



Star International
Worldwide marine and offshore services

Welding electrodes

A range of electrodes for use on-board ship and offshore installations.

Mild and low alloyed steel

STAR GP-6013

General purpose rutile electrode for welding of mild and low alloyed steel on-board. Strikes and re-strikes easily and is less effected by the rust and paint on steel surface to be welded. The re-striking ability makes it ideal for tack welding. The STAR GP-6013 can be used in all positions including vertical down and is therefore highly suitable for use in confined spaces. The electrode can also be used to bridge large gaps where plate or pipe assembly have poor fit up.

Applications range from tack welding of plate and pipes to complete welding jobs on light or heavy mild steel sections.

Classification: AWS A5.1.E6013
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610000	2.5	4	70 - 100
00610001	3.2	4	90 - 130
00610002	4.0	4	130 - 180

STAR GP-7024

High recovery mild steel rutile electrode with recovery rate of 170 - 180% for welding in the flat and horizontal-vertical position. Designed specifically for mild steel, heavy fabrication welding where there is a need for large volume deposits to be laid using single or multi-pass techniques.

This is an easy-to-use electrode employing conventional to touch welding (contact with the base material) techniques. The STAR GP-7024, with its high welding speed and high deposition rate becomes specifically useful when there is a need for large steel replacements on-board or when doing sea fastening on-board heavy lifters.

Classification: AWS A5.1.E7024
Type of current: AC, DC +/-

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00611000	2.5	4	140 - 175
00611001	3.2	4	200 - 230
00611002	4.0	4	230 - 280

STAR LH-7018

High quality, superior all positional, low hydrogen, basic coated electrode that provides 120% metal recovery. For welding of unalloyed, low alloyed and yield point controlled steel, normally used in deck plates, hull plates and frames on-board. The extruded, moisture resistant electrode coating prevents moisture absorption during storage, thereby achieving low hydrogen levels and crack resistant welds. Welds are of smooth appearance, ductile and of high radiographic quality.

LH-7018 electrodes are particularly suitable for welding heavy sections, subject to high levels of resistance and for welding problem steels with high sulphur content. Recommended for unalloyed C: Mn ferritic steels with high sub-zero toughness requirements, EG: Charpy values down to -60°C. CTOD values at -10°C. Used to best advantage for welding thick sections either on-board ship or in fabrication shops.

Classification: AWS A5.1.E7018
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610003	2.5	4	70 - 100
00610004	3.2	4	90 - 130
00610005	4.0	4	130 - 180

STAR LH-7016

An easy to weld, low hydrogen basic coated electrode for welding of unalloyed, low alloyed and yield point controlled steel. Good positional welding properties. Vertical welding should be conducted in the upward direction.

Classification: AWS A 5.1 E7016
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610006	2.5	4	60 - 100
00610007	3.2	4	80 - 130
00610008	4.0	4	120 - 170

STAR LH-8018

A superior, versatile, low hydrogen, basic coated electrode for welding of high temperature steel with up to 1% chromium and 0.5% molybdenum. The electrode coating is extra moisture resistant with a controlled iron powder addition.

Recommended where there is a need for resistance to hydrogen attack up to 330°C and corrosive effects of processing high sulphur crude oil up to 450°C. Also, for prolonged elevated temperature service up to 550°C with reasonable degree of corrosion resistance in super-heated stream.

Classification: AWS A5.5.E8018-B2
Type of current: AC, DC +/-

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610009	2.5	4	70 - 90
00610010	3.2	4	90 - 130
00610011	4.0	4	130 - 180

Stainless steel

STAR STAIN-316L

STAR STAIN-316L is a high-quality rutile stainless steel electrode for welding of stainless and acid resistant steel. The weld metal contains 19% chromium, 12% nickel and 3% molybdenum with very low carbon content. Suitable for use in all positions except vertical down. For general service at temperatures up to 500°C and for acid resistance up to 350°C. The electrode is suitable for welding steels of AISI 316L, 316 and 304 types.

Classification: AWS A5.4.E316L
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610012	1.5	2	25 - 35
00610013	2.0	2	30 - 45
00610014	2.5	2	45 - 70
00610015	3.2	2	70 - 110

STAR STAIN-309Mo L

STAR STAIN-309Mo L is a rutile stainless and acid resistant steel electrode for welding of compound steel and for welding of unalloyed steel to stainless steel. The weld metal contains 23% chromium, 12% nickel and 3% molybdenum with very low carbon content. Primarily designed for maintenance applications where various types of stainless steels intermediate in composition between 18/8 and 23/12 chrome nickel, are used and where the need for one electrode to accommodate all applications on a general basis is required. Most of the common types of stainless steel can be welded with this electrode, without the loss of properties.

Classification: AWS A5.4.E309Mo
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610016	2.5	2	50 - 60
00610017	3.2	2	70 - 100
00610018	4.0	2	110 - 140

Stainless steel

STAR DUPLEX-2209

STAR DUPLEX-2209 is a rutile stainless steel electrode for welding of duplex stainless steel used in tanks, cargo loading pipes, heating coils and ladders. The electrode can also be used for joining duplex steel to mild steel, duplex to stainless and stainless to mild steel. The deposit has very high yield and tensile strength and high resistance to general corrosion and pitting corrosion. Also good against chloride-induced stress corrosion. Primarily designed for maintenance applications where various types of stainless steels are used and where the need for one electrode to accommodate all applications on a general basis, is required.

Classification: AWS A5.4.E2209
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610019	2.5	2	45 - 70
00610020	3.2	2	70 - 100
00610021	4.0	2	110 - 140

Difficult to weld steel and hard facing

STAR SUPER TENSILE

STAR SUPER TENSILE is a specially designed, high strength austenitic type electrode for welding of steel types which are difficult to weld, E.G: spring steel, carbon steel, vanadium steel, high speed steel, tool steel and manganese steel. Typical applications are main engine rocker arms and push rods, pump shaft gear wheels, etc.

The electrode can be used for overlaying (build up) as well as joining. High resistance to cracking coupled with good wear, heat, impact and corrosion resistance. An excellent electrode to use as primary buffer layer when building up parts before final using hard surface electrodes. The STAR SUPER TENSILE is a problem-solving electrode that no workshop should be without.

Classification: AWS A5.4.E312-17
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610053	2.5	2	50 - 70
00610054	3.2	2	90 - 110
00610055	4.0	2	120 - 140

STAR STELL-21

Cobalt based electrode designed on a fully alloyed core wire to combat all four elements of wear: heat, impact; corrosion and abrasion. Most suitable of cobalt range electrodes where impact is the most predominant of the four elements of wear. Excellent for rebuilding exhaust valves in combustion engines, steam valves, piston rings, pump and valve part seats. Has the ability to overlay extensive areas without cracking and with little dilution with the base material. Will retain hardness at high temperatures. The welds are machinable.

Classification: AWS A5.13.ECoCr-E (Grade 21)
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610027	2.5	2	60 - 75
00610023	3.2	2	90 - 115
00610024	4.0	2	100 - 150

STAR HF600

The STAR HF600 hard facing electrode is designed to deposit wear resistant overlays on all ferrous metals where high resistance to impact and abrasion is required. The electrode is all positional with a metal recovery rate of 110%. The welds are non-machinable in the as welded state but can be softened by heat treatment at temperatures of 720 - 750°C. After machining, the welds can be re-hardened by oil or water quenching, typical hardness value on a single pass is 56HRC, multi-pass 60HRC.

Classification: No national or international specification.
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610025	2.5	2	80 - 100
00610026	3.2	2	90 - 120

STAR HF900

The Star HF900 hard facing electrode is designed for applications on ferrous metals involving friction and severe abrasion, also where certain heat and corrosive conditions apply. The electrode is of the rutile chromium carbide all positional type and has a metal recovery rate of 150%. Typical hardness value on a single pass is 62HRC, multi-pass 65HRC

Classification: No national or international specification.
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610028	3.2	2	90 - 130
00610029	4.0	2	139 - 170

STAR IMPACT

Tough, high strength electrode with produces a stainless deposit with excellent resistance against heavy impact, friction, corrosion and heat. Easy to use in all positions, producing sound welds good build up characteristics and good slag detachability. In 4mm size the recovery rate is 170%. The weld deposit is fully machinable and it will harden under impact and retain properties at high temperatures. Hardness as welded 220 Brinell. Work hardness to 350 Brinell.

Areas of application: Anchor winch wheels and guides, windlasses, drums and rollers, cranes, track wheels and sprocket wheels. Also used for joining Cr Mo steel, T1 steel, Manganese steel, N-A-Xtra steel, HARDOX steel and joining and fastening of wear plates, fine grain steel and shear blades. May be used for welding manganese steel rails or similar applications involving friction, impact or corrosion.

Classification: 3.2mm-AWS A5.4.E307-16 Type 20.10.4Mn
4.0mm - AWS A5.4.E307-26
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00611003	3.5	2	70 - 120
00611004	4.0	2	120 - 140

Cast iron

STAR CAST NICKEL

High-quality, general-purpose nickel electrode designed for economical joining and surfacing of cast iron.

May be used for hot or cold welding of cast irons and for surfacing and building up on malleable irons. Suitable for joining mild steel to cast iron and ideal for maintenance repair where sound welds are required. The electrode provides fast build-up, easy slag removal and fully machinable porosity free welds.

Classification: AWS A5.15.69 ENi-Ci
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610030	2.5	2	50 - 80
00610031	3.2	2	80 - 100
00610032	4.0	2	120 - 170

Cast iron - continued

STAR CAST Ni-Fe

High strength, machinable electrode for joining and building up on cast irons. Low amperage, smooth arc, minimum spatter and high resistance to cracking. For the repair of grey, S.G, nodular or ductile irons where higher strength is required. Also suitable for joining cast iron to mild steel. If oily cast iron use STAR GOUGING electrode to provide groove preparation. It will provide a smooth groove plus burn out the oil that otherwise will create porosity in the weld deposit.

Classification: AWS A5.15.69 ENiFe-Ci
Type of current: AC, DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610033	2.5	2	40 - 70
00610034	3.2	2	70 - 110
00610035	4.0	2	110 - 150

Copper alloy and aluminium

STAR TIN BRONZE

Superior coated tough bronze electrode for joining and overlaying steels, cast irons, malleable irons, bronzes and copper-based metals. Due to the high thermal conductivity of copper and copper alloys pre-heating is advisable in certain instances, particularly where heavy sections are involved. Highly recommended for bearing surfaces and for wear facing against sea water corrosion.

Classification: AWS A5.6.ECuSn
Type of current: DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610039	2.5	2	50 - 75
00610040	3.2	2	80 - 120

STAR AL-BRONZE

An electrode designed for joining and overlaying aluminium bronze and for corrosion and wear resistant deposits on steel and cast irons. The weld metal deposits will produce good friction and corrosion resistance. Ideal for bearing surfaces, shafts, guides, slides, gear teeth and any wear application involving metal to metal friction.

Classification: AWS A5.6.ECuAl-A2
Type of current: DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610041	2.5	2	60 - 80
00610042	3.2	2	80 - 130

STAR ALUMINIUM

Aluminium electrode with 11% silicon for welding wrought and cast aluminium alloys of similar composition. Rapid deposition rate, good penetration characteristics, excellent arc stability and slag control. The special, chemically active mineral coating enables easy removal of surface oxides during welding, ensuring results of high quality. Suitable for slag over slag welding. Welding wrought alloys N4, H9, H10, H20, H30 and cast alloys LM6, LM8, LM9, LM13 and LM20. Used extensively for repair of casting defects such as surface voids where slag over slag techniques may be employed.

Classification: AWS A5.3-91.E4047
Type of current: DC +

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610043	2.5	2	60 - 90
00610044	3.2	2	80 - 110

Nickel alloy

STAR INCO

Superior electrode for joining and overlaying almost any nickel chrome alloy for service in both cryogenic and high temperature conditions, with the emphasis on the cryogenic side. For welding Inconel 600 and 601 type alloys, Incoloy 800 and 800H, involved in temperatures up to 540°C and for dissimilar applications such as Incoloy 600 and 800HT to carbon or stainless steels; nickel 200 ormonel 400 and nimonic 75. Also suitable for welding 3%, 5% nickel semi-cryogenic steels and 9% nickel steels for full cryogenic conditions.

Classification: AWS A5.11.ENiCrFe-3
Type of current: AC, DC +/-

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610047	2.5	2	60 - 90
00610048	3.2	2	80 - 120
00610049	4.0	2	100 - 150

Stud remover

STAR STUD REMOVER

Flux coated electrode made of high alloy, duplex micro structured, high tensile, non-heat treatable steel. The electrode can maintain a continuous arc when slag over slag welding while restricting the flow of the molten metal. These physical welding characteristics make the electrode ideal for the removal of threaded bolts when the bolt head has sheared at or just below the surface.

Broken bolt removal procedure

Selecting the appropriate diameter electrode, EG: approximately 50% of the stud's diameter. Make short continuous build up welds. During the breaks in welding remove slag and check circumference of build-up is within the diameter of the stud. Repeat weld procedure until build up is 5 to 8mm above component surface. File two opposite flats on weld deposit and remove broken stud (unscrow) with the use of mole grips.

Classification: No national or international specification.
Type of current: AC, DC+

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610045	2.5	2	50 - 90
00610046	3.2	2	75 - 130

Cutting and gouging

STAR GOUGING

Exothermic electrode, specially designed for cutting, gouging and piercing operations on all metals without the use of air or oxygen. Easy to use with little skill required. Operates at lower current and produces fewer fumes than would normally be expected from an electrode of this type. Metal surfaces are seared by the force of the arc leaving them clean and ready for subsequent welding operations. Smooth and even grooves are easily produced.

Applications include, grooving, cutting, gouging and piercing operations on all metals, including those which would normally present difficulties by machining. These include hard enable steels, armour plate, hard weld overlays, cast iron and stainless steels. The electrodes are ideal for back gouging of butt-welded seams and almost indispensable for the preparation of cast irons prior to welding repair.

Classification: No national or international specification.
Type of current: AC, DC+

Star product no.	Diameter (mm)	Packet size (kg)	Amp A
00610037	3.2	4	150 - 250
00610038	4.0	4	250 - 300

STAR ACA GOUGING

Star Air Carbon Arc (ACA) Gouging electrodes are used for gouging, cutting, bevel and piercing of all electrically conductive materials. In this process, the arc is used to melt the metal and the molten metal is then blown away by a jet of compressed air. Typical applications are removal of old welds and opening of cracks before re-welding.

On-board heavy lift vessels

Removal of welds on sections which have been welded to the deck for securing deck cargo during voyage. The flat gouging electrode (15 x 5 x 305mm) is used for scarfing down old welds to the level of the deck.

Classification: No national or international specification.
Type of current: DC+

Star product no.	Diameter (mm)	Packet size (pcs)	Amp A	Air pressure (bar)
00611003	6.5	100	200 - 350	6 - 9
00611004	10.00	100	200 - 450	6 - 9
00611005	15 x 5	100	400 - 600	6 - 9

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