

INDUSTRY LEADING



OUTERSHIELD[®]
FLUX AND METAL CORED WIRES

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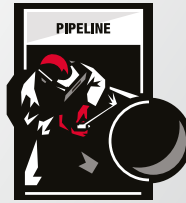
LINCOLN[®]
ELECTRIC

OUTERSHIELD®

Quality welds start with quality welding consumables. Industries such as steel construction, pipeline, onshore and offshore wind, shipbuilding, oil and gas offshore and automotive have long relied on gas-shielded OUTERSHIELD® flux and metal cored wires. Their steel fabrication needs often require a process that allows for robust mechanical properties, excellent repetitive welds, and high deposition rates both when down-hand and out-of-position welding is a necessity.

The OUTERSHIELD® industry leading cored wire family of products is a demonstration of the Lincoln Electric commitment to quality and innovation. Establishing a name for itself in the welding industry, Outershield® flux and metal cored wires offer proven consistency, demonstrated performance, and a solution for any job requirements. Outershield® wires also allow for reduced welding costs, high deposition rates, superb arc and exceptional puddle control in out-of-position (flux cored) and down-hand (metal cored) welding.

FLUX & METAL CORED WIRES



METAL CORED [138]

- Reduced welding cost in downhand positions due to increased productivity, current density, superior quality of welds, tolerance of surface contamination, and easier welding combined with reduced welder training time
- Positional and root passing capability with short and pulsed arc
- Perfect for robotic and mechanised applications, regular slag free welds
- The latest grades offer reduced welders' exposure to welding fumes

OUTERSHIELD® is an ISO 9001 and ISO 14001 certified, welder friendly group of welding consumables producing a high weld quality with minimal lack of fusion or porosity risk.



The cored wires generate savings as a result of reduced total production costs driven by high productivity due to:

- optimised fill ratio that drives current density to increase deposition rate
- slag support when welding vertical up with flux cored wires allows higher wire feed speeds
- core components of flux cored wires secure slag coverage that leads to smooth weld bead surface
- low spatter and high electrode efficiency
- best in class arc direction and easy visible arc column help to position the arc precisely to deliver best in class quality level and weldability
- perfect wire feeding increases duty cycle

FLUX CORED RUTILE [136]

- Reduced welding cost in positional welding due to high current density, weld quality, tolerance of surface contamination, and easier welding combined with reduced welder training time
- The best solution for vertical up, slag supports the welding pool
- Root passing with the ceramic backing
- Suitable for robotic and mechanised applications, regular welds and self peeling slag

FLUX CORED BASIC [136]

- Superior mechanical properties due to basic slag system
- Root passing with or without ceramic backing
- All positional welding capability
- Slag support when welding vertical up



Products overview

Product name	Classifications	Recommended Shielding Gas	General Description
Flux Cored wires for welding of mild steels with Re 275MPa – 460Mpa			
OUTERSHIELD® 71T1	E71T1-C-H8 T 42 2 P C 2 H10	100% CO ₂	Outershield® 71T1 is a rutile gas shielded flux cored wire designed and qualified for CO ₂ . The wire produces regular welds and delivers very good bead wetting action. Very good performance in out of position welding.
OUTERSHIELD® 71E-H	E71T1-M-JH4, E71T1-C-H4 T 46 3 P M 1 H5, T 42 0 P C 1 H5	Ar+ 15-25% CO ₂ or CO ₂	Outershield® 71E-H, the all position gas shielded flux cored wire for high quality welding. Excellent operator appeal due to superior welding characteristics. Smooth arc transfer, low spatter and good bead appearance make the wire a top quality electrode. Excellent wire feeding, out of position capability with higher deposition rates. Designed for use with Ar+15-25%CO ₂ shielding gases and suitable for use with 100%CO ₂ (impact at 0°C).
OUTERSHIELD® 71M-H	E71T-1/9C-H4, E71T-1/9M-H4 T 46 3 P C 1 H5, T 46 2 P M 2 H5	CO ₂ and Ar+ 15-25% CO ₂	Outershield® 71M-H is a rutile gas shielded flux cored wire for high deposition and quality welding, excellent feedability and arc performance. Best in class operator appeal due to superior welding characteristics and premium slag system. Specially developed for welding with 100% CO ₂ and optimised for Ar+ 15-25% CO ₂ gases. Provides a smooth arc with low spatter.
OUTERSHIELD® MC710	T 46 3 M M 2 H10 E70C6 -M-H8	Ar+ 15-25% CO ₂	Outershield® MC710 is the general purpose metal cored wire with reliable feedability, stable arc and regular metal transfer.
OUTERSHIELD® MC710-H	E70C6-M-H4 T 46 3 M M 2 H5	Ar+ 15-25% CO ₂	The industry leading metal cored Outershield® MC710-H is high efficiency metal cored wire for welding with M21 gas. Excellent arc characteristics provide outstanding operator appeal. Regular welds with very little silicates, superior product consistency with optimal alloy control. Reduced welder training time and total welding cost, high quality of welds, high resistance against surface contamination.
OUTERSHIELD® MC710RF-H	E70C6-M-H4 T 46 3 M M 2 H5	Ar+ 15-25% CO ₂	Outershield® MC710RF-H is best in class metal cored wire with Reduced Welding Fumes for welding with M21 gas. Very good arc characteristics provide outstanding operator appeal. Regular welds with very reduced mass of silicates and very stable work with pulse modes make it the best solution for robotic applications.
High Strength Steels, impact requirements between -40°C and -60°C			
OUTERSHIELD® MC715-H	E70C6-M-H4 T 46 4 M M 2 H5	Ar+ 15-25% CO ₂	The industry leading metal cored Outershield® MC715-H is high efficiency metal cored wire for welding with M21 gas and meets impact requirements at -40°C. Excellent arc characteristics provide outstanding operator appeal. Regular welds with very little silicates, superior product consistency with optimal alloy control. Reduced welder training time and total welding cost, high quality of welds, high resistance against surface contamination.
OUTERSHIELD® MC80D2-H	E80T15-M21G2-G T 55 3 T15 0 M21 G	Ar+ 15-25% CO ₂	0.5% Mo alloyed metal cored wire for M21 shielding gas is designed for heavy fabrication. Excellent arc characteristics for outstanding operator appeal. Applicable for base materials with higher strength, good impact properties (CVN >47J) at -30°C).
OUTERSHIELD® MC420N-H Wind Towers Only	E70C-GM H4 T 38 Z Z M M2 H5	Ar+ 15-25% CO ₂	All position high efficiency mix gas shielded metal cored wire designed to withstand normalizing post weld heat treatment. Mechanical properties after normalising meet base material requirements, to be used in normalised condition.
OUTERSHIELD® T55-H	E71T-5M/C- JH4 T 42 4 B M/C 2 H5	Ar+ 15-25% CO ₂ and CO ₂	Outershield® T55-H is all position gas shielded basic flux cored wire. Good weldability, also vertical up. Root passing without ceramic backing. Superior product consistency with optimal alloy control. Excellent wire feeding.

Product name	Classifications	Recommended Shielding Gas	General Description
OUTERSHIELD® 71MS-H	E71T-1/9C-JH4 T 46 4 P C 2 H5	CO ₂	0.4% Ni alloyed rutile gas shielded flux cored wire for high deposition quality welding. Excellent operator appeal due to superior welding characteristics. Perfect root pass welding on ceramic backing. Outstanding mechanical properties [CVN > 47] at -40°C). Increased current capacity, especially in out of position welding.
OUTERSHIELD® MC715Ni-H	E80C-Ni1M H4 T 46 5 1Ni M M 2 H5	Ar+ 15-25% CO ₂	Outershield® MC715Ni-H is a gas shielded 1%Ni alloyed metal cored wire for offshore and similar applications. Excellent arc characteristics give outstanding operator appeal. Virtually no spatter, high travel speed and excellent wire feeding. Excellent mechanical properties [CVN >47] at -50°C). Optimal alloy control, Ni content is controlled to meet "sour service" oilfield requirements such as NACE MR0175.
OUTERSHIELD® 81Ni1-H	E81T1-Ni1M-J T 50 5 1Ni P M 2 H5	Ar+ 15-25% CO ₂	Outershield® 81Ni1-H is the industry leading, all position gas shielded 1% Ni rutile flux cored wire for offshore, structural and similar applications. Outstanding operator appeal combined with superior weldability. Low spatter, good bead appearance, exceptional mechanical properties [CVN >47] at -50°C). Superior product consistency with optimal alloy control, meets NACE MR-0175 requirements.
OUTERSHIELD® 81Ni1-HSR	E81T1-Ni1M-J T 50 5 1Ni P M 2 H5 T	Ar+ 15-25% CO ₂	Industry leading, all position gas shielded 1% Ni rutile flux cored wire for offshore, structural and similar applications. Specifically designed for stress relieved applications, guaranteed impact properties after PWHT. Outstanding operator appeal combined with superior weldability. Low spatter, good bead appearance, exceptional mechanical properties [CVN >47] at -50°C). Superior product consistency with optimal alloy control, meets NACE MR-0175 requirements.
OUTERSHIELD® 81K2-H	E81T1-K2M-J T 50 6 1.5Ni P M 2 H5	Ar+ 15-25% CO ₂	Outershield® 81K2-H is an all position gas shielded 1.5% Ni, Ti and B alloyed flux cored wire. Typically used in offshore and similar applications, where outstanding mechanical properties combined with perfect weldability deliver exceptional productivity and quality of welds. Superior weldability, low spatter, good bead appearance. Outstanding operator appeal, excellent wire feeding. Exceptional mechanical properties [CVN >80J] at -60°C). Superior product consistency with optimal alloy control.
OUTERSHIELD® 81K2-HSR	E81T1-K2M-J T 50 6 1.5Ni P M 2 H5 T	Ar+ 15-25% CO ₂	The all position, gas shielded 1.5% Ni, Ti and B alloyed flux cored wire for PWHT applications. Specifically designed for stress relieved applications, guaranteed impact properties after PWHT. Typically used in offshore and similar applications where outstanding mechanical properties, combined with perfect weldability, deliver exceptional productivity and quality of welds. Superior weldability, low spatter, good bead appearance. Outstanding operator appeal, excellent wire feeding. Exceptional mechanical properties [CVN >80J] at -60°C). Superior product consistency with optimal alloy control.
OUTERSHIELD® 91Ni1-HSR	E91T1-GM T 55 4 1NiMo P M 2 H5	Ar+ 15-25% CO ₂	Outershield® 91Ni1-HSR is an all position, gas shielded 1% Ni and 0.4% Mo alloyed flux cored wire for offshore, pipeline and similar applications. Specifically designed for stress relieved applications, guaranteed impact properties after PWHT. Superior weldability, low spatter, good bead appearance and outstanding operator appeal. Superior product consistency with optimal alloy control and excellent wire feeding. Specifically designed to withstand high heat input procedures and meets NACE MR-0175 requirements.
OUTERSHIELD® 91NiK2-HSR	E91T1-GM-H4 T 55 4 1.5NiMo P M 2 H5	Ar+ 15-25% CO ₂	Outershield® 91K2-HSR is an all position gas shielded 1.5% Ni and 0.4% Mo, alloyed flux cored wire for pipeline, offshore and structural applications. Specifically designed for stress relieved applications, guaranteed impact properties after PWHT. The wire withstands higher heat input procedures that are typical for mechanised welding of cross country pipelines. Superior weldability, low spatter, good bead appearance and outstanding operator appeal. Exceptional mechanical properties are combined with arc characteristics to produce sound and regular welds. Self releasing slag and regular bead profile after welding in 3Gup position reduce cleaning time and increase productivity.

Product name	Classifications	Recommended Shielding Gas	General Description
Ultra High Strength Steels			
OUTERSHIELD® 101Ni-HSR	E101T1-G H4	Ar+ 15-25% CO ₂	Outershield® 101Ni-HSR is a rutile micro alloyed flux-cored wire for welding in all positions, applicable for welding of specific high carbon containing low alloy, high strength steels such as SAE 4130. Meets NACE MR-0175 requirements. Specifically designed for stress relieved applications. Outstanding operator appeal, excellent mechanical properties (CVN >50J at -40°C) and wire feeding. Superior product consistency with optimal alloy control.
OUTERSHIELD® 690-H	E111T1-K3M JH4 T 69 4 Z P M 2 H5	Ar+ 15-25% CO ₂	Outershield® 690-H is an all position, gas shielded rutile flux cored wire, for high strength steel grades like grade S690. Outstanding operator appeal, easy to weld with. Excellent mechanical properties, CVN >69J at -40°C for 1.2mm diameter. Superior product consistency with optimal alloy control. Very good wire feeding.
OUTERSHIELD® 690-HSR	E111T1-K3M J T 69 4 Z P M 2 H5 T	Ar+ 15-25% CO ₂	Outershield® 690-HSR is an all position, gas shielded rutile flux cored wire for high strength steel grades like grade S690 and is specifically designed for stress relieved applications. Superior product consistency with optimal alloy control. Very good wire feeding.
Pipeline			
PIPELINER® G60M-E	E71T1/9-M-J T 46 4 P M1 H5	Ar+ 15-25% CO ₂	Flux cored wire for mechanised and semi-automatic welding with increased deposition rate (kg/h). Perfect bead profile for fill and cap passes. Easy to remove, reduces cleaning time and improves operating factors. A concentrated and deeply penetrating arc helps to achieve optimal quality of welds. Focused and clearly visible arc column offers easier welding and reduces operator training time. Stable mechanical properties over a wide range of heat input, CVN > 47J at -40°C. Very low hydrogen (HDM <4 ml/100g) and long term resistance against moisture pick-up in vacuum sealed packaging.
PIPELINER® G70M-E	E81T1-GM-H4 T 50 5 Z P M 2 H5	Ar+ 15-25% CO ₂	Flux cored wire for mechanised and semi-automatic welding with increased deposition rate (kg/h). Perfect bead profile for fill and cap passes, easy to remove reducing cleaning time and improves operating factors. The concentrated and deeply penetrating arc helps to achieve optimal quality of welds. Focused and clearly visible arc column offers easier welding and reduces operator training time. Stable mechanical properties over a wide range of heat input, CVN > 47J at -50°C. Very low hydrogen (HDM <4 ml/100g) and long term resistance against moisture pick-up in vacuum sealed packaging.
PIPELINER® G80M-E	E91T1-GM-H4 T 55 4 Z P M 2 H5	Ar+ 15-25% CO ₂	Flux E91 cored wire for mechanised and semi-automatic welding with increased deposition rate (kg/h). Perfect bead profile for fill and cap passes, easy to remove reducing cleaning time and improves operating factors. The concentrated and deeply penetrating arc helps to achieve optimal quality of welds. Focused and clearly visible arc column offers easier welding and reduces operator training time. Stable mechanical properties over a wide range of heat input, CVN > 47J at -50°C. Very low hydrogen (HDM <4 ml/100g) and long term resistance against moisture pick-up in vacuum sealed packaging.

Product name	Classifications	Recommended Shielding Gas	General Description
Weathering Steels			
OUTERSHIELD® 500CT-H	E81T1-GM T 50 5 Z P M 2 H5	Ar+ 15-25% CO ₂	All position gas shielded 0.8% Ni and 0.4% Cu flux cored wire, for welding weather resistant steel (CorTen). Superior weldability, low spatter, good bead appearance, outstanding operator appeal. Exceptional mechanical properties (CVN >47) at -50°C). Superior product consistency with optimal alloy control. Excellent wire feeding. For welding applications with higher surface temperatures (i.e chimneys), Outershield 555CT-H is recommended.
OUTERSHIELD® 555CT-H	E81T1-W2M-J T555T1-1MA-NCC1-UH5	Ar+ 15-25% CO ₂	All position gas shielded 0.6% Ni, 0,5 Cr and 0.5% Cu alloyed flux cored wire, for welding weather resistant steel (CorTen). Superior weldability, low spatter, good bead appearance. Outstanding operator appeal. Exceptional mechanical properties (CVN >47) at -50°C). Superior product consistency with optimal alloy control. Excellent wire feeding.
OUTERSHIELD® MC555CT-H	E80C-W2 H4 T554T15-0MA-NCC1-UH5	Ar+ 15-25% CO ₂	Gas shielded 0,5%Ni-0,5%Cu-0,5%Cr alloyed metal cored wire for welding weather resistant (CorTen) steel grade. Excellent arc characteristics provide outstanding operator appeal. Virtually no spatter, high travel speed and excellent wire feeding. Excellent mechanical properties (CVN >47) at -40°C). Superior product consistency with optimal alloy control.
Cr-Mo Steels			
OUTERSHIELD® 12-H	E81T1-A1M T MoL P M 2 H5	Ar+ 15-25% CO ₂	All position mix gas shielded 0.5% Mo-alloyed rutile cored wire. Superior weldability, low spatter, good bead appearance. Outstanding operator appeal. Superior product consistency with optimal alloy control. Excellent wire feeding.
OUTERSHIELD® 19-H	E81T1-B2M T CrMo1 P M 2 H5	Ar+ 15-25% CO ₂	All position mix gas shielded 1.25% Cr 0.5% Mo-alloyed rutile cored wire. Superior weldability, low spatter, good bead appearance. Outstanding operator appeal. Superior product consistency with optimal alloy control. Excellent wire feeding.
OUTERSHIELD® 20-H	E91T1-B3M T CrMo2 P M 2 H5	Ar+ 15-25% CO ₂	All position mix gas shielded 2.25% Cr 1% Mo-alloyed rutile cored wire. Superior weldability, low spatter, good bead appearance. Outstanding operator appeal. Superior product consistency with optimal alloy control. Excellent wire feeding.

Products characteristic

Base metal, Re in MPa	Impact Testing Temperature in °C				
	-20°C	-30°C	-40°C	-50°C	-60°C
420/355	Outershield 71T1 Outershield 71E-H Outershield 71M-H Outershield MC460VD-H	Outershield 71E-H Outershield 71M-H Outershield MC710-H Outershield MC7100RF-H	Outershield 71MS-H Outershield MC715-H Outershield 81Ni1-H	Outershield MC715Ni1-H Outershield 81Ni1-H	Outershield 81K2-H
460	Outershield 71E-H Outershield 71M-H	Outershield 71E-H Outershield 71M-H Outershield MC710-H Outershield MC7100RF-H	Outershield 71MS-H Outershield MC715-H Outershield 81Ni1-H	Outershield MC715Ni1-H Outershield 81Ni1-H	Outershield 81K2-H
500	Outershield 81Ni1-H				Outershield 81K2-H
550	Outershield 91Ni1-H/Outershield 91K2-HSR				
620	Outershield 101Ni1-HSR				
690	Outershield 690-H/Outershield 690-HSR				
Weathering Steels					
355-460	Outershield MC555CT-H			Outershield 555CT-H	
500	Outershield 500CT-H				
Pipeliners					
X65	Pipeliners G60M-E/Pipeliners G70M-E			Pipeliners G70M-E	
X70	Pipeliners G80M-E				
X70/X80	Pipeliners G80M-E/Outershield 91K2-HSR				

CUSTOMER ASSISTANCE POLICY

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