



MEGAFIL[®] Seamless Flux- and Metal-cored Welding Wires



ITW Welding -

Your Route to Full Performance in Welding

We are passionate about welding and this is reflected by our unique offering to the market. When you use Hobart's best in class welding consumables or Miller's welding equipment, you will enjoy the most advanced and productive products.



Hobart is a recognized leader in the development of filler metal technologies and has the expertise to address the toughest welding challenges. Under this brand, we have been bringing together a wealth of welding expertise and consumables with unequalled welding performance since 1917.

Special wires have been developed to meet specific requirements of demanding industries, such as offshore, oil & gas and pipe mills. Hobart MIG/MAG welding consumables are manufactured using state-of-the-art production technology. They carry the name MEGAFIL for the advanced range of low-hydrogen cored wires.



MEGAFIL seamless flux and metal cored products are brought to the market supported by a dedicated team of specialists, capable of providing integrated welding solutions. Partnering with ITW Welding, you will have the deep knowledge and experience of our engineers at your side, along with fully equipped laboratories for sound application research.



ITW Welding is a total solution provider for welding processes, including welding heads, torches, tractors, orbital welding equipment, column & booms, ceramic backings, flux drying, handling equipment and preheating equipment. The offer includes engineering and automation and turnkey solutions, making us the ideal partner for one-stop shopping.

Contact us and discover ways to optimize your existing processes to their full potential.

**MEGAFIL – A PRODUCT OF HOBART –
WELCOMES YOUR CHALLENGES**

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Disclaimer: The information contained herein is furnished for reference purposes only and is believed to be accurate and reliable. Typical data are those obtained when welding and testing are performed in accordance with prescribed standards and guidelines. Other tests may produce different results and typical data should not be assumed to yield similar results in a particular application or weldment. ITW Welding does not assume responsibility for any results obtained by persons over whose methods it has no control. It is the user's responsibility to determine the suitability of any products or methods mentioned herein for a particular purpose. In light of the foregoing, ITW Welding specifically disclaims all warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, and further disclaims any liability for consequential or incidental damages of any kind, including lost profits.

MEGAFIL® Quick Selection Guide

Product	Features
Non-alloy and fine grain steels	
MEGAFIL 710 M	Metal-cored wire for non-alloyed steels < 460 MPa yield strength. Suitable for robot applications. Ideal for use in short arc and spray arc. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂) and 100% Carbon Dioxide (CO₂). Excellent impact toughness properties down to -60° C with mixed gas.
MEGAFIL 240 M	Metal-cored wire with < 1.0% Ni for non-alloyed steels < 500 MPa yield strength. Suitable for robot applications. Ideal for use in short arc and spray arc. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂) and 100% Carbon Dioxide (CO₂). Excellent impact toughness properties down to -60° C with mixed gas.
MEGAFIL 713 R	Micro-alloyed rutile flux-cored wire for non-alloyed steels < 460 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂) and 100% Carbon Dioxide (CO₂).
MEGAFIL 716 R	Micro-alloyed rutile flux-cored wire for non-alloyed steels < 460 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂) and 100% Carbon Dioxide (CO₂). Excellent impact toughness properties down to -60° C with mixed gas.
MEGAFIL 821 R	Micro-alloyed rutile flux-cored wire with < 1.0% Ni for non-alloyed steels < 500 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Excellent impact toughness properties down to -60° C with mixed gas.
MEGAFIL 822 R	Micro-alloyed rutile flux-cored wire with < 1.0% Ni for non-alloyed steels < 500 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For 100% Carbon Dioxide (CO₂). Excellent impact toughness properties down to -40° C with CO₂.
MEGAFIL 731 B	High basicity flux-cored wire for non-alloyed steels < 460 MPa yield strength. Extremely crack resistant weld metal. Well suited for welding high carbon steels and critical mixed base metal combinations. Ideal metallurgical choice for repair welding and buffer layers. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂) and 100% Carbon Dioxide (CO₂).
MEGAFIL 740 B	High basicity flux-cored wire with < 1.0% Ni for non-alloyed steels < 500 MPa yield strength. Extremely crack resistant weld metal. Well suited for welding high carbon steels and critical mixed base metal combinations. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Excellent impact toughness properties down to -60° C with mixed gas.
Weather resisting steels	
MEGAFIL 281 M	Metal-cored wire with < 1.0% Ni and 0.5% Cu for weatherproof steels < 460 MPa yield strength. High deposition rate, excellent impact toughness properties down to -60° C. Suitable for robot applications. Ideal for use in short arc and spray arc. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂) and 100% Carbon Dioxide (CO₂).
MEGAFIL 781 R	Micro-alloyed rutile flux-cored wire with < 1.0% Ni and 0.5% Cu for weatherproof steels < 460 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Excellent impact toughness properties down to -40° C with mixed gas.

Product	Features
High-strength fine grain steels	
MEGAFIL 741 M	Metal-cored wire with < 1.0% Ni and 0.5% Mo for high strength steel < 500 MPa yield strength. High deposition rate. Well suited for steels such as 20MnMoNi4-5 / 15NiCuMoNb5(WB36). Suitable for robot applications. Ideal for use in short arc and spray arc. Excellent impact toughness properties down to -60° C with mixed gas, as welded and stress relief annealed.
MEGAFIL 610 M	Metal-cored wire with 1.0% Ni for high strength steels < 620 MPa yield strength. High deposition rate. Suitable for robot applications. Ideal for use in short arc and spray arc. Excellent impact toughness properties down to -60° C with mixed gas, as welded and stress relief annealed.
MEGAFIL 742 M	Metal-cored wire with Ni, Mo and Cr for high strength steel < 690 MPa yield strength. High deposition rate. Ideal for use in short arc and spray arc. Suitable for robot applications. Excellent impact toughness properties down to -60° C with mixed gas, as welded and stress relief annealed.
MEGAFIL 1100 M	Metal-cored wire with Ni, Mo and Cr for high strength steel < 960 (1100) MPa yield strength. High deposition rate. Suitable for robot applications. Ideal for use in short arc and spray arc. Excellent impact toughness properties down to -40° C with mixed gas, as welded and stress relief annealed.
MEGAFIL 550 R	Micro-alloyed rutile flux-cored wire with 1.0% Ni for high strength steel < 550 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Excellent impact toughness properties down to -60° C with mixed gas.
MEGAFIL 610 R	Micro-alloyed rutile flux-cored wire with 1.0% Ni for high strength steel < 620 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Excellent impact toughness properties down to -40° C with mixed gas
MEGAFIL 620 R	Micro-alloyed rutile flux-cored wire with > 1.0% Ni for high strength steel < 620 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Excellent impact toughness properties down to -40° C with mixed gas.
MEGAFIL 690 R	Micro-alloyed rutile flux-cored wire for high strength steel < 690 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Excellent impact toughness properties down to -40° C with mixed gas.
MEGAFIL 741 B	High basicity flux-cored wire with < 1.0% Ni and 0.5% Mo for high strength steel < 500 MPa yield strength. Extremely crack resistant weld metal. Well suited for steels such as 20MnMoNi4-5 / 15NiCuMoNb5(WB36). For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Excellent impact toughness properties down to -60° C with mixed gas, as welded and stress relief annealed.

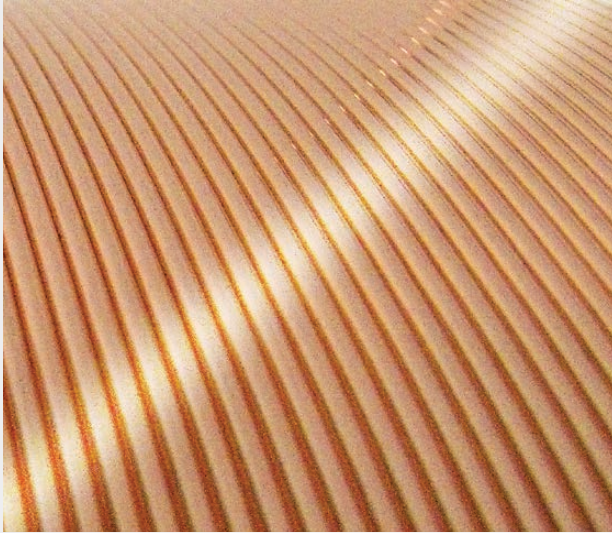
MEGAFIL® Quick Selection Guide

Product	Features
MEGAFIL 501 B	High basicity flux-cored wire with 1.0% Ni for high strength steel < 500 MPa yield strength. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO ₂). Extremely crack resistant weld metal. Well suited for steels such as 20MnMoNi4-5 / 15NiCuMoNb5(WB36). Excellent impact toughness properties down to -60° C with mixed gas, as welded and stress relief annealed.
MEGAFIL 610 B	High basicity flux-cored wire with 1.0% Ni for high strength steels < 620 MPa yield strength. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO ₂). Extremely crack resistant weld metal. Excellent impact toughness properties down to -60° C with mixed gas, as welded and stress relief annealed.
MEGAFIL 742 B	High basicity flux-cored wire with Ni, Mo and Cr for high strength steel < 690 MPa yield strength. Extremely crack resistant weld metal. Excellent impact toughness properties down to -60° C with mixed gas, as welded and stress relief annealed.
MEGAFIL 745 B	High basicity flux-cored wire with Ni, Mo and Cr for high strength steel < 960 (1100) MPa yield strength. Extremely crack resistant weld metal. Excellent impact toughness properties down to -40° C with mixed gas, as welded and stress relief annealed.
Quenched and tempered steels	
MEGAFIL 807 M	Metal-cored wire for non-alloyed steels < 700 MPa yield strength, high-strength fine grain structural steels (tempered) 25CrMo4; 34CrMo4; 28NiCrMo5-5; 42CrMo4 typically ASTM A 829 M.
Creep resisting steels	
MEGAFIL 235 M	Metal-cored wire with 0.5% Mo for creep resisting steels < 460 MPa yield strength. Good arc restriking even with cold wire tip, suitable for robot applications. Ideal for use of short arc and spray arc. Excellent gap bridging for root welding. High-efficiency type for economic production of Mo-steels up to 500° C (932° F). Excellent impact toughness properties down to -40° C with mixed gas.
MEGAFIL P36 M	Metal-cored wire with < 1.0% Ni and 0.5% Mo for creep resisting steels < 500 MPa yield strength. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO ₂). Excellent gap bridging for root welding. Well suited for steels such as 20MnMoNi4-5 / 15NiCuMoNb5 (WB36). Excellent impact toughness properties down to -60° C with mixed gas, as welded and stress relief annealed.
MEGAFIL 236 M	Metal-cored wire with 1.0% Cr and 0.5% Mo for creep resisting steels < 460 MPa yield strength. Good arc restriking even with cold wire tip, suitable for robot applications. Ideal for use of short arc and spray arc. Excellent gap bridging for root welding. High-efficiency type for economic production of CrMo-steels up to 550° C (1022° F). Excellent impact toughness properties down to -40° C with mixed gas, stress relief annealed.
MEGAFIL 237 M	Metal-cored wire with 2.3% Cr and 1.0% Mo for creep resisting steels < 460 MPa yield strength. Good arc restriking even with cold wire tip, suitable for robot applications. Ideal for use of short arc and spray arc. High-efficiency type for economic production of creep resisting steels and pressure-hydrogen-resistant 2¼Cr1Mo-steels. Excellent impact toughness properties down to -20° C with mixed gas, stress relief annealed.

Product	Features
MEGAFIL P5 M	Metal-cored wire with 5.0% Cr and 0.5% Mo for creep resisting steels < 460 MPa yield strength. Good arc restriking even with cold wire tip, suitable for robot applications. Ideal for use of short arc and spray arc. High-efficiency type for economic production of creep resisting steels and pressure-hydrogen-resistant 5Cr1Mo-steels. Excellent impact toughness properties down to -20° C with mixed gas, stress relief annealed.
MEGAFIL 825 R	Micro-alloyed rutile flux-cored wire with 0.5% Mo for creep resisting steels < 460 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance. High-efficiency type for economic production of Mo-steels up to 500° C (932° F). Excellent impact toughness properties down to 0° C with mixed gas, stress relief annealed.
MEGAFIL 836 R	Micro-alloyed rutile flux-cored wire with 1.0% Cr and 0.5% Mo for creep resisting steels < 460 MPa yield strength. Rapidly solidifying slag for higher deposition rate in all position welding. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). High-efficiency type for economic production of CrMo-steels up to 550° C (1022° F). Excellent impact toughness properties at RT with mixed gas, stress relief annealed.
MEGAFIL 735 B	High basicity flux-cored wire with 0.5% Mo for creep resisting steels < 460 MPa yield strength. Extremely crack resistant weld metal. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). High-efficiency type for economic production of Mo-steels up to 500° C (932° F). Excellent impact toughness properties down to -40° C with mixed gas, as welded and stress relief annealed.
MEGAFIL P36 B	High basicity flux-cored wire with < 1.0% Ni and 0.5% Mo for high strength steel < 500 MPa yield strength. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Extremely crack resistant weld metal. Well suited for steels such as 20MnMoNi4-5 / 15NiCuMoNb5 (WB36). Excellent impact toughness properties down to -60° C with mixed gas, as welded and stress relief annealed.
MEGAFIL 736 B	High basicity flux-cored wire with 1.0% Cr and 0.5% Mo for creep resisting steels < 460 MPa yield strength. Extremely crack resistant weld metal. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). High-efficiency type for economic production of CrMo-steels up to 550° C (1022° F). Excellent impact toughness properties at RT with mixed gas, stress relief annealed.
MEGAFIL 737 B	High basicity flux-cored wire with 2.0% Cr and 1.0% Mo for creep resisting steels < 460 MPa yield strength. Good arc restriking even with cold wire tip, suitable for robot applications. Ideal for use of short arc and spray arc. High-efficiency type for economic production of creep resistant steels and pressure-hydrogen-resistant steels. For mixed gas 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂). Extremely crack resistant weld metal. Excellent impact toughness properties at RT with mixed gas, stress relief annealed.

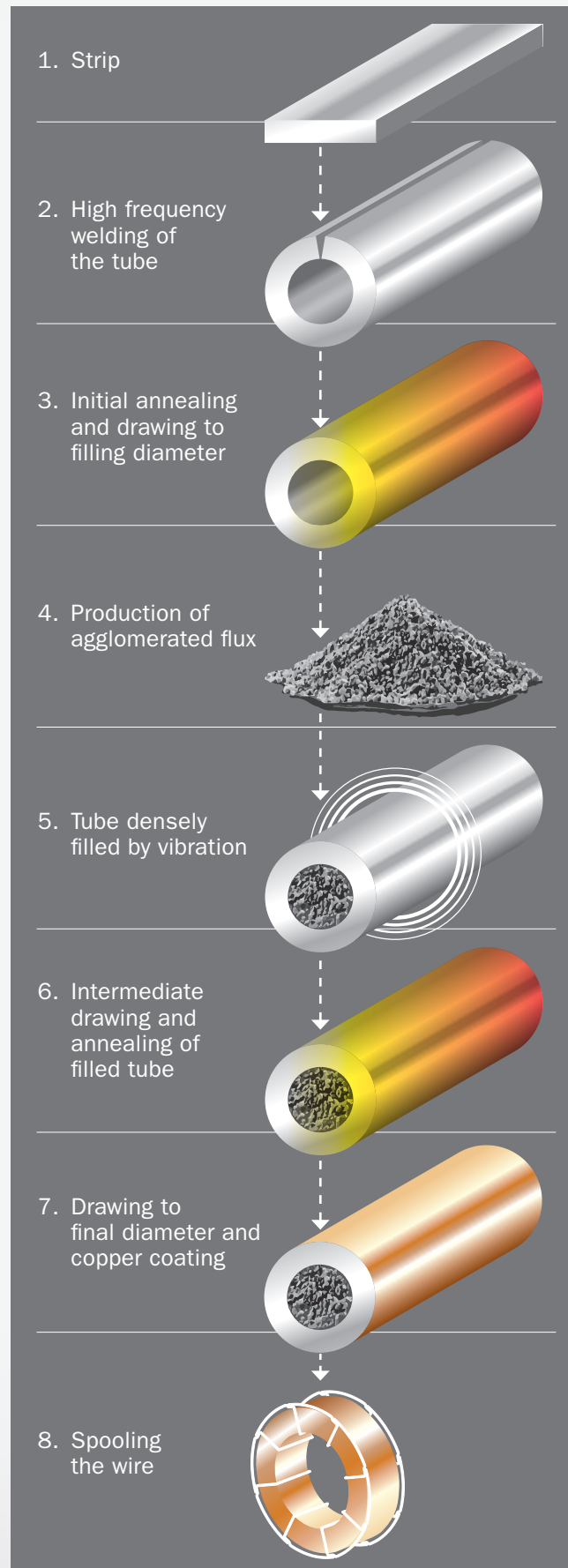
MEGAFIL® Seamless Cored Wires Production Technology

The unique production technology ITW Welding utilizes to manufacture MEGAFIL seamless flux- and metal-cored wires results in valuable product benefits for end users. Strips are folded round, closed by high frequency welding and drawn to filling diameter.



In the next step, the tube is filled with agglomerated flux by means of a vibration system. In several steps the wire is annealed, drawn to final diameter and finally copper-coated.

Subsequently, the wire is precision layer-wound onto various spool sizes. The result is a full penetration closed cored wire with an extremely dry flux core, which is totally insensitive for moisture reabsorption during storage and use.



MEGAFIL® Characteristics and Advantages

Guaranteed no moisture pick-up

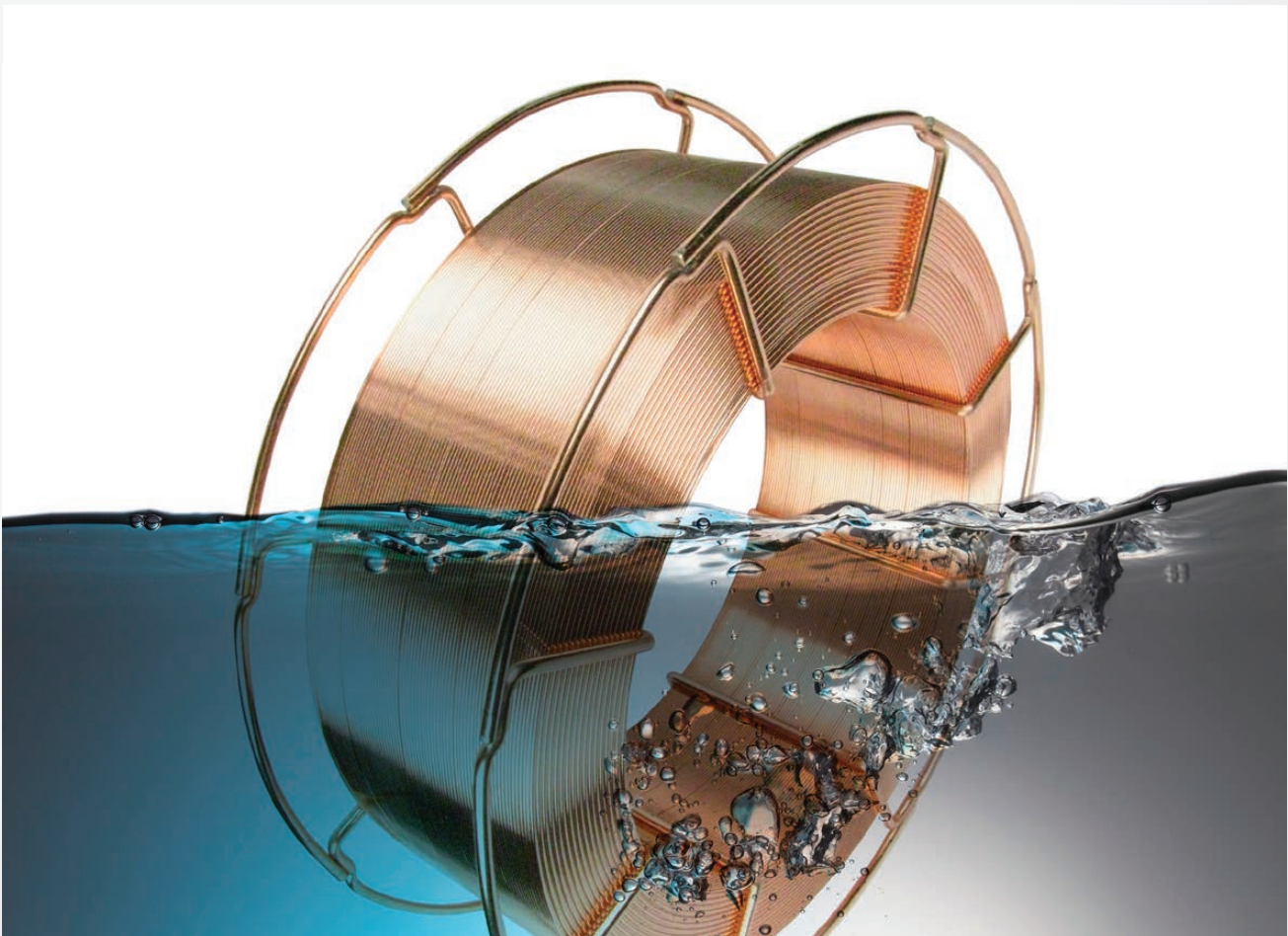
MEGAFIL seamless flux- and metal-cored wires are closed by full penetration welding and totally insensitive to moisture absorption, even under extreme climatic conditions with tropical temperatures and very high relative humidity. The filling remains dry throughout the entire process of storage and use in welded fabrication, preventing hydrogen induced cracking caused by moisture in the consumable. MEGAFIL cored wires require no special storage conditions. Re-drying prior to use is never necessary.

The special MEGAFIL manufacturing technology enables production of cored wires with these and other unique advantages for end users.

- Prevention of hydrogen induced cracking.
Weld metal hydrogen content tested according to EN and AWS is below 4 ml/100 g weld metal.
Typical values below H3.

- No special storage conditions required.
Can be stored like solid wires for an indefinite period, without any risk of moisture absorption.
- Re-drying not necessary - even after storage under humid conditions.
- Resistance to moisture pick-up when mounted on wire feeder, out of packaging.
- No discontinuities in the filling - dependable weld metal properties.
- Copper-coating for optimal current transfer from contact tip to wire and for low contact tip wear.
- Carefully controlled cast, helix and diameter gives good wire feeding and straight delivery at contact tip. Ideal for robotic welding.

MEGAFIL flux- and metal-cored wires are available for all construction steel qualities with a wide range of approvals from authorities such as ABS, DNV, LR and TÜV. Wires can be supplied with 3.1 certificates for chemical composition and mechanical properties.



Product Overview MEGAFIL® Seamless Cored Wires

Non-alloy and fine grain steels

Type	EN ISO 17632	AWS	Page
MEGAFIL® 710 M	T 46 6 M M 1 H5	E70C-6M H4	12
MEGAFIL® 240 M	T 50 6 1Ni M M 1 H5	E80C-Ni1 H4	13
MEGAFIL® 713 R	T 46 4(2) P M(C) 1 H5	E71T-1M-J H4	14
MEGAFIL® 716 R	T 46 6(4) P M(C) 1 H5	E71T-1M-J H4	15
MEGAFIL® 821 R	T 50(46) 6(4) 1Ni P M(C) 1 H5	E81T1-Ni1-J H4	16
MEGAFIL® 822 R	T 46(50) 4(6) 1Ni P C(M) 1 H5	E81T1-Ni1-J H4	17
MEGAFIL® 731 B	T 46(42) 6(4) B M(C) 3 H5	E70T-5M-J H4	18
MEGAFIL® 740 B	T 50(46) 6 1Ni B M(C) 3 H5	E80T5-Ni1M-J H4	19

Weather resisting steels

Type	EN ISO 17632	AWS	Page
MEGAFIL® 281 M	T 46 4 Z M M 1 H5	E80C-W2 H4	20
MEGAFIL® 781 R	T 46 4 Z P M 1 H5	E81T1-W2M H4	21

High-strength fine grain steels

Type	EN ISO 18276	AWS	Page
MEGAFIL® 741 M	T 55 6 1NiMo M M 1 H5	E90C-K3 H4	22
MEGAFIL® 610 M	T 62 6 Mn1Ni M M 1 H5	E100C-K3 H4	23
MEGAFIL® 742 M	T 69 6 Mn2NiCrMo M M 1 H5	E110C-K4 H4	24
MEGAFIL® 1100 M	T 89 4 Mn2Ni1CrMo M M 1 H5	~ E120C-K4 H4	25
MEGAFIL® 550 R	T 55 6 Mn1Ni P M 1 H5	E91T1-K2M-J H4	26
MEGAFIL® 610 R	T 62 4 Mn1Ni P M 1 H5	E101T1-K2M H4	27
MEGAFIL® 620 R	T 62 4 Mn1,5Ni P M 1 H5	E101T1-K3M H4	28
MEGAFIL® 690 R	T 69 6 Z P M 1 H5	~ E111T1-K3M-J H4	29
MEGAFIL® 741 B	T 55 6 Mn1NiMo B M 3 H5	E90T5-K2M H4	30
MEGAFIL® 501 B	T 55 6 Mn1Ni B M 3 H5	E90T5-K2M-J H4	31
MEGAFIL® 610 B	T 55 6 Mn1,5Ni B M 3 H5	E90T5-K2M-J H4	32
MEGAFIL® 742 B	T 69 6 Mn2NiCrMo B M 3 H5	E110T5-K4M H4	33
MEGAFIL® 745 B	T 89 4 Mn2Ni1CrMo B M 3 H5	~ E120T5-K4M H4	34

Quenched and tempered steels

Type	EN ISO 17634	AWS	Page
MEGAFIL® 807 M	T 69 0 Z M M 1 H5	E110C-G H4	35

Creep resisting steels

Type	EN ISO 17634	AWS	Page
MEGAFIL® 235 M	T Mo M M 1 H5	E80C-G H4	36
MEGAFIL® P36 M	T Z M M 1 H5	E90C-G H4	37
MEGAFIL® 236 M	T CrMo1 M M 1 H5	E80C-B2 H4	38
MEGAFIL® 237 M	T CrMo2 M M 1 H5	E90C-B3 H4	39
MEGAFIL® P5 M	T CrMo5 M M 1 H5	E80C-B6 H4	40
MEGAFIL® 825 R	T MoL P M 1 H5	E81T1-A1M H4	41
MEGAFIL® 836 R	T CrMo1 P M 1 H5	E81T1-B2M H4	42
MEGAFIL® 735 B	T Mo B M 3 H5	E80T5-G H4	43
MEGAFIL® P36 B	T Z B M 3 H5	E90T5-G H4	44
MEGAFIL® 736 B	T CrMo1 B M 3 H5	E80T5-B2M H4	45
MEGAFIL® 737 B	T CrMo2 B M 3 H5	E90T5-B3M H4	46

MEGAFIL® 710 M



AWS 5.18: E70C-6M H4
ISO 17632: T 46 6 M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 2.4 mm (0.039 - 3/32")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging

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

MATERIALS TO BE WELDED

Shipbuilding steels		A, B, D, AH 32 - EH 36
Unalloyed structural steels	Rel < 355 MPa	S185 - S355, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 355 MPa	P235GH - P355GH
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460NL2 L210 - L445MB
Fine grain structural steels	Rel < 460 MPa	S235 - S460QL1
Steels to API-standard	Rel < 460 MPa	X42 - X60

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	-
Manganese (Mn)	1.5	Molybdenum (Mo)	-
Silicon (Si)	0.7	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW and SR	> 460 (67)	550 - 680 (80 - 99)	26	60 (44)	47 (35)
AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min					

APPROVALS TÜV, DB, GL, BV, LR, DNV, RINA, ABS, CWB

MEGAFIL® 240 M



AWS 5.28: E80C-Ni1 H4
ISO 17632: T 50 6 1Ni M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Shipbuilding steels		A, B, D, AH 32 - EH 36
Unalloyed structural steels	Rel < 500 MPa	S185 - S500, A 106 Gr.B, A 333 Gr.6, A 516
Boiler steels	Rel < 500 MPa	P235GH - P485GH
Pipe steels	Rel < 500 MPa	P235T1/T2 - P500NL2 L210 - L485MB
Fine grain structural steels	Rel < 500 MPa	S235 - S500QL1
Steels to API-standard	Rel < 500 MPa	X 42 - X 70

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

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

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW	> 500 (73)	560 - 720 (81 - 104)	24	80 (59)	47 (35)
AW: as welded					

APPROVALS TÜV, DB, GL

MEGAFIL® 713 R



AWS 5.20: E71T-1C, E71T-1M, E71T-9C, E71T-9M
ISO 17632: T 46 4 P M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 2.4 mm (0.039 - 3/32")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Shipbuilding steels		A, B, D, AH 32 - EH 36
Unalloyed structural steels	Rel < 355 MPa	S185 - S355, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 355 MPa	P235GH - P355GH
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460NL2 L210 - L445MB
Fine grain structural steels	Rel < 460 MPa	S235 - S460QL1
Steels to API-standard	Rel < 460 MPa	X42 - X60

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

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

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
AW and SR	> 460 (67)	550 - 680 (80 - 99)	22	60 (44)	47 (35)
AW: as welded SR: stress relief annealed 580° C (1076° F) / 60 min					

APPROVALS TÜV, DB, GL, BV, LR, DNV, RINA, ABS, CWB

MEGAFIL® 716 R



AWS 5.20: E71T-1C, E71T-1M, E71T-12C, E71T-12M
ISO 17632: T 46 6 P M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar) Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

1.2 mm (0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Material	Strength	Grade
Shipbuilding steels		A, B, D, AH 32 - EH 36
Unalloyed structural steels	Rel < 355 MPa	S185 - S355, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 355 MPa	P235GH - P355GH
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460NL2 L210 - L445MB
Fine grain structural steels	Rel < 460 MPa	S235 - S460QL1
Steels to API-standard	Rel < 460 MPa	X42 - X60

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Element	Carbon (C)	Nickel (Ni)	0.2
Manganese (Mn)	0.05	Molybdenum (Mo)	-
Silicon (Si)	1.3	Chromium (Cr)	-
Sulphur (S)	0.5		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW	> 460 (67)	550 - 680 (80 - 99)	22	60 (44)	47 (35)

AW: as welded

APPROVALS TÜV, DB, GL, LR, DNV

MEGAFIL® 821 R



AWS 5.29: E81T1-Ni1M-J H4 (AWS 5.29: E81T1-Ni1C-J H4)
ISO 17632: T 50 6 1Ni P M 1 H5 (ISO 17632: T 46 4 1Ni P C 1 H5)

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂) possible; Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Shipbuilding steels		A, B, D, AH 32 - EH 46
Unalloyed structural steels	Rel < 500 MPa	S185 - S355, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 500 MPa	P235GH - P485GH up to A516; A537; A455
Pipe steels	Rel < 500 MPa	P235T1/T2 - P485NL2; L210 - L485MB up to A 572
Fine grain structural steels	Rel < 500 MPa	S235 - S500(NL1,2) up to A 572
Steels to API-standard	Rel < 500 MPa	X42 - X70

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	0.8
Manganese (Mn)	1.3	Molybdenum (Mo)	-
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW and SR	> 500 (73)	550 - 690 (80 - 100)	22	60 (44)	47 (35)
AW: as welded SR: stress relief annealed 580° C (1076° F) / 60 min					

APPROVALS TÜV, DB, GL, BV, LR, DNV, RINA, ABS, CWB

MEGAFIL® 822 R



AWS 5.29: E81T1-Ni1C-J H4 (AWS 5.29: E81T1-Ni1M-J H4)
ISO 17632: T 46 4 1Ni P C 1 H5 (ISO 17632: T 50 6 1Ni P M 1 H5)

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

100% Carbon Dioxide (CO₂); 75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂) possible; Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Material	Strength	Material
Shipbuilding steels		A, B, D, AH 32 - EH 46
Unalloyed structural steels	Rel < 460 MPa	S185 - S355, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 460 MPa	P235GH - P460GH up to A516; A537; A455
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460; L210 - L445 up to A 572
Fine grain structural steels	Rel < 460 MPa	S235 - S460 up to A 572
Steels to API-standard	Rel < 460 MPa	X42 - X60

ALL WELD METAL CHEMISTRY (%) (typical values for 100% CO₂)

Element	Content (%)	Element	Content (%)
Carbon (C)	0.05	Nickel (Ni)	0.9
Manganese (Mn)	1.2	Molybdenum (Mo)	-
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for 100% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW	> 460 (67)	550 - 680 (80 - 100)	22	60 (44)	27 (20)
AW: as welded					

APPROVALS TÜV, DB, GL, LR, DNV, ABS

MEGAFIL® 731 B



AWS 5.20: E70T-5C-J H4, E70T-5M-J H4

ISO 17632: T 46 6 B M 3 H5, T 42 4 B C 3 H5

WELDING POSITIONS:



FEATURES

- Basic slag system
- Low hydrogen weld deposit
- Ideal for use of short arc and spray arc
- Excellent low temperature impacts
- Low spatter loss
- Easy slag removal

BENEFITS

- Minimized risk of hydrogen-induced cracking
- No re-drying
- Provides increased toughness
- For high carbon steels and dissimilar welds with critical weldability
- For buffer layers

APPLICATIONS

- Automatic and mechanized welding
- Steel structures
- Heavy fabrication
- Severe service
- Non-alloy and fine grain steels
- Vessels
- General fabrication
- Single and multi-pass welding
- Railroad rails
- Earthmoving equipment

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Shipbuilding steels		A, B, D, AH 32 - EH 46
Unalloyed structural steels	Rel < 355 MPa	S185 - S355, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 355 MPa	P235GH - P355GH
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460NL2 L210 - L445MB
Fine grain structural steels	Rel < 460 MPa	S235 - S460QL1
Steels to API-standard	Rel < 460 MPa	X42 - X60

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	-
Manganese (Mn)	1.4	Molybdenum (Mo)	-
Silicon (Si)	0.6	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW and SR	> 460 (67)	550 - 680 (80 - 99)	27	80 (59)	60 (44)

AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min

APPROVALS TÜV, DB, GL, BV, LR, DNV, ABS

MEGAFIL® 740 B



AWS 5.29: E80T5-Ni1M-J H4
ISO 17632: T 50 6 1Ni B M 3 H5

WELDING POSITIONS:



FEATURES

- Basic slag system
- Low hydrogen weld deposit
- Ideal for use of short arc and spray arc
- Excellent low temperature impacts
- Low spatter loss
- Easy slag removal

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- No re-drying
- Provides increased toughness
- For high carbon steels and dissimilar welds with critical weldability
- For buffer layers

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 - 1.6 mm (0.045 - 1/16")

< 3.0 ml / 100 g ; Guaranteed for the total processing time < 4.0 ml / 100g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Shipbuilding steels		A, B, D, AH 32 - EH 36
Unalloyed structural steels	Rel < 500 MPa	S185 - S500, A 106 Gr.B, A 333 Gr.6, A 516
Boiler steels	Rel < 500 MPa	P235GH - P485GH
Pipe steels	Rel < 500 MPa	P235T1/T2 - P500NL2 L210 - L485MB
Fine grain structural steels	Rel < 500 MPa	S235 - S500QL1
Steels to API-standard	Rel < 500 MPa	X42 - X70

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	0.9
Manganese (Mn)	1.2	Molybdenum (Mo)	-
Silicon (Si)	0.4	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW	> 500 (73)	550 - 680 (80 - 99)	24	60 (44)	47 (35)
SR	> 460 (67)	500 - 640 (73 - 93)	24	60 (44)	47 (35)

AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min

APPROVALS TÜV, DB

MEGAFIL® 281 M



AWS 5.18: E80C-W2 H4
ISO 17632: T 46 4 Z M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

- Minimized risk of hydrogen-induced cracking
- No re-drying
- Suitable for robot applications
- Reduces clean-up time, improved productivity
- Root welding without any backing
- Automatic root welding possible

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.2 mm (0.039 - 0.045")

< 3.0 ml / 100 g ; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Weather resistant steels	CuNi-alloyed steels	S235JRW - S355JRW; 9CrNiCuP3-2-4, A 572, A 588, or A 709 Gr 50W
Unalloyed structural steels	Rel < 355 MPa	S185 - S355, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 355 MPa	P235GH - P355GH
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460NL2 L210 - L445MB
Fine grain structural steels	Rel < 460 MPa	S235 - S460QL1

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	1.1
Manganese (Mn)	1.5	Molybdenum (Mo)	-
Silicon (Si)	0.7	Chromium (Cr)	0.5
Sulphur (S)	0.015	Copper (Cu)	0.5
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
AW	> 460 (67)	550 - 680 (80 - 99)	22	60 (44)	47 (35)
AW: as welded					

MEGAFIL® 781 R

AWS 5.29: E81T1-G H4

ISO 17632: T 46 4 Z P M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 - 1.6 mm (0.045 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Weather resistant steels	CuNi-alloyed steels	S235JRW - S355JRW; 9CrNiCuP3-2-4, A 572, A 588, or A 709 Gr 50W
Unalloyed structural steels	Rel < 355 MPa	S185 - S355, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 355 MPa	P235GH - P355GH
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460NL2 L210 - L445MB
Fine grain structural steels	Rel < 460 MPa	S235 - S460QL1

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	1.1
Manganese (Mn)	1.3	Molybdenum (Mo)	-
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015	Copper (Cu)	0.5
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
AW	> 460 (67)	550 - 680 (80 - 99)	22	60 (44)	47 (35)
AW: as welded					

MEGAFIL® 741 M



AWS 5.28: E90C-K3 H4

ISO 17632: T 55 6 1NiMo MM 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- No re-drying
- Suitable for robot applications
- Reduces clean-up time, improves productivity
- Root welding without any backing
- Automatic root welding possible

APPLICATIONS

- Automatic and mechanized welding
- Steel structures
- Offshore structures
- Pipelines
- Non-alloy and fine grain steels
- Vessels
- Railroad rails
- Earthmoving equipment
- Single and multi-pass welding

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Shipbuilding steels		A, B, D, AH 32 - EH 46
Unalloyed structural steels	Rel < 550 MPa	S355 - S550, A 106, A 600
Boiler steels	Rel < 550 MPa	P355GH - P550GH up to A5.16: A537; A600
Pipe steels	Rel < 550 MPa	P355T1/T2 - P550NL2; L210 - L550MB up to A 572
Fine grain structural steels	Rel < 550 MPa	S355 - S550QL1 up to A 572
Steels to API-standard	Rel < 550 MPa	X 42 - X 80
High grade structural steels	Rel < 550 MPa	15NiCuN55, 20MnMoNi 4-5, 11NiMoV53, 17MnMoV6-4

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	1.0
Manganese (Mn)	1.3	Molybdenum (Mo)	0.5
Silicon (Si)	0.4	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW	> 550 (80)	640 - 820 (93 - 119)	18	60 (44)	47 (35)
SR	> 540 (78)	620 - 760 (90 - 110)	20	60	47

AW: as welded SR: stress relief annealed 600 °C (1112 ° F) / 60 min

MEGAFIL® 610 M



AWS 5.28: E100C-K3 H4

ISO 18276: T 62 6 Mn1NiMo M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- No re-drying
- Suitable for robot applications
- Reduces clean-up time, improves productivity
- Root welding without any backing
- Automatic root welding possible

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.2 mm (0.039 - 0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Unalloyed structural steels	Rel < 620 MPa	A 517, A 537
Boiler steels	Rel < 620 MPa	P500GH - P620GH
Pipe steels	Rel < 620 MPa	P500T1/T2 - P620NL2 - L620MB
Fine grain structural steels	Rel < 620 MPa	S500 - S620QL1
Steels to API-standard	Rel < 620 MPa	up to X 90

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	0.9
Manganese (Mn)	1.5	Molybdenum (Mo)	0.5
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW and SR	> 620 (90)	690 - 890 (100 - 129)	20	60 (44)	47 (35)
AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min					

MEGAFIL® 742 M



AWS 5.28: E110C-K4 H4

ISO 18276: T 69 6 Mn2NiCrMo M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.2 mm (0.039 - 0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Unalloyed structural steels	Rel < 690 MPa	S620 - S690, A 106, A 600
Boiler steels	Rel < 690 MPa	P620GH - P690GH up to A517; A537; A625
Pipe steels	Rel < 690 MPa	P620 - P690
Fine grain structural steels	Rel < 690 MPa	S620 - S690QL1 up to A 625
Steels to API-standard	Rel < 690 MPa	X 70 - X 100 / HY100

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

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

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW and SR	> 690 (100)	770 - 940 (112 - 136)	17	75 (55)	69 (51)
AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min					

APPROVALS TÜV, DB, LR, DNV, ABS, BV, GL, BWB, WIIWEB

MEGAFIL® 1100 M



AWS 5.28: ~ E120C-G H4

ISO 18276: T 89 4 Mn2NiCrMo M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 mm (0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Material	Rel < 890 MPa	up to S890QL1
TM pipesteels	Rel < 890 MPa	up to S890QL1
Pipe steels	Rel < 890 MPa	X 120
Fine grain structural steels	Rel < 890 MPa	S890 - S1100QL1
ASTM	Rel < 890 MPa	A517

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Element	Carbon (C)	Nickel (Ni)	2.6
Manganese (Mn)	1.5	Molybdenum (Mo)	0.6
Silicon (Si)	0.5	Chromium (Cr)	0.6
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

Welding speed cm/min*	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
t ≥ 12: 35-45	> 890 (130)	980 - 1180 (142 - 171)	15	55 (41)	47 (35)
t ≤ 12: ≥ 45	> 960 (139)	980 - 1180 (142 - 171)	15	55 (41)	47 (35)
t ≤ 10: ≥ 50	> 1000 (145)	> 1100 (160)	15	55 (41)	47 (35)

AW: as welded *depending on Material thickness

APPROVALS TÜV

MEGAFIL® 550 R



AWS 5.29: E91T1-K2M-J H4

ISO 17632: T 55 6 Mn1NI P M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 (0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Shipbuilding steels		A, B, D, AH 32 - EH 46
Unalloyed structural steels	Rel < 550 MPa	S185 - S550, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 550 MPa	P235GH - P550GH up to A516; A537; A455
Pipe steels	Rel < 550 MPa	P235T1/T2 - P550NL2; L210 - L550MB up to A 572
Fine grain structural steels	Rel < 550 MPa	S235 - S550QL1 up to A 572
Steels to API-standard	Rel < 550 MPa	X42 - X80

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.08	Nickel (Ni)	1.0
Manganese (Mn)	1.5	Molybdenum (Mo)	< 0.35
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW and SR	> 550 (80)	640 - 820 (93 - 119)	18	60 (44)	55 (41)
AW: as welded SR: stress relief annealed 580° C (1076° F) / 60 min					

APPROVALS LR, DNV, ABS

MEGAFIL® 610 R



AWS 5.29: E101T1-K2M H4

ISO 18276: T 62 4 Mn1Ni P M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 mm (0.045")

< 3.0 ml /100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Unalloyed structural steels	Rel < 620 MPa	A 517, A537
Boiler steels	Rel < 620 MPa	P500GH - P620GH
Pipe steels	Rel < 620 MPa	P500T1/T2 - P620NL2 - L620MB
Fine grain structural steels	Rel < 620 MPa	S500 - S620QL1
Steels to API-standard	Rel < 620 MPa	up to X90

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.08	Nickel (Ni)	0.9
Manganese (Mn)	1.6	Molybdenum (Mo)	< 0.35
Silicon (Si)	0.6	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
AW	> 620 (90)	690 - 830 (100 - 121)	18	60 (44)	47 (35)
AW: as welded					

MEGAFIL® 620 R



AWS 5.29: E101T1-K3M H4

ISO 17632: T 62 4 1,5NiMo P M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 mm (0.045")

< 3.0 ml / 100 g ; Guaranteed for the total processing time < 4.0 ml /100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Material	Rel	Strength
Shipbuilding steels		A, B, D, AH 32 - EH 36
Unalloyed structural steels	Rel < 620 MPa	A 517, A 537
Boiler steels	Rel < 620 MPa	P500GH - P620GH
Pipe steels	Rel < 620 MPa	P500T1/T2 - P620NL2 - L620MB
Fine grain structural steels	Rel < 620 MPa	S500 - S620QL1
Steels to API-standard	Rel < 620 MPa	up to X90

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Element	Carbon (C)	Manganese (Mn)	Silicon (Si)	Sulphur (S)	Phosphorus (P)	Nickel (Ni)	Molybdenum (Mo)	Chromium (Cr)
	0.08	1.4	0.5	0.015	0.015	1.7	< 0.35	-

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
AW	> 620 (90)	690 - 830 (100 - 121)	18	60 (44)	47 (35)

AW: as welded

APPROVALS LR, ABS

MEGAFIL® 690 R



AWS 5.29: E111T1-G M-J H4 (~ E111T1-K3MJ H4)
ISO 18276: T 69 6 Z P M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

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

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 mm (0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Material	Rel < 690 MPa	Material
Unalloyed structural steels	Rel < 690 MPa	S620 - S690, A 106, A 600
Boiler steels	Rel < 690 MPa	P620GH - P690GH up to A517; A537; A625
Pipe steels	Rel < 690 MPa	P620 T1/T2 - P690NL2; up to A 625
Fine grain structural steels	Rel < 690 MPa	S620 - S690QL1 up to A 625
Steels to API-standard	Rel < 690 MPa	X 70 - X 100 / HY100

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

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

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW	> 690 (100)	770 - 940 (112 - 136)	17	69 (51)	47 (35)

AW: as welded

APPROVALS GL, BV, LR, DNV, ABS

MEGAFIL® 741 B



AWS 5.29: E90T5-K2M H4

ISO 18276: T 55 6 Mn1NiMo B M 3 H5

WELDING POSITIONS:



FEATURES

- Basic slag system
- Low hydrogen weld deposit
- Ideal for use of short arc and spray arc
- Excellent low temperature impacts
- Low spatter loss
- Easy slag removal

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- No re-drying
- Provides increased toughness

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 mm (0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Unalloyed structural steels	Rel < 550 MPa	S355 - S550, A 106, A 600
Boiler steels	Rel < 550 MPa	P355GH - P550GH up to A516; A537; A600
Pipe steels	Rel < 550 MPa	P355T1/T2 - P550NL2; L210 - L550MB up to A 572
Fine grain structural steels	Rel < 550 MPa	S355 - S550QL1 up to A 572
Steels to API-standard	Rel < 550 MPa	X42 - X80
High grade structural steels	Rel < 550 MPa	15NiCuN55, 20MnMoNi 4-5, 11NiMoV53, 17MnMoV6-4

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	1.0
Manganese (Mn)	1.4	Molybdenum (Mo)	< 0.35
Silicon (Si)	0.4	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW and SR	> 550 (80)	640 - 820 (93 - 119)	18	60 (44)	47 (35)
AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min					

MEGAFIL® 501 B



AWS 5.29: E90T5-K2M-J H4
ISO 18276: T 55 6 Mn1Ni B M 3 H5

WELDING POSITIONS:



FEATURES

- Basic slag system
- Low hydrogen weld deposit
- Ideal for use of short arc and spray arc
- Excellent low temperature impacts
- Low spatter loss
- Easy slag removal

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- No re-drying
- Provides increased toughness

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 mm (0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Shipbuilding steels		A, B, D, AH 32 - EH 46
Unalloyed structural steels	Rel < 550 MPa	S185 - S550, A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 550 MPa	P235GH - P550GH up to A516; A537; A455
Pipe steels	Rel < 550 MPa	P235T1/T2 - P550NL2; L210 - L550MB up to A 572
Fine grain structural steels	Rel < 550 MPa	S235 - S550QL1 up to A 572
Steels to API-standard	Rel < 550 MPa	X42 - X80

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.08	Nickel (Ni)	< 1.0
Manganese (Mn)	1.5	Molybdenum (Mo)	< 0.35
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-60° C (-76° F)	-80° C (-112° F)
AW and SR	> 550 (80)	640 - 760 (93 - 110)	18	100 (73)	60 (44)

AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min

MEGAFIL® 610 B



AWS 5.29: E90T5-K2M-J H4

ISO 18276: T 55 6 Mn1,5Ni B M 3 H5

WELDING POSITIONS:



FEATURES

- Basic slag system
- Low hydrogen weld deposit
- Ideal for use of short arc and spray arc
- Excellent low temperature impacts
- Low spatter loss
- Easy slag removal
- Single and multi-pass welding

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- No re-drying
- Provides increased toughness
- For high carbon steels and dissimilar welds with critical weldability
- For buffer layers

APPLICATIONS

- Offshore
- Steel structures
- Heavy fabrication
- Non-alloy and fine grain steels
- Vessels
- General fabrication
- Earthmoving equipment

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 mm (0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Unalloyed structural steels	Rel < 620 Mpa	A 517 A537
Boiler steels	Rel < 620 Mpa	P500GH - P620GH
Pipe steels	Rel < 620 Mpa	P500T1/T2 - P620NL2 - L620MB
Fine grain structural steels	Rel < 620 Mpa	S500 - S620QL1
Steels to API-standard	Rel < 620 Mpa	up to X90

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.08	Nickel (Ni)	1.7
Manganese (Mn)	1.5	Molybdenum (Mo)	< 0.35
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-60° C (-76° F)	-80° C (-76° F)
AW and SR	> 600 (88)	640 - 760 (93 - 110)	24	100 (74)	47 (35)

AW: as welded SR: stress relief annealed 600 °C (1112 ° F) / 60 min

MEGAFIL® 742 B



AWS 5.29: E110T5-K4M H4

ISO 18276: T 69 6 Mn2NiCrMo B M 3 H5

WELDING POSITIONS:



FEATURES

- Basic slag system
- Low hydrogen weld deposit
- Ideal for use of short arc and spray arc
- Excellent low temperature impacts
- Low spatter loss
- Easy slag removal

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- No re-drying
- Provides increased toughness

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 mm (0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Unalloyed structural steels	ReI < 690 MPa	S620 - S690, A 106, A 600
Boiler steels	ReI < 690 MPa	P620GH - P690GH up to A517; A537; A625
Pipe steels	ReI < 690 MPa	P6205T1/T2 - P690NL2; up to A 625
Fine grain structural steels	ReI < 690 MPa	S620 - S690QL1 up to A 625
Steels to API-standard	ReI < 690 MPa	X70 - X100 / HY100

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

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

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-40° C (-40° F)	-60° C (-76° F)
AW and SR	> 690 (100)	770 - 960 (112 - 139)	17	80 (59)	69 (51)
AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min					

APPROVALS TÜV, DB, LR, DNV, BV, GL, ABS

MEGAFIL® 745 B



AWS 5.29: E120T5-K4M H4

ISO 17632: T 89 4 Mn2Ni1CrMo B M 3 H5

WELDING POSITIONS:



FEATURES

- Basic slag system
- Low hydrogen weld deposit
- Ideal for use of short arc and spray arc
- Excellent low temperature impacts
- Low spatter loss
- Easy slag removal

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- No re-drying
- Provides increased toughness

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Material	Rel < 890 MPa	up to S890QL1
TM pipesteels	Rel < 890 MPa	to X120
Pipe steels	Rel < 890 MPa	S890 - S1100QL1
Fine grain structural steels	Rel < 890 MPa	A517
Steels to API-standard	Rel < 890 MPa	

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Element	Value	Element	Value
Carbon (C)	0.05	Nickel (Ni)	1.8
Manganese (Mn)	1.6	Molybdenum (Mo)	0.6
Silicon (Si)	0.4	Chromium (Cr)	1.0
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
AW	> 890 (129)	940 - 1180 (136 - 171)	15	60 (44)	47 (35)
AW: as welded					

MEGAFIL® 807 M



AWS 5.28: E110C-G H4
ISO 17632: T 69 0 Z M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- No re-drying
- Suitable for robot applications
- Reduces clean-up time, improves productivity
- Root welding without any backing
- Automatic root welding automatically possible

APPLICATIONS

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

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.2 mm (0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

High strength fine grain structural steels (tempered)	25CrMo4; 34CrMo4; 28NiCrMo5-5; 42CrMo4 typical ASTM A 829 M
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ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	2.3
Manganese (Mn)	1.7	Molybdenum (Mo)	0.6
Silicon (Si)	0.6	Chromium (Cr)	0.6
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				0° C (32° F)	-20° C (-4° F)
SR	> 700 (102)	800 - 950 (116 - 138)	15	47(35)	27 (20)

AW: as welded SR: stress relief annealed 680° C (1256° F) / 1120 min

MEGAFIL® 235 M



AWS 5.28: E80C-G H4
ISO 17634: T Mo M M 1 H5

WELDING POSITIONS:



FEATURES	BENEFITS	APPLICATIONS
- Extremely low diffusible hydrogen weld deposit - Good reignition characteristics - Ideal for use of short arc and spray arc - Excellent gap bridging for root welding - High deposition rate - Virtually no slag coverage - Smooth arc characteristic	- Minimizes risk of hydrogen-induced cracking - Suitable for robot applications - Automatic root welding possible - Root welding without any backing - Improved efficiency - Reduced cleaning time - Easy handling	- Automatic and mechanized welding - Steel structures - Pipelines - Non-alloy and fine grain steels - Vessels (Mo steels up to 500 °C (932 °F)) - General fabrication - Single and multi-pass welding

WIRE TYPE	Gas shielded metal-cored wire
SHIELDING GAS	75-95% Argon (Ar)/Balance Carbon Dioxide (CO ₂); 100% Carbon Dioxide (CO ₂); Gas flow see Annex
TYPE OF CURRENT	Direct Current Electrode Positive (DCEP)
STANDARD DIAMETERS	Ø 1.0 - 1.6 mm (0.039 - 1/16")
TYPICAL DIFFUSIBLE HYDROGEN*	< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)
RE-DRYING	Not required due to seamless wire design
STORAGE	The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Material	Strength	Material
Shipbuilding steels		A, B, D, AH 32 - EH 36
Unalloyed structural steels	Rel < 355 MPa	S185 - S355 , A 106 Gr.B, A 333 Gr.6
Boiler steels	Rel < 355 MPa	P235GH - P355GH ,16Mo3
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460NL2 L210 - L445MB
Fine grain structural steels	Rel < 460 MPa	S235 - S460QL1
Steels to API-standard	Rel < 460 MPa	X42 - X70

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Element	Carbon (C)	Nickel (Ni)	
Manganese (Mn)	0.07	Molybdenum (Mo)	-
Silicon (Si)	1.1	Chromium (Cr)	0.5
Sulphur (S)	0.7		-
Phosphorus (P)	0.015		
	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
AW and SR	> 460 (67)	550 - 680 (80 - 99)	22	60 (44)	47 (35)

AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min

APPROVALS TÜV, DB

MEGAFIL® P36 M



AWS 5.28: E90C-G H4
ISO 17634: T Z M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- Suitable for robot applications
- Automatic root welding possible
- Root welding without any backing
- Improved efficiency
- Reduced cleaning time
- Easy handling

APPLICATIONS

- Automatic and mechanized welding
- Steel structures
- Pipelines
- High-grade structural steels
- Vessels (Mo steels up to 500° C (932° F))
- General fabrication
- Single and multi-pass welding

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

High-grade structural steels	Rel < 540 MPa	15NiCuMoNb5, 20MnMoNi4-5, 11NiMoV53, 17MnMoV6-4
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ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.07	Nickel (Ni)	< 1.1
Manganese (Mn)	1.3	Molybdenum (Mo)	0.5
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
SR	> 540 (78)	620 - 820 (90 - 119)	18	60 (44)	47 (35)

SR: stress relief annealed 605 - 635° C (1121° F - 1175° F) / 60 min

MEGAFIL® 236 M



AWS 5.28: E80C-B2 H4
ISO 17634: T CrMo1 M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- Suitable for robot applications
- Automatic root welding possible
- Root-welding without any backing
- Improved efficiency
- Reduced cleaning time
- Easy handling

APPLICATIONS

- Automatic and mechanized welding
- Steel structures
- Pipelines
- Cast steels
- Steam boilers and turbines (Mo steels up to 550° C (1022° F))
- Single and multi-pass welding

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

boiler steels	Rel < 460 MPa	13CrMo4-5
cast steels	Rel < 460 MPa	G17CrMo5-5, G22CrMo5-4
Similar alloyed heat treatable steels and similar alloyed cementation and nitrided steels		

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	-
Manganese (Mn)	1.0	Molybdenum (Mo)	0.5
Silicon (Si)	0.3	Chromium (Cr)	1.1
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)		
				RT	-20° C (-4° F)	-40° C (-40° F)
SR	> 470 (68)	550 - 740 (80 - 107)	20	80 (59)	47 (35)	27 (20)
SR: stress relief annealed 675 - 705° C (1247° F - 1301° F) / 60 min						

APPROVALS TÜV

MEGAFIL® 237 M



AWS 5.28: E90C-B3 H4

ISO 17634: T CrMo2 M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- Suitable for robot applications
- Automatic root welding possible
- Root-welding without any backing
- Improved efficiency
- Reduced cleaning time
- Easy handling

APPLICATIONS

- Automatic and mechanized welding
- Construction of containers
- Pipelines
- Steam boilers and turbines (2 ¼ Cr1Mo steels)
- Machine-building
- Single and multi-pass welding

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); 100% Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

boiler steels	Rel < 540 MPa	10CrMo9-10, 12CrMo9-10
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ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.07	Nickel (Ni)	-
Manganese (Mn)	1.0	Molybdenum (Mo)	1.1
Silicon (Si)	0.3	Chromium (Cr)	2.3
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				RT	-20° C (-4° F)
SR	> 540 (78)	620 - 820 (90 - 119)	18	80 (59)	47 (35)

SR: stress relief annealed 675 - 705° C (1247° F - 1301° F) / 60 min

APPROVALS TÜV

MEGAFIL® P5 M



AWS 5.28: E80C-B6 H4
ISO 17634: T CrMo5 M M 1 H5

WELDING POSITIONS:



FEATURES

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

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- Suitable for robot applications
- Automatic root-welding possible
- Root-welding without any backing
- Improved efficiency
- Reduced cleaning time
- Easy handling

APPLICATIONS

- Automatic and mechanized welding
- Vessels
- Pumps and fittings
- Creep & scale resistant steels up to 600° C (1112° F)
- Steam turbines
- Hydropower stations
- Single and multi-pass welding

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded metal-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Boiler steels	Rel < 460 MPa	X12CrMo5
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ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.07	Nickel (Ni)	-
Manganese (Mn)	1.0	Molybdenum (Mo)	0.6
Silicon (Si)	0.4	Chromium (Cr)	5.2
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)		
				RT	0° C (32° F)	-20° C (-4° F)
SR	> 470 (68)	550 - 740 (80 - 107)	20	80 (59)	47 (35)	27 (20)

SR: stress relief annealed 730 - 760° C (1346° F - 1400° F) / 60 min

MEGAFIL® 825 R



AWS 5.29: E81T1-A1M H4
ISO 17634: T MoL P M 1 H5

WELDING POSITIONS:



FEATURES

- Extremely low diffusible hydrogen weld deposit
- Excellent weld puddle manipulation
- Particularly suited for mechanized MAG welding
- Ideal for all-position welding on ceramic backing
- Low spatter loss
- Easy slag removal
- Smooth arc characteristic

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- Efficient out-of-position welding
- Economic production
- High flexibility
- No additives needed
- Reduced cleaning time
- Easy handling

APPLICATIONS

- Mechanized welding
- Steel construction
- Vessels (Mo steels up to 500° C (932° F))
- Pipelines
- Single and multi-pass welding
- Mechanical engineering

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Material	Rel	Wire
Boiler steels	Rel < 355 MPa	P235GH - P355GH, 16Mo3
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460NL2, L210 - L445MB
Fine grain structural steels	Rel < 460 MPa	S255 - S460

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Element	Content (%)	Element	Content (%)
Carbon (C)	0.07	Nickel (Ni)	-
Manganese (Mn)	1.1	Molybdenum (Mo)	0.5
Silicon (Si)	0.5	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)		
				RT	0° C (32° F)	-20° C (-4° F)
AW and SR	> 470 (68)	550 - 680 (80 - 99)	22	60 (44)	47 (35)	27 (20)

AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min

APPROVALS TÜV

MEGAFIL® 836 R



AWS 5.29: E81T1-B2M H4
ISO 17634: T CrMo1 P M 1 H5

WELDING POSITIONS:



FEATURES

- Extremely low diffusible hydrogen weld deposit
- Excellent weld puddle manipulation
- Particularly suited for mechanized MAG welding
- Ideal for all-position welding on ceramic backing
- Low spatter loss
- Easy slag removal
- Smooth arc characteristic

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- Efficient out-of-position welding
- Economic production
- High flexibility
- No additives needed
- Reduced cleaning time
- Easy handling

APPLICATIONS

- Mechanized welding
- Construction of containers
- Steam boilers and turbines (CrMo steels up to 550° C (1022° F))
- Pipelines
- Single and multi-pass welding
- Mechanical engineering

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded rutile flux-cored wire with rapidly solidifying slag

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.2 mm (0.039 - 0.045")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Boiler steels	Rel < 460 MPa	13CrMo4-5
Cast steels	Rel < 460 MPa	G17CrMo5-5, G22CrMo5-4

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	-
Manganese (Mn)	1.0	Molybdenum (Mo)	0.5
Silicon (Si)	0.3	Chromium (Cr)	1.1
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)
				RT
SR	> 470 (68)	550 - 680 (80 - 100)	20	47 (35)
SR: stress relief annealed 675 - 705° C (1247° F - 1301° F) / 60 min				

MEGAFIL® 735 B



AWS 5.29: E80T5-G H4
ISO 17634: T Mo B M 3 H5

WELDING POSITIONS:



FEATURES

- Extremely low diffusible hydrogen weld deposit
- Extremely clean weld puddle
- Ideal for repair welding
- Low spatter loss
- Easy slag removal

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- High reserve of toughness and crack resistance
- High flexibility
- No additives needed
- Reduced cleaning time

APPLICATIONS

- Steel construction
- Mechanical engineering
- Vessels (Mo steels up to 500° C (932° F))
- Pipelines
- Single and multi-pass welding

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Material	Rel	Product
Boiler steels	Rel < 355 MPa	P235GH - P355GH, 16Mo3
Pipe steels	Rel < 460 MPa	P235T1/T2 - P460NL2 L210 - L445MB
Fine grain structural steels	Rel < 460 MPa	S255 - S460QL1

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Element	Value	Element	Value
Carbon (C)	0.07	Nickel (Ni)	-
Manganese (Mn)	1.1	Molybdenum (Mo)	0.5
Silicon (Si)	0.3	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
AW and SR	> 470 (68)	550 - 680 (80 - 99)	22	60 (44)	47 (35)

AW: as welded SR: stress relief annealed 600° C (1112° F) / 60 min

APPROVALS TÜV

MEGAFIL® P36 B



AWS 5.29: E90T5-G H4
ISO 17634: T Z B M 3 H5

WELDING POSITIONS:



FEATURES

- Extremely low diffusible hydrogen weld deposit
- Extremely clean weld puddle
- Ideal for repair welding
- Low spatter loss
- Easy slag removal

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- High reserve of toughness and crack resistance
- High flexibility
- No additives needed
- Reduced cleaning time

APPLICATIONS

- Mechanical engineering
- Steel construction
- Vessels (Mo steels up to 500° C (932° F))
- Pipelines
- Single and multi-pass welding

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

High-grade structural steels	Rel < 540 MPa	15NiCuMoNb5, 20MnMoNi4-5, 11NiMoV53, 17MnMoV6-4
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ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.07	Nickel (Ni)	< 1.1
Manganese (Mn)	1.3	Molybdenum (Mo)	0.5
Silicon (Si)	0.3	Chromium (Cr)	-
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)	
				-20° C (-4° F)	-40° C (-40° F)
SR	> 540 (78)	620 - 820 (90 - 119)	18	60 (44)	47 (35)

SR: stress relief annealed 605 - 635° C (1121° F - 1175° F) / 60 min

MEGAFIL® 736 B



AWS 5.29: E80T5-B2M H4
ISO 17634: T CrMo1 B M 3 H5

WELDING POSITIONS:



FEATURES

- Extremely low diffusible hydrogen weld deposit
- Extremely clean weld puddle
- Ideal for repair welding
- Low spatter loss
- Easy slag removal

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- High reserve of toughness and crack resistance
- High flexibility
- No additives needed
- Reduced cleaning time

APPLICATIONS

- Construction of containers
- Boiler & machinery parts
- Steam boiler and turbines (CrMo steels up to 550° C (1022° F))
- Pipelines
- Single and multi-pass welding

WIRE TYPE

Gas shielded basic flux-cored wire

SHIELDING GAS

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); Gas flow see Annex

TYPE OF CURRENT

Direct Current Electrode Positive (DCEP)

STANDARD DIAMETERS

Ø 1.0 - 1.6 mm (0.039 - 1/16")

TYPICAL DIFFUSIBLE HYDROGEN*

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

RE-DRYING

Not required due to seamless wire design

STORAGE

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Boiler steels	Rel < 460 MPa	13CrMo4-5
Pipe steels	Rel < 460 MPa	G17CrMo5-5, G22CrMo5-4
Similar alloyed heat treatable steels and similar alloyed cementation and nitrided steels		

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.05	Nickel (Ni)	-
Manganese (Mn)	1.0	Molybdenum (Mo)	0.5
Silicon (Si)	0.3	Chromium (Cr)	1.1
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)		
				RT	-20° C (-4° F)	-40° C (-40° F)
SR	> 470 (68)	550 - 690 (80 - 100)	20	80 (59)	47 (35)	27 (20)
SR: stress relief annealed 675 - 705° C (1247° F - 1301° F) / 60 min						

APPROVALS TÜV

MEGAFIL® 737 B



AWS 5.29: E90T5-B3M H4
ISO 17634: T CrMo2 B M 3 H5

WELDING POSITIONS:



FEATURES

- Extremely low diffusible hydrogen weld deposit
- Extremely clean weld puddle
- Ideal for repair welding
- Low spatter loss
- Easy slag removal
- Heat treatable weld metal

BENEFITS

- Minimizes risk of hydrogen-induced cracking
- High reserve of toughness and crack resistance
- High flexibility
- No additives needed
- Reduced cleaning time
- Step cooling possible

APPLICATIONS

- Construction of containers
- Boiler & machinery parts
- Steam boiler and turbines (2 ¼ Cr1Mo steels)
- Pipelines
- Single and multi-pass welding

WIRE TYPE

SHIELDING GAS

TYPE OF CURRENT

STANDARD DIAMETERS

TYPICAL DIFFUSIBLE HYDROGEN*

RE-DRYING

STORAGE

Gas shielded basic flux-cored wire

75-95% Argon (Ar)/Balance Carbon Dioxide (CO₂); Gas flow see Annex

Direct Current Electrode Positive (DCEP)

Ø 1.0 - 1.6 mm (0.039 - 1/16")

< 3.0 ml / 100 g; Guaranteed for the total processing time < 4.0 ml / 100 g maximum (AWS Spec)

Not required due to seamless wire design

The same conditions as for solid wire. Product should be stored in a dry, enclosed environment, in its original undamaged packaging.

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

MATERIALS TO BE WELDED

Boiler steels	Rel < 540 MPa	10CrMo9-10, 12CrMo9-10

ALL WELD METAL CHEMISTRY (%) (typical values for mixed gas 82% Ar / 18% CO₂)

Carbon (C)	0.07	Nickel (Ni)	-
Manganese (Mn)	1.0	Molybdenum (Mo)	1.1
Silicon (Si)	0.3	Chromium (Cr)	2.3
Sulphur (S)	0.015		
Phosphorus (P)	0.015		

ALL WELD METAL MECHANICAL PROPERTIES (typical values for mixed gas 82% Ar / 18% CO₂)

	Rp0.2 MPa (ksi)	Rm MPa (ksi)	A5 %	Charpy V Notch [J] (ft-lbf)		
				RT	0° C (32° F)	-20° C (-4° F)
SR	> 540 (78)	620 - 760 (90 - 110)	18	120 (89)	80 (59)	60 (44)
SR: stress relief annealed 675 - 705° C (1247° F - 1301° F) / 60 min						

APPROVALS TÜV

Storage and Handling Recommendations

MEGAFIL seamless flux- and metal-cored wires are totally insensitive to moisture absorption. They can be stored for an indefinite period of time. Like solid wire, however, they are copper-coated and direct contact with any liquid - particularly water - must be avoided to prevent the formation of rust on the wire surface. Rust is a potential source of weld metal hydrogen, but it can also cause poor wire feeding.

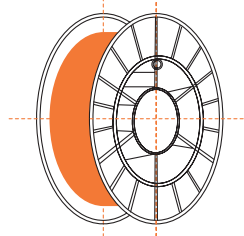
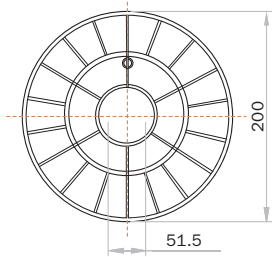
It is therefore recommended to store MEGAFIL wires in a dry area - away from weather influences - and in their original packaging. Any sudden drop in temperature should be avoided to prevent the formation of condensate water. It is sufficient to slightly warm the storeroom during winter months. Partly used wire spools must be re-packed in their original plastic bag, carefully sealed, and stored in their original cardboard boxes.

Summarized MEGAFIL storage and handling recommendations are:

- Store wires under dry conditions in the original sealed packaging.
- Avoid contact between wire and substances such as water or any other kind of liquid or vapour, oil, grease or corrosion.
- Do not touch the wire surface with bare hands.
- Avoid exposure of the wire below dew point.
- Do not leave unprotected wire spools in workshops overnight.
- Store the wire in its original plastic bag and box when not used.
- Apply first in - first out for stocked wires.

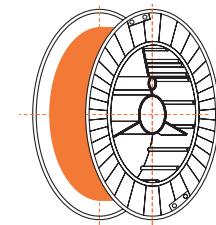
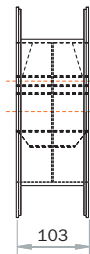
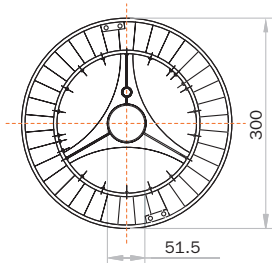
Packaging

Wire or plastic basket spools



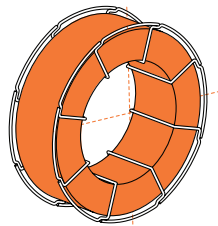
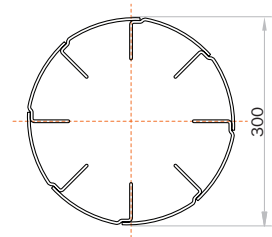
Plastic spool KD 200

Diameter: 200 mm
Width: 55 mm
Suitable for a 50 hub



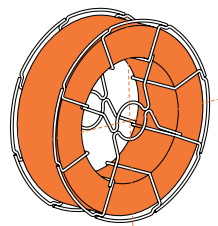
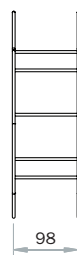
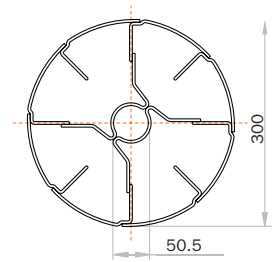
Plastic spool KD 300

Diameter: 300 mm
Width: 103 mm
Suitable for a 50 hub



Basket spool K 300

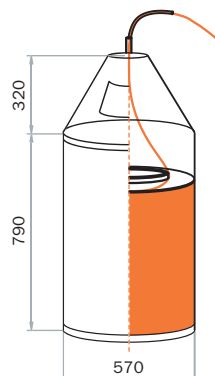
Diameter: 300 mm
Width: 98 mm
Suitable for a 50 hub



Basket spool K 3000

Diameter: 300 mm
Width: 98 mm
Suitable for a 50 hub

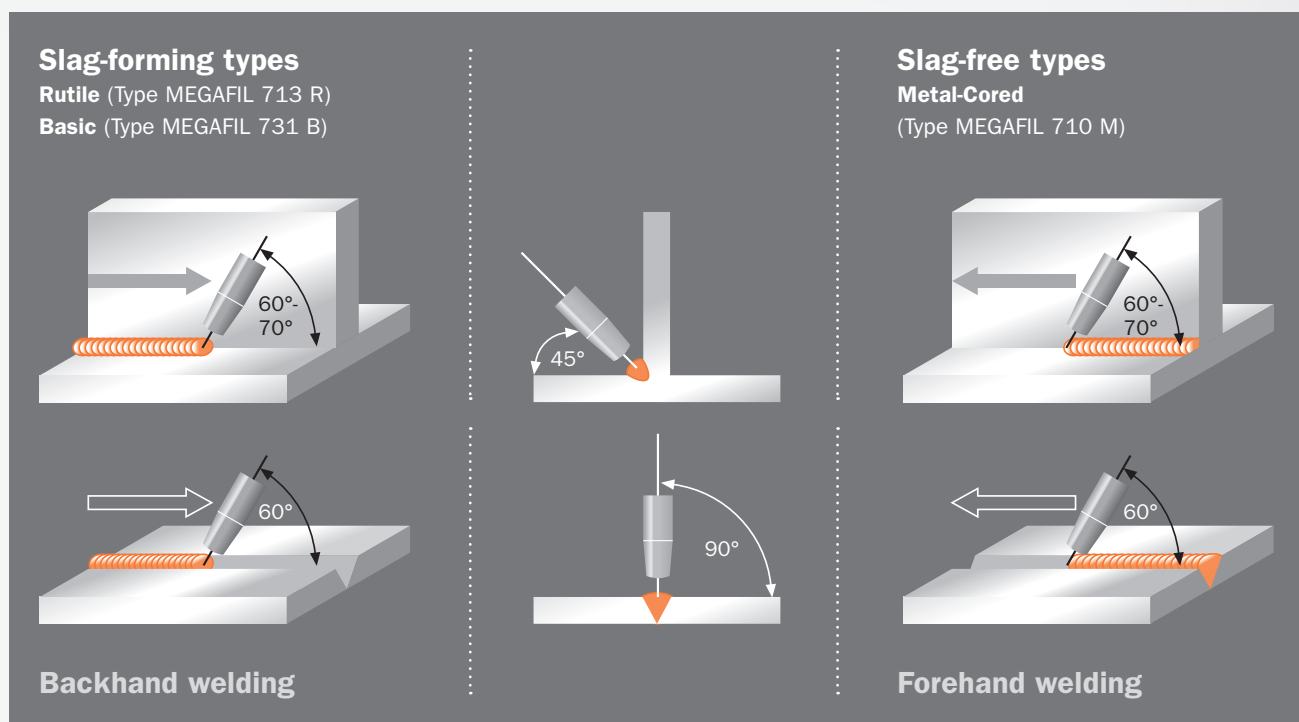
Drum



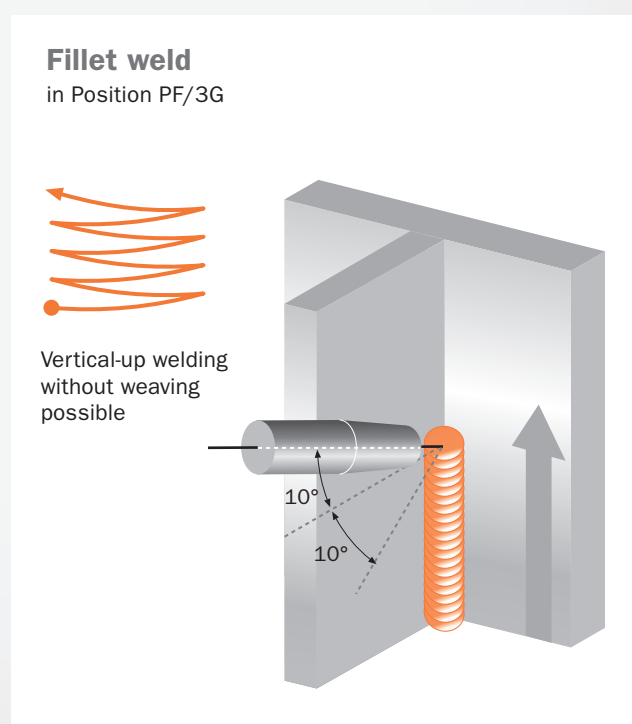
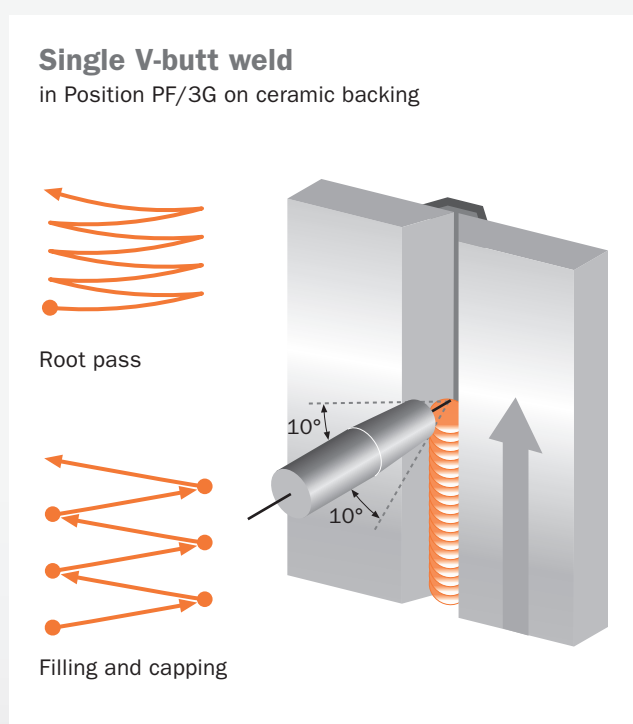
Diameter: 570 mm
Weight: 300 kg

Other types on request

Torch Angle and Manipulation



Positional Welding with MEGAFIL® Rutile Flux-Cored Wires



Use of Ceramic Backing Material

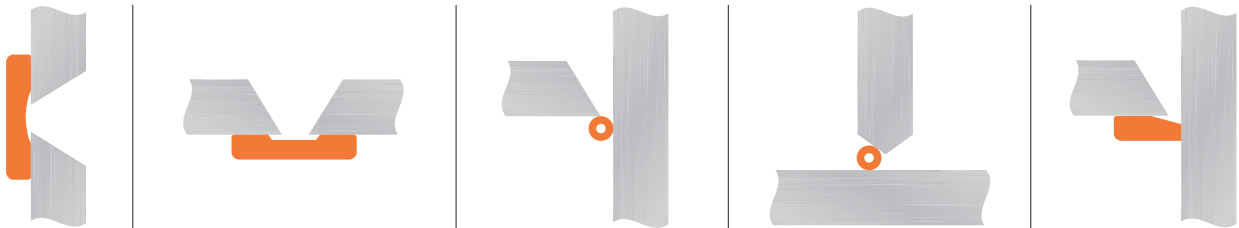
Ceramic backing is used to provide weld metal support when welding from one side only. It is an extremely effective way to rationalise welding procedures, improve root pass quality and reduce production costs.

Reduced production costs

- Eliminates the need for back-gouging, grinding and weld sealing operations at the reverse side of the joint.
- No turning of heavy sections.
- Increased productivity when welding root runs in PA/1G, PC/2G and PF/3G positions.
- Simpler joint preparation and reduced set-up time, due to greater root gap tolerances.

Improved quality

- Smooth, even root bead with slightly convex profile and excellent blend-in with base material.
- Ceramic material does not contain any moisture and produces no fumes. Ideal for low-hydrogen applications.
- No pollution of working environment with noise and fume from gouging, grinding and weld sealing operations.



Typical examples of ceramic backing applications

Two-sided welding means additional time needed for:

1. Back-gouging
2. Grinding
3. Rewelding on the reverse side, depending on the construction

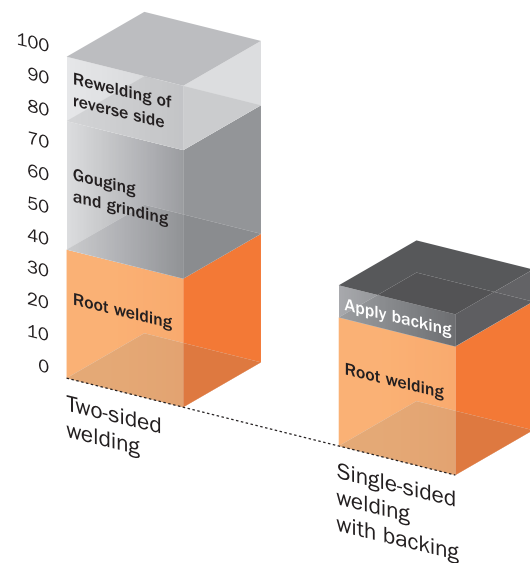


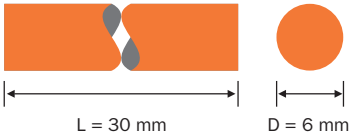
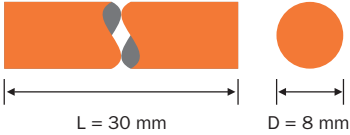
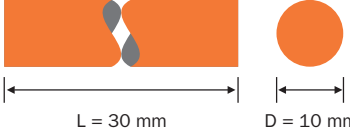
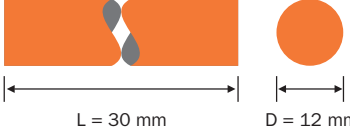
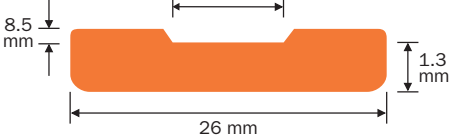
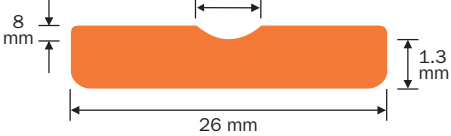
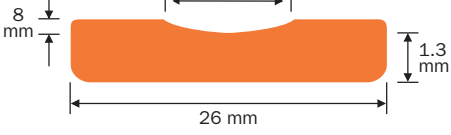
Single-sided welding with flux cored wire and backing:

Substantially higher productivity since all “extra work” has been eliminated. ✓



Total time comparison %

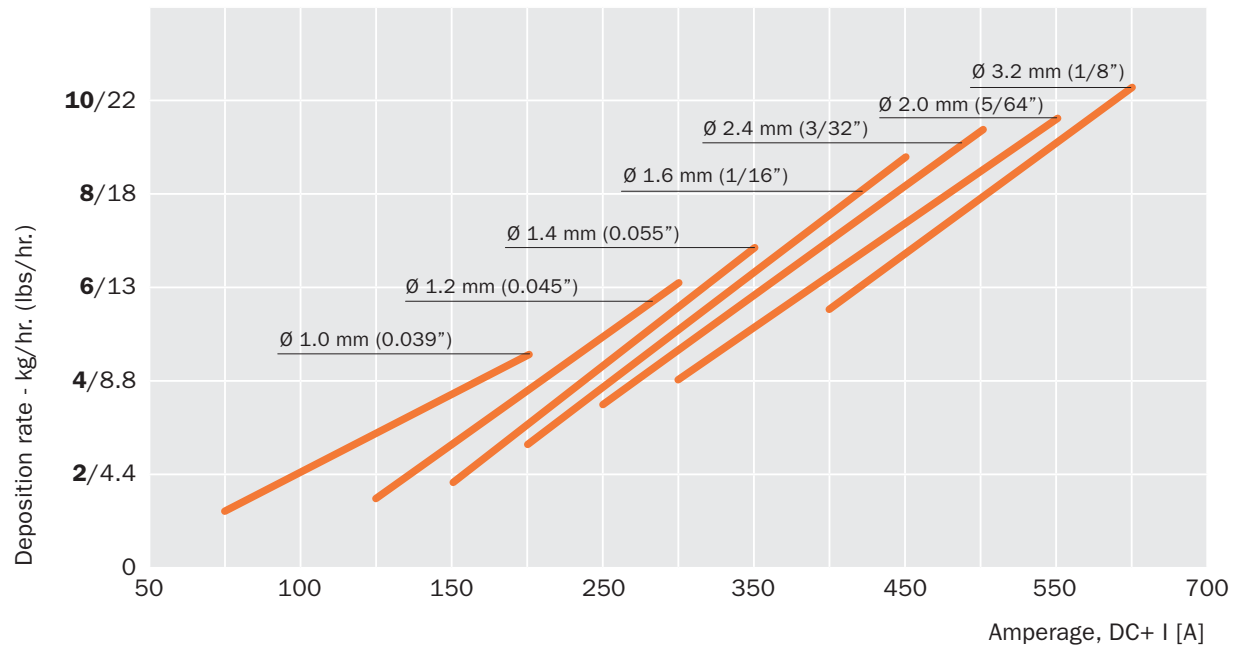


 L = 30 mm D = 6 mm	X- and K-joints MEGAFIL rutile and metal-cored wires Root gap: 3-5 mm Length of tile: 30 mm Art. Nr.. 86640600	Contents Pieces per box: 40 Pieces per pallet: 4480
 L = 30 mm D = 8 mm	X- and K-joints MEGAFIL rutile and metal-cored wires Root gap: 4-6 mm Length of tile: 30 mm Art. Nr.. 86650600	Contents Pieces per box: 40 Pieces per pallet: 4480
 L = 30 mm D = 10 mm	X- and K-joints MEGAFIL rutile and metal-cored wires Root gap: 5-7 mm Length of tile: 30 mm Art. Nr.. 86660600	Contents Pieces per box: 40 Pieces per pallet: 4480
 L = 30 mm D = 12 mm	X- and K-joints MEGAFIL rutile and metal-cored wires Root gap: 7-10 mm Length of tile: 30 mm Art. Nr.. 86670600	Contents Pieces per box: 30 Pieces per pallet: 3360
 13 mm 8.5 mm 26 mm 1.3 mm	V-joints MEGAFIL rutile flux-cored wires Root gap: 3-8 mm Length of tile: 25 mm Art. Nr.. 86800600	Contents Pieces per box: 30 Pieces per pallet: 3360
 6 mm 8 mm 26 mm 1.3 mm	V-joints MEGAFIL metal-cored wires and solid wires Root gap: 3-5 mm Length of tile: 25 mm Art. Nr.. 86980600	Contents Pieces per box: 30 Pieces per pallet: 3360
 12.5 mm 8 mm 26 mm 1.3 mm	V-joints MEGAFIL rutile flux-cored wires Root gap: 3-7 mm Length of tile: 25 mm Art. Nr.. 86990600	Contents Pieces per box: 30 Pieces per pallet: 3360

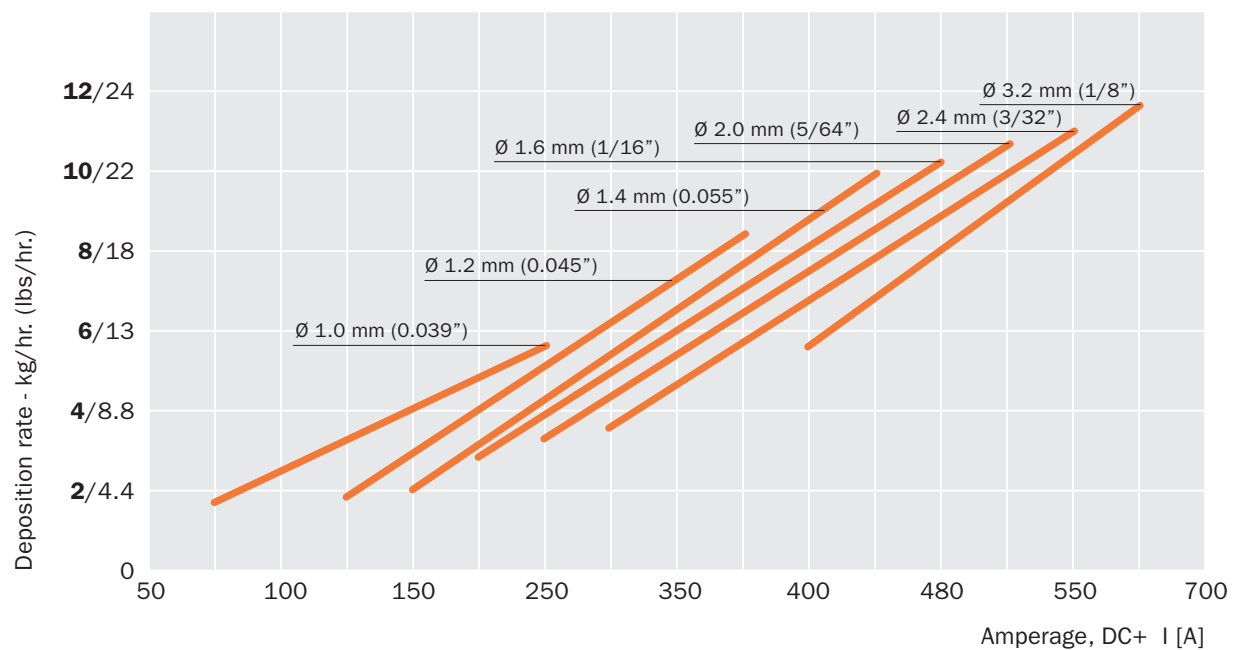
Overview of ITW Welding ceramic backing materials. All are grey ceramic backing on aluminium adhesive tape.
Length per piece is 600 mm. Used for non- and low-alloyed steels and stainless steels.

Deposition Rate Flux- and Metal-Cored Wires

Deposition rate of MEGAFIL® flux-cored wires

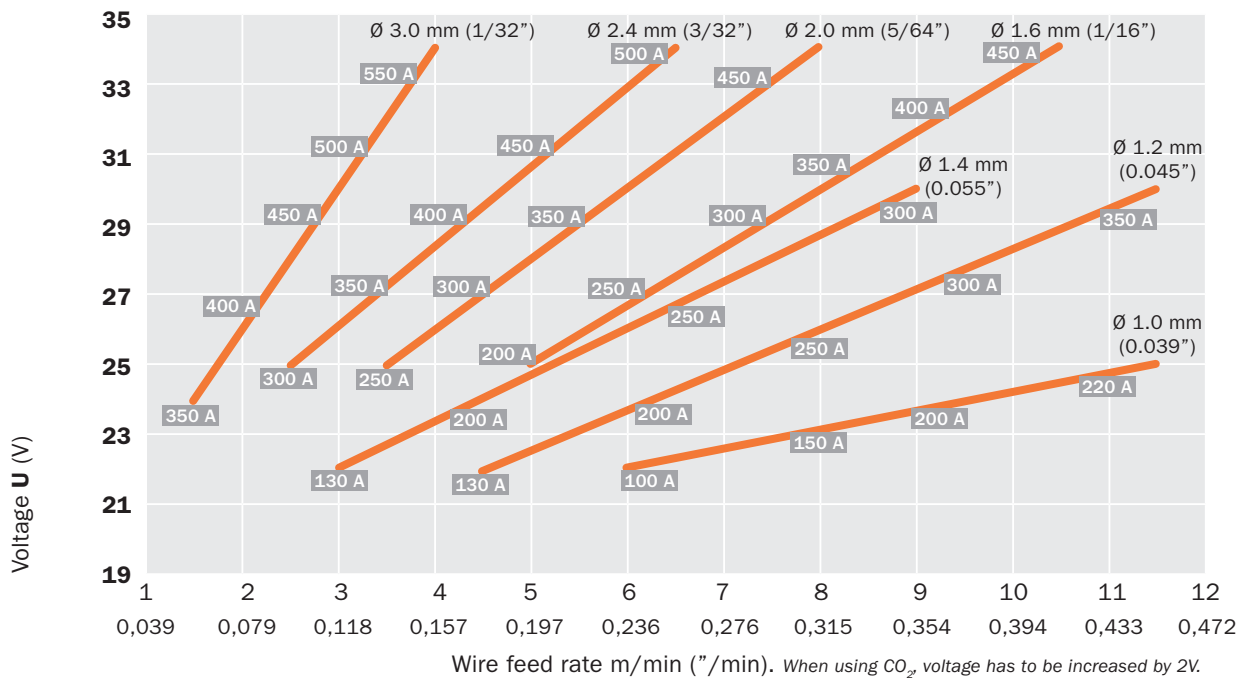


Deposition rate of MEGAFIL® metal-cored wires

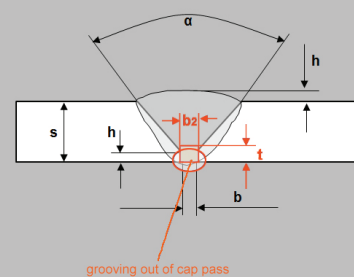


Welding parameters / welding costs

Welding parameter of MEGAFIL® cored wires under mixed gas M21



Starting page	Comparison of welding economy of V weld in PF / 3G position				
		MEGAFIL® 713 R		SG2 / G3Si1	
wire diameter	Ø	1,2	mm	1,2	mm
labour and overhead costs	L	40	€/h	40	€/h
amperage	I	260	A	170	A
deposition rate	A	5,5	kg/h	2,8	kg/h
welding duty cycle	ED	70	%	70	%
price of welding consumable	Zp	3	€/kg *)	1	€/kg *)
weld metal recovery	E	85	%	95	%
price of gas	Gp	0,006	€/l	0,006	€/l
gas volumetric flow rate	Gs	12	l/min	15	l/min
gas consumption = 60 x GS / Ax ED	Gv	187,01	L/kgSG	459,184	L/kgSG
gas costs = Gp x Gv	Gk	1,12	€/kgSG	2,76	€/kgSG
welding costs = Zp / E x 100	Zk	3,53	€/kgSG	1,05	€/kgSG
production costs = L / A x ED	Fk	10,39	€/kgSG	20,41	€/kgSG
	total costs = Fk + Zk + Gk	15,04	€/kgSG	24,22	€/kgSG
sheet thickness s [mm]	20,0	production costs per meter weld [€ / mSN]			
weld preparation angle α	50				
gap width b [mm]	3,0	required wire quantity [kg/mSN]			
root height h [mm]	1,0				
weld reinforcement [mm]	2	1,978	29,75	47,90	
cap pass (if necessary)	1,0	solid or metal powder flux-cored wire *		2,06	
depth t [mm]	1	rutile or basic flux-cored wire *		2,25	
width b2 [mm]		* for flux-cored wire with slag 86 % for solid and metal powder flux-cored wire 96 % recovery are considered			

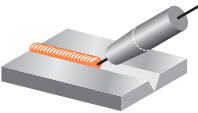
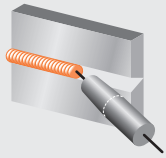
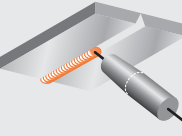
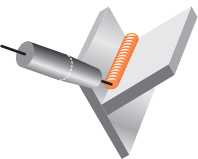
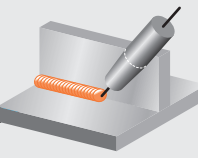
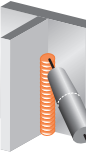
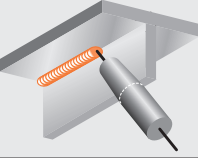


Remarks:

*) Price of welding consumable depending on supplied volume

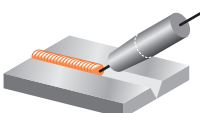
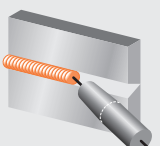
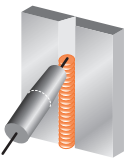
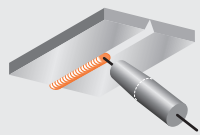
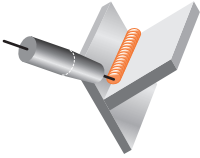
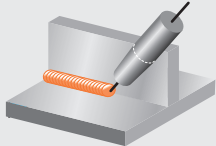
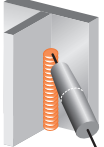
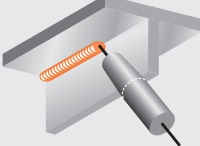
MEGAFIL® Welding parameters - Metal-cored wires

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		

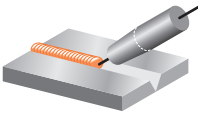
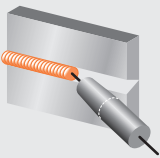
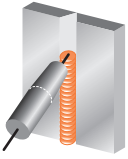
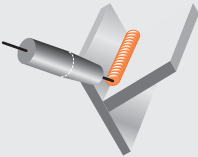
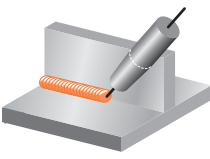
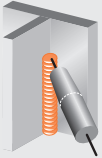
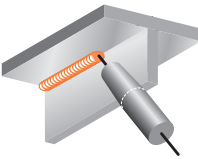
MEGAFIL® Welding parameters - Metal-cored wires

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		

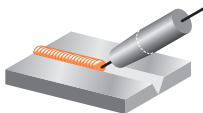
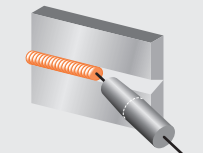
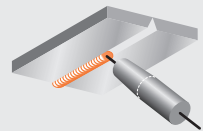
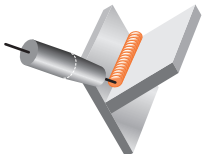
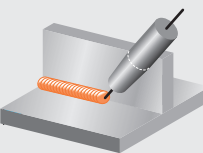
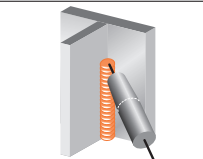
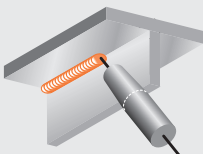
MEGAFIL® Welding parameters - Metal-cored wires

MEGAFIL® - Metal-cored wire - Ø 1.6 mm; Gas flow 12-18 l/min (25-38 cfh)

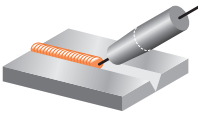
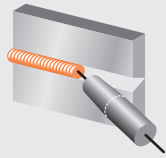
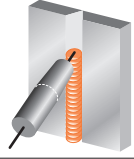
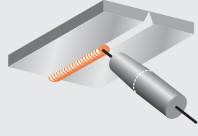
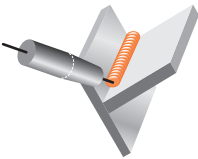
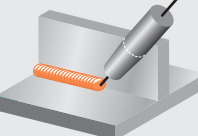
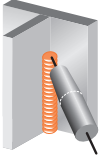
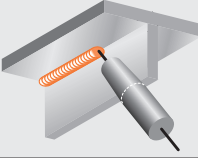
Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1 (Root)	100 ± 10	14.5 ± 1	1.1	4 (3)	
			2-n	250 ± 20	26 ± 1	3.5		
PC 2G			1 (Root)	100 ± 10	14.5 ± 1	1.1	3 (4)	
			2-n	220 ± 10	25 ± 1	2.9		
PF 3G			1 (Root)	100 ± 10	14.5 ± 1	1.1	4	
			2	120 ± 10	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 - Rutile flux-cored wires

MEGAFIL® - Rutile flux-cored wire - Ø 1.0 mm; Gas flow 12-18 l/min (25-38 cfh)

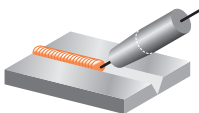
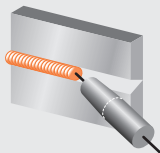
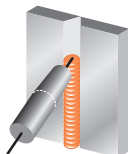
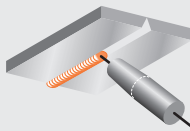
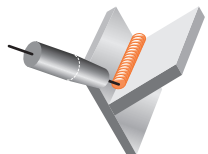
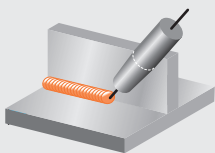
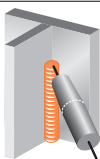
Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1	180 ± 10	23 ± 1	8.6	5	
			2-n	220 ± 20	26 ± 1	11.5		
PC 2G			1	160 ± 10	22 ± 1	7.1	4	
			2-n	220 ± 20	24 ± 1	11.5		
PF 3G		t < 12 mm	1	160 ± 10	22 ± 1	7.1	5	
			2-n	200 ± 20	25 ± 1	10.4		
		t > 12 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® - 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	5.4	6	
			2-n	250 ± 20	27 ± 1	9.6		
PC 2G			1	160 ± 10	22 ± 1	5	5	
			2-n	210 ± 20	24 ± 1	6.3		
PF 3G		t < 12 mm	1	160 ± 10	22 ± 1	5	5	
			2-n	200 ± 20	25 ± 1	6.1		
		t > 12 mm	1	180 ± 10	23 ± 1	5.4	6	
			2-n	240 ± 20	26 ± 1	9.3		
PE 4G			1	160 ± 10	22 ± 1	5	4	
			2-n	220 ± 10	25 ± 1	6.4		
PA 1F			1	260 ± 20	27 ± 2	10.5		
PB 2F	single layer	t < 12 mm		180 ± 20	24 ± 1	5.4		
		t > 12 mm	1	260 ± 20	27 ± 2	10.5		
	multi layer		1	260 ± 20	27 ± 2	10.5		
			2-n	240 ± 20	26 ± 2	9.3		
PF 3F	single layer	t < 12 mm		160 ± 10	22 ± 1	5		
		t > 12 mm	1	200 ± 20	23 ± 2	6.1		
	multi layer		1	160 ± 10	22 ± 1	5		
			2-n	230 ± 10	26 ± 1	8.5		
PD 4F	single layer	t < 12 mm		160 ± 10	22 ± 1	5		
		t > 12 mm	1	200 ± 20	24 ± 1	6.1		
	multi layer		1	160 ± 10	22 ± 1	5		
			2-n	200 ± 20	24 ± 1	6.1		

MEGAFIL® Welding parameters - Rutile flux-cored wires

MEGAFIL® - Rutile 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	180 ± 10	24 ± 1	2.7	5	
			2-n	250 ± 20	26 ± 1	4		
PC 2G			1	160 ± 10	22 ± 1	2.4	5	
			2-n	220 ± 10	24 ± 1	3.2		
PF 3G		t < 20 mm	1	160 ± 10	22 ± 1	2.4	5	
			2-n	220 ± 10	25 ± 1	3.2		
		t > 20 mm	1	180 ± 10	23 ± 1	2.7	5	
			2-n	240 ± 20	26 ± 1	3.8		
1F		t > 20 mm	1	300 ± 20	27 ± 2	5.3		
PB 2F	single layer	t < 20 mm		240 ± 20	26 ± 1	3.8		
		t > 20 mm	1	280 ± 20	27 ± 2	4.9		
	multi layer		1	260 ± 20	27 ± 1	4.2		
			2-n	240 ± 20	26 ± 2	3.8		
PF 3F	single layer	t < 20 mm		180 ± 10	22 ± 1	2.7		
		t > 20 mm	1	240 ± 20	24 ± 2	3.8		
	multi layer		1	160 ± 10	22 ± 1	2.4		
			2-n	220 ± 20	24 ± 1	3.2		
PD 4F	single layer	t < 20 mm		180 ± 10	22 ± 1	2.7		
		t > 20 mm	1	220 ± 20	25 ± 1	3.2		
	multi layer		1	160 ± 10	22 ± 1	2.4		
			2-n	200 ± 20	23 ± 1	3		

MEGAFIL® Welding parameters - Basic flux-cored wires



MEGAFIL® - Basic flux-cored wire - Ø 1.0 mm; Gas flow 12-18 l/min (25-38 cfh)

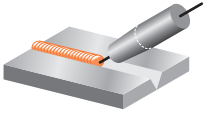
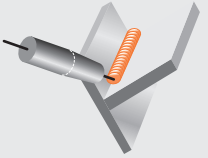
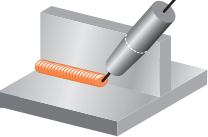
Position		Plate thickness	Layer	Amperage [A]	Voltage [V]	W.- Speed [m/ min]	Gap max (mm)	Symbol
PA 1G			1	200 ± 10	23 ± 1	11.5	4	
			2-n	220 ± 20	26 ± 1	13		
PC 2G			1	180 ± 10	23 ± 1	10.3	3	
			2-n	220 ± 20	25 ± 1	13		
PA 1F	single layer	> 10 mm	1	240 ± 20	26 ± 2	14.1		
	multi layer		2-n	220 ± 20	25 ± 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 - 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		

EN ISO 17632-A: Welding consumables

Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of non-alloy and fine grain steels

Example:

MEGAFIL 240 M

T 50 6 1Ni M M 1 H5

T - Tubular cored wire

Tensile properties (multi-run welds)

Symbol	Rel/Rp 0.2 min. MPa	Rm MPa	A min. %
35	355	440-570	22
38	380	470-600	20
42	420	500-640	20
46	460	530-680	20
50	500	560-720	18

Tensile properties (single-run welds)

Symbol	Rel/Rp 0.2 min. MPa	Rm MPa
3T	355	470
4T	420	520
5T	500	500

Impact properties

Symbol	Min. 47 J at °C
Z	No requirements
A	20
0	0
2	-20
3	-30
4	-40
5	-50
6	-60
7	-70
8	-80
9	-90
10	-100

Welding positions

Symbol	Positions
1	PA, PB, PC, PD, PE, PF & PG
2	PA, PB, PC, PD, PE & PF
3	PA & PB
4	PA
5	PA, PB & PG

Diffusible hydrogen in weld metal

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

All weld metal chemical composition (%) ^{1,2}

Symbol	C	Mn	Si	P	S	Cr	Ni	Mo	V	Nb	Al ²	Cu
No symbol	—	2.0	—	—	—	0.2	0.5	0.2	0.08	0.05	2.0	0.3
Mo	—	1.4	—	—	—	0.2	0.5	0.3-0.6	0.08	0.05	2.0	0.3
MnMo	—	1.4-2.0	—	—	—	0.2	0.5	0.3-0.6	0.08	0.05	2.0	0.3
1Ni	—	1.4	0.80	—	—	0.2	0.6-1.2	0.2	0.08	0.05	2.0	0.3
1.5Ni	—	1.6	—	—	—	0.2	1.2-1.8	0.2	0.08	0.05	2.0	0.3
2Ni	—	1.4	—	—	—	0.2	1.8-2.6	0.2	0.08	0.05	2.0	0.3
3Ni	—	1.4	—	—	—	0.2	2.6-3.8	0.2	0.08	0.05	2.0	0.3
Mn1Ni	—	1.4-2.0	—	—	—	0.2	0.6-1.2	0.2	0.08	0.05	2.0	0.3
1NiMo	—	1.4	—	—	—	0.2	0.6-1.2	0.3-0.6	0.08	0.05	2.0	0.3
Z	Any other agreed analysis											
¹	Single values are maximum											
²	Non-gas shielded electrodes only											

Type of filling

Symbol	Properties	Type of weld	Shielding gas
R	Rutile, slowly solidifying slag	Single- and multi-run	Required
P	Rutile, quickly solidifying slag	Single- and multi-run	Required
B	Basic	Single- and multi-run	Required
M	Metal-cored	Single- and multi-run	Required
V	Rutile or fluoride-basic	Single-run	Not required
W	Basic-fluoride, slowly solidifying slag	Single- and multi-run	Not required
Y	Basic-fluoride, quickly solidifying slag	Single- and multi-run	Not required
Z	Other types		

Type of filling

C	Shielding gas according EN ISO 14175 - C1 (100% CO ₂)
M	Shielding gas compositions according to EN ISO 14175 - M2

EN ISO 18276-A: Welding consumables

Tubular cored electrodes for gas shielded and non-gas shielded metal arc welding of high strength steels

Example:



T - Tubular cored wire

Tensile properties (multi-run welds)			
Symbol	Rel/Rp 0.2 min. MPa	Rm MPa	A min. %
55	550	640-820	18
62	620	700-890	18
69	690	770-940	17
62	790	880-1080	16
6	890	940-1180	15

Impact properties	
Symbol	Min. 47 J at °C
Z	No requirements
A	20
0	0
2	-20
3	-30
4	-40
5	-50
6	-60
7	-70
8	-80
9	-90
10	-100

Welding positions	
Symbol	Positions
1	PA, PB, PC, PD, PE, PF & PG
2	PA, PB, PC, PD, PE & PF
3	PA & PB
4	PA
5	PA, PB & PG

Diffusible hydrogen in weld metal	
Symbol	ml / 100 g weld metal, max.
H5	5
H10	10
H15	15

All weld metal chemical composition (%) ^{1,2}									
Symbol	C	Mn	Si	P	S	Ni	Cr	Mo	V
MnMo	0.03-0.10	1.4-2.0	0.90	0.020	0.020	0.3	0.2	0.3-0.6	0.05
Mn1Ni	0.03-0.10	1.4-2.0	0.90	0.020	0.020	0.6-1.2	0.2	0.2	0.05
Mn1.5Ni	0.03-0.10	1.1-1.8	0.90	0.020	0.020	1.3-1.8	0.2	0.2	0.05
Mn2.5Ni	0.03-0.10	1.1-2.0	0.90	0.020	0.020	2.1-3.0	0.2	0.2	0.05
1NiMo	0.03-0.10	1.4	0.90	0.020	0.020	0.6-1.2	0.2	0.3-0.6	0.05
1.5NiMo	0.03-0.10	1.4	0.90	0.020	0.020	1.2-1.8	0.2	0.3-0.7	0.05
2NiMo	0.03-0.10	1.4	0.90	0.020	0.020	1.8-2.6	0.2	0.3-0.7	0.05
Mn1NiMo	0.03-0.10	1.4-2.0	0.90	0.020	0.020	0.6-1.2	0.2	0.3-0.7	0.05
Mn2NiMo	0.03-0.10	1.4-2.0	0.90	0.020	0.020	1.8-2.6	0.2	0.3-0.7	0.05
Mn2NiCrMo	0.03-0.10	1.4-2.0	0.90	0.020	0.020	1.8-2.6	0.3-0.6	0.3-0.6	0.05
Mn2Ni1CrMo	0.03-0.10	1.4-2.0	0.90	0.020	0.020	1.8-2.6	0.6-1.0	0.3-0.6	0.05
Z	Any other agreed analysis								
¹	Single values are maximum								
²	Cu < 0.3 Nb < 0.05								

Type of filling	
Symbol	Properties
R	Rutile, slowly solidifying slag
P	Rutile, quickly solidifying slag
B	Basic
M	Metal-cored
Z	Other types

Shielding gas	
C	Shielding gas according EN ISO 14175 - C1 (100% CO ₂)
M	Shielding gas compositions according to EN ISO 14175 - M2

EN ISO 17634-A: Welding consumables

Tubular cored electrodes for gas shielded metal arc welding of creep resisting steels

Example:

MEGAFIL 236 M

T **CrMo1** **M** **M** **1** **H5**

T - Tubular cored wire

Welding positions

Symbol	Positions
1	PA, PB, PC, PD, PE, PF & PG
2	PA, PB, PC, PD, PE & PF
3	PA & PB
4	PA
5	PA, PB & PG

Diffusible hydrogen in weld metal

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

All weld metal chemical composition (extract) ^{1,2}

Symbol	C	Mn	Si	P	S	Ni	Cr	Mo	V
Mo	0.07-0.12	0.60-1.30	0.80	0.020	0.020	0.3	0.2	0.40-0.65	0.03
MoL	0.07	0.60-1.70	0.80	0.020	0.020	0.3	0.2	0.40-0.65	0.03
MoV	0.07-0.12	0.40-1.00	0.80	0.020	0.020	0.3	0.30-0.60	0.50-0.80	0.25-0.45
CrMo1	0.05-0.12	0.40-1.30	0.80	0.020	0.020	0.3	0.90-1.40	0.40-0.65	0.03
CrMo1L	0.05	0.40-1.30	0.80	0.020	0.020	0.3	0.90-1.40	0.40-0.65	0.03
CrMo2	0.05-0.12	0.40-1.30	0.80	0.020	0.020	0.3	2.00-2.50	0.90-1.30	0.03
CrMo2L	0.05	0.40-1.30	0.80	0.020	0.020	0.3	2.00-2.50	0.90-1.30	0.03
CrMo5	0.03-0.12	0.40-1.30	0.80	0.020	0.025	0.3	4.0-6.0	0.40-0.70	0.03
MoL	0.07	0.60-1.70	0.80	0.020	0.020	0.3	0.2	0.40-0.65	0.03
CrMo1L	0.05	0.40-1.30	0.80	0.020	0.020	0.3	0.90-1.40	0.40-0.65	0.03

Z Any other agreed composition

¹ Single values are maximum

² Cu < 0.3 Nb < 0.1

All weld metal mechanical properties

Symbol	Rp 0.2 min.	Rm min.	A Min.	CVN impact toughness at +20° C		Heat treatment,	PWHT,	
	(MPa)	(MPa)	(%)	Av. 3 min.	Single value min.	all weld metal	all weld metal	Time
				J	J	°C	°C	min.
Mo	255	510	22	47	38	<200	570-620	60
MoL	355	510	22	47	38	<200	570-620	60
MoV	355	510	18	47	38	200-300	690-730	60
CrMo1	355	510	20	47	38	150-250	660-700	60
CrMo1L	355	510	20	47	38	150-250	660-700	60
CrMo2	400	500	18	47	38	200-300	690-750	60
CrMo2L	400	500	18	47	38	200-300	690-750	60
CrMo5	400	590	17	47	38	200-300	730-780	60

Z As agreed between buyer and manufacturer

Type of filling

Symbol	Properties
R	Rutile, slowly solidifying slag
P	Rutile, quickly solidifying slag
B	Basic
M	Metal-cored
Z	Other types

Shielding gas

C	Shielding gas according EN ISO 14175 - C1 (100% CO ₂)
M	Shielding gas compositions according to EN ISO 14175 - M2

AWS A5.18: Welding consumables

Specification for carbon steel electrodes and rods for gas shielded arc welding (extract for metal-cored wires)

Example:



Designates use as either an electrode or rod (ER) or use only as an electrode (E)

Indicates whether the filler metal is solid (S) or composite (C)

Shielding gas

C	CO ₂
M	75-80% Ar/Balance CO₂

Diffusible hydrogen in weld metal

Symbol	ml / 100 g weld metal, max.
H16	16
H8	8
H4	4

Chemical composition requirements for weld metal from composite electrodes, as welded, as welded (%)¹

Multiple pass	Shielding gas	C	Mn	Si	S	P	Ni ²	Cr ²	Mo ²	V ²	Cu
E70C-3X	75-80% Ar/Balance CO ₂ or CO ₂	0.12	1.75	0.90	0.03	0.03	0.50	0.20	0.30	0.08	0.50
E70C-6X	75-80% Ar/Balance CO₂ or CO₂	0.12	1.75	0.90	0.03	0.03	0.50	0.20	0.30	0.08	0.50
E70C-G(X)	³	Not specified ⁴									
Single pass											
E70C-GS(X)	³	Not specified									

¹ Single values are maximum

² Sum of Ni, Cr, Mo + V shall not exceed 0.50%

³ Shielding gas agreed between purchaser and supplier, unless designated by the C or M suffix

⁴ Composition as agreed between purchaser and supplier

Tension test requirements, as welded

	Shielding gas	Tensile strength (min.)		Yield strength (min)		Elongation (min)
		psi	MPa	psi	MPa	%
E70C-3X	75-80% Ar/Balance CO ₂ or CO ₂	70000	480	58000	400	22
E70C-6X	75-80% Ar/Balance CO₂ or CO₂	70000	480	58000	400	22
E70C-G(X)	As agreed	70000	480	58000	400	22
E70C-GS(X)	As agreed	70000	480	Not specified		

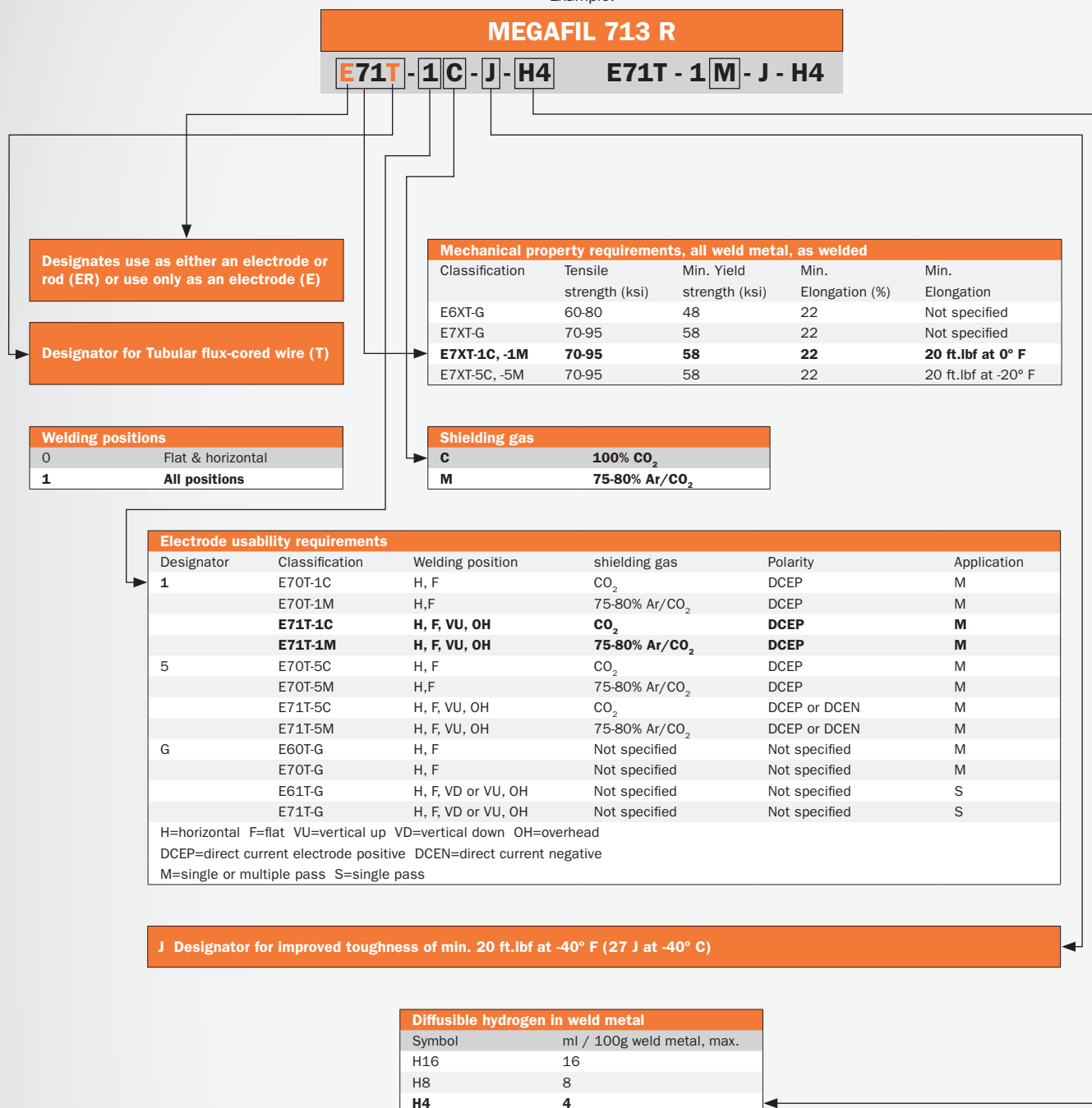
AWS classification Impact test requirements, as welded

E70C-3X	20 ft.lbf at 0° F	27 J at -20° C
E70C-6X	20 ft.lbf at -20° F	27 J at -30° C
E70C-G(X)	As agreed between supplier and purchaser	
E70C-GS(X)	Not required	

AWS A5.20: Welding consumables

Specification for carbon steel electrodes for flux-cored arc welding (extract)

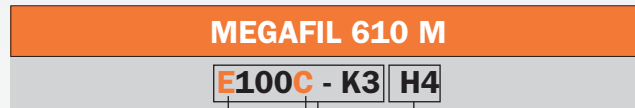
Example:



AWS A5.28: Welding consumables

Specification for low-alloy steel electrodes and rods for gas shielded arc welding (extract for metal-cored wires)

Example:



Designates use as either an electrode or rod (ER) or use only as an electrode (E)

Indicates whether the filler metal is solid (S) or metal-cored (C)

Chemical composition requirements for weld metal from composite electrodes, all weld metal, as welded ¹														
Classification	C	Mn	Si	P	S	Ni	Cr	Mo	V	Ti	Zr	Al	Cu	Others total
Chromium molybdenum weld metal														
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
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-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
Nickel steel electrodes and rods														
E80C-Ni1	0.12	1.50	0.90	0.025	0.030	0.80-1.10	-	0.30	0.03	-	-	-	0.35	0.50
E70C-Ni2	0.08	1.25	0.90	0.025	0.030	1.75-2.75	-	-	0.03	-	-	-	0.35	0.50
E80C-Ni2	0.12	1.50	0.90	0.025	0.030	1.75-2.75	-	-	0.03	-	-	-	0.35	0.50
E80C-Ni3	0.12	1.50	0.90	0.025	0.030	2.75-3.75	-	-	0.03	-	-	-	0.35	0.50
Other low-alloy steel electrodes and rods														
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													
1	Single values are maximum													

Tension test requirements, all weld metal						
Classification	Shielding gas	Tensile strength (min.)		Yield strength (min.)		Elongation
		MPa	MPa	psi	MPa	%
E80C-B2		80000	550	68000	470	19
E90C-B3		90000	620	78000	540	17
E80C-B6		80000	550	68000	470	17
E80C-Ni1	Ar/1-5%O ₂	80000	550	68000	470	24
E70C-Ni2	Ar/1-5%O ₂	70000	490	58000	400	24
E80C-Ni2	Ar/1-5%O ₂	80000	550	68000	470	24
E90C-K3	Ar/5-25%O ₂	90000	620	78000	540	18
E100C-K3	Ar/5-25%O₂	100000	690	88000	610	16
E110C-K3	Ar/5-25%O ₂	110000	760	98000	680	15
E110C-K4	Ar/5-25%O ₂	110000	760	98000	680	15
E120C-K4	Ar/5-25%O ₂	120000	830	108000	750	15
E80C-W2	Ar/5-25%O ₂	80000	550	68000	470	22

Diffusible hydrogen in weld metal	
Symbol	ml / 100 g weld metal, max.
H16	16
H8	8
H4	4

AWS A5.29: Welding consumables

Specification for low alloy steel electrodes for flux cored arc welding (extract)

Example:

MEGAFIL 742 B

E110T5 - K4 M H4

Designates use as either an electrode or rod (ER) or use only as an electrode (E)

Designator for Tubular flux-cored wire (T)

Welding positions

0	Flat & horizontal
1	All positions

Shielding gas

C	100% CO ₂
M	75-80% Ar/CO ₂

Mechanical property requirements, all weld metal, as welded

Classification	Condition	Tensile strength (ksi)	Min. Yield strength (ksi)	Min. Elongation (%)	Min. CVN impact energy
E8XT1-A1C, -A1M	PWHT	80-100	68	19	Not specified
E8XT1-B2C, -B2M	PWHT	80-100	68	19	Not specified
E8XT5-B2C, -B2M	PWHT	80-100	68	19	Not specified
E9XT5-B3C, -B3M	PWHT	90-110	78	17	Not specified
E9XT1-K2C, -K2M	AW	90-110	78	17	20 ft.lbf at 0°F
E9XT5-K2C, -K2M	AW	90-110	78	17	20 ft.lbf at -60°F
E10XT1-K3C, -K3M	AW	100-120	88	16	20 ft.lbf at 0°F
E11XT1-K3C, -K3M	AW	110-130	98	15	20 ft.lbf at 0°F
E11XT5-K4C, -K4M	AW	110-130	98	15	20 ft.lbf at -60°F
E12XT5-K4C, -K4M	AW	120-140	108	14	20 ft.lbf at -60°F
EXXTX-G, -GC, -GM	Chemical composition, test condition and mechanical properties as agreed between supplier and purchaser.				

Electrode usability requirements

Designator	Classification	Welding position	shielding gas	Polarity	Application
1	EX0T1-XC	H, F	CO ₂	DCEP	M
	EX0T1-XM	H, F	75-80% Ar/CO ₂	DCEP	M
	EX1T1-XC	H, F, VU, OH	CO ₂	DCEP	M
	EX1T1-XM	H, F, VU, OH	75-80% Ar/CO ₂	DCEP	M
5	EX0T5-XC	H, F	CO ₂	DCEP	M
	EX0T5-XM	H, F	75-80% Ar/CO ₂	DCEP	M
	EX1T5-XC	H, F, VU, OH	CO ₂	DCEP or DCEN	M
	EX1T5-XM	H, F, VU, OH	75-80% Ar/CO ₂	DCEP	M
G	EX0TX-G	H, F	None	g	M
	EX0TX-GC	H, F	CO ₂	g	M
	EX0TX-GM	H, F	75-80% Ar/CO ₂	g	M

H=horizontal F=flat VU=vertical up VD=vertical down OH=overhead

DCEP=direct current electrode positive DCEN=direct current negative

M=single or multiple pass S=single pass

Diffusible hydrogen in weld metal

Symbol	ml / 100 g weld metal, max.
H16	16
H8	8
H4	4

Approval Certificates

A collage of various certificates and documents related to welding quality assurance. The documents include:

- Zertifikat** (Certificate) from ITW Welding GmbH, Spechtal 1a, 67317 Altleiningen, Germany. Certificate No. WF 1370002 HH. It states: "Hiermit wird bescheinigt, daß die Firma ITW Welding GmbH Spechtal 1a 67317 Altleiningen".
- WELDING CONSUMABLE CERTIFICATE** from ABS. Certificate No. HN200024-BX. Port of Haan/Germany. Date: 15.11.2013. It certifies that the undersigned surveyor to this bureau did, at the request of ITW WELDING GMBH, attend (the) plant at 67317 Altleiningen / Germany, on the 20th day of February, 2013 and on subsequent dates, in order to carry out a plant survey of facilities and associated quality assurance and quality control procedures and to witness and report on the annual approval testing of welding consumables; and, THAT THE FACILITY IS CONSIDERED CAPABLE OF PROVIDING AN ACCEPTABLE UNIFORM PRODUCT, AND THAT EACH WELDING CONSUMABLE LISTED BELOW WAS FOUND IN COMPLIANCE WITH THE SPECIFICATION INDICATED AND IS ELIGIBLE TO BE PLACED ON THIS BUREAU'S APPROVED WELDING CONSUMABLES LIST IN THE WIRE-GAS SECTION.
- Vordruck-Kennblatt für Schweißzusätze** (Welding Consumables Data Sheet) from TÜV. Certificate No. MNDE/MD00-04/1000/2013/JSN. It lists ITW WELDING GMBH, Spechtal 1a D-67317 Altleiningen, Germany. The document includes technical specifications for welding consumables, such as "Die weitere Gültigkeit wird in der jeweils letzten Ausgabe der CD-ROM TÜV-eignungsgeprüfte Schweißzusätze bescheinigt."
- CERTIFICATE OF QUALITY ASSURANCE SYSTEM APPROVAL** from ABS. Certificate Number 09-MMPQA-575. Port Office ABS MATERIALS HOUSTON. It states: "This is to certify that a representative of ABS did, at the request of ITW Welding GmbH, Altleiningen, Germany attend its facilities as indicated in the ABS Haan port office survey report number HN1695663 dated 01 July 2009, in order to carry out an audit of the quality system procedures and that the system is considered in compliance with the ABS Quality Assurance Program. This Certificate covers ABS Approved Welding Consumables and is valid subject to adherence to relevant ABS Rules and survey requirements and annual facility quality audits by an ABS representative."

The documents also include various logos, signatures, and technical details related to welding consumables and quality assurance.



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