typical values				T °C	Typical (J)
Yield Strength, Re	520	MPa	Impact energy, CV	-20	120
Tensile Strength, Rm	600	MPa		-40	100
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X					

Available diameters : 1.2mm

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MEGAFIL® 236M

MCAW Low Alloyed Seamless

Classifications EN ISO 17634-A T CrMo1 M M21 1 H5
AWS A5.28 E80C-B2 H4

MEGAFIL® 236M is a metal-cored seamless wire which deposits a 1,25%Cr/0,5% Mo type weld metal. It is primarily intended for creep resisting steels of similar composition used in power generation plant operating at service temperatures up to 550°C. Wire suitable also for use in the chemical and petrochemical industries where resistance to hydrogen attack and stress corrosion cracking in sour environments are required. Diffusible hydrogen levels will be less than 4ml/100g of deposited weld metal giving it more resistance to cracking. Applications: vessels (Mo steels up to 500°C (932°F)), steam boilers and turbines, petrochemical plant, steel structures etc.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
		Diffusible Hydrogen	< 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,06	0,3	0,9	0,01	0,01	1,2		0,5	

Mechanical properties

Welding Conditions : 690°C/60min

Typical values				T °C	Typical (J)
Yield Strength, Re	520	MPa	Impact energy, CV	+20	120
Tensile Strength, Rm	600	MPa		-40	52
Elongation A5	24	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.2mm

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MCAW Low Alloyed Seamless

MEGAFIL® 237M

Classifications EN ISO 17634-A T CrMo2 M M21 1 H5
AWS A5.28 E90C-B3 H4

MEGAFIL® 237M is a metal-cored seamless wire which deposits a 2,25%Cr/ 1,0% Mo type weld metal. It is primarily intended for creep resisting steels of similar composition used in steam generation. Wire suitable also for use in the chemical and petrochemical industries where resistance to hydrogen attack and stress corrosion cracking in sour environments are required. Diffusible hydrogen levels will be less than 4ml/100g of deposited weld metal giving it more resistance to cracking. Applications: vessels, steam boilers and turbines (2,25 Cr/1 Mo steels), machinebuilding, petrochemical plant etc.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,3	1	0,015	0,015	2,3		1,1	

Mechanical properties

Welding Conditions : 690°C/60min

Typical values				T °C	Typical (J)
Yield Strength, Re	560	MPa	Impact energy, CV	+20	130
Tensile Strength, Rm	650	MPa		-20	90
Elongation A5	22	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.2mm

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MEGAFIL® 713R

FCAW Unalloyed Seamless

Classifications EN ISO 17632-A T 46 4 P M21 1 H5 / T 46 2 P C1 H5
AWS A5.20 E71T-1M(C)-J H4

MEGAFIL® 713 R is a seamless micro-alloy rutile flux-cored wire with rapidly solidifying slag for CO_2 and Ar-CO_2 mix. The wire is all-positional and runs with a very stable, soft arc producing excellent weld bead shape and finish with negligible spatter. The slag is easily detachable and fume emission is very low. It is suitable for welding mild and medium strength carbon manganese structural steels and produces excellent root beads on ceramic backing. Ease of use and high productivity, in combination with good mechanical properties and a weld metal hydrogen content less than 4ml/100g, make MEGAFIL® 713 R an extremely versatile general purpose cored wire. Applications: shipbuilding, steel and vessel construction, mechanical engineering and pipe work.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-20 l/min	**Welding Current**	DC+
	C1, 100% CO2, 12-20 l/min	**Diffusible Hydrogen**	< 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,5	1,3	0,015	0,015				

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	530	MPa	Impact energy, CV	-20	100
Tensile Strength, Rm	600	MPa		-40	70
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA	CWB
x	x	x	x	x	x	x	x	x

Available diameters : 1.0 - 1.6mm

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FCAW Unalloyed Seamless

MEGAFIL® 716R

Classifications EN ISO 17632-A T 46 6 P M21 1 H5
AWS A5.20 E71T-9M-J H4

MEGAFIL® 716 R is a seamless rutile flux cored wire with excellent welding properties combined with extreme impact toughness down to -60ºC. Fast freezing slag for economic welding in PF position up to 280 A without any spatters. Due to the seamless production process the hydrogen content is below 3 ml / 100 g weld metal even after long storage. CTOD tested. Applications: steel construction, shipbuilding, pressure vessels, mechanical engineering, pipe work, offshore, crane building, heavy transport, etc.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,5	1,3	0,015	0,015		0,4		

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	530	MPa	Impact energy, CV	-40	100
Tensile Strength, Rm	600	MPa		-60	70
Elongation A5	27	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X		X			

Available diameters : 1.2mm

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MEGAFIL® 819R

FCAW Low Alloyed Seamless

Classifications EN ISO 17632-A T 50 6 1Ni P M21 1 H5 / T 46 4 1Ni P C1 1 H5
AWS A5.29 E81T1-Ni1M-J H4

MEGAFIL® 819 R is an all position flux-cored wire used with mixed gas or 100% CO_2 shielding gas for applications where low temperature notch toughness are required. The seamless technology provides extremely low hydrogen levels giving more resistance to cracking. The wire has excellent weld puddle manipulation, superior out-of-position weldability. Weld metal conforms to NACE MR0175 in combination with excellent fracture toughness down to -60°C. MEGAFIL® 819 R provides low spatter and an easy slag removal. Single or multiple pass applications with mixed gas or 100% CO_2 shielding gas. Applications: offshore, pipeline, pressure vessels, heavy equipment.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
	C1, 100% CO2, 12-18 l/min	**Diffusible Hydrogen**	< 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,5	1,2	0,015	0,015		0,8		

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	550	MPa	Impact energy, CV	-40	90
Tensile Strength, Rm	620	MPa		-60	60
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA	CWB
X				X				x

Available diameters : 1.2mm

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FCAW Low Alloyed Seamless

MEGAFIL® 821R

Classifications EN ISO 17632-A T 50 6 1Ni P M21 1 H5
AWS A5.20 E81T1-Ni1M-J H4

MEGAFIL® 821R is a seamless micro-alloy rutile flux-cored wire with rapidly solidifying slag for Ar-CO_2 mix. The wire has excellent weld puddle manipulation, superior out-of-position weldability. Weld metal that conforms to NACE MR0175 in combination with low diffusible hydrogen, excellent fracture toughness down to -60°C and CTOD test at -20°C makes this wire particularly suitable for critical applications in the pipeline and offshore industries. Suitable when PWHT is required. MEGAFIL® 821R provides low spatter loss and an easy slag removal. Applications: specialized shipbuilding, offshore steel structures, pipelines, steel and vessel construction, pipe work.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,5	1,2	0,015	0,015		0,9		

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	550	MPa	Impact energy, CV	-40	110
Tensile Strength, Rm	620	MPa		-60	80
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	x	x	x	x	x	x	

Available diameters : 1.2 - 1.6mm

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MEGAFIL® 781R

FCAW Low Alloyed Seamless

Classifications EN ISO 17632-A T 46 5 Z P M21 1 H5
AWS A5.29 E81T1-GM H4

MEGAFIL® 781R is is a seamless rutile flux-cored wire which deposits 1%Ni/0,5%Cu weld metal designed for weather-resisting steels similar to Cor-Ten. Diffusible hydrogen levels will be less than 4ml/100g of deposited weld metal giving it more resistance to cracking. Excellent impact toughness properties down to -50°C. Applications: weathering steels, steel structure, general fabrication, offshore etc.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
		Diffusible Hydrogen	< 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,5	1,3	0,015	0,015		1		0,5

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	570	MPa	Impact energy, CV	-40	80
Tensile Strength, Rm	620	MPa		-50	60
Elongation A5	20	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Available diameters : 1.2mm

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FCAW Low Alloyed Seamless

MEGAFIL® 610R

Classifications EN ISO 18276-A T 62 4 Mn1Ni P M21 1 H5
AWS A5.29 E 81T1-Ni1 M J-H4

MEGAFIL® 610R is a seamless micro-alloy rutile flux-cored wire with rapidly solidifying slag for Ar-CO_2 mix. The wire has an excellent weld out-of-position weldability. Weld metal that conforms to NACE MR0175 in combination with low diffusible hydrogen, high tensile properties and impact properties down to -40°C a makes this wire particularly suitable for critical applications in the pipeline and offshore industries. Low spatter levels and an easy slag removal. Applications: pipelines, offshore steel structures, steel and vessel construction, pipe work.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,08	0,6	1,6	0,015	0,015		<1,0	<0,2	

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	670	MPa	Impact energy, CV	-20	110
Tensile Strength, Rm	750	MPa		-40	80
Elongation A5	21	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.2mm

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MEGAFIL® 690R

FCAW Low Alloyed Seamless

Classifications EN ISO 18276-A T 69 6 Z P M21 1 H5

MEGAFIL® 690R is a seamless micro-alloyed rutile flux-cored wire for high strength steels. This is the first seamless rutile FCW with extreme low hydrogen for S690. It is excellent for use in positional welding where high deposition rate is required, suitable for temperatures down to -60°C. Excellent for use with ceramic backing and orbital welding in all positions. Extreme low spatter properties and excellent arc stability with fast freezing slag. Applications: high-strength low alloy steels, quenched and tempered steels, offshore structures, heavy equipment, crane building, lifting platforms, single and multi-pass welding.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
		Diffusible Hydrogen	< 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,08	0,5	1,7	0,015	0,015		2,0	0,15	

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	750	MPa	Impact energy, CV	-20	110
Tensile Strength, Rm	820	MPa		-40	75
Elongation A5	18	%		-60	50

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X		X	X	X	X	

Available diameters : 1.2mm

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FCAW Low Alloyed Seamless

MEGAFIL® 825R

Classifications EN ISO 17634-A T MoL P M21 1 H5
AWS A5.29 E81T1-A1M H4

MEGAFIL® 825R is a micro-alloy rutile flux-cored wire with rapidly solidifying slag for Ar-CO_2 mix. Excellent weld puddle manipulation, superior out-of-position welding. Ideal for mechanized welding and all-position welding on ceramic backing. Applications: vessel and steel construction, Mo-steels up to 500°C (932°F), mechanical engineering and pipe work.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,5	1,1	0,015	0,015			0,5	

Mechanical properties **Welding Conditions :** 600°C/60min

Typical values				T °C	Typical (J)
Yield Strength, Re	520	MPa	Impact energy, CV	+20	70
Tensile Strength, Rm	600	MPa			
Elongation A5	23	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.2mm

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MEGAFIL® 731B

FCAW Unalloyed Seamless

Classifications EN ISO 17632-A T 46 6 B M21 3 H5
AWS A5.20 E70T-5M(C)-J H4

MEGAFIL® 731 B is a seamless basic flux cored wire with excellent operating characteristics and is suitable for steels with a tensile strength up to 600 MPa. It produces weld metal with superior crack resistance under difficult conditions of high restraint and exhibits good low temperature impact toughness down to -60°C. Due to the seamless production process the hydrogen content is below 3ml/100g weld metal even after long storage. Low spatter levels combined with extreme stable arc guarantee an excellent weldability. Applications: steel construction, buffer layers, severe service, pressure vessels, general fabrication, heavy transport, earthmoving equipment, railroad rails etc.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
	C1, 100% CO2, 12-18 l/min	**Diffusible Hydrogen**	< 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,6	1,4	0,015	0,015				

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	530	MPa	Impact energy, CV	-40	140
Tensile Strength, Rm	600	MPa		-60	100
Elongation A5	27	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X	X	X	X	X	

Available diameters : 1.2mm

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FCAW Low Alloyed Seamless

MEGAFIL® 742B

Classifications EN ISO 18276-A T 69 6 Mn2NiCrMo B M21 3 H5
AWS A5.29 E110T5-K4M H4

MEGAFIL® 742B is a seamless high strength metal-cored wire. Ideal for use of short arc and spray arc. Excellent gap bridging for root welding. Absolutely crack resistant weld metal conditioned by the high-basic slag in combination with extreme low hydrogen content. Therefore, suitable for the economic processing of high-strength, low temperature fine-grained structural steels with yield strength exceeding 690 N/mm. Applications: cranes, equipment, vessel and apparatus construction.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,4	1,6	0,015	0,015	0,5	2,2	0,5	

Mechanical properties

Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	750	MPa	Impact energy, CV	-40	120
Tensile Strength, Rm	820	MPa		-60	90
Elongation A5	20	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X	X	X	X	X	

Available diameters : 1.2mm

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MEGAFIL® 735B

FCAW Low Alloyed Seamless

Classifications EN ISO 17634-A T Mo B M21 3 H5
AWS A5.29 E80T5-G H4

MEGAFIL® 735B is a high basic seamless flux-cored wire for welding creep resistant steels. Minimized risk of hydrogen-induced cracking for the extremely low diffusible hydrogen weld deposit. Excellent weld puddle manipulation, low spatter levels, easy slag removal. Applications: steel and vessel construction (Mo steels up to 500°C (932°F), boiler works, mechanical engineering and pipework.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,07	0,3	1,1	0,015	0,015			0,5	

Mechanical properties

Welding Conditions : 600°C/60min

Typical values				T °C	Typical (J)
Yield Strength, Re	520	MPa	Impact energy, CV	-20	140
Tensile Strength, Rm	600	MPa		-40	120
Elongation A5	26	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.2mm

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FCAW Low Alloyed Seamless

MEGAFIL® 736B

Classifications EN ISO 17634-A T CrMo1 B M21 3 H5
AWS A5.29 E80T5-B2M H4

MEGAFIL® 736B is a basic low alloyed flux-cored wire for Ar-CO_2 mix. Absolutely crack resistant weld metal conditioned by the high-basic slag in combination with very low hydrogen content. Suitable for welding of high temperature resistant CrMo-steels up to 550°C. Applications: steam boiler, pressure vessels, mechanical engineering, pipe work, steam turbine construction, foundries.

Shielding Gas M21, 80% Ar + 20% CO2, 12-18 l/min

Welding Current DC+

Diffusible Hydrogen < 3ml/100g

Weld metal chemistry %

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,3	1,0	0,015	0,015	1,1		0,5	

Mechanical properties

Welding Conditions : 690°C/60min

Typical values				T °C	Typical (J)
Yield Strength, Re	470	MPa	Impact energy, CV	+20	160
Tensile Strength, Rm	550	MPa		-40	70
Elongation A5	20	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.2mm

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Stainless Stick Electrodes

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification	Page
CROMAROD® 308L	EN ISO 3581-A	E 19 9 L R 12	AWS A5.4	E308L-17	**81**
CROMAROD® 308LP	EN ISO 3581-A	E 19 9 L R 11	AWS A5.4	E308L-17	**82**
CROMAROD® B308L	EN ISO 3581-A	E 19 9 L B 42	AWS A5.4	E 308L-15	**83**
CROMAROD® 316L	EN ISO 3581-A	E 19 12 3 L R 12	AWS A5.4	E 316L-17	**84**
CROMAROD® 316LP	EN ISO 3581-A	E 19 12 3 L R 11	AWS A5.4	E 316L-17	**85**
CROMAROD® B316L	EN ISO 3581-A	E 19 12 3 L B 42	AWS A5.4	E316L-15	**86**
CROMAROD® 309L	EN ISO 3581-A	E 23 12 L R 12	AWS A5.4	E309L-17	**87**
CROMAROD® 309MoL	EN ISO 3581-A	E 23 12 2 L R 32	AWS A5.4	E309MoL-17	**88**
CROMAROD® 309MoLP	EN ISO 3581-A	E 23 12 2 L R 11	AWS A5.4	E309MoL-17	**89**
CROMAROD® 310	EN ISO 3581-A	E 25 20 R 12	AWS A5.4	~E310-17	**90**
CROMAROD® Duplex	EN ISO 3581-A	E 22 9 3 N L R 12	AWS A5.4	~E2209-17	**91**
CROMAROD® Duplex LP	EN ISO 3581-A	E 22 9 3 N L R 11	AWS A5.4	~E2209-17	**92**
CROMAROD® Duplex B	EN ISO 3581-A	E 22 9 3 NL B 42	AWS A5.4	E 2209-15	**93**
CROMAROD® 2507R	EN ISO 3581-A	E 25 9 4 N L R 12	AWS A5.4	E2594-17	**94**
CROMAROD® 308H	EN ISO 3581-A	E 19 9 R 12	AWS A5.4	E308H-17	**95**
CROMAROD® 347	EN ISO 3581-A	E 19 9 Nb R 12	AWS A5.4	E 347-17	**96**
CROMAROD® 385	EN ISO 3581-A	E 20 25 5 Cu N L R 12	AWS A5.4	~E385-17	**97**
CROMAROD® 383	EN ISO 3581-A	E 27 31 4 Cu L R 12	AWS A5.4	~E383-17	**98**
CROMAROD® 253	–	–	–	–	**99**
CROMAROD® 312	EN ISO 3581-A	~ E 29 9 R 32	AWS A5.4	~E 312-17	**100**
CROMAROD® 82	EN ISO 14172	E Ni 6182	AWS A5.11	E NiCrFe-3	**101**
CROMAROD® 625	EN ISO 14172	E Ni 6625	AWS A5.11	E NiCrMo-3	**102**

CROMAROD® 308L

Rutile Electrodes SMAW Stainless

Classifications EN ISO 3581-A E 19 9 L R 12
AWS A5.4 E308L-17

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.

Redrying temperature 350 °C, 2h

Scaling temperature Approx. 850 °C in air

Welding Current AC OCV > 39V DC+

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

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	0,7	0,02	0,02	20,0	10,0	0,1	0,02

FN 7 (WRC-92)

Notes :
Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	450	MPa	Impact energy, CV	-20	60
Tensile Strength, Rm	580	MPa		-120	45
Elongation A5	39	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	30.042.04		X		X	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2x300	35-60	28	0,62	143	0,7	31
2,5x300	40-80	28	0,62	91	1	33
3,2x350	80-120	29	0,64	45	1,5	45
4x350	100-160	30	0,64	31	2	55

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CROMAROD® 308LP

Rutile Electrodes SMAW Stainless

Classifications EN ISO 3581-A E 19 9 L R 11
AWS A5.4 E308L-17

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.

Redrying temperature 350 °C, 2h

Welding Current AC OCV > 39V DC+

Scaling temperature

Corrosion resistance

FN 5 (WRC-92)

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,7	0,6	0,02	0,02	19,7	9,5	0,1	0,02

Notes :
Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	450	MPa	Impact energy, CV	-60	50
Tensile Strength, Rm	580	MPa			
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2x300	20-45	21	0,67	148	0,7	40
2,5x300	35-85	21	0,68	91	0,9	45
3,2x350	40-100	23	0,73	44	1,4	53

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Basic Electrodes SMAW Stainless

CROMAROD® B308L

Classifications EN ISO 3581-A E 19 9 L B 42
AWS A5.4 E 308L-15

Basic coated stainless steel electrode for type 304L/304LN steel grades. Produces weld metal with higher touhgness at lower temperatures compared to rutile coated electrodes. The basic coating results in higher resistance to porosity due to improved gas shield, making the electrode highly suitable for on site welding. CROMAROD® B308L has an easy slag removal even in narrow joint preparations, reducing post-weld cleaning time. Applications are in offshore, pipeline, restrained joints.

Redrying temperature 350 °C, 2h

Welding Current DC+

Scaling temperature

Corrosion resistance

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,35	1,0	0,02	0,01	19,0	10,0	0,03	0,1

FN 5 (WRC 92)

Notes :
- For fixed pipe position PF/5G, electrode diameter 3,2 mm is the max recommended size.

- Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	450	MPa	Impact energy, CV	-50	70
Tensile Strength, Rm	570	MPa		-196	45
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	50-80	24	0,69	86	0,83	43
3,2x350	75-125	25	0,69	43	1,24	59
4x350	100-165	26	0,69	28	1,94	60

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CROMAROD® 316L

Rutile Electrodes SMAW Stainless

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

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.

Redrying temperature 350 °C, 2h

Scaling temperature Approx. 850 °C in air

Welding Current AC OCV > 39V DC+

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.

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	0,7	0,02	0,02	18,5	12,0	2,7	0,1

FN 6 (WRC-92)

Notes :
Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	490	MPa	Impact energy, CV	-20	55
Tensile Strength, Rm	600	MPa		-120	45
Elongation A5	32	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	30.042.02	x	x	x	x	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2x300	35-60	29	0,63	137	0,7	33
2,5x300	40-80	29	0,64	85	1,1	35
3,2x350	80-120	29	0,64	44	1,5	43
4x350	100-160	30	0,65	30	2,1	56
5x450	170-230	30	0,65	14	2,8	83

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Rutile Electrodes SMAW Stainless

CROMAROD® 316LP

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

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.

Redrying temperature 350 °C, 2h **Welding Current** DC+

Scaling temperature Approx. 850 °C in air.

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.

Weld metal chemistry %

FN 4 (WRC-92)

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,7	0,8	0,02	0,02	18,3	12,2	2,7	

Notes :
Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	+20	60
Tensile Strength, Rm	580	MPa			
Elongation A5	32	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X		x	x			

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2x300	20-45	21	0,67	145	0,7	40
2x250	20-45	21	0,67	178	0,6	37
2,5x300	40-85	23	0,68	91	0,9	45
3,2x350	40-100	23	0,73	44	1,4	53

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CROMAROD® B316L

Basic Electrodes SMAW Stainless

Classifications EN ISO 3581-A E 19 12 3 L B 42
AWS A5.4 E316L-15

Basic coated stainless steel electrode for type 316L steel grades. Produces weld metal with higher touhgness at lower temperatures compared to rutile coated electrodes. The basic coating results in higher resistance to porosity due to improved gas shield, making the electrode highly suitable for on site welding. CROMAROD® B316L has an easy slag removal even in narrow joint preparations, reducing the post weld cleaning time. Applications are in offshore, pipeline, restrained joints.

Redrying temperature 350 °C, 2h

Welding Current DC+

Scaling temperature

Corrosion resistance

FN 5 (WRC 92)

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,35	1,0	0,02	0,01	18,5	12,0	2,7	0,1

Notes :
- For fixed pipe position PF/5G, electrode diameter 3,25 mm is the max recommended size.

Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	470	MPa	Impact energy, CV	-50	65
Tensile Strength, Rm	575	MPa		-196	40
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	50-80	24	0,69	86	0,83	43
3,2x350	75-125	25	0,69	43	1,24	59
4x350	100-165	26	0,69	28	1,94	60

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CROMAROD® 309L

Rutile Electrodes SMAW Stainless

Classifications EN ISO 3581-A E 23 12 L R 12
AWS A5.4 E309L-17

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 are:
– 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.

Redrying temperature 350 °C, 2h

Welding Current AC OCV > 39V DC+

Scaling temperature Approx. 1000 °C in air.

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.

Weld metal chemistry %

FN 9 (WRC-92)

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	0,8	0,02	0,02	23,0	13,0	0,1	0,02

Notes :
Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	470	MPa	Impact energy, CV	-20	48
Tensile Strength, Rm	560	MPa		-60	45
Elongation A5	34	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X			x	x	x	x	

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	40-80	27	0,67	83	0,9	42
3,2x350	80-120	28	0,67	42	1,4	53
4x350	100-160	29	0,67	28	1,9	59
4x450	100-160	29	0,67	21	1,9	75

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CROMAROD® 309MoL

Rutile Electrodes SMAW Stainless

Classifications EN ISO 3581-A E 23 12 2 L R 32
AWS A5.4 E309MoL-17

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 are:
– 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.

Redrying temperature 350 °C, 2h

Scaling temperature Approx. 1000 °C in air.

Welding Current AC OCV > 39V DC+

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

Weld metal chemistry %

FN 20 (WRC-92)

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	0,8	0,02	0,02	22,8	12,8	2,4	0,02

Notes :
Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	555	MPa	Impact energy, CV	-20	50
Tensile Strength, Rm	680	MPa			
Elongation A5	33	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X	30.042.03		x		x	x

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2x300	35-60	26	0,63	135	0,7	33
2,5x300	40-80	27	0,64	84	1,1	36
3,2x350	80-120	28	0,65	43	1,5	42
4x350	100-160	29	0,65	29	2,1	55
4x450	100-160	29	0,65	23	2,1	70
5x450	150-220	30	0,67	13	3,1	79

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Rutile Electrodes SMAW Stainless

CROMAROD® 309MoLP

Classifications EN ISO 3581-A E 23 12 2 L R 11
AWS A5.4 E309MoL-17

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

Redrying temperature 350 °C, 2h

Welding Current AC OCV > 39V DC+

Scaling temperature

Corrosion resistance

Weld metal chemistry %

FN 20 (WRC-92)

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,7	1	0,02	0,02	23,2	13	2,5	0,02

Notes :
Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	550	MPa	Impact energy, CV	-20	50
Tensile Strength, Rm	720	MPa			
Elongation A5	33	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	35-80	23	0,66	98	0,9	45
3,2x350	40-100	23	0,73	41	1,4	53

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CROMAROD® 310

Rutile Electrodes SMAW Stainless

Classifications EN ISO 3581-A E 25 20 R 12
AWS A5.4 ~E310-17

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.

Redrying temperature 350 °C, 2h **Welding Current** AC OCV > 39V DC+

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

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

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,10	0,65	2,5	0,02	0,02	26,0	21,0	0,1	0,02

FN 0 (WRC-92)

Notes :
AWS: Slight deviation in Mn
Core wire:
P ≤ 0.030%
S ≤ 0.030%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	410	MPa	Impact energy, CV	-60	60
Tensile Strength, Rm	600	MPa			
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	50-70	23	0,67	79	0,7	58
3,2x350	70-110	23	0,67	40	1,1	74
4x350	110-155	25	0,67	27	1,5	78

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CROMAROD® Duplex

Rutile Electrodes SMAW Stainless

Classifications EN ISO 3581-A E 22 9 3 N L R 12
AWS A5.4 ~E2209-17

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.

Redrying temperature 350 °C, 2h

Welding Current AC OCV > 39V DC+

Scaling temperature Approx. 850 °C in air.

Corrosion resistance Very good resistance to pitting corrosion and stress corrosion cracking in chloride and H2S environments. Good resistance to intergranular corrosion. Pitting resistance equiva-

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,9	0,7	0,02	0,02	23,2	9,5	3,0	

FN 35 (WRC-92)

Notes :
AWS: Slight difference in Cr.

- Core wire:
P ≤ 0.020%
S ≤ 0.010%
0.14% ≤ N ≤ 0.17%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	670	MPa	Impact energy, CV	-46	34
Tensile Strength, Rm	840	MPa			
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X			x	x		

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	60-90	24	0,62	92	1,1	33
3,2x350	80-120	25	0,64	45	1,4	50
4x350	130-170	26	0,64	30	2	54
5x450	160-220	30	0,64	14	2,7	87

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CROMAROD® Duplex LP

Rutile Electrodes SMAW Stainless

Classifications EN ISO 3581-A E 22 9 3 N L R 11
AWS A5.4 ~E2209-17

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.

Redrying temperature 350 °C, 2h

Scaling temperature

Welding Current AC OCV > 39V DC+

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

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	1	0,8	0,02	0,02	23,2	9,2	3	0,06

FN 35 (WRC-92)

Notes :
AWS: Slight difference in Cr and Si.

- Core wire:
P ≤ 0.020%
S ≤ 0.010%
0.14% ≤ N ≤ 0.17%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	680	MPa	Impact energy, CV	-46	32
Tensile Strength, Rm	800	MPa			
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2x300	20-45	21	0,67	145	0,7	40
2,5x300	35-85	22	0,75	80	1	38
3,2x350	50-110	22	0,71	44	1,2	62

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Basic Electrodes SMAW Stainless

CROMAROD® Duplex B

Classifications EN ISO 3581-A E 22 9 3 NL B 42
AWS A5.4 E 2209-15

CROMAROD® Duplex B is a basic flux coated electrode intended for welding similar composition duplex stainless steels e.g. 1.4462, UNS 31803. The basic coating design produces a very low micro-oxide level in the deposit, giving excellent fracture toughness at temperatures down to -46°C. Duplex stainless steels 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 ferrite/austenite phase balance in the weld metal. Applications are in Offshore, platform, pipework, pipelines transporting chloride bearing products, or sour gas and process vessels for chloride environments.

Redrying temperature 350 °C, 2h **Welding Current** DC+

Scaling temperature

Corrosion resistance Typical value: PRE 36 / CPT 30°C (ASTM G48)

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,6	0,9	0,02	0,01	23	9	3,2	0,06

FN 35 (WRC-92)

Notes :
Metal recovery: 110%

- Core wire:
P ≤ 0.020%
S ≤ 0.010%
0.14% ≤ N ≤ 0.17%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	630	MPa	Impact energy, CV	-50	60
Tensile Strength, Rm	790	MPa			
Elongation A5	27	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	50-80	24	0,65	87	0,8	44
3,2x350	75-120	25	0,68	43	1,4	54
4x350	120-175	27	0,68	28	1,9	59

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CROMAROD® 2507R

Rutile Electrodes SMAW Stainless

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

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.

Redrying temperature 350 °C, 2h

Welding Current AC OCV > 39V DC+

Scaling temperature Approx. 850°C in air.

Corrosion resistance Very good resistance to pitting corrosion and stress corrosion cracking in chloride and H2S environments. Good resistance to intergranular corrosion. Pitting resistance equiva-

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	0,7	0,02	0,01	25,0	9,0	4	

FN 50-55 (WRC-92)

Notes :
Typical value: PRE 42, CPT 40° C (ASTM G48)

Core wire: P ≤ 0.015%,
S ≤ 0.001%,
0.14% ≤ N ≤ 0.16%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	700	MPa	Impact energy, CV	+20	35
Tensile Strength, Rm	900	MPa			
Elongation A5	22	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X				x			

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	60-90	22	0,5	110	1,1	31
3,25x350	80-120	23	0,55	53	1,5	47
4x350	130-170	24	0,55	35	2,3	46

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Rutile Electrodes SMAW Stainless

CROMAROD® 308H

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

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.

Redrying temperature 350 °C, 2h

Welding Current AC OCV > 39V DC+

Scaling temperature

Corrosion resistance

Weld metal chemistry %

FN 4 (WRC-92)

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,7	0,8	0,02	0,02	19,5	10,0	0,1	0,02

Notes :
Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	435	MPa	Impact energy, CV	+20	75
Tensile Strength, Rm	585	MPa			
Elongation A5	39	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	35-85	21	0,68	95	0,9	45
3,2x350	40-100	23	0,73	46	1,4	53
4x350	100-160	24	0,65	30	1,6	65

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CROMAROD® 347

Rutile Electrodes SMAW Stainless

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

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.

Redrying temperature 350 °C, 2h

Welding Current AC OCV > 39V DC+

Scaling temperature Approx. 850 °C in air.

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

Weld metal chemistry %

FN 8 (WRC-92)

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,9	0,7	0,020	0,015	20,0	10,0	0,1	<0,1

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	-60	40
Tensile Strength, Rm	620	MPa			
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	50-80	21	0,62	90	1	34
3,2x350	80-110	22	0,64	46	1,3	55
4x350	130-170	22	0,63	31	1,9	56

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Rutile Electrodes SMAW Stainless

CROMAROD® 385

Classifications EN ISO 3581-A E 20 25 5 Cu N L R 12
AWS A5.4 ~E385-17

CROMAROD® 385 is a rutile flux coated electrode designed for welding the fully austenitic stainless steels of the 20%Cr / 25%Ni / 4.5%Mo / Cu type, used for their very high resistance to corrosion in severe, non-oxidising environments e.g. sulphuric acid. The low carbon, high alloy content of CROMAROD® 385 weld metal gives excellent resistance to intergranular corrosion and stress corrosion cracking, combined with superior resistance to crevice and pitting corrosion. Use no preheat, avoid high heat-input and maintain an interpass temperature of maximum 150°C. For very severe corrosion environments a special variant of this electrode, with a Mo content of 6%, is available to order.

Redrying temperature 350 °C, 2h

Welding Current AC OCV > 39V DC+

Scaling temperature Approx. 1000 °C in air.

Corrosion resistance Very good resistance to general and intergranular corrosion in non-oxidising acid environments e.g. sulphuric (up to 90%), phosphoric and organic acids. Good resistance to stress

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	1,1	0,02	0,02	20,5	25,5	4,2	1,5

FN 0 (WRC-92)

Notes :
AWS: Slight deviation in Si

Core wire:
P ≤ 0.020%
S ≤ 0.015%
N ≤ 0.08%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	380	MPa	Impact energy, CV	+20	55
Tensile Strength, Rm	580	MPa			
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	40-80	24	0,53	101	1,1	33
3,2x350	80-120	25	0,58	50	1,5	48
4x350	130-170	26	0,58	33	2,3	48

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CROMAROD® 383

Rutile Electrodes SMAW Stainless

Classifications EN ISO 3581-A E 27 31 4 Cu L R 12
AWS A5.4 ~E383-17

CROMAROD® 383 is a rutile flux coated electrode specially designed for high alloyed fully austenitic stainless steels of similar composition e.g. Sandvik Sanicro 28. It deposits a 27%Cr / 31%Ni / 3.5%Mo / 1%Cu weld metal with exceptionally good corrosion resistance in non-oxidising acid environments, e.g. sulphuric and phosphoric. With a PRE of approximately 40, the electrode has even higher resistance to pitting corrosion than CROMAROD® 385.

Redrying temperature 350 °C, 2h

Scaling temperature

Corrosion resistance

Welding Current AC OCV > 39V DC+

FN 0 (WRC-92)

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,025	0,9	1	0,01	0,01	27,5	31,5	3,8	1

Notes :
AWS: Slight deviation in C and Si

Core wire:
P ≤ 0.015%
S ≤ 0.010%
N ≤ 0.08%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	+20	55
Tensile Strength, Rm	600	MPa			
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	45-75	21	0,6	88	0,6	56
3,2x350	70-110	22	0,63	44	1	71
4x350	30-170	25	0,64	29	1,9	56

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Rutile Electrodes SMAW Stainless

CROMAROD® 253

Classifications –

CROMAROD® 253 is a special rutile flux coated electrode designed for high temperature stainless steels of similar composition used at temperatures up to 1150°C. The electrode is made on a fully alloyed core wire and deposits a 0.06%C / 22%Cr / 10.5%Ni / 0.17%N weld metal, microalloyed with the rare earth metal cerium to give stable high temperature mechanical and oxidation properties. CROMAROD® 253 runs with a low spatter arc to produce a smooth weld bead finish, easy slag detachability and particularly good vertical-up operability.

Redrying temperature 350 °C, 2h

Scaling temperature Approx. 1150 °C in air.

Welding Current AC OCV > 39V DC+

Corrosion resistance Designed for high temperature oxidation applications. Its resistance to wet corrosion is limited.

Weld metal chemistry %

FN 4 (WRC-92)

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,06	1,5	0,5	0,02	0,005	22,0	10,5		0,02

Notes :
Core wire:
P ≤ 0.025%
S ≤ 0.015%
0.14% ≤ N ≤ 0.20%
Ce ~0.05%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	540	MPa	Impact energy, CV	-60	38
Tensile Strength, Rm	700	MPa		+20	55
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	40-80	22	0,65	89	0,7	59
3,2x350	70-110	23	0,65	46	1,1	63
4x350	100-140	24	0,65	30	1,6	66

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CROMAROD® 312

Rutile Electrodes SMAW Stainless

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

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 are:
– 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.

Redrying temperature 350 °C, 2h

Scaling temperature Approx. 1100 °C in air.

Welding Current AC OCV > 39V DC+

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

Weld metal chemistry %

FN 50 (WRC-92)

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,10	0,8	0,8	0,02	0,02	29,0	9,0	0,2	0,02

Notes :
All classifications: slight deviation in Si.
Core wire:
P ≤ 0.030%
S ≤ 0.030%
N ≤ 0.080%

Mechanical properties Welding Conditions : As Welded

Typical values			T °C	Typical (J)
Yield Strength, Re	590	MPa	Impact energy, CV	
Tensile Strength, Rm	760	MPa		
Elongation A5	25	%		

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	40-80	25	0,64	90	1,1	34
3,2x350	80-120	26	0,64	47	1,5	44
4x350	100-160	27	0,65	31	2,1	55

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CROMAROD® 82

Basic Electrodes SMAW High Alloyed

Classifications EN ISO 14172 E Ni 6182 (NiCr15Fe6Mn)
AWS A5.11 E NiCrFe-3

CROMAROD® 82 is a basic flux coated nickel-base electrode intended for welding Inconel 600 and similar composition alloys. The deposit tolerates high dilution levels and is very resistant to hot cracking. It is not susceptible to sigma phase embrittlement or carbon migration and is therefore ideal for service at elevated temperatures. CROMAROD® 82 is highly suitable for a wide range of dissimilar joint combinations between nickel-base alloys, Monels, mild and low alloy steels and austenitic stainless steels. It can also be used to clad carbon steels with an Inconel type surface. The weld metal exhibits very good fracture toughness at temperatures down to -196°C and is suitable for welding 5% and 9% nickel steels for cryogenic applications.

Redrying temperature 350 °C, 2h

Scaling temperature

Welding Current DC+

Corrosion resistance Very good resistance to general and intergranular corrosion. Very good resistance to stress corrosion cracking.

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,3	7,0	0,005	0,005	16,0	bal.		

FN 0 (WRC-92)

Notes :
High temperature properties : the weld metal is resistant to oxidation in air up to 1100 °C

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	405	MPa	Impact energy, CV	-196	94
Tensile Strength, Rm	642	MPa		-20	110
Elongation A5	44	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	45-70	25-27				
3,2x350	70-110	25-27				

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CROMAROD® 625

Basic Electrodes SMAW High Alloyed

Classifications EN ISO 14172 E Ni 6625 (NiCr22Mo9Nb)
AWS A5.11 E NiCrMo-3

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.

Redrying temperature 350 °C, 2h **Welding Current** DC+

Scaling temperature 1150°C in air

Corrosion resistance Very good resistance to general and intergranular corrosion. Maximum resistance (practically immune) to pitting corrosion, crevice corrosion and

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,3	0,6	0,005	0,005	22,4	bal.	9,0	0,02

FN 0 (WRC-92)

Notes :
- High temperature properties: Very high tensile strength and yield strength up to approx. 850 °C (Rp 0.2% ~400 MPa).B229
- Core wire:
P ≤ 0.010%
S ≤ 0.005%

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	530	MPa	Impact energy, CV	-196	60
Tensile Strength, Rm	790	MPa		+20	70
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Diameter x Length (mm)	Current A	Voltage V	Kg weld metal / kg électrodes	No. of electrodes / kg weld metal	Kg weld metal / hour arc time	Burn-Off time / electrode (sec)
2,5x300	45-70	25	0,67	80	0,9	47
3,2x350	60-100	26	0,71	57	1,6	57
4x350	85-130	27	0,71	26	1,7	70
5x450	130-190	28	0,7	13	2,6	100

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Stainless
TIG & MIG Solid Wires

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CROMATIG 316LSi	EN ISO 14343-A	W 19 12 3 L Si	AWS A5.9	ER316LSi	**107**
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CROMATIG 82	EN ISO 18274	S Ni 6082 (NiCr20Mn3Nb)	AWS A5.14	ERNiCr-3	**117**
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CROMAMIG 308LSi	EN ISO 14343-A	G 19 9 L Si	AWS A5.9	ER308LSi	**119**
CROMAMIG 316LSi	EN ISO 14343-A	G 19 12 3 L Si	AWS A5.9	ER316LSi	**120**
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CROMAMIG Duplex	EN ISO 14343-A	G 22 9 3 N L	AWS A5.9	ER2209	**124**
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CROMATIG® 308L

GTAW Stainless

Classifications EN ISO 14343-A W 19 9 L
AWS A5.9 ER308L

CROMATIG® 308L 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 applications are below 400°C.

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

Welding Current DC-

Scaling temperature

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

Weld metal chemistry %

FN 9

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,40	1,7	0,020	0,010	20,5	10,0	0,10	0,10

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	380	MPa	Impact energy, CV	-196	60
Tensile Strength, Rm	600	MPa		20	120
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X							

Available diameters : 1.6 - 2.4mm

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CROMATIG® 308LSi

Classifications EN ISO 14343-A W 19 9 L Si
AWS A5.9 ER308LSi

CROMATIG® 308LSi 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.

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

Welding Current DC-

Scaling temperature

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

Weld metal chemistry %

FN 9

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	1,75	0,02	0,01	20,0	10,0	0,10	0,10

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	-196	50
Tensile Strength, Rm	590	MPa		20	120
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X					

Available diameters : 1.0 - 3.2mm

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CROMATIG® 316L

GTAW Stainless

Classifications EN ISO 14343-A W 19 12 3 L
AWS A5.9 ER316L

CROMATIG® 316L is primarily intended for welding the low carbon, molybdenum alloyed, acid resisting 316L austenitic stainless steels of similar composition. Suitable also for welding 316 grades as well as Nb or Ti stabilised steels provided service temperatures for structural work are below 400°C.

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

Welding Current DC-

Scaling temperature

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.

Weld metal chemistry %

FN 6

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,40	1,7	0,020	0,010	18,5	12,0	2,6	0,10

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	-196	60
Tensile Strength, Rm	600	MPa		20	150
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X				X			

Available diameters : 1.6 - 3.2mm

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CROMATIG® 316LSi

Classifications EN ISO 14343-A W 19 12 3 L Si
AWS A5.9 ER316LSi

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.

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

Welding Current DC-

Scaling temperature

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.

Weld metal chemistry %

FN 8

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,85	1,75	0,015	0,01	18,5	12	2,7	0,1

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch.

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	+20	120
Tensile Strength, Rm	600	MPa		-196	50
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X		X			

Available diameters : 1.0 - 3.2mm

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CROMATIG® 309L

GTAW Stainless

Classifications EN ISO 14343-A W 23 12 L
AWS A5.9 ER309 L

CROMATIG® 309L deposits a 24% 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.

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

Welding Current DC-

Scaling temperature

Corrosion resistance As CROMATIG 309 L 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.

Weld metal chemistry %

FN 10

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,40	1,8	0,020	0,010	23,5	13,5	0,10	0,10

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	450	MPa	Impact energy, CV		+20
Tensile Strength, Rm	650	MPa		130	
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 1.6 - 2.4mm

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CROMATIG® 309LSi

Classifications EN ISO 14343-A W 23 12 L Si
AWS A5.9 ER309LSi

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.

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

Welding Current DC-

Scaling temperature

Corrosion resistance

Weld metal chemistry %

FN 11

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	1,8	0,015	0,01	23,5	13,5	0,10	0,10

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	450	MPa	Impact energy, CV	+20	130
Tensile Strength, Rm	650	MPa		-120	65
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 1.6 - 2.4mm

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CROMATIG® 310

GTAW Stainless

Classifications EN ISO 14343-A W 25 20
AWS A5.9 ER310

CROMATIG® 310 is primarily intended for welding the 25% Cr / 20% Ni type 310 fully austenitic stainless steels, used for corrosion and oxidation resistance at elevated temperatures. Suitable also for joining difficult-to-weld steels such as armour plate and ferritic stainless steels as well as dissimilar steels.

Shielding Gas I1, Ar 99.99%, 6-12 l/min / , **Welding Current** DC-

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

Corrosion resistance Designed for high temperature oxidation applications and its resistance to wet corrosion is limited.

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,011	0,40	1,6	0,020	0,010	25,5	20,5	0,10	0,10

Notes :

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	390	MPa	Impact energy, CV	-196	60
Tensile Strength, Rm	590	MPa		20	170
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 2.0 - 2.4mm

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CROMATIG® Duplex

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

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.

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

Welding Current DC-

Scaling temperature

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.

Weld metal chemistry %

FN 35

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,4	1,8	0,020	0,005	22,5	9,0	3,0	0,10

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	620	MPa	Impact energy, CV	-46	100
Tensile Strength, Rm	800	MPa		-60	85
Elongation A5	30	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	43.042.11		X			

Available diameters : 1.6 - 3.2mm

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CROMATIG® 2507

GTAW Stainless

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

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.

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

Welding Current

Scaling temperature Approx. 850°C in air.

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).

Weld metal chemistry %

FN 55

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,3	0,4	0,015	0,002	25	9,5	4	0,1

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

Mechanical properties

Welding Conditions :

Typical values				T °C	Typical (J)
Yield Strength, Re	640	MPa	Impact energy, CV	-40	60
Tensile Strength, Rm	850	MPa			
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 1.6 - 3.2mm

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CROMATIG® 308H

Classifications EN ISO 14343-A W 19 9 H
AWS A5.9 ER308H

CROMATIG® 308H 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 their creep strength and oxidation resistance at temperatures up to 800°C. CROMATIG® 308H is also recommended for welding the controlled carbon stabilised grades 321H and 347H, used for structural applications at temperatures above 400°C.

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

Welding Current DC-

Scaling temperature

Corrosion resistance

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,05	0,4	1,8	0,015	0,006	20	9,5		

Notes :

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	380	MPa	Impact energy, CV	+20	75
Tensile Strength, Rm	580	MPa			
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 2.0 - 2.4mm

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CROMATIG® 318Si

GTAW Stainless

Classifications EN ISO 14343-A W 19 12 3 Nb Si
AWS A5.9 ~ER318

CROMATIG® 318Si is designed for welding the Nb or Ti stabilised 18% Cr/12% Ni/3% Mo austenitic stainless steel grades 316 Cb and 316 Ti. It is primarily intended for use at service temperatures above 400°C, but for structural applications at elevated temperatures the creep strength of the weld metal should always be considered.

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

Welding Current DC-

Scaling temperature Approx. 850°C in air.

Corrosion resistance Good resistance to general and intergranular corrosion in dilute hot acids. Good resistance to chloride pitting corrosion as well as oxidation and corrosion at elevated temperatures.

Weld metal chemistry %

FN 9

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,04	0,80	1,8	0,015	0,010	19,5	11,5	2,7	0,10

Notes :
Stamping: Elga, AWS, Wst, EN, Batch
AWS A5.9 : deviation in Si content

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	+20	90
Tensile Strength, Rm	610	MPa		-120	40
Elongation A5	34	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X					

Available diameters : 1.6 - 2.4mm

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CROMATIG® 385

Classifications EN ISO 14343-A W 20 25 5 Cu L
AWS A5.9 ER385

CROMATIG® 385 is intended for welding the 20% Cr / 25% Ni / 4.5% Mo / Cu fully austenitic stainless steels, used for their very high resistance to corrosion in severe, non-oxidising environments e.g. sulphuric acid. The low carbon, high alloy content of the weld metal gives excellent resistance to intergranular corrosion and stress corrosion cracking, combined with superior resistance to crevice and pitting corrosion compared to standard 304 L and 316 L materials.

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

Welding Current DC-

Scaling temperature Approx. 1000°C in air.

Corrosion resistance Very good resistance to general and intergranular corrosion in non-oxidising acid environments e.g. Sulphuric (up to 90%), phosphoric and organic acids. Good resistance to stress corrosion cracking and crevice and pitting corrosion in chloride bearing env

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,4	1,6	0,01	0,01	20	25	4,5	1,5

Notes :
AWS: Slight deviation in Cr

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	+20	130
Tensile Strength, Rm	600	MPa		-196	60
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 2.0 - 2.4mm

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CROMATIG® 307Si

GTAW Stainless

Classifications EN ISO 14343-A W 18 8 Mn

CROMATIG® 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 CROMATIG 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.

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

Welding Current DC-

Scaling temperature

Corrosion resistance

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,08	0,85	7,0	0,025	0,02	19,0	9,0	0,2	0,2

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	450	MPa	Impact energy, CV	+20	120
Tensile Strength, Rm	650	MPa		-80	60
Elongation A5	42	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
	X	X					

Available diameters : 1.6 - 2.4mm

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CROMATIG® 82

Classifications	EN ISO 18274	S Ni 6082 (NiCr20Mn3Nb)
	AWS A5.14	ERNiCr-3

CROMATIG® 82 is intended for welding Inconel 600, Incoloy 800 and similar composition nickel base alloys particularly where these are used for high temperature service. Highly suitable for a wide range of dissimilar joint combinations between nickel base alloys, Monels, mild and low alloy steels and austenitic stainless steels. Can be used to clad carbon steels with an Inconel type surface. Suitable for welding 5% and 9% nickel steels for cryogenic applications.

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

Welding Current

Scaling temperature The weld metal is resistant to oxidation
– in air up to 1150°C

Corrosion resistance Very good resistance to general and intergranular corrosion. Very good resistance to stress corrosion cracking.

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,01	0,1	3	0,005	0,005	20	73		0,1

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

-Ta max 0.30

Mechanical properties

Welding Conditions :

Typical values				T °C	Typical (J)
Yield Strength, Re	420	MPa	Impact energy, CV	-196	100
Tensile Strength, Rm	670	MPa			
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 2.4mm

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CROMATIG® 625

GTAW Stainless

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

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.

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

Welding Current

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)

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.

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,01	0,1	0,05	0,005	0,005	22	64,5	9	0,1

Notes :
Stamping:
Elga, AWS, Wst, EN, Batch

-Ta max 0.30

Mechanical properties

Welding Conditions :

Typical values				T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	-196	80
Tensile Strength, Rm	780	MPa			
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
	X						

Available diameters : 2.0 - 2.4mm

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CROMAMIG® 308LSi

Classifications EN ISO 14343-A G 19 9 L Si
AWS A5.9 ER308LSi

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.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min **Welding Current** DC+

Scaling temperature

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

Weld metal chemistry %

FN 9

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	1,75	0,02	0,01	20	10	0,1	0,1

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	+20	120
Tensile Strength, Rm	590	MPa		-196	50
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X					

Available diameters : 0,8 - 1,2mm

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CROMAMIG® 316LSi

GMAW Stainless

Classifications EN ISO 14343-A G 19 12 3 L Si
AWS A5.9 ER316LSi

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.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min **Welding Current** DC+

Scaling temperature

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.

Weld metal chemistry %

FN 8

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,85	1,75	0,015	0,01	18,5	12,0	2,7	0,1

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	-196	50
Tensile Strength, Rm	600	MPa			
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X					

Available diameters : 0,8 - 1,2mm

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CROMAMIG® 309LSi

Classifications EN ISO 14343-A G 23 12 L Si
AWS A5.9 ER309LSi

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.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min **Welding Current** DC+

Scaling temperature

Corrosion resistance

Weld metal chemistry % FN 11

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,02	0,8	1,8	0,015	0,01	23,5	13,5	0,10	0,10

Notes :

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	450	MPa	Impact energy, CV	+20	130
Tensile Strength, Rm	650	MPa		-120	60
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X						

Available diameters : 0,8 - 1,2mm

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CROMAMIG® 309MoL

GMAW Stainless

Classifications EN ISO 14343-A G 23 12 2 L
AWS A5.9 ~ER309MoL

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.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min

Welding Current DC+

Scaling temperature

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

Weld metal chemistry %

FN 12

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,50	1,5	0,02	0,003	22,0	14,5	2,6	0,15

Notes :
AWS: Slight deviation in Cr.

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	470	MPa	Impact energy, CV	+20	80
Tensile Strength, Rm	680	MPa			
Elongation A5	30	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 0,8 - 1,2mm

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CROMAMIG® 310

Classifications EN ISO 14343-A G 25 20
AWS A5.9 ER310

CROMAMIG® 310 is primarily intended for welding the 25% Cr / 20% Ni, type 310, fully austenitic stainless steels, used for corrosion and oxidation resistance at elevated temperatures. Suitable also for joining difficult-to-weld steels such as armour plate and ferritic stainless steels as well as dissimilar steels.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min **Welding Current** DC+

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

Corrosion resistance Designed for high temperature oxidation applications and its resistance to wet corrosion is limited.

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,11	0,40	1,6	0,02	0,01	25,5	20,5	0,10	0,10

Notes :

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	390	MPa	Impact energy, CV	-196	60
Tensile Strength, Rm	590	MPa		20	170
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 1.0 - 1.2mm

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CROMAMIG® Duplex

GMAW Stainless

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

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.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / I3, Ar + <30% H, 16-21 l/min **Welding Current** DC+

Scaling temperature

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.

Weld metal chemistry % FN 35

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,40	1,8	0,02	0,005	22,5	9,0	3,0	0,10

Notes :

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	620	MPa	Impact energy, CV	-60	65
Tensile Strength, Rm	800	MPa			
Elongation A5	30	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X		X			

Available diameters : 0.8 - 1.2mm

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CROMAMIG® 2507

Classifications EN ISO 14343-A G 25 9 4 N L
AWS A5.9 ER2594

CROMAMIG® 2507 deposits a 25%Cr/9%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. CROMAMIG® 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.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / ,

Welding Current DC+

Scaling temperature Approx. 850°C in air.

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

Weld metal chemistry %

FN 55

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,020	0,3	0,4	0,015	0,002	25,0	9,5	4,0	0,10

Notes :

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	640	MPa	Impact energy, CV	-40	60
Tensile Strength, Rm	850	MPa		20	135
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 0,8 - 1,2mm

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CROMAMIG® 347Si

GMAW Stainless

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

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. The higher silicon content gives better arc stability and weld metal flow which improves bead appearance, particularly when dip transfer welding.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min **Welding Current** DC+

Scaling temperature

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

Weld metal chemistry %

FN 8

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,04	0,8	1,3	0,015	0,010	19,5	9,7	0,10	0,10

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	-196	30
Tensile Strength, Rm	620	MPa		20	110
Elongation A5	30	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 1.0 - 1.2mm

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CROMAMIG® 318Si

Classifications EN ISO 14343-A G 19 12 3 Nb Si
AWS A5.9 ~ER318

CROMAMIG® 318Si is designed for welding the Nb or Ti stabilised 18% Cr/12% Ni/3% Mo austenitic stainless steel grades 316 Cb and 316Ti. It is primarily intended for use at service temperatures above 400°C, but for structural applications at elevated temperatures the creep strength of the weld metal should always be considered.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min **Welding Current** DC+

Scaling temperature Approx. 850°C in air.

Corrosion resistance Good resistance to general and intergranular corrosion in dilute hot acids. Good resistance to chloride pitting corrosion as well as oxidation and corrosion at elevated temperatures.

Weld metal chemistry %

FN 9

Notes :

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,04	0,80	1,8	0,015	0,010	19,5	11,5	2,7	0,10

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	+20	90
Tensile Strength, Rm	610	MPa		-120	40
Elongation A5	34	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	X	X					

Available diameters : 0.8 - 1.2mm

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CROMAMIG® 385

GMAW Stainless

Classifications EN ISO 14343-A G 20 25 5 Cu LN
AWS A5.9 ER385

CROMAMIG® 385 is intended for welding the 20% Cr / 25% Ni / 4.5% Mo / Cu fully austenitic stainless steels, used for their very high resistance to corrosion in severe, non-oxidising environments e.g. sulphuric acid. The low carbon, high alloy content of the weld metal gives excellent resistance to intergranular corrosion and stress corrosion cracking, combined with superior resistance to crevice and pitting corrosion compared to standard 304L and 316L materials.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min **Welding Current** DC+

Scaling temperature Approx. 1000°C in air

Corrosion resistance Very good resistance to general and intergranular corrosion in non-oxidising acid environments e.g. sulphuric (up to 90%), phosphoric and organic acids. Good resistance to stress corrosion cracking and crevice and pitting corrosion in chloride bearing env

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,015	0,40	2,0	0,01	0,004	20,0	25,0	4,5	1,5

Notes :

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	-196	50
Tensile Strength, Rm	580	MPa		20	120
Elongation A5	33	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 1.2mm

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CROMAMIG® 307Si

Classifications EN ISO 14343-A G 18 8 Mn
AWS A 5.9 ~ER307

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.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min **Welding Current** DC+

Scaling temperature

Corrosion resistance

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,08	0,85	7,0	0,025	0,02	19,0	9,0	0,2	0,2

Notes :
AWS A5.9-95: Slight deviation in Cr, Mn and Si-content

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	380	MPa	Impact energy, CV	+20	100
Tensile Strength, Rm	600	MPa			
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	af	43.042.10					

Available diameters : 0,8 - 1,2mm

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CROMAMIG® 312

Classifications EN ISO 14343-A G 29 9
AWS A5.9 ER312

CROMAMIG® 312 deposits a 29% Cr / 9% Ni austenitic/ferritic stainless steel weld metal with a ferrite content of about FN 40. The weld metal exhibits excellent tolerance to dilution from dissimilar and difficult-to-weld base materials without hot cracking, together with high strength and very good heat and oxidation resistance.

Shielding Gas M13, Ar + 1-3% O2,16-21 l/min / M12, Ar + 2% CO2, 16-21 l/min **Welding Current** DC+

Scaling temperature Approx. 1100°C in air

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

Weld metal chemistry %

FN 40

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,10	0,50	1,9	0,020	0,010	30,5	9,2	0,10	0,10

Notes :

Mechanical properties Welding Conditions : As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	600	MPa	Impact energy, CV	+20	50
Tensile Strength, Rm	750	MPa			
Elongation A5	25	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 1.0 - 1.2mm

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CROMAMIG® 625

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

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.

Shielding Gas I3, Ar + <30% He, 20-25 l/min., / , **Welding Current**

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)

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.

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,01	0,1	0,05	0,005	0,005	22	64,5	9	0,1

Notes :
Ta max 0.30.

Mechanical properties Welding Conditions :

Typical values				T °C	Typical (J)
Yield Strength, Re	480	MPa	Impact energy, CV	-196	60
Tensile Strength, Rm	780	MPa			
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
	af						

Available diameters : 0.8 - 1.2mm

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Stainless Cored Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification	Page
CROMACORE 308L	EN ISO 17633-A	T 19 9 L R M21 3 T 19 9 L R C1 3	AWS A5.22	E308LT0-1/-4	**133**
CROMACORE 308LP	EN ISO 17633-A	T 19 9 L P M21 1 T 19 9 L P C1 1	AWS A5.22	E 308LT1-1/-4	**134**
CROMACORE 316L	EN ISO 17633-A	T 19 12 3 L R M21 3 T 19 12 3 L R C1 3	AWS A5.22	E316LT0-1/-4	**135**
CROMACORE 316LP	EN ISO 17633-A	T 19 12 3 L P M21 1 T 19 12 3 L P C1 1	AWS A5.22	E 316LT1-1/-4	**136**
CROMACORE 309L	EN ISO 17633-A	T 23 12 L R M21 3 T 23 12 L R C1 3	AWS A5.22	E309LT0-1/-4	**137**
CROMACORE 309LP	EN ISO 17633-A	T 23 12 L P M21 1 T 23 12 L P C1 1	AWS A5.22	E 309LT1-1/-4	**138**

FCAW Stainless

CROMACORE® 308L

Classifications EN ISO 17633-A T 19 9 L R M21 3 / T 19 9 L R C1 3
AWS A5.22 E308LT0-1/-4

CROMACORE® 308L 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® 308L is used mainly for horizontal-vertical welding and is ideal for standing fillets.

Shielding Gas M21, 80% Ar + 20% CO2,22-25 l/min

C1, 100% CO2, 22-25 l/min

Welding Current DC+

Weld metal chemistry %

FN 8

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,7	1,4	0,020	0,008	19,5	10,5		

Notes :
Stick-out: 15-20 mm

Mechanical properties Welding Conditions : As Welded Mixed

Typical values				T °C	Typical (J)
Yield Strength, Re	400	MPa	Impact energy, CV	-196	32
Tensile Strength, Rm	560	MPa			
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X	X	X			

Available diameters : 1.2mm

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CROMACORE® 308LP

FCAW Stainless

Classifications EN ISO 17633-A T 19 9 L P M21 1 / T 19 9 L P C1 1
AWS A5.22 E 308LT1-1/-4

CROMACORE® 308LP 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® 308LP 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.

Shielding Gas M21, 80% Ar + 20% CO2,22-25 l/min

C1, 100% CO2, 22-25 l/min

Welding Current DC+

FN 8

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,7	1,4	0,020	0,008	20	10,5		

Notes :
Stick-out: 15-20 mm

Mechanical properties Welding Conditions : As Welded Mixed

Typical values				T °C	Typical (J)
Yield Strength, Re	460	MPa	Impact energy, CV	-196	35
Tensile Strength, Rm	620	MPa			
Elongation A5	40	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X	X	X			

Available diameters : 1.2mm

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FCAW Stainless

CROMACORE® 316L

Classifications EN ISO 17633-A T 19 12 3 L R M21 3 / T 19 12 3 L R C1 3
AWS A5.22 E316LT0-1/-4

CROMACORE® 316L 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® 316L is used mainly for horizontal-vertical welding and is ideal for standing fillets.

Shielding Gas M21, 80% Ar + 20% CO2,22-25 l/min
C1, 100% CO2, 22-25 l/min

Welding Current DC+

FN 8

Weld metal chemistry %

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,8	1,4	0,020	0,008	19	12	2,8	

Notes :
Stick-out: 15-20 mm

Mechanical properties Welding Conditions : As Welded Mixed

Typical values				T °C	Typical (J)
Yield Strength, Re	420	MPa	Impact energy, CV	-60	40
Tensile Strength, Rm	560	MPa			
Elongation A5	37	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X	X	X			

Available diameters : 1.2mm

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CROMACORE® 316LP

FCAW Stainless

Classifications EN ISO 17633-A T 19 12 3 L P M21 1 / T 19 12 3 L P C1 1
AWS A5.22 E 316LT1-1/-4

CROMACORE® 316LP 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 316LP 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.

Shielding Gas M21, 80% Ar + 20% CO2,22-25 l/min

C1, 100% CO2, 22-25 l/min

Welding Current DC+

Weld metal chemistry %

FN 10

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,8	1,4	0,020	0,008	19	12	2,9	

Notes :
Stick-out: 15-20 mm

Mechanical properties Welding Conditions : As Welded Mixed

Typical values				T °C	Typical (J)
Yield Strength, Re	490	MPa	Impact energy, CV	-60	50
Tensile Strength, Rm	600	MPa			
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X	X	X			

Available diameters : 1.2mm

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FCAW Stainless

CROMACORE® 309L

Classifications EN ISO 17633-A T 23 12 L R M21 3 / T 23 12 L R C1 3
AWS A5.22 E309LT0-1/-4

CROMACORE® 309L 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® 309L 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 teels prior to overlaying with CROMACORE® 308L Interface runs on clad steel joints. Welding of similar composition, 309 type, stainless steels. Joining of ferritic-martensitic stainless steels.

Shielding Gas M21, 80% Ar + 20% CO2,22-25 l/min
C1, 100% CO2, 22-25 l/min

Welding Current DC+

Weld metal chemistry %

FN 17

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,7	1,4	0,02	0,008	23,5	13		

Notes :
Stick-out: 15-20 mm

Mechanical properties Welding Conditions : As Welded Mixed

Typical values				T °C	Typical (J)
Yield Strength, Re	460	MPa	Impact energy, CV	-60	40
Tensile Strength, Rm	580	MPa			
Elongation A5	32	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X	X	X			

Available diameters : 1.2mm

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CROMACORE® 309LP

FCAW Stainless

Classifications EN ISO 17633-A T 23 12 L P M21 1 / T 23 12 L P C1 1
AWS A5.22 E 309LT1-1/-4

CROMACORE® 309LP 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® 309LP 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® 308L. Interface runs on clad steel joints. Welding of similar composition, 309 type, stainless steels. Joining of ferritic-martensitic stainless steels..

Shielding Gas M21, 80% Ar + 20% CO2,22-25 l/min

C1, 100% CO2, 22-25 l/min

Welding Current DC+

Weld metal chemistry %

FN 17

	%C	%Si	%Mn	%P	%S	%Cr	%Ni	%Mo	%Cu
Typical	0,03	0,7	1,4	0,02	0,008	23,5	13		

Notes :
Stick-out: 15-20 mm

Mechanical properties Welding Conditions : As Welded Mixed

Typical values				T °C	Typical (J)
Yield Strength, Re	460	MPa	Impact energy, CV	-60	40
Tensile Strength, Rm	580	MPa			
Elongation A5	35	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X	X	X			

Available diameters : 1.2mm

Cast Iron and Hardfacing Stick Electrodes and Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification	Page
ELGALOY Cast-Ni	EN ISO 1071	E C Ni-CI 3	AWS A5.15	E Ni-CI	**140**
ELGALOY Cast-NiFe	EN ISO 1071	E C NiFe-1 3	AWS A5.15	E NiFe-CI	**141**
ELGALOY HARD 60	EN ISO 14700	E Z Fe2	–	–	**142**
ELGALOY HARD 100	EN ISO 14700	E Fe14	–	–	**143**
ELGALOY HARD M60	EN ISO 14700	S Fe8	–	–	**144**
MEGAFIL® A 730M	EN ISO 14700	T Fe1	–	–	**145**
MEGAFIL® A 740M	EN ISO 14700	T Z Fe2	–	–	**146**
MEGAFIL® A 750M	EN ISO 14700	T Z Fe2	–	–	**147**
MEGAFIL® A 760M	EN ISO 14700	T Fe2	–	–	**148**
MEGAFIL® A 762M	EN ISO 14700	T Fe8	–	–	**149**
MEGAFIL® A 765M	EN ISO 14700	T Fe8	–	–	**150**
MEGAFIL® A 867M	EN ISO 14700	T Z Fe13	–	–	**151**
MEGAFIL® A 864M	EN ISO 14700	T Fe13	–	–	**152**

ELGALOY® Cast-Ni

Special Electrodes SMAW Special

Classifications		
	EN ISO 1071	E C Ni-CI 3
	AWS A5.15	E Ni-CI

ELGALOY® Cast-Ni is a pure nickel electrode for general purpose welding of all types of cast iron. It is suitable for the joining and repair of grey and malleable cast irons and dissimilar joints between these and steel, monel and stainless steels. The electrode will tolerate dirty and contaminated surfaces. No preheat is required for small castings and thin sections up to 15 mm. Above this, preheat up to about 150°C is recommended. Joint surfaces should be prepared by gouging or grinding. Select smallest diameter electrode practical, deposit short thin stepped layers and lightly peen the weld beads during welding to reduce shrinkage strains. Avoid arc striking on the base metal. On completion allow the work piece to cool slowly. The deposit is soft and fully machinable. Grey and malleable cast irons, machine bases, engine blocks and gear housings.

Redrying temperature	150 °C, 2h	**Welding Current**	AC DC+ DC-
Metal recovery		**Hardness as welded**	150-170 HV

Weld metal chemistry %

	%C	%Ni	%Fe
Typical	0,5	94	2,5

Notes :
Hardness as welded : 150-170 HV.

Mechanical Properties

Typical values		
Tensile Strength, Rm	240 -	MPa
Elongation A5	8	%

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Electrodes SMAW Special

ELGALOY® Cast-NiFe

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

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

Redrying temperature 150 °C, 2h

Metal recovery

Welding Current AC DC+ DC-

Hardness as welded 180-200 HV

Weld metal chemistry %

	%C	%Ni	%Fe
Typical	1,0	54	bal.

Notes :
Hardness as welded:
180-200 HV.

Mechanical Properties

Typical values		
Tensile Strength, Rm	450	MPa
Elongation A5	8	%

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ELGALOY® HARD 60

Basic Electrodes SMAW
Hardfacing and Overlay

Classifications EN ISO 14700 E Z Fe2

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 solid wires ELGALOY M60 and Metal Cored Wire Megafil 760 M. Excavator teeth, bulldozer blades, swing hammers, crusher jaws, scrapers etc.

Redrying temperature	350°C, 2h	**Welding Current**	AC DC+
Metal recovery	130%	**Hardness as welded**	57 - 60 HRC, 640 - 690 HV10

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo
Typical	0,7	0,8	0,8	8	0,5

Notes :

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Special Electrodes SMAW
Hardfacing and Overlay

ELGALOY® HARD 100

Classifications EN ISO 14700 E Fe14

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

Redrying temperature	350°C, 2h	**Welding Current**	(AC) DC+
Metal recovery	175%	**Hardness as welded**	58 - 61 HRC, 700 - 740 HV10

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo
Typical	3,5			30	0,5

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

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ELGALOY® HARD M60

GMAW Hardfacing and Overlay

Classifications EN ISO 14700 S Fe8

ELGALOY® Hard M60 is a solid wire producing a martensitic weld metal with a hardness of 55-60 HRC. The deposit exhibits a good wear resistance under conditions of abrasion and friction coupled with moderate impact and can be shaped by grinding.

Shielding Gas	M21, 80% Ar + 20% CO2,	**Welding Current**	DC+
		Hardness as welded	55 - 60 HRC

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo	%B
Typical	0,45	2,95	0,35	9,2		

Notes :

Available diameters : 1.0-1.2mm

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MCAW Hardfacing and Overlay

MEGAFIL® A 730M

Classifications EN ISO 14700 T Fe1

MEGAFIL® A 730M is a metal-cored seamless wire designed for wear resisting parts subject to impact and shock or high compression stress. The weld metal requires no buffer layer except on materials considered critical. The weld metal is machinable by carbide tools. Applications: Rairoad frogs, Transport rollers and wheels, Rope pulleys, Wear parts of track vehicles.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
		Hardness as welded	25 - 35 HRC

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo	%B
Typical	0,22	0,6	1,5	1,3		

Available diameters : 1.2mm

Notes :
The achieved hardness as well as the structure of the hard-facing depends on (among others): Base material, welding parameters, working and inter-pass temperature, heating up, cooling down, number of layers, hardfacing methods and shape of component.

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MEGAFIL® A 740M

MCAW Hardfacing and Overlay

Classifications EN ISO 14700 T Z Fe2

MEGAFIL® A 740M is a metal-cored seamless wire designed for wear resisting parts subject to heavy impact and moderate abrasion. The weld metal requires no buffer layer except on materials considered critical. The weld metal is machinable by carbide tools. Applications: Conveyors and transport surfaces, Tires, Construction equipment.

Shielding Gas M21, 80% Ar + 20% CO2,

Welding Current DC+

Hardness as welded 35 - 45 HRC

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo	%B
Typical	0,15	0,4	1,3	5	0,5	

Available diameters : 1.2mm

Notes :
The achieved hardness as well as the structure of the hard-facing depends on (among others): Base material, welding parameters, working and inter-pass temperature, heating up, cooling down, number of layers, hardfacing methods and shape of component.

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MCAW Hardfacing and Overlay

MEGAFIL® A 750M

Classifications EN ISO 14700 T Z Fe2

MEGAFIL® A 750M is a metal-cored seamless wire designed for wear resisting parts subject to heavy impact and moderate abrasion. The weld metal requires no buffer layer except on materials considered critical. The weld metal is machinable by carbide tools. Applications: Conveyors and transport surfaces, Tires, Construction equipment.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
		Hardness as welded	45 - 55 HRC

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo	%B
Typical	0,3	0,4	1,5	5,5	0,5	

Available diameters : 1.2mm

Notes :
The achieved hardness as well as the structure of the hard-facing depends on (among others): Base material, welding parameters, working and inter-pass temperature, heating up, cooling down, number of layers, hardfacing methods and shape of component.

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MEGAFIL® A 760M

MCAW Hardfacing and Overlay

Classifications EN ISO 14700 T Fe2

MEGAFIL® A 760M is a metal-cored seamless wire designed for wear resisting parts subject to heavy impact and shock. The interpass temperature should be maximum 250°C (482°F). The weld metal requires no buffer layer except on materials considered critical. In this situation, MEGAFIL® 731 B is suggested to be used as a buffer. The weld metal is machinable by carbide tools, hardening is possible. Applications: Bucket and loader teeth, conveyors and transport surfaces, crusher jaws, crusher cones, Tires, Construction equipment.

Shielding Gas M21, 80% Ar + 20% CO2,

Welding Current DC+

Hardness as welded 55 - 65 HRC

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo	%B
Typical	0,5	0,6	1,5	6	0,5	

Available diameters : 1.2mm and 1.6mm

Notes :
The achieved hardness as well as the structure of the hard-facing depends on (among others): Base material, welding parameters, working and inter-pass temperature, heating up, cooling down, number of layers, hardfacing methods and shape of component.

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MCAW Hardfacing and Overlay

MEGAFIL® A 762M

Classifications EN ISO 14700 T Fe8

MEGAFIL® A 762M is a metal-cored seamless wire designed for wear resisting parts subject to heavy impact .Tough and hard hot working steel type deposit for service temperature up to 550°C. Applications: Bucket and loader teeth, Conveyors, Crusher jaws and cones.

Shielding Gas M21, 80% Ar + 20% CO2,

Welding Current DC+

Hardness as welded 55 - 65 HRC (ave. 59)

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo	%B
Typical	0,6	0,7	1,6	6,8	0,9	

Available diameters : 1.2mm

Notes :
Addition of 1.6% Tungsten

The achieved hardness as well as the structure of the hard-facing depends on (among others): Base material, welding parameters, working and inter-pass temperature, heating up, cooling down, number of layers, hardfacing methods and

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MEGAFIL® A 765M

MCAW Hardfacing and Overlay

Classifications EN ISO 14700 T Fe8

MEGAFIL® A 765M is a metal-cored seamless wire designed for wear resisting parts subject to heavy impact and shock and retains high hardness up to 400 °C. Applications: Cutting tools, crushers, recycling parts, Converyors and transport surfaces.

Shielding Gas	M21, 80% Ar + 20% CO2, 12-18 l/min	**Welding Current**	DC+
		Hardness as welded	58 - 62 HRC (ave. 60)

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo	%B
Typical	0,45	2,9	1,0	8,5		

Available diameters : 1.2mm

Notes :
The achieved hardness as well as the structure of the hard-facing depends on (among others): Base material, welding parameters, working and inter-pass temperature, heating up, cooling down, number of layers, hardfacing methods and shape of component.

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MCAW Hardfacing and Overlay

MEGAFIL® A 867M

Classifications EN ISO 14700 T Z Fe13

MEGAFIL®A 867M is a high-alloy metal cored wire for hardfacing using Ar-CO2 mix. Can also be used without shielding gas. Microstructure consisting of special boron based carbides in combination with Chromium carbides providing an excellent resistance to abrasion from sand and minerals. The weld metal is machinable only by grinding. Stringer bead technique is recommended. The hard surfacing contains check cracks, but this does not impact wear resistance. Applications: Repair of equipment used in mining and steel mills. Hardfacing equipment and tools used in the construction and agriculture industries, conveyor chains, mixing paddles, cement pumps components, etc.

Shielding Gas M21, 80% Ar + 20% CO2,

Welding Current DC+

Hardness as welded 62 - 70 HRC

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo	%B
Typical	1,8	0,6	0,8	8,1		3,8

Available diameters : 1.6mm

Notes :
The achieved hardness as well as the structure of the hardfacing depends on (among others): Base material, welding parameters, working and interpass temperature, heating up, cooling down, number of layers, hardfacing methods and shape of component.

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MEGAFIL® A 864M

MCAW Hardfacing and Overlay

Classifications EN ISO 14700 T Fe13

MEGAFIL® A 864M is a high-alloy metal cored wire for hardfacing using Ar-CO_2 mix. Can also be used without shielding gas. The hardfacing contains sufficient special carbides formed with boron and therefore has excellent resistance to abrasion from sand and minerals. The weld metal is machinable only by grinding. Stringer bead technique is recommended. The hard surfacing contains check cracks, but this does not impact wear resistance. Applications: repair of equipment used in mining and steel mills, hardfacing equipment and tools used in the construction and agriculture industries, conveyor chains, mixing paddles, cement pumps components, etc.

Shielding Gas	M21, 80% Ar + 20% CO2,	**Welding Current**	DC+
		Hardness as welded	60 - 70 HRC

Weld metal chemistry %

	%C	%Si	%Mn	%Cr	%Mo	%B
Typical	0,5	0,3	1,1	0,3		4,2

Available diameters : 1.2mm and 1.6mm

Notes :
The achieved hardness as well as the structure of the hardfacing depends on (among others): Base material, welding parameters, working and interpass temperature, heating up, cooling down, number of layers, hardfacing methods and shape of component.

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Aluminium
TIG & MIG Solid Wires

Product	ISO Norms	ISO Classification	AWS Norms	AWS Classification	Page
ALUTIG Si5	EN ISO 18273	S Al 4043A (AlSi5)	AWS A5.10	ER 4043	**154**
ALUTIG Mg3	EN ISO 18273	S Al 5754 (AlMg3)	AWS A5.10	ER 5754	**155**
ALUTIG Mg5	EN ISO 18273	S Al 5356 (AlMg5Cr (A))	AWS A5.10	ER 5356	**156**
ALUTIG Mg4,5Mn	EN ISO 18273	S Al 5183	AWS A5.10	ER 5183	**157**
ALUMIG Si5	EN ISO 18273	S Al 4043A (AlSi5)	AWS A5.10	ER 4043	**158**
ALUMIG Mg3	EN ISO 18273	S Al 5754 (AlMg3)	AWS A5.10	ER 5754	**159**
ALUMIG Mg5	EN ISO 18273	S Al 5356 (AlMg5Cr (A))	AWS A5.10	ER 5356	**160**
ALUMIG Mg4,5Mn	EN ISO 18273	S Al 5183	AWS A5.10	ER 5183	**161**

ALUTIG® Si5

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

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.

Shielding Gas I1, Ar 99.99%, 5-10 l/min.
I2, Helium, 8-16 l/min

Welding Current AC

Weld metal chemistry %

	%Si	%Mn	%Cr	%Cu	%Al	%Ti	%Zn	%Mg	%Fe
Typical	5	0,01		0,03	bal.	0,01	0,01	0,01	0,2

Notes :
Stamping:
Si5

Mechanical properties **Welding Conditions :** As Welded

Typical values			T °C	Typical (J)
Yield Strength, Re	55	MPa	Impact energy, CV	
Tensile Strength, Rm	140	MPa		
Elongation A5	10	%		

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x		X					

Available diameters : 1.6 - 3.2mm

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ALUTIG® Mg3

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

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.

Shielding Gas I1, Ar 99.99%, 5-10 l/min.
I2, Helium, 8-16 l/min

Welding Current AC

Weld metal chemistry %

	%Si	%Mn	%Cr	%Cu	%Al	%Ti	%Zn	%Mg	%Fe
Typical	0,15	0,3	0,1	0,03	bal.	0,05	0,1	3,2	0,25

Notes :
Stamping:
Mg3

Mechanical properties **Welding Conditions :** As Welded

Typical values			T °C	Typical (J)
Yield Strength, Re	120	MPa	Impact energy, CV	
Tensile Strength, Rm	230	MPa		
Elongation A5	22	%		

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 2.0 - 3.2mm

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ALUTIG® Mg5

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

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.

Shielding Gas I1, Ar 99.99%, 5-10 l/min.
I2, Helium, 8-16 l/min

Welding Current AC

Weld metal chemistry %

	%Si	%Mn	%Cr	%Cu	%Al	%Ti	%Zn	%Mg	%Fe
Typical	0,05	0,15	0,10	0,007	bal.	0,12	0,01	5,0	0,15

Notes :
Stamping:
Mg5

Mechanical properties **Welding Conditions :** As Welded

Typical values			T °C	Typical (J)
Yield Strength, Re	125	MPa	Impact energy, CV	
Tensile Strength, Rm	255	MPa		
Elongation A5	24	%		

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	61.042.04					

Available diameters : 2.0 - 3.2mm

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ALUTIG® Mg4,5Mn

Classifications EN ISO 18273 S Al 5183 (AlMg4.5Mn0,7(A))
AWS A5.10 ER 5183

Aluminium TIG wire containing a nominal 4.9% Magnesium and 0.7% Manganese to produce a higher strength weld metal than the standard 5% Mg alloy.

Shielding Gas I1, Ar 99.99%, 5-10 l/min.
I2, Helium, 8-16 l/min

Welding Current AC

Weld metal chemistry %

	%Si	%Mn	%Cr	%Cu	%Al	%Ti	%Zn	%Mg	%Fe
Typical	0,08	0,7	0,15	0,03	bal.		0,1	4,9	0,20

Notes :
Stamping:
Mg4.5Mn

Mechanical properties **Welding Conditions :** As Welded

Typical values			T °C	Typical (J)
Yield Strength, Re	145	MPa	Impact energy, CV	
Tensile Strength, Rm	275	MPa		
Elongation A5	24	%		

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	x	61.042.02		x			

Available diameters : 1.6 - 3.2mm

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ALUMIG® Si5

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

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.

Shielding Gas I1, Ar 99.99%, 16-20 l/min

I2, Helium, 16-20 l/min

Welding Current DC+

Weld metal chemistry %

Notes :

	%Si	%Mn	%Cr	%Cu	%Al	%Ti	%Zn	%Mg	%Fe
Typical	5	0,01		0,03	bal.	0,01	0,01	0,01	0,2

Mechanical properties **Welding Conditions :** As Welded

Typical values			T °C	Typical (J)
Yield Strength, Re	55	MPa	Impact energy, CV	
Tensile Strength, Rm	140	MPa		
Elongation A5	10	%		

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X					

Available diameters : 1.0 -1.6mm

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ALUMIG® Mg3

Classifications EN ISO 18273 S Al 5754 (AlMg3)
AWS A5.10 ER5754

Aluminium MIG wire containing 3,2% Magnesium for welding similar composition materials. The medium strength weld metal has good corrosion resistance in marine environments. Excellent colour match with material to be anodised. Melting range 590-650°C.

Shielding Gas I1, Ar 99.99%, 16-20 l/min

I2, Helium, 16-20 l/min

Welding Current DC+

Weld metal chemistry %

Notes :

	%Si	%Mn	%Cr	%Cu	%Al	%Ti	%Zn	%Mg	%Fe
Typical	0,15	0,3	0,1	0,03	bal.	0,05	0,1	3,2	0,25

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	120	MPa	Impact energy, CV		
Tensile Strength, Rm	230	MPa			
Elongation A5	22	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA

Available diameters : 1.2mm

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ALUMIG® Mg5

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

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.

Shielding Gas I1, Ar 99.99%, 16-20 l/min

I2, Helium, 16-20 l/min

Welding Current DC+

Weld metal chemistry %

Notes :

	%Si	%Mn	%Cr	%Cu	%Al	%Ti	%Zn	%Mg	%Fe
Typical	0,05	0,15	0,1	0,01	bal.	0,12	0,01	5,0	0,15

Mechanical properties **Welding Conditions :** As Welded

Typical values			T °C	Typical (J)
Yield Strength, Re	125	MPa	Impact energy, CV	
Tensile Strength, Rm	255	MPa		
Elongation A5	24	%		

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
X	X	X		X	X		

Available diameters : 1.0 - 1.2mm

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ALUMIG® Mg4,5Mn

Classifications EN ISO 18273 S Al 5183 (AlMg4.5Mn0,7(A))
AWS A5.10 ER 5183

Aluminium MIG wire containing a nominal 4.9% Magnesium and 0.7% Manganese to produce a higher strength weld metal than the standard 5% Mg alloy.

Shielding Gas I1, Ar 99.99%, 16-20 l/min

I2, Helium, 16-20 l/min

Welding Current DC+

Weld metal chemistry %

Notes :

	%Si	%Mn	%Cr	%Cu	%Al	%Ti	%Zn	%Mg	%Fe
Typical	0,08	0,7	0,15	0,02	bal.		0,1	4,9	0,2

Mechanical properties **Welding Conditions :** As Welded

Typical values				T °C	Typical (J)
Yield Strength, Re	145	MPa	Impact energy, CV		
Tensile Strength, Rm	275	MPa			
Elongation A5	24	%			

CE	TÜV	DB	LR	DNV	BV	ABS	RINA
x	af	61.042.01		af	x		

Available diameters : 1.0 - 1.6mm

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WHEREVER WELDING TAKES YOU.

WE BUILD™
with you








OTHER INFORMATION

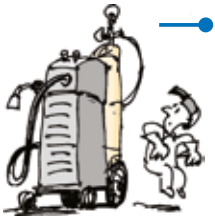
STICK ELECTRODE WELDING

Welding with ”stick” electrodes is a traditional and reliable welding method.
It has many advantages and is superior to MIG/MAG/TIG welding, when used under the right circumstances.

USE COATED ELECTRODES



When you don’t want to handle shielding gas at the site.
– The cost of shielding gas can be as large as the cost of the welding consumable.



When you don’t want to use advanced and heavy welding machines.
– Large and complicated welding machines are often expensive. They also require maintenance of wear parts and conduits.



When you want great flexibility and short set-up times.
– The light and simple equipment is portable and easy to move between different work places and work levels.



When you work in restricted spaces.
– With coated electrodes and a small inverter it’s easier to weld when it’s cramped.



When it’s hard to protect the site.
– MIG/MAG/TIG-welding requires the working site to be protected from the wind, which can be both time consuming and costly.



ALL YOU NEED

Coated electrodes from Elga® and a small inverter.

WHY CHOSE ELGA® CROMAROD®

- Batch number on each stick for full traceability
- Bead appearance
- Easy slag removal
- Welds better at lower welding parameters: less heat input and less commodity costs

CROMAROD® FAMILY: PERFECT WELD

- Self-detaching slag
- Clean, bright bead
- Smooth bead profile
- Absolute minimum spatter

HIGH DEGREE OF TRACEABILITY:

- The batch number is printed on each electrode



METAL CAN – THE HIGHEST POSSIBLE PROTECTION:

- Hermetically sealed cans keep electrodes protected and ready to use when opened
- Easy open pull-tab with plastic lid to protect product after opening
- Very resistant to shocks
- No moisture pick up in any environment
- Small packing: 2.5-3 kg per can / 7.5-10 kg a box



Wet corrosion applications

Cromarod 625
63Ni22Cr9MoNb
Excellent corrosion properties
Ni-Base, +Mo, Cr, +Nb, austenitic

Cromarod 383
27Cr31Ni3.5MoLCu
Excellent in phosphoric acid applications Ni, +Cr, Mo, Cu, austenitis

Cromarod 385
20Cr25Ni4.5MoLCu
Excellent in sulphuric acid applications
Cr, Ni, +Mo, +Cu, austenitisc

Duplex types

Cromarod Duplex
23Cr9Ni3MoLN

Cromarod 2507
25Cr8Ni4MoLN

+N, High tensile strength, and resistance against pitting and stress corrosion

High temperature applications

Cromarod 82
70Ni16CrNb
Ni-BAS, Cr +Nb, austenitic

Cromarod 253
23Cr11NiCeN
+Cr, Ce, Ni, austenitic

Cromarod 310
25Cr20Ni
+Cr, Ni, C, austenitic

Cromarod 308H
20Cr10Ni
Cr, Ni, controlled C, for creep resistant properties

Cromarod 347
19Cr 9Ni Nb
Cr, Ni, stabilized with Nb

Fe-"18-20Cr 8-10Ni"
Common base: AISI 304

Cromarod 316L
19Cr12Ni3MoL
Low C, Cr, Ni, Mo

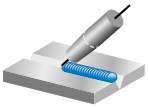
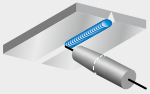
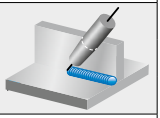
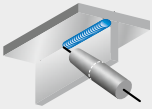
Cromarod 308L
19Cr10NiL
Low C, Cr, Ni

CONSUMABLES SELECTION GUIDE

Product name	EN ISO 1 norm	EN ISO 1 class	AWS 1 norm	AWS 1 class	Features
CROMAROD® 308L	EN ISO 3581-A	E 19 9 L R 12	AWS A5.4	E308L-17	Exceptional bead appearance, rutile
CROMAROD® 308LP	EN ISO 3581-A	E 19 9 L R 11	AWS A5.4	E308L-17	Designed for thin pipes welding, root runs, tack welding and fully positional work.
CROMAROD® B308L	EN ISO 3581-A	E 19 9 L B 42	AWS A5.4	E 308L-15	Excellent impact properties for Cryogenic applications - Basic
CROMAROD® 316L	EN ISO 3581-A	E 19 12 3 L R 12	AWS A5.4	E 316L-17	Welder's favourite - Exceptional bead appearance, rutile
CROMAROD® 316LP	EN ISO 3581-A	E 19 12 3 L R 11	AWS A5.4	E 316L-17	Designed for thin pipes welding, root runs, tack welding and fully positional work.
CROMAROD® B316L	EN ISO 3581-A	E 19 12 3 L B 42	AWS A5.4	E316L-15	Excellent impact properties for Cryogenic applications - Basic
CROMAROD® 309L	EN ISO 3581-A	E 23 12 L R 12	AWS A5.4	E309L-17	Dissimilar joints - Exceptional bead appearance
CROMAROD® 309MoL	EN ISO 3581-A	E 23 12 2 L R 32	AWS A5.4	E309MoL-17	Dissimilar joints with higher Ferrite than 309L- Exceptional bead appearance
CROMAROD® 309MoLP	EN ISO 3581-A	E 23 12 2 L R 11	AWS A5.4	E309MoL-17	Dissimilar joint - Designed for thin pipes welding, root runs, tack welding and fully positional work.
CROMAROD® 310	EN ISO 3581-A	E 25 20 R 12	AWS A5.4	~E310-17	High temperature applications- fully austenitic - deposits a 25%Cr 20%Ni alloy
CROMAROD® 312	EN ISO 3581-A	E 29 9 R 32	AWS A5.4	E 312-17	Problem solver - dissimilar joint - difficult steels to weld - Exceptional bead appearance
CROMAROD® 308H	EN ISO 3581-A	E 19 9 R 12	AWS A5.4	E308H-17	High Carbon for better creep resistance at high temperature
CROMAROD® 347	EN ISO 3581-A	E 19 9 Nb R 12	AWS A5.4	E 347-17	Nb Stabilized for better resistance to intergranular corrsion
CROMAROD® Duplex	EN ISO 3581-A	E 22 9 3 N L R 12	AWS A5.4	~E2209-17	Duplex - rutile
CROMAROD® Duplex B	EN ISO 3581-A	E 22 9 3 NL B 42	AWS A5.4	E 2209-15	Duplex with improved impact properties - basic
CROMAROD® Duplex LP	EN ISO 3581-A	E 22 9 3 N L R 11	AWS A5.4	~E2209-17	Duplex designed for thin pipe welding, root run, tack welding and fully positional work
CROMAROD® 2507R	EN ISO 3581-A	E 25 9 4 N L R 12	AWS A5.4	E2594-17	Super Duplex, Rutile
CROMAROD® 383	EN ISO 3581-A	E 27 31 4 Cu L R 12	AWS A5.4	~E383-17	High corrosion resistance in phosphoric acid
CROMAROD® 385	EN ISO 3581-A	E 20 25 5 Cu N L R 12	AWS A5.4	~E385-17	High corrosion resistance in sulfuric acid
CROMAROD® 253	-				High temperature applications - microalloyed with Cerium - for base material 253MA
CROMAROD® 625	EN ISO 14172	E Ni 6625 (NiCr22Mo9Nb)	AWS A5.11	E NiCrMo-3	Excellent corrosion resistance for 625 alloys / 254Mo
CROMAROD® 82	EN ISO 14172	E Ni 6182 (NiCr15Fe6Mn)	AWS A5.11	E NiCrFe-3	Ni-base for welding alloys 600

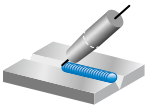
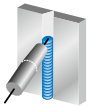
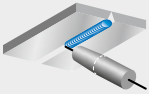
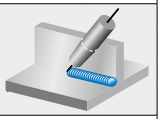
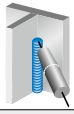
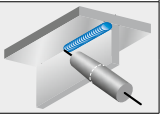
MEGAFIL® WELDING PARAMETERS - GUIDANCE VALUES: METAL-CORED WIRES

MEGAFIL® - metal-cored wire - Ø 1.0 mm; gas flow 12-18 l/min (25-38 cfh)

Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1 (Root)	90 ± 10	14.5 ± 1	2.3	4	
			2-n	220 ± 20	26 ± 1	10.7		
PC 2G			1 (Root)	90 ± 10	14.5 ± 1	2.3	3	
			2-n	220 ± 10	25 ± 1	10.7		
PF 3G			1 (Root)	90 ± 10	14.5 ± 1	2.3	4	
			2	120 ± 10	14.5 ± 1	3.8		
			3-n	140 ± 20	15.5 ± 1	5.1		
PE 4G			1 (Root)	100 ± 10	14.5 ± 1	2.9	2 (3)	
		weaving	2-n	120 ± 10	15 ± 1	3.8		
		stringer beads	2-n	200 ± 10	24 ± 1	9.5		
PA 1F	min 1.5 mm	< 5 mm		100 ± 20	14.5 ± 1	2.9		
		< 10 mm		220 ± 10	25 ± 1	10.7		
		> 10 mm		220 ± 20	26 ± 1	10.7		
PB 2F	min 1.5 mm	< 5 mm		120 ± 20	15.5 ± 1	3.8		
		< 10 mm		220 ± 10	26 ± 1	10.7		
		> 10 mm		220 ± 20	26 ± 1	10.7		
PF 3F	single layer			100 ± 20	15.5 ± 1	2.9		
	multi layer			120 ± 20	15.5 ± 1	3.8		
PD 4F		< 5 mm		120 ± 20	15.5 ± 1	3.8		
		> 5 mm		220 ± 10	25 ± 1	10.7		

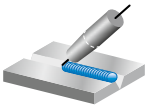
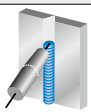
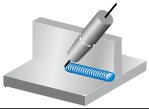
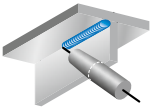
MEGAFIL® WELDING PARAMETERS - GUIDANCE VALUES: METAL-CORED WIRES

MEGAFIL® - metal-cored wire - Ø 1.2 mm; gas flow 12-18 l/min (25-38 cfh)

Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1 (Root)	90 ± 10	14.5 ± 1	1.8	4	
			2-n	240 ± 20	26 ± 1	7.1		
PC 2G			1 (Root)	90 ± 10	14.5 ± 1	1.8	3	
			2-n	230 ± 10	25 ± 1	6.7		
PF 3G			1 (Root)	90 ± 10	14.5 ± 1	1.8	4	
			2	110 ± 10	14.5 ± 1	2.2		
			3-n	120 ± 20	15.5 ± 1	2.6		
PE 4G			1 (Root)	100 ± 10	14.5 ± 1	2	2 (3)	
		weaver	2-n	130 ± 10	15 ± 1	3		
		stringer beads	2-n	220 + 10	25 + 1	6.6		
PA 1F	min 1.5 mm	< 5 mm		120 ± 20	14.5 ± 1	2.6		
		< 10 mm		220 ± 10	26 ± 1	6.6		
		< 15 mm		240 ± 20	27 ± 1	7.1		
		> 15 mm		300 ± 20	30 ± 1	9.5		
PB 2F	min 1.5 mm	< 5 mm		120 ± 10	15.5 ± 1	2.6		
		< 10 mm		220 ± 10	26 ± 1	6.6		
		< 15 mm		240 ± 20	27 ± 1	7.1		
		> 15 mm		300 ± 20	30 ± 1	9.5		
PF 3F	single layer			140 ± 20	15.5 ± 1	3.2		
	multi layer			160 ± 20	16.5 ± 1	3.8		
PD 4F		< 5 mm		160 ± 20	16.5 ± 1	3.8		
		> 5 mm		220 + 10	25 ± 1	6.6		

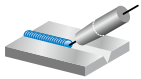
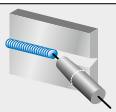
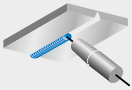
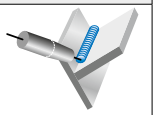
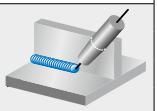
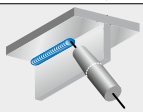
MEGAFIL® WELDING PARAMETERS - GUIDANCE VALUES: METAL-CORED WIRES

MEGAFIL® - metal-cored wire - Ø 1.6 mm; gas flow 12-18 l/min (25-38 cfh)

Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1 (Root)	100 + 10	14.5 ± 1	1.1	4 (3)	
			2-n	250 ± 20	26 ± 1	3.5		
PC 2G			1 (Root)	100 + 10	14.5 ± 1	1.1	3 (4)	
			2-n	220 ± 10	25 ± 1	2.9		
PF 3G			1 (Root)	100 + 10	14.5 ± 1	1.1	4	
			2	120 ± 10	14.5 ± 1	1.4		
			3-n	140 ± 20	15.5 ± 1	1.6		
PA 1F	min 1.5 mm	< 5 mm		120 ± 20	14.5 ± 1	1.4		
		< 10 mm		220 ± 10	26 ± 1	2.9		
		< 15 mm		240 ± 20	27 ± 1	3.3		
		> 15 mm		300 ± 20	28 ± 1	4.2		
PB 2F	min 1.5 mm	< 5 mm		120 ± 10	15.5 ± 1	1.4		
		< 10 mm		220 ± 10	26 ± 1	2.9		
		< 15 mm		240 ± 20	27 ± 1	3.3		
		> 15 mm		300 ± 20	28 ± 1	4.2		
PF 3F	single layer			120 ± 20	15.5 ± 1	1.4		
	multi layer			140 ± 20	15.5 ± 1	1.6		
PD 4F		< 5 mm		140 ± 20	15.5 ± 1	1.6		
		> 5 mm		220 ± 10	25 ± 1	2.9		

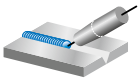
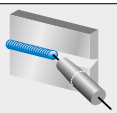
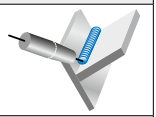
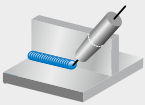
MEGAFIL® WELDING PARAMETERS - GUIDANCE VALUES: RUTILE FLUX-CORED WIRES

MEGAFIL® - rutile flux-cored wire - Ø 1.2 mm; gas flow 12-18 l/min (25-38 cfh)

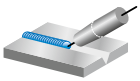
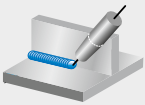
Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1	180 ± 10	23 ± 1	8.6	5	
			2-n	220 ± 20	26 ± 1	11.5		
PC 2G			1	160 ± 10	22 ± 1	7.1	4	
			2-n	220 ± 20	24 ± 1	11.5		
PF 3G		t < 12 mm	1	160 ± 10	22 ± 1	7.1	5	
			2-n	200 ± 20	25 ± 1	10.4		
		t > 12 mm	1	180 ± 10	23 ± 1	8.6	6	
			2-n	220 ± 20	26 ± 1	11.5		
PE 4G			1	160 ± 10	22 ± 1	7.1	4	
			2-n	220 ± 20	25 ± 1	11.5		
PA 1F			1	220 ± 20	26 ± 2	11.5		
PB 2F	single layer	t < 12 mm		200 ± 20	25 ± 1	10.4		
		t > 12 mm	1	240 ± 20	26 ± 2	12.8		
	multi layer		1	240 ± 20	27 ± 2	12.8		
			2-n	220 ± 20	25 ± 2	11.5		
PF 3F	single layer	t < 12 mm		160 ± 10	22 ± 1	7.1		
		t > 12 mm	1	220 ± 20	25 ± 2	11.5		
	multi layer		1	180 ± 10	24 ± 1	8.6		
			2-n	220 ± 10	25 ± 1	11.5		
PD 4F	single layer	t < 12 mm		160 ± 10	22 ± 1	7.1		
		t > 12 mm	1	220 ± 20	25 ± 1	11.5		
	multi layer		1	160 ± 10	22 ± 1	7.1		
			2-n	200 ± 20	24 ± 1	10.4		

MEGAFIL® WELDING PARAMETERS - GUIDANCE VALUES: BASIC FLUX-CORED WIRES

MEGAFIL® - basic flux-cored wire - Ø 1.0 mm; gas flow 12-18 l/min (25-38 cfh)

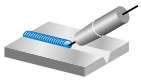
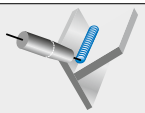
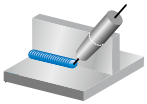
Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1	200 ± 10	23 ± 1	11.5	4	
			2-n	220 ± 20	26 ± 1	13		
PC 2G			1	180 ± 10	23 ± 1	10.3	3	
			2-n	220 ± 20	25 ± 1	13		
PA 1F	single layer	> 10 mm	1	240 ± 20	26 ± 2	14.1		
	multi layer		2-n	220 ± 20	25 ± 2	13		
PB 2F	single layer	> 10 mm	1	240 ± 20	26 ± 2	14.1		
	multi layer		2-n	220 ± 20	25 ± 2	13		

MEGAFIL® - basic flux-cored wire - Ø 1.2 mm; gas flow 12-18 l/min (25-38 cfh)

Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1	200 ± 10	23 ± 1	8.5	4	
			2-n	220 ± 20	26 ± 2	9.8		
PC 2G			1	180 ± 10	23 ± 1	7.3	3	
			2-n	220 ± 20	25 ± 1	9		
PA 1F	single layer	> 10 mm	1	250 ± 20	26 ± 2	10.5		
	multi layer		2-n	240 ± 20	25 ± 2	9.8		
PB 2F	single layer	> 10 mm	1	240 ± 20	26 ± 2	9.8		
	multi layer		2-n	220 ± 20	25 ± 2	9		

MEGAFIL® WELDING PARAMETERS - GUIDANCE VALUES: BASIC FLUX-CORED WIRES

MEGAFIL® - basic flux-cored wire - Ø 1.6 mm; gas flow 12-18 l/min (25-38 cfh)

Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1	200 ± 10	23 ± 1	3.9	4	
			2-n	250 ± 20	26 ± 1	5		
PA 1F	single layer	> 10 mm	1	300 ± 20	26 ± 2	6.2		
	multi layer		2-n	240 ± 20	25 ± 2	4.7		
PB 2F	single layer	> 10 mm	1	250 ± 20	26 ± 1	5		
	multi layer		2-n	220 ± 20	25 ± 2	4.2		

MEGAFIL® WELDING PARAMETERS - GUIDANCE VALUES: HARFACING METAL-CORED WIRES

MEGAFIL® A 730M, A 740M, A 750M, A 760M - metal-cored wires - Ø 1.2 mm; shielding gas 82% Ar - 18% CO_2

Position	Stickout mm	Amperage [A]	Voltage [V]	Wire feeding [m/ min]	Arc type / transfer mode
PA/PC/PF	20	80	14	1.7	short arc
PA/PC/PF		100	15.1	2.2	short arc
PA/PC/PF		120	15.4	2.9	short arc
PA/PC/PF		140	16	3.5	globular transfer
PA/PC/PF		160	18.3	4.4	globular transfer
PA		180	20.1	5.3	globular transfer
PA		200	21.4	6.1	globular transfer
PA		220	23-29	6.9	globular / spray
PA		240	25-30	8.4	globular / spray
PA		260	30	9.6	spray arc
PA		280	31	10.4	spray arc
PA		300	32	10.9	spray arc

MEGAFIL® A 760M - metal-cored wires - Ø 1.6 mm; shielding gas 82% Ar - 18% CO_2

Position	Stickout mm	Amperage [A]	Voltage [V]	Wire feeding [m/ min]	Arc type / transfer mode
PA/PC/PF	20	100	15.8	1.1	short arc
PA/PC/PF		120	16	1.3	short arc
PA/PC/PF		140	16.2	1.6	short arc
PA/PC/PF		160	16.5	1.9	short arc
PA		180	16.7	2.3	short arc
PA		200	17	2.6	globular transfer
PA		220	18-24	3	globular transfer
PA		240	24-27.5	3.4	globular / spray
PA		260	27.6	3.8	spray arc
PA		280	28	4.1	spray arc
PA		300	28.5	4.8	spray arc
PA		330	29	5.3	spray arc
PA		360	31	6.2	spray arc
PA		390	33	7	spray arc
PA		420	34	7.6	spray arc

SELECTION CHART
SPOOL TYPES

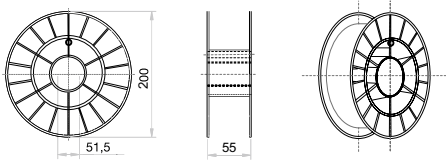
SELECTION CHART

Select the right consumables according to type of steels and welding process:

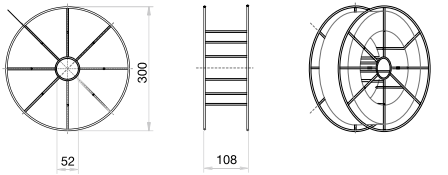
		Electrodes	MIG/MAG	TIG	Cored Wires
Unalloyed steel	Types of steel: S235 (St-37), S275 (St-44), S355 (St-52), NVA, NVA 32/36, NVD, NVD 32/36.	P 47D P 51 P 48S P 48M P 52T P 62MR	ELGAMATIC 100	ELGATIG 100	MEGAFIL® 713 R MEGAFIL® 710 M ELGACORE® MATRIX
	Types of steel: S235 (St-37), S275 (St-44), NVA	P 45S MAXETA™ 11	ELGAMATIC 100	ELGATIG 100	MEGAFIL® 713 R MEGAFIL® 710 M ELGACORE® MATRIX
Stainless steel	Types of steel: 304L, 316L	CROMAROD® 316L CROMAROD® 316LP	CROMAMIG 316LSi	CROMATIG 316LSi	–
Non-alloyed structural steel towards stainless steel		CROMAROD® 309MoL	CROMAMIG 309LSi CROMAMIG 309MoL	CROMATIG 309LSi	–
Repair and maintenance		ELGALOY HARD 60 CROMAROD® 312 ELGALOY CAST-NiFe	ELGALOY HARD M60 CROMAMIG 307Si	–	MEGAFIL® A 760M

SPOOL TYPES

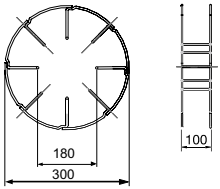
Plastic or wire basket spools



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

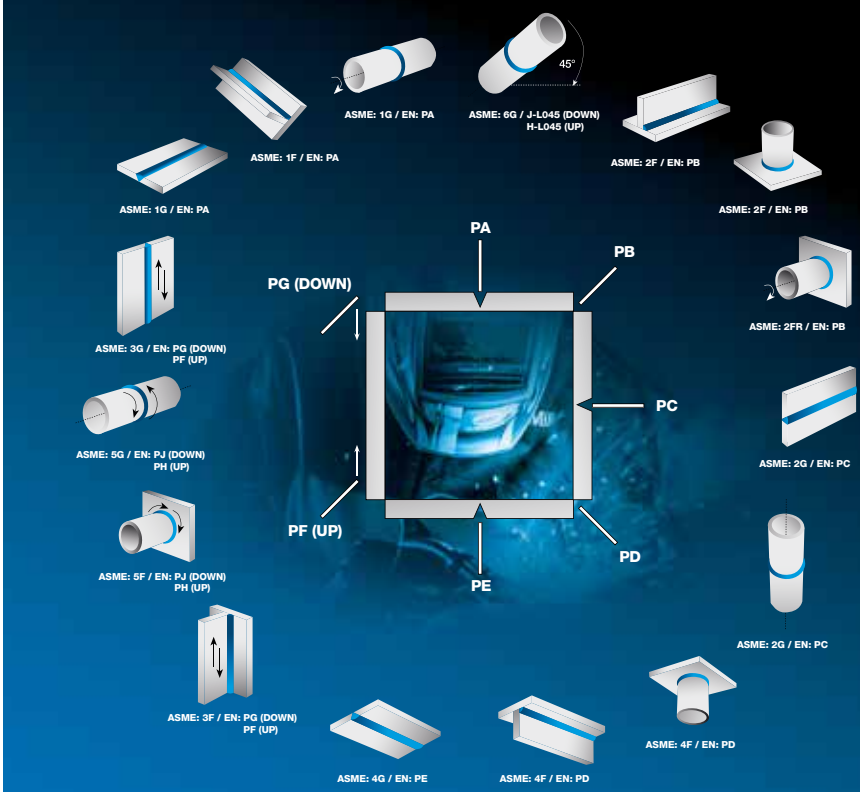


Basket rim K 300 (B 300)
Diameter: 300 mm
Width: 100 mm
Suitable for a 50 mm hub, but an adaptor is needed.

WELDING POSITIONS

ACCORDING TO AWS A3.0, ASME SECTION IX AND EN ISO 6947

WE BUILD *with you*



ELGACORE® MATRIX | MEGAFIL® | CROMAROD® | MAXETA™

Improve your welding performance
with products that provide maximum uptime and weld quality in the most demanding applications.

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NOTES

GUIDE TO
EN ISO & AWS STANDARDS

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	Electrode efficiency %	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 6 1Ni B 3 2 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
Mn2Ni	1.4 - 2.0	–	1.2 - 2.6
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	Tensile Strength MPa	Yield Strength min. MPa	Elongation min. %
55	640-820	550	18
62	700-890	620	18
69	770-960	690	17
79	880-1080	790	16
89	940-1180	890	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	Electrode efficiency %	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 69 6 Mn2NiCrMo B 3 2 H5

Covered electrode for 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

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 STAINLE SS AND HEAT RESISTING STEELS

Covered electrode for manual metal arc welding.

Type of electrode covering
R =rutile covering
B =basic covering

E 19 12 2 R 3 4

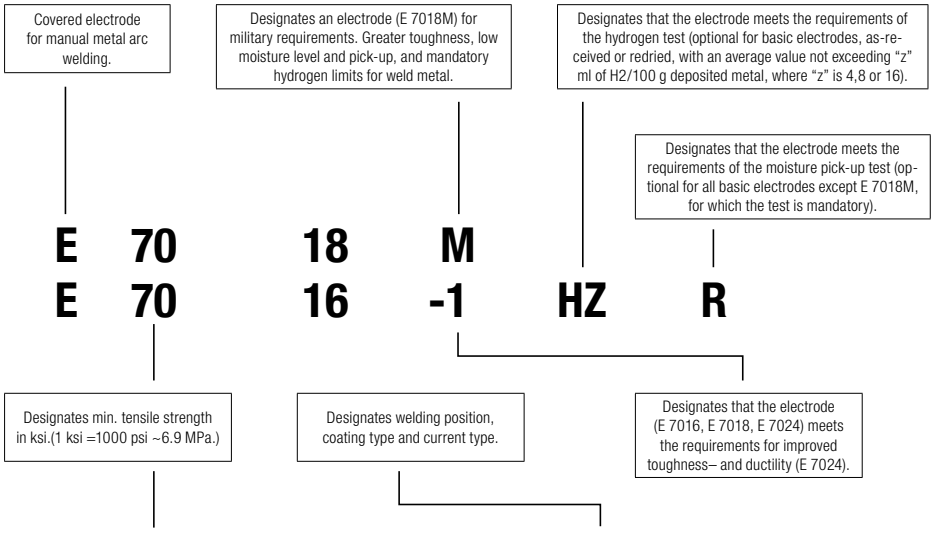
Symbol	Metal recovery %	Type of current
1	<105	AC+DC
2	<105	DC
3	105<125	AC+DC
4	105<125	DC
5	125<160	AC+DC
6	125<160	DC
7	>160	AC+DC
8	>160	DC

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

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
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
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 Classification	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 FOR SMAW

Covered electrode for manual metal arc welding.

E 308 -17

Indicates compositional type.

Suffix	Coating type and usability characteristics
-15 -16	For use with DC+only. Usually basic coating. All positions. For use with DC+and AC. Rutile coating. All positions
-17	As for -16, but higher sili ca 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 fill ets • When making ver- tical-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 all-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-x x*	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-x x*	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

Covered electrode for manual metal arc welding.

Designates chemical composition of weld metal.

AWS Classification	Welding Position	Type of coating
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	~2.5
-C2	Ni	~3.5
-C2L*	Ni	~3.5
-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%

EXXXX-A1/BX/BXL and E(X)X XX-G – Not spec.

AWS Classi-fication	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) For Horizontal Fillet weld only - polarity

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

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

GUIDE TO EN ISO 14341: WIRE ELECTRODES AND DEPOSITS FOR GAS SHIELDED METAL ARC WELDING OF NON-ALLOY 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	Shielding Gas according to EN 14175
M12	Ar +0,5 to 5% CO_2
M13	Ar +0,5 to 3% O_2
M20	Ar +5 to 15% CO_2
M21	Ar +15 to 25% CO_2
C1	100% CO_2
Z	Unspecified

G 46 4 M21 3Si1

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
2Si	0.06-0.14	0.50-0.80	0.90-1.30	0.025	0.025	0.15	0.15	0.02	0.15
3Si1	0.06-0.14	0.70-1.00	1.30-1.60	0.025	0.025	0.15	0.15	0.02	0.15
4Si1	0.06-0.14	0.80-1.20	1.60-1.90	0.025	0.025	0.15	0.15	0.02	0.15
3Si2	0.06-0.14	1.00-1.30	1.30-1.60	0.025	0.025	0.15	0.15	0.02	0.15
2Ti	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
3Ni1	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
2Ni2	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
2Mo	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
4Mo	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
2Al	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 <0.15, Cu <0.35,V <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	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

W **46** **3** **3Si1**

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
2Si	0.06-0.14	0.50-0.80	0.90-1.30	0.025	0.025	0.15	0.15	0.02	0.15
3Si1	0.06-0.14	0.70-1.00	1.30-1.60	0.025	0.025	0.15	0.15	0.02	0.15
4Si1	0.06-0.14	0.80-1.20	1.60-1.90	0.025	0.025	0.15	0.15	0.02	0.15
2Ti	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
3Ni1	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
2Ni2	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
2Mo	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

* If not specified Cr <0.15, Cu <0.35,V <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	Tensile Strength MPa	Yield Strength min. MPa	Elongation min. %
55	640-820	550	18
62	700-890	620	18
69	770-940	690	17
79	880-1080	790	16
89	940-1180	890	15

Symbol	Shielding Gas according to EN 14175
M12	Ar +0,5 to 5% CO_2
M13	Ar +0,5 to 3% O_2
M20	Ar +5 to 15% CO_2
M21	Ar +15 to 25% CO_2
C1	100% CO_2
Z	Unspecified

G 69 4 M21 Mn3Ni1CrMo

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
Mn3NiCr Mo	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	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

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 according to EN 14175
M12	Ar +0,5 to 5% CO_2
M13	Ar +0,5 to 3% O_2
M20	Ar +5 to 15% CO_2
M21	Ar +15 to 25% CO_2
C1	100% CO_2
Z	Unspecified

T 50 6 1NI P M 1 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
		Single-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 93N 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.

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	Yi eld 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

Designates an electrode.

Indicates primary welding positions.
0 =flat and horizontal
1 =all positions

Indicates a cored wire.

Suffix	Designation
M	75-80% Ar/CO_2
C	CO_2
None	Self-shield

E 7 1 T -1 M

Indicates min. tensile strength in 10 ksi units.
(10 ksi =10.000psi ~69 MPa)

Indicates usability and performance capabili ties.

Alloy Symbol	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 SHIEL DED 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 solid wire or rod, 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-Ni 1	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	Chemical composition of solid wire or rod, wt % *				
	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

STORAGE AND HANDLING OF WELDING CONSUMABLES

STORAGE AND HANDLING OF WELDING CONSUMABLES

1. 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 minimized, along with the associated hydrogen induced cracking risk.

2. 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”.

2.1 Categories of Coated electrodes

Coated electrodes are divided in 3 categories:

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

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

Type 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 minimize 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 minimize 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.

2.2 Types of packaging

ELGA's electrodes are supplied in 3 different types of packaging, depending on the required level of resistance to moisture pick-up from the atmosphere in the unopened condition.

Packaging type	Packaging description	Category of electrodes	Picture
A	Cardboard box with shrink plastic wrapping	• Unalloyed Rutile Electrodes • Un & Low alloyed Basic Electrodes	
B	Aluminium-laminated plastic foil vacuum pack (DryPac).	• Un & Low alloyed Basic Electrodes • Stainless	
	Hermetically sealed steel can	• Stainless Electrodes	

Of these two packaging types, 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.

2.3 Points to consider when handling and storing unopened packaging

2.3.1 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:

Range of Temperatures	% Relative Humidity
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.

2.3.2 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	Shelf Life
Unbroken	5 years
Opened but electrodes remained in the pack	8 hours
Electrodes exposed outside the pack	4 hours

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.
Shelf Life of electrodes in type A packaging is one year.

2.3.3 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 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.

3. STORAGE AND HANDLING OF ELGA CORED WIRES.

3.1 Scope

The product portfolio of ELGA Cored Wires is constituted by:

- MEGAFIL® - Un & Low alloyed and Hardfacing Cored wires manufactured with the Seamless Technology. The flux or Metal Powder are protected against the moisture
- ELGACORE® MATRIX® – Seamed Unalloyed Metal Cored wires
- CROMACORE® – Stainless Rutile Cored Wires

3.2 Storage

- 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 50%.
- CROMACORE® wires being vacuum packed does not require any special conditions provided there is no damage on the packaging and the vacuum is not lost. If the package is damaged please refer to the above point.
- 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.
- Transportation to and from the storage place shall be carried out in covered vehicles and direct exposure to rain and snow avoided.

3.3 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.

3.4 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.
- Redrying is not recommended. Redrying would deteriorate the wire surface and consequently the feeding performance.

3.5 Shelf life

We normally recommend the ELGA Cored wires to be used before 2 years after production provided, they are stored between 10 to 30°C and with a relative humidity below 50%. However, the ELGA wire can retain its designated performance even after longer storage period, which is determined and controlled by the end users. If the wire is kept in original sealed package without opening, stored under the right conditions, the product performance and properties would be usable after longer storage period. The end users have the ultimate responsibility to determine if product is suitable for their application or not. It is better to test the wire performance, before being used on actual welding/production jobs, if the wire is stored over 1 or 2 years. Recommended testing would be Radiographic Testing described in the corresponding ASME IIC AWS chapter per customer specification as new/fresh wire.

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.

4. STORAGE AND HANDLING OF SOLID WIRES

4.1 Scope:

The ELGA solid wires product portfolio is constituted by:

- ELGAMATIG® and ELGATIG® – un & low alloyed MIG and TIG solid wires
- CROMAMIG® and CROMATIG® – high alloyed MIG and TIG solid wires
- ALUMIG® and ALUTIG® – aluminium MIG and TIG solid wires

For the storage and handling of solid wires and rods, the same conditions as for Cored wires apply.

4.2 Storage

- Solid 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 50%.
- 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.
- Transportation to and from the storage place shall be carried out in covered vehicles and direct exposure to rain and snow avoided.

4.3 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.

4.4 Shelf life

We normally recommend the ELGA wires to be used before 2 years after production (except for Aluminium wires) provided, they are stored between 10 to 30°C and with a relative humidity below 50%. However, the ELGA wire can retain its designated performance even after longer storage period, which is determined and controlled by the end users. If the wire is kept in original sealed package without opening, stored under the right conditions, the product performance and properties would be usable after longer storage period. The end users have the ultimate responsibility to determine if product is suitable for their application or not. It is better to test the wire performance, before being used on actual welding/production jobs, if the wire is stored over 1 or 2 years. Recommended testing would be Radiographic Testing described in the corresponding ASME IIC AWS chapter per customer specification as new/fresh wire. 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.

4.5 Aluminium wires

All above points are applicable for Aluminium wires. Additionally wires and rods moved from colder to warmer environments must be allowed to stabilize thermally in (acclimate to) the welding environment for at least 24 hours prior to welding.

- If not acclimated, condensation can form directly on the wire or rods creating hydrated oxide on exposed surfaces.
- If the filler metal is below the dew point temperature indicated by the intersection of the welding environment's air temperature and relative humidity shown in the table, condensation will form on the material causing weld discontinuities.

Relative Humidity %										
Air Temp. (°F)	100	90	80	70	60	50	40	30	20	10
110	110	106	102	98	93	87	80	72	60	41
100	100	97	93	89	84	78	71	63	52	32
90	90	87	83	79	74	68	62	54	43	32
80	80	77	73	69	65	59	53	45	35	–
70	70	67	63	59	55	50	44	37	–	–
60	60	57	53	50	45	41	35	–	–	–
50	50	46	44	40	36	–	–	–	–	–
40	40	37	34	–	–	–	–	–	–	–
32	32	–	–	–	–	–	–	–	–	–

5. STORAGE AND HANDLING OF SUBMERGED ARC WELDING FLUXES

CROMAFLUX® and HOBART SWX fluxes are supplied as standard in 25kg moisture resistant plastic bags, 25kg hermetically sealed aluminium-coated plastic bags. All fluxes have a guaranteed low as-manufactured moisture content that can be maintained by observing the following recommendations for storage and handling.

5.1 Transport

Flux is normally supplied on plastic shrink wrapped pallets with a net weight of 1000kg or 1200kg. Transportation should be carried out in covered vehicles and direct exposure to rain and snow avoided.

5.2 Storage

Agglomerated and fused fluxes should be stored in their original, undamaged packaging under properly maintained climatic conditions as follows:

Temperature 15-35°C
Relative humidity As low as possible, maximum 70%

Stored under these conditions the lifetime for agglomerated fluxes is 3 years and that for fused fluxes 5 years. Stock control should encompass the first-in, first-out principle.

5.3 Storage and handling in the workshop

When handled and stored according to conditions described above, flux can normally be used direct from the bag. For non-critical applications, flux may be stored on the shopfloor in unheated flux hoppers, provided these are closed units and protect the flux from open contact with the prevailing atmosphere.
For critical applications, shopfloor storage should be in heated flux hoppers maintained at 120-150°C.
Flux in opened bags, not used during an 8 h period, should be placed in a storage cabinet or heated flux hopper, at 120-150°C.

5.4 Recycling

Unused flux recovered from the welding area must be cleaned from mill scale, slag, metal particles and other impurities by use of a suitable fine-mesh sieve, before being recycled. Addition of new flux to that being recycled should be done regularly, in the ratio 1:3.

5.5 Redrying

The need for redrying only arises under two circumstances:

- If the flux has picked up moisture due to unfavorable storage and handling, and needs to be restored to its original condition.
- For critical applications demanding guaranteed very low weld metal hydrogen levels, redrying of the flux is recommended.

Redrying should be carried out in an appropriate oven with free air circulation or purpose made drier, as follows:

Agglomerated fluxes:	300-350°C for 2 h
Fused fluxes:	150-250°C for 2 h

The most important factor here is for the complete flux bed to reach the given temperature. Redried flux that is not for immediate use should be stored in a storage cabinet or heated flux hopper, maintained at 120-150°C.

NOTES

NOTES

PLEASE CONTACT YOUR LOCAL ITW WELDING SALES OFFICE FOR MORE INFORMATION

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