WELDWELL
ELECTRODES

Introduction

Weldwell Electrodes an ISO 9001 certified company, has an established state-of-the-art unit to manufacture high quality welding consumables for joining, repairs, maintenance and fabrication purposes since the year 1985.

Quality Control and well-established Quality Assurance Policy are integral features of the Weldwell manufacturing process. The company has developed "WELDFAST" series of electrodes and MIGFAST/ TIGFAST series of wires for the process, engineering and core sector industries. Weldwell make welding consumables conform to the requirements of BIS, ASME, BS, DIN and ISO specifications.

Weldwell believes in improving relations with customer, based on mutual cooperation and consistent exchange of experience. The company has capacity to develop, test and manufacture new products as per the specific or exceptional requirements by the customer.

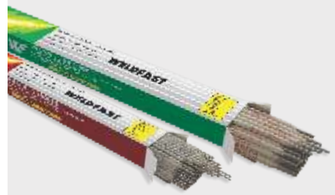
Through this brochure in addition to providing information about the products, an attempt is made to incorporate information frequently required by the shop floor personnel, which may not be readily available to them.

ISO 9001 REGISTERED
DNV MGML SYS. RvA C024
DNV Certification B.V., The Netherlands

An ISO 9001 Certified Company

Index

Emerging Through Quality...

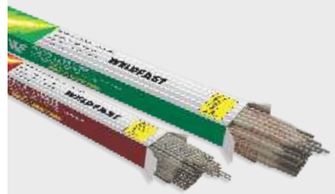


MILD STEEL ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
1	**WELDFAST SUPER** AWS A / SFA - 5.1 E 6013 IS 814 / ER 4211X DIN 1913 / E 4322R322	A medium coated rutile electrode suitable for all position welding. The electrode burns with smooth arc and least spatter. The welds are of radiographic quality. Re-drying temperature 120°C for ½ hr. ***Approvals :*** BHEL Trichy, LRS Gr 1, ABS Gr 1, DNV Gr 1, IRS Gr 1, BV Gr 1, BIS, CIB (Maharashtra), Delhi Metro, Toyo Engg., M.N. Dastur, TCE Consulting Engineers, MAHAGENCO, Uhde India, Tata Projects Ltd., CIDCO	**C** : 0.10 max **Mn** : 0.60 max **Si** : 0.40 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 480-530 N/mm² **YS** : 380-490N/mm² **Elongation** : 22-26% **CVN Impact at 0°C** : 55-60 J **Current** : AC/DC⁻	Steel structures and tanks, truck frames and bodies, machinery construction, auto body frames, railway wagons, ships, pipelines, bridges etc.
2	**WELDFAST QUALITY** AWS A/ SFA - 5.1 E 6013 IS 814 / ER 4222X DIN 1913 / E 4322R322	A medium coated rutile electrode suitable for all position welding. The electrode burns with smooth arc and least spatter. The strong protective gas shield ensures good X-ray quality deposit. Re-drying temperature 120°C for ½ hr. ***Approvals :*** NPCIL, LRS Gr 2, ABS Gr 2, DNV Gr 2, IRS Gr 2, BV Gr2, BIS, CIB (Maharashtra), Thermax, Delhi Metro, Toyo Engg., TCE Consulting Engineers, MAHAGENCO, Uhde India, TATA Projects Ltd., CIDCO, BEML.	**C** : 0.10 max **Mn** : 0.60 max **Si** : 0.40 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 480-540 N/mm² **YS** : 370-500 N/mm² **Elongation** : 23-27% **CVN Impact at 0°C** : 55-60 J **Current** : AC/DC⁻	The electrode has wide application in fabrication of pressure vessels, tanks, rail wagons, ship building, pressure pipelines, steel furniture, auto bodies etc. suitable for joining steels conforming to ASTM specifications : SA-36/SA-36M, SA-285/SA-285M & SA-414/SA-414M.
3	**WELDFAST SUPREME** AWS A / SFA - 5.1 E 6013 IS 814 / ERR 4222X DIN 1913 / E 4322RR622	A heavy coated rutile electrode for very smooth bead appearance of the filling and capping runs. It produces smooth arc, clean and radiographic weld deposit, little spatter and slag is easy to remove. Re-drying temperature 120°C for ½ hr. ***Approvals :*** LRS Gr 2, BIS, CIB (Maharashtra), Delhi Metro, Toyo Engg., MAHAGENCO.	**C** : 0.10 max **Mn** : 0.60 max **Si** : 0.40 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 480-550 N/mm² **YS** : 370-500 N/mm² **Elongation** : 23-27% **CVN Impact at 0°C** : 60-70 J **Current** : AC/DC⁻	Storage tanks, railway wagons, automobile frames and bodies, boilers, rail coaches, ships, locomotive, fiber boxes etc.
4	**WELDFAST CONTACT** AWS A/SFA - 5.1 E 7024 IS 814 / ERR 4241KX DIN 1913 / E 5122RR11140	An iron powder, rutile electrode for touch welding of fillets and gravity filling of V & X welds in ship building, structural steel and pressure vessel industries. No spatter, smooth welds, self removal of slag and welder friendly characteristics. The weld deposit is of radiographic quality and weld metal recovery of approximately 140%. Re-drying temperature 200°C for 1 hr.	**C** : 0.10 max **Mn** : 0.80 max **Si** : 0.60 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 490-540 N/mm² **YS** : 400-480N/mm² **Elongation** : 23-26% **CVN Impact at 0°C** : 50-60 J **Current** : AC/DC⁻	Welding of crane, bridge girders, earth moving equipments, penstocks, ship building, heavy machinery parts and boiler & pressure vessels.
5	**WELDFAST ZITANK**	A heavy coated mild steel electrode with soft arc, easily removable slag with low spatter. The weld metal is resistant to corrosion by molten zinc. The electrode has low silicon content which ensures high resistance to corrosion by molten zinc. The deposited weld metal is almost pure iron and is strong as well as ductile. Re-drying temperature 120°C for ½ hr.	**C** : 0.08 max **Mn** : 0.10 -0.30 **Si** : 0.05 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 420- 520 N/mm² **YS** : 325 450 N/mm² **Elongation** : 20-26 % **CVN Impact at 27°C** : 50-80 J **Current** : AC/DC⁻	WELDFAST ZITANK is a specially designed electrode for welding of hot dip galvanised baths. Suitable for welding as well as repairs of hot dip galvanizing tanks. Offers longer life as of the weld offer resistance to Zn included pitting.

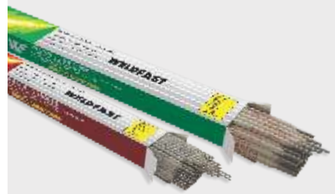
LOW HYDROGEN ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
6	**WELDFAST LH 16** AWS A/SFA - 5.1 E 7016 IS 814 / EB 5426H_3X DIN 1913 / E 5144B1026	A medium coated, all position, basic type hydrogen controlled electrode for welding Mild Steel, Medium & High Tensile Low Alloy steels, for depositing buffer layer before hard facing and for joining cast steel to mild steel. The weld deposit is of excellent X-ray quality. The electrode produces stable & smooth arc, smooth uniform weld deposit and is easy in slag removal. Re-drying temperature 300°C for 1 hr. ***Approvals :*** RDSO CLASS A3/B1	**C** : 0.10 max **Mn** : 1.60 max **Si** : 0.75 (max) **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-610 N/mm² **YS** : 430-540 N/mm² **Elongation** : 24-28% **CVN Impact at -30°C** : 50-60 J **Current** : AC/DC+	Suitable for cast steels, difficult steels of unknown composition and for non machinable deposits on cast iron. Typical applications include coaches, ships, heavy duty structures, earth moving machinery, rotary kiln shells, boilers and pressure vessels. Used as Buffer layer before depositing hard facing electrodes.
7	**WELDFAST LH 18** AWS A/SFA - 5.1 E 7018 IS 814 / EB 5426H_3JX DIN 1913 / E5144B1026	A basic coated low hydrogen all position welding electrode with metal recovery of 110% approximately. The weld deposit has good toughness and excellent X- ray quality. It gives excellent arc stability, smooth arc and is very easy in slag removal. Re-drying temperature 300°C for 1 hr. ***Approvals :*** NPCIL, BHEL Trichy, LRS 3YH5, ABS 3YH5, DNV 3YH5, IRS 3YH5, BV, BIS, CIB (Maharashtra), Thermax, Delhi Metro, Toyo Engg., M.N.Dastur & Co., TCE Consulting Engineers, MAHAGEN CO., Uhde India, TATA Projects Ltd., RDSO CLASS A4/B2.	**C** : 0.10 max **Mn** : 1.60 max **Si** : 0.75 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-610 N/mm² **YS** : 430-540 N/mm² **Elongation** : 24-28% **CVN Impact at -30°C** : 50-60 J **Current** : AC/DC+	Boiler and pressure vessels, penstocks, storage tanks, bridges, heavy structures subjected to dynamic loading and under restrained conditions.
8	**WELDFAST LH 18 - 1** AWS A/SFA - 5.1 E 7018-1 IS 814 / EB 5526H_3JX DIN 1913 / E 5155B1029	A basic coated low hydrogen all position welding electrode with deposition efficiency of approximately 110%. The weld metal has excellent toughness even at -50°C and satisfies X-ray, ultrasonic and radiographic requirements. Electrode gives smooth and stable arc, easy slag removal and is suitable for welding of pipes in 1G, 2G, 5G & 6G positions. Re-drying temperature 300°C for 1 hr. ***Approvals :*** NPCIL, Delhi Metro Rail Corp. Ltd. Uhde India, CIDCO, LRS 4Y40H5, DNV 4Y40H5, BV 4Y40H5.	**C** : 0.10 max **Mn** : 1.60 max **Si** : 0.75 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-610 N/mm² **YS** : 440-530N/mm² **Elongation** : 24-28% **CVN Impact at -45°C** : 55-65J **Current** : AC/DC+	Welding of pressure vessels & boilers, pipelines, power plants, penstocks, earth moving equipments, bridges, low alloy steels and heavy thick plates of carbon steel. Suitable for steels conforming to ASTM specification : Gr. 60, Gr. 65 steels of SA-515/SA-515(P. No. 1) and Gr. 60, Gr. 65 steels of SA-516/SA-516M (P.No.1).
9	**WELDFAST LH 18 (NACE)** AWS A/SFA - 5.1 E 7018-1 IS 814 / EB 5629H_3JX DIN 1913 / E 5155B1029	A basic coated extra- low- hydrogen all position welding electrode with deposition efficiency of approximately 110%. The weld metal has excellent toughness even at –50°C and satisfies X-ray, ultrasonic and radiographic requirements. Electrode gives smooth and stable arc, with easy slag removal even from first pass in a vee groove. The weld metal which contain about 1.2 % Mn, is extremely resistant to cold and hot cracking and tri-axial stressing. Re-drying temperature 300°C for 1 hr.	**C** : 0.10 max **Mn** : 1.40 max **Si** : 0.60 max **S** : 0.015 max **P** : 0.018 max	**UTS** : 520-600 N/mm² **YS** : 430-530N/mm² **Elongation** : 24-28% **CVN Impact at -46°C** : 40 J **Current** : AC(70 OCV)/DC+	Welding of medium high tensile steels, heavy sections and restrained joints in high tensile steel. Welding of carbon steel and low alloy steel fabrications where severe service conditions exist. It meets corrosion test as per **NACE** Standard TM- 01-77 and TM-02-84. Suitable for joining steels like ASTM 106Gr.B (NACE quality), Gr60, Gr65 of SA-515/SA-515M.
10	**WELDFAST LH 28** AWS A/SFA - 5.1 E 7028 IS 814 / EB 5336H_2LX	An iron powder basic coated low hydrogen electrode with metal recovery of approximately 150%. It is ideal for rapid filling of beveled butt joints in heavy plates in down hand position. Easy slag removal and weld deposit is of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.10 max **Mn** : 0.80-1.20 **Si** : 0.80 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-610 N/mm² **YS** : 420-500 N/mm² **Elongation** : 24-28% **CVN Impact at -20°C** : 60 -70J **Current** : AC/DC+	Heavy structures like cranes, bridge girders, earth moving equipments, heavy machinery parts, ships and pressure vessels etc.



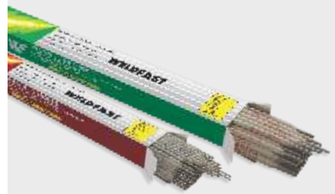
LOW ALLOY HIGH TENSILE STEEL ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
11	**WELDFAST CROMO 0500** AWS A/SFA - 5.5 E 7018-A1 IS 1395 / E 49B-A1-26Fe DIN 8575 / EMoB20+	A medium heavy basic coated, hydrogen controlled, iron powder electrode, gives weld deposit containing 0.5% Mo. The weld deposit is of radiographic quality. Suitable for welding carbon - moly creep resistant steels in all position. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** NPCIL	**C** : 0.06-0.09 **Mn** : 0.90 max **Mo** : 0.40-0.65 **Si** : 0.80 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-630 N/mm² **YS** : 500 N/mm²(min) **Elongation** : 23-27% **CVN Impact at +27°C** : 90-120 J **Current** : AC/DC+	For welding of 0.5% Mo and 1% Cr-0.5% Mo steels. Suitable in welding of flange, forged fittings, valves, seamless tubes and pipes for high temperature applications in power plants, refinery, petro-chemical and fertilizer units
12	**WELDFAST CROMO 1500** AWS A/SFA - 5.5 E 8018-B2 IS 1395 / E 55BB226Fe DIN 8575 / E CrMo1B20+	A medium heavy coated, low hydrogen iron powder type electrode gives weld deposit of 1.3% Cr and 0.5% Mo steel. The weld deposit is of radiographic quality. The electrode burns with smooth arc, low spatter and is easy in slag removal. Suitable for welding chrome - moly creep resistant steels in all positions. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** NPCIL	**C** : 0.06-0.09 **Mn** : 0.90 max **Si** : 0.80 max **Cr** : 1.00-1.50 **Mo** : 0.40-0.65 **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-630 N/mm² **YS** : 500N/mm²(min) **Elongation** : 23-27% **CVN Impact at +27°C** : 50-90 J **Current** : AC/DC+	For welding 1Cr/0.5Mo and similar creep resistant steels. Suitable in welding of flange, forged fittings, valves, seamless tubes and pipes for high temperature applications in power plants, refinery, petro-chemical and fertilizer units and P11 and P12 type of steels.
13	**WELDFAST CROMO 2251** AWS A/SFA - 5.5 E 9018-B3 IS 1395 / E 55BB326Fe DIN 8575 / E CrMo2B26	A medium heavy coated, low hydrogen, iron powder type, all position electrode with weld deposit of approximately 2.30% Cr and 1% Mo steel. The weld deposit is of radiographic quality and creep resistant up to 600°C. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** NPCIL	**C** : 0.06-0.09 **Mn** : 0.90 max **Si** : 0.80 max **Cr** : 2.00-2.50 **Mo** : 0.90-1.20 **S** : 0.03 max **P** : 0.03max	**UTS** : 630-690 N/mm² **YS** : 540 N/mm²(min) **Elongation** : 21-24% **CVN Impact at +27°C** : 50-100 J **Current** : AC/DC+	For welding 2Cr/1Mo and similar creep resistant steels. Suitable in welding of flange, forged fittings, valves, seamless tubes and pipes for high temperature applications in power plants, refinery, petro-chemical and fertilizer units and P22 type of steels.
14	**WELDFAST CROMO 5500** AWS A/SFA - 5.5 E 8018-B6 IS 1395 / E 41BB626Fe DIN 8575 / E KbCrMo 526	It is basic coated electrode for welding Chrome-Moly creep resistant steels suitable for welding in all position. Weld deposit is of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.05-0.10 **Mn** : 1.00 max **Si** : 0.90 max **Cr** : 4.00-6.00 **Mo** : 0.45-0.65 **S** : 0.03 max **P** : 0.03 max **Ni** : 0.40 max	**UTS** : 550-650 N/mm² **YS** : 480 N/mm²(min) **Elongation** : 19-22% **Hardness** : 250 BHN max **Current** : AC/DC+	For welding cast or forged fitting, flanges, valves, seamless tubes or pipes used for high temperature applications in power plants, refinery, petrochemical and fertilizer units.
15	**WELDFAST CROMO 9100** AWS A/SFA - 5.5 E 8018-B8 DIN 8575 / E CrMo526	A basic coated electrode for welding Chrome Moly creep resistant steels in all positions. The weld deposit contains approximately 9% Cr is air hardenable and requires preheat & post heat treatment. Weld deposit is of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.05-0.10 **Mn** : 1.00 max **Si** : 0.90 max **Cr** : 8.00-10.50 **Mo** : 0.85-1.20 **S** : 0.03 max **P** : 0.03 max **Ni** : 0.40 max	**UTS** : 600-650 N/mm² **YS** : 480-550 N/mm² **Elongation** : 20-25% **Hardness** : 250 BHN max Current : AC/DC+	For Welding cast or forged fitting, flanges, valves, seamless tubes or pipes used for high temperature applications in power plants, refinery, petrochemical and fertilizer units.



LOW ALLOY HIGH TENSILE STEEL ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
16	**WELDFAST TENSAL 60** AWS A/SFA - 5.5 E 8018G IS 1395 / E 55BG129Fe	A basic coated all position electrode for welding fine grained high tensile steels. It gives a very smooth arc, medium penetration, low spatter and easy operation in all position. The welds are of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.06-0.10 **Mn** : 0.90-1.40 **Si** : 0.50 max **Ni** : 0.70-1.00 **Mo** : 0.30-0.50 **S** : 0.03 max **P** : 0.03 max	**UTS** : 610-680 N/mm² **YS** : 480-550 N/mm² **Elongation** : 22-25% **CVN Impact at +27°C** : 80 -150J **Current** : AC/DC+	For construction of heavy duty mining and earth moving equipments. It is ideal for steels subjected to dynamic loading conditions like bridge girders, penstocks etc.
17	**WELDFAST TENSAL 100 G** AWS A/SFA -5.5 E 10018G	A basic coated low hydrogen iron powder electrode for welding of low alloy and high tensile steels. The weld metal is Ni-Cr-Mo type having good toughness properties at sub-zero temperature. It gives smooth and excellent arc stability, easy removal of slag and radiographic quality weld. Re-drying temperature is 300°C for 1 hr.	**C** : 0.06 max **Mn** : 1.50 max **Si** : 0.60 max **Ni** : 0.50-1.00 **Mo** : 0.50 max **Cr** : 0.50 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 720 N/mm² (min) **YS** : 650 N/mm² (min) **Elongation** : 20% (min) **CVN Impact at +27°C** : 50-100 J **Hardness** : 220 BHN (max) Diffusible Hydrogen content : 5ml (max) **Current** : AC/DC+	Welding of high tensile steels, fabrication of penstocks, pressure vessels, boilers, pipelines and other machinery parts.
18	**WELDFAST TENSAL 100 D2** AWS A/SFA 5.5 E10018-D2 IS 1395 / E 68 BD 229 Fe	A low alloy, low hydrogen, iron-powder electrode for welding of high tensile steels. Weld metal is of Mn-Mo type. It gives smooth arc and easy slag removal. Welds are of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.15 max **Mn** : 1.65-2.00 **Mo** : 0.25-0.45 **Ni** : 0.90 max **Si** : 0.80 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 690-750 N/mm² **YS** : 600-700 N/mm² **Elongation** : 16-25 % **CVN Impact at -50°C** : 27 J min **Current** : AC/DC+	For welding of high tensile steels used for fabrication of penstocks, earth moving equipments and heavy structures subjected to dynamic loading and mechanical restraint.
19	**WELDFAST TENSAL 100 M** AWS A/SFA 5.5 E10018M IS 1395 / E 68 BD 229 Fe	Low hydrogen, iron-powder electrode for welding of high tensile steels. Weld metal is of Mn-Mo type. It gives smooth arc and easy slag removal. Welds are of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.10 max **Mn** : 0.75-1.70 **Mo** : 0.25-0.50 **Cr** : 0.35 max **Ni** : 1.40-2.10 **Si** : 0.60 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 690-750 N/mm² **YS** : 610-690 N/mm² **Elongation** : 20-25 % **CVN Impact at -50°C** : 27 J min **Current** : DC+	Welding of earth moving equipments, high tensile steels e.g. USST-1, N-A-XTRA 70, BH65.
20	**WELDFAST TENSAL 80** AWS A/SFA - 5.5 E 11018G	A basic coated all position electrode for welding fine grained high tensile steels. It gives smooth arc, little spatter with easy removal of slag and fine rippled bead. Welds are of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.06-0.10 **Mn** : 1.30-1.80 **Si** : 0.60 max **Ni** : 0.50-1.00 **Mo** : 0.50 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 780-820 N/mm² **YS** : 680-750 N/mm² **Elongation** : 18-22% **Current** : AC/DC+	For construction of heavy duty mining and earth moving equipments. It is ideal for steels like T1, HY80, HSD70 grade used in dynamic loading conditions like bridge girders, penstocks etc.



LOW ALLOY HIGH TENSILE STEEL ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
21	**WELDFAST 80 C1** AWS A/SFA -5.5 E8018-C1	A basic coated low hydrogen, iron powder electrode for welding of 2.5% Ni steel. The electrode gives very smooth arc, medium penetration, low spatter & easy slag removal and radiographic quality weld. Re-drying temperature is 300°C for 1 hr.	**C** : 0.12 max **Mn** : 1.25 max **Si** : 0.60 max **Ni** : 2.00-2.75 **S** : 0.03 max **P** : 0.03 max	**U T S** : 550 N/mm² min **YS** : 460 N/mm² min **Elongation** : 24-30% **CVN Impact at - 60°C** : 27 J min.	It is used for welding of 2.5 % Ni steels in refineries, pressure vessels, heat exchanger.
22	**WELDFAST 80 C2** AWS A/SFA - 5.5 E8018-C2	A basic coated hydrogen controlled iron powder electrode specially designed for welding nickel alloy steels, used for its high ductility, toughness & resistance to embrittling effects at sub-zero temperature. The weld deposit contains 3.0 - 3.75% Ni & has better tensile strength. The electrode gives very smooth arc, medium penetration, low spatter, easy operation in all positions & easy slag removal and radiographic quality weld. Re-drying temperature is 300°C for 1 hr.	**C** : 0.12 max **Mn** : 1.25 max **Si** : 0.80 max **Ni** : 3.00-3.75 **S** : 0.03 max **P** : 0.03 max	**U T S** : 550-640 N/mm² **YS** : 460-540 N/mm² **Elongation** : 24-30% **CVN Impact at -75°C** : 27 J min.	For welding of 3.0-3.75% Nickel steels & fabrication of parts, subjects to low temperature service. Locomotive main frames, truck & side frames, refinery pressure vessels & valves. Suitable for joining steels confirming to ASTM specifications of B. D grades of SA- 203/SA - 203 M.
23	**WELDFAST 80 C3** AWS A/SFA -5.5 E8018-C3	A basic coated, hydrogen controlled iron powder electrode, designed to deposit weld metal of 0.8-1.10% Ni with good impact strength at -50°C. The electrode gives very smooth arc, medium penetration, low spatter, easy operation in all positions & easy slag removal and radiographic quality weld. Re-drying temperature is 300°C for 1 hr.	**C** : 0.12 max **Mn** : 0.40-1.25 max **Si** : 0.80 max **Ni** : 0.80-1.10 **Cr** : 0.15 max **Mo** : 0.35 max **S** : 0.03 max **P** : 0.03 max	**U T S** : 560-640 N/mm² **YS** : 460-540 N/mm² **Elongation** : 24-30% **CVN Impact at - 50°C** : 30 J	It is used for welding of 0.8-1.10% Ni steels in refineries, pressure vessels, heat exchanger.
24	**WELDFAST 80 C4** AWS A/SFA - 5.5 E 8018-C4	A basic coated electrode, designed to deposit weld metal of 1.1- 2 .0 % Ni with good impact strength at -50°C. The electrode gives very smooth arc, medium penetration, low spatter, easy operation in all positions & easy slag removal and radiographic quality weld. Re-drying temperature is 300°C for 1 hr.	**C** : 0.10 max **Mn** : 1.25 max **Si** : 0.80 max **Ni** : 1.10-2.00 **S** : 0.03 max **P** : 0.03 max	**U T S** : 550 N/mm² min **YS** : 460 N/mm² min **Elongation** : 19.0% **CVN Impact at -50°C** : 35 J	It is used for welding of 1.1- 2.0 % Ni steels in refineries, pressure vessels, heat exchanger.
25	**WELDFAST W2** AWS A/SFA -5.5 E8018-W2	A low alloy, low hydrogen, iron-powder electrode for welding of low alloy steels. Weld metal exhibits excellent atmospheric corrosion resistance. It gives excellent arc stability, arc smoothness and easy slag removal. Welds are of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.10 max **Mn** : 0.50-1.30 **Si** : 0.35-0.80 **Ni** : 0.40-0.80 **Cr** : 0.45-0.70 **Cu** : 0.30-0.75 **S** : 0.03 max **P** : 0.03 max	**U T S** : 550 N/mm² min **YS** : 460 N/mm² min **Elongation** : 19% min **CVN Impact at -20°C** : 27 J	It is extra low hydrogen electrode specially designed for welding of high strength structural steels including quenched and tempered steels. Welding of weathering steels e.g. Corten-A, Corten-B & their equivalents. Weld metal has high notch toughness at low temperature. Extra low level of diffusible hydrogen prevents hydrogen induced cracking.

LOW ALLOY HIGH TENSILE STEEL ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
26	**WELDFAST 7018M** AWS A/SFA- 5.1 E 7018M	A basic coated low hydrogen, iron powder electrode for welding of high tensile, low-alloy steels. Weld metal is Ni-Cr-Mo type and exhibits good toughness at sub-zero temperatures. It gives excellent arc stability, arc smoothness and very easy slag removal.Weld metal is of X-ray quality. Re-drying temperature 300°C for 1 hr.	**C** : 0.10 max **Mn** : 0.40-1.60 **Si** : 0.80 max **Cr** : 0.15 max **Ni** : 0.25 max **Mo** : 0.35 max **V** : 0.05 max **S** : 0.03 max **P** : 0.02 max Diffusible hydrogen content in ml/ 100 gm 5 ml	**U T S** : 620 N/mm²min **YS** : 540-620 N/mm² **Elongation** : 24-28% **Reduction in area** : 50 % min **CVN Impact at –50°C** : 30 J	Boiler and pressure vessels, penstock, pipelines, machinery parts. Suitable for joining N-A-XTRA 60 steels.
27	**WELDFAST 9018M** AWS A/SFA- 5.5 E 9018M	A basic coated low hydrogen, iron powder electrode for welding of high tensile, low-alloy steels. Weld metal is Ni-Cr-Mo type and exhibits good toughness at sub-zero temperatures. It gives excellent arc stability, arc smoothness and very easy slag removal. Weld metal is of X-ray quality. Re-drying temperature 300 °C for 1 hr.	**C** : 0.10 max **Mn** : 0.60-1.25 **Si** : 0.80 max **Cr** : 0.20 max **Ni** : 1.40-1.80 **Mo** : 0.35 max **V** : 0.05 max **S** : 0.030 max **P** : 0.030 max Diffusible hydrogen content in ml/ 100 gm 5 ml	**U T S** : 620 N/mm² min **YS** : 540-620 N/mm² **Elongation** : 24-28% **Reduction in area** : 50 % min **CVN Impact at–50°C** : 30 J	Boiler and pressure vessels, penstock, pipelines, machinery parts. Suitable for joining N-A-XTRA 60 steels.
28	**WELDFAST 11018M** AWS A/SFA- 5.5 E 11018M	It is an extra low hydrogen low alloy high tensile steel electrode, designed to deposit weld metal of 1.25 - 2 .5 % Ni with good impact strength at -50°C. The all position electrode gives very smooth arc, medium penetration, low spatter, easy operation & easy slag removal and radiographic quality weld. Re-drying temperature is 300°C for 1 hr.	**C** : 0.10 max **Mn** : 1.3-1.8 **Si** : 0.60 max **Ni** : 1.25-2.5 **Cr** : 0.40 max **Mo** : 0.25-0.50 **S** : 0.03 max **P** : 0.03 max	**U T S** : 760 N/mm² **YS** : 680-760 N/mm² **Elongation** : 20% min **CVN Impact at -50°C** : 28-50 J	It is extra low hydrogen electrode specially designed for welding of high strength structural steels including quenched and tempered steels. Weld metal has high notch toughness at low temperature. Extra low level of diffusible hydrogen prevent hydrogen induced cracking.
29	**WELDFAST 8016C2** AWS A/SFA- 5.5 E8016-C2	A medium basic coated hydrogen controlled electrode specially designed for welding nickel alloy steels, used for its high ductility. toughness & resistance to embrittling effects at sub-zero temperature. The weld deposit contains 3.0 - 3.75 % Ni & has better tensile strength. The electrode gives very smooth arc, medium penetration, low spatter, easy operation in all positions & easy slag removal and radiographic quality weld. Re-drying temperature is 300°C for I hr.	**C** : 0.12 max **Mn** : 1.25 max **Si** : 0.60 max **Ni** : 3.0-3.75 **S** : 0.03 max **P** : 0.03 max	**U T S** : 560-640 N/mm² **YS** : 460-540 N/mm² **Elongation** : 24-30% **CVN Impact at–50°C** : 30 J	For welding of 3.0-3.75% Nickel steels & fabrication of parts, subjects to low temperature service. Locomotive main frames, truck & side frames, refinery pressure vessels & valves. Suitable for joining steels confirming to ASTM specifications of B, D Grades of SA- 203/SA - 203M.

STAINLESS STEEL ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
30	**WELDFAST 308** AWS A/SFA - 5.4 E 308-16 IS 5206 / E19.9R26	A rutile basic coated all position electrode. Smooth arc, excellent slag removal, smooth uniform bead and easy striking are the characteristics of this electrode. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** RDSO : CLASS M1	**C** : 0.08 max **Mn** : 0.60-1.20 **Si** : 1.00 max **Ni** : 9.00-11.00 **Cr** : 18.00-21.00 **S** : 0.03 max **P** : 0.04 max	**UTS** : 560-630 N/mm² **Elongation** : 35-40% **Ferrite (%)** : 3-7 **Current** : AC/DC⁺	For welding of corrosion resistant Cr-Ni steels of AISI grades 301, 302, 304, 308 used in dairy, food processing and chemical industries.
31	**WELDFAST 308L** AWS A/SFA - 5.4 E 308L-16 IS 5206 / E19.9LR26	A rutile basic coated all position electrode. Excellent slag removal, smooth & uniform bead and easy striking are the characteristics. Extra low carbon content gives added resistance to inter granular corrosion. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** NPCIL	**C** : 0.04 max **Mn** : 0.60-1.20 **Si** : 1.00 max **Ni** : 9.00-11.00 **Cr** : 18.00-21.00 **S** : 0.03 max **P** : 0.04 max	**UTS** : 540-580 N/mm² **Elongation** : 35-40% **Ferrite (%)** : 3-7 **Current** : AC/DC⁺	For welding of Cr-Ni steels of AISI grades 301, 302, 304, 308 equipments used in chemical processing, dairy & food industry.
32	**WELDFAST 308Mo** AWS A/SFA - 5.4 E 308Mo-16 IS 5206 / E19.9.2R26	A rutile basic coated all position electrode. Smooth arc, easy slag removal, uniform bead and easy striking are the characteristics of this electrodes. Re-drying temperature is 300°C for 1 hr.	**C** : 0.08 max **Mn** : 0.80-1.20 **Si** : 1.00 max **Ni** : 9.00-11.00 **Cr** : 18.00-21.00 **Mo** : 2.00-3.00 **S** : 0.03 max **P** : 0.04 max	**UTS** : 630-730 N/mm² **Elongation** : 35-40% **Current** : AC/DC⁺	For welding of steels where severe stresses or risk of cracking are involved.
33	**WELDFAST 347** AWS A/SFA - 5.4 E 347-16 IS 5206 / E19.9NbR26	A rutile basic coated all position electrode for welding stabilized version of corrosion resistant Cr-Ni Steels. Weld beads are smooth, uniform and excellent in appearance. Re-drying temperature is 300°C for 1 hr.	**C** : 0.08 max **Mn** : 0.60-1.20 **Si** : 0.90 max **Ni** : 9.00-11.00 **Cr** : 18.00-21.00 **Cb** : 1.00 max **S** : 0.03 max **P** : 0.03 max	**UTS** : 560-620 N/mm² **Elongation** : 30-35% **Ferrite (%)** : 6-9 **Current** : AC/DC⁺	For welding of AISI grades 301, 302, 304, 308, 321 and 347. A wide range of application in the manufacture of equipments for chemical, food, aircraft industries, gas turbines and soap industries.
34	**WELDFAST 316** AWS A/SFA - 5.4 E 316-16 IS 5206 / E19.12.2R26	A rutile basic coated all position electrode, 18/12 Mo Stainless Steel weld deposit. The weld metal has excellent creep strength and resistance to cracking, corrosion at high temperature up to 850°C. The electrode has smooth arc & excellent arc stability, low spatter loss, easy removal of slag and smooth, uniform weld deposit. Re-drying temperature is 300°C for 1 hr.	**C** : 0.08 max **Mn** : 0.60-1.20 **Si** : 0.90 max **Ni** : 11.00-14.00 **Cr** : 17.00-20.00 **Mo** : 2.00-3.00 **S** : 0.03 max **P** : 0.03 max	**UTS** : 580-630 N/mm² **Elongation** : 30-35% **Ferrite (%)** : 3-8 **Current** : AC/DC⁺	For welding of corrosion resistant Cr-Ni-Mo Steels of AISI grades 316, 316H, 317 used in chemical industries, handling organic assets and other corrosion chemicals etc.

STAINLESS STEEL ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
35	**WELDFAST 316L** AWS A/SFA - 5.4 E 316L-16 IS 5206 / E19.12.2LR26	A rutile basic coated all position electrode having extra low carbon with weld deposit of 18Cr/13Ni/2.5Mo stainless steel. Resistant to stress corrosion cracking, chemical corrosion cracking at temperature up to 850°C. The weld metal deposit has excellent creep strength and is of radiographic quality. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** NPCIL	**C** : 0.04 max **Mn** : 0.60-1.20 **Si** : 0.90 max **Ni** : 11.00-14.00 **Cr** : 17.00-20.00 **Mo** : 2.00-3.00 **S** : 0.03 max **P** : 0.03 max	**UTS** : 560-600 N/mm^2 **Elongation** : 30-40% **Ferrite (%)** : 3-8 **Current** : AC/DC$^+$	For welding of stainless steels such as AISI 316, 316L, 316H, 317 and 317L, in chemical plants, paint industries and dye industries.
36	**WELDFAST 317L** AWS A/SFA - 5.4 E317L-16	A rutile basic coated all position electrode having extra low carbon with weld deposit of 19Cr/12Ni/3.5 Mo and controlled Ferrite content of 3-8 for maximum resistance to cracking. Weld Metal is resistant to stress corrosion cracking, hot cracking, chemical corrosion at high temp. Higher moly reduces susceptibility to pitting. Excellent arc stability and low spatter loss. The weld metal is of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.04 max **Mn** : 0.50-2.50 **Si** : 1.00 max **Ni** : 12.00-14.00 **Cr** : 18.00-21.00 **Mo** : 3.00-4.00 **S** : 0.03 max **P** : 0.03 max	**UTS** : 560-600 N/mm^2 **Elongation** : 30-40 % **Ferrite (%)** : 3-8 **Current** : AC/DC$^+$	For welding of stainless steels such as AISI 316L/317and for welding of equipments in chemical industries especially for sulphuric and sulfurous acids and their salts, paper and pulp industry, paint and dye industries.
37	**WELDFAST 309** AWS A/SFA - 5.4 E 309-16 IS 5206 / E23.12R26	A rutile basic coated all position electrode giving 25/12, Cr-Ni deposit which has excellent corrosion and oxidation resistance in continuous service up to 1100°C. It gives smooth arc and has self - removing slag, least spatter and uniform weld bead. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** RDSO : CLASS M4	**C** : 0.10 max **Mn** : 0.60-1.20 **Si** : 1.00 max **Ni** : 12.00-14.00 **Cr** : 22.00-25.00 **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-650 N/mm^2 **Elongation** : 30-35% **Current** : AC/DC$^+$	For welding of corrosion and heat resistant Cr-Ni steels to themselves or to mild steel. The weld deposit offers higher temperature oxidation resistance than 18/8 Cr-Ni grade stainless steel. It is used for overlays of ferritic steel, dissimilar steels and difficult to weld steels.
38	**WELDFAST 309L** AWS A/SFA - 5.4 E 309L-16 IS 5206 / E23.12LR26	A rutile basic coated all position electrode giving 25/12, Cr-Ni deposit which has excellent corrosion and oxidation resistance in continuous service up to 1100°C. It gives smooth arc, self removal of slag, least spatter and uniform weld bead. The extra low carbon gives added resistance to inter-granular corrosion. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** NPCIL	**C** : 0.04 max **Mn** : 0.60-1.20 **Si** : 1.00 max **Ni** : 12.00-14.00 **Cr** : 22.00-25.00 **S** : 0.03 max **P** : 0.03 max	**UTS** : 520-650 N/mm^2 **Elongation** : 30-35% **Current** : AC/DC$^+$	For welding of corrosion and heat resistant Cr-Ni steels to themselves or to mild steel. The weld deposit offers higher temperature oxidation resistance than 18/8 Cr-Ni grade stainless steel. Useful in welding of clad steel.
39	**WELDFAST 309Mo** AWS A/SFA - 5.4 E 309Mo-16 IS 5206 / E23.12.2R26	A rutile basic coated all position electrodes giving 25/12/2.5 Mo weld deposit. It gives a smooth arc, low spatter, easy removal of slag and uniform bead. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** NPCIL	**C** : 0.10 max **Mn** : 0.60-1.20 **Si** : 0.90 max **Ni** : 12.00-14.00 **Cr** : 22.00-25.00 **Mo** : 2.00-3.00 **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-650 N/mm^2 **Elongation** : 30-35% **Current** : AC/DC$^+$	For welding of corrosion and heat resistant Cr-Ni steels to themselves or to mild steel. The electrode is useful in welding clad steel and for building corrosion and heat resistant layer on mild or low alloy steels. Also suitable for dissimilar joints of carbon steels with 316 type of stainless steel.

STAINLESS STEEL ELECTRODES

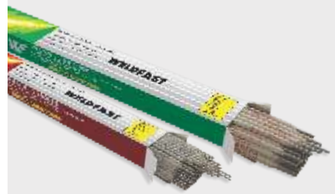
No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
40	**WELDFAST 309MoL** AWS A/SFA - 5.4 E 309L-Mo-16 IS 5206 / E23.12.2LR26	A rutile basic coated all position electrode giving 25/12/2.5 Mo weld deposit. It gives a smooth arc, low spatter, easy removal of slag and uniform bead. Excellent resistance to chemical corrosion and heat. Re-drying temperature is 300°C for 1 hr.	**C** : 0.04 max **Mn** : 0.60-1.20 **Si** : 0.90 max **Ni** : 12.00-14.00 **Cr** : 22.00-25.00 **Mo** : 2.00-3.00 **S** : 0.03 max **P** : 0.03 max	**UTS** : 520-650 N/mm^2 **Elongation** : 30-35% **Current** : AC/DC$^+$	For welding of corrosion and heat resistant Cr-Ni steels to themselves or to mild steel. The electrode is useful in welding clad steel and for building corrosion heat resistant layer on mild or low alloy steels.
41	**WELDFAST 309Cb** AWS A/SFA - 5.4 E 309Cb-16 IS 5206 / E23.12CbR26	It is rutile basic coated all position electrode gives smooth arc, easy slag removal and uniform weld bead. It gives weld deposit of 25/12Cb stabilised SS which has excellent resistant to inter-granular corrosion and higher strength upto 1100°C. Re-drying temperature is 300°C for 1 hr.	**C** : 0.10 max **Mn** : 0.60-1.20 **Si** : 0.90 max **Ni** : 12.00-14.00 **Cr** : 22.00-25.00 **Cb** : 0.70-1.00 **S** : 0.03 max **P** : 0.03 max	**UTS** : 580-650 N/mm^2 **Elongation** : 30-35% **Current** : AC/DC$^+$	For welding of corrosion and heat resistant Cr and Cr-Ni stabilized steel to themselves or to mild steel. Welding of AISI 309-Cb, SS 347 to low alloy or carbon steels. The electrode is useful in welding clad steels.
42	**WELDFAST 310** AWS A/SFA - 5.4 E 310-16 IS 5206 / E25.20R26X	A basic coated austenitic all position electrode and deposit 25/20 SS which has excellent stability and oxidation resistance in continuous service upto 1100°C. Smooth arc, easy slag removal, low spatter and uniform bead are characteristics of this electrode. Re-drying temperature is 300°C for 1 hr.	**C** : 0.10-0.15 **Mn** : 1.00-2.50 **Si** : 0.75 max **Ni** : 20.00-22.50 **Cr** : 25.00-28.00 **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-580 N/mm^2 **Elongation** : 30-35% **Current** : AC/DC$^+$	Welding of AISI 310 type, German steels 4762, 4828, 4841, 4846 and 4848 welding of stainless clad steels, straight chrome steels, dissimilar steels, hydrogenation and polymerisation plant, gas turbine combustion chamber parts, high temp. furnace parts etc.
43	**WELDFAST 312** AWS A/SFA - 5.4 E 312-16 IS 5206 / E28.8R26	A rutile basic coated all position electrode giving 30/10 Cr-Ni deposit which has excellent oxidation resistance. The weld deposit gives duplex structure with substantial amount of Ferrite in austenitic matrix. The deposited weld metal is highly resistant to cracks and fissures. It gives smooth and stable arc, low spatter, easy removal of slag & uniform weld bead. Re-drying temperature is 300°C for 1 hr.	**C** : 0.08-0.15 **Mn** : 0.90-1.30 **Si** : 0.90 max **Ni** : 8.00-10.50 **Cr** : 28.00-32.00 **S** : 0.03 max **P** : 0.04 max	**UTS** : 750-800 N/mm^2 **Elongation** : 22 % (min) **Current** : AC/DC$^+$	For welding of all unknown composition and dissimilar joints. Extensive application in heavy mining and earth moving equipments. The weld deposit has very high strength in addition to moderate corrosion resistance.
44	**WELDFAST 318** AWS A/SFA - 5.4 E318-16 IS 5206 / E19.12.2NbR26	A rutile basic coated all position electrode for welding stabilized version of corrosion resistant Cr-Ni-Mo Steels. The electrode is resistant to stress corrosion cracking, chemical corrosion and inter-granular corrosion. The weld metal has excellent creep strength up to 850°C and is of radiographic quality. Weld beads are smooth uniform and excellent in appearance. Re-drying temperature is 300°C for 1 hr.	**C** : 0.08 max **Mn** : 0.60-1.20 **Si** : 0.90 max **Ni** : 11.00-14.00 **Cr** : 17.00-20.00 **Mo** : 2.00-3.00 **Cb** : 1.00 max **S** : 0.03 max **P** : 0.04 max	**UTS** : 600-650 N/mm^2 **Elongation** : 25-30% **Ferrite (%)** : 4-8 **Current** : AC/DC$^+$	For welding of stainless steels such as AISI 316, 317, 318 and CPF 8M, CPF 10MC, CPF 8C and CPF 8M, paper industries, bleaching equipments, chemical plants handling sulphuric, hydrochloric, acetic, formic, citric, tartaric acid etc., dyeing equipments, pickling plant, heat resistant casting.

STAINLESS STEEL ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
45	**WELDFAST 320** AWS A/SFA - 5.4 E 320-15	A medium heavy coated basic type all position electrode giving a smooth arc, medium penetration and least spatter. The slag is easily removable and has a smooth and uniform bead. The weld metal can withstand temperature up to 1200°C in continuous service. Excellent resistance to chemical corrosion and heat. Re-drying temperature is 300°C for 1 hr.	**C** : 0.07 max **Mn** : 1.20-1.80 **Si** : 0.60 max **Ni** : 32.0-36.0 **Cr** : 19.0-21.0 **Mo** : 2.00-3.00 **Cu** : 3.00-4.00 **Cb** : 1.00% max **S** : 0.03 max **P** : 0.03 max	**UTS** : 550-600 N/mm^2 **Elongation** : 30 % min **Current** : DC$^+$	For welding cast or wrought heat resistant alloys like HV9, carpenter 20. Application for a wide range of chemical plants handling sulphuric and sulphurous acids and their salts.
46	**WELDFAST 13** AWS A/SFA - 5.4 E 410-15	A heavy basic coated electrode, specially designed for welding of ferritic martensitic chrome steels. The weld metal contains 13% Cr and air hardenable. Hardening can be avoided through preheating and stress relieving. Re-drying temperature is 300°C for 1 hr.	**C** : 0.06-0.09 **Mn** : 0.50-0.90 **Si** : 0.40-0.60 **Cr** : 11.0-13.0 **S** : 0.03 max **P** : 0.04 max	**UTS** : 530-580 N/mm^2 **Elongation** : 23-27% **Current** : DC$^+$	For joining of heavy section of steel armatures, welding of similar corrosion resistant Cr Steels and steels casting. It is also used in pump parts, oil refinery equipments, coal washers and general corrosion & heat resisting applications.
47	**WELDFAST 410** AWS A/SFA - 5.4 E 410-15	A basic coated electrode with ER410 core wire for welding of 13% Cr Steels for producing straight chrome stainless steel deposit on austenitic stainless steels and carbon steels. The weld deposit is of air hardening type and requires preheat and post heat treatment to achieve optimum ductility and toughness to resist cavitation-erosion, abrasion and moderate corrosion. Re-drying temperature is 300°C for 1 hr.	**C** : 0.10 max **Mn** : 1.00 max **Si** : 0.90 max **Cr** : 11.00-13.50 **S** : 0.03 max **P** : 0.04 max	**UTS** : 520-570 N/mm^2 **Elongation** : 24-28% **Current** : DC$^+$	Very much suitable for refiner plug and socket, sleeves, turbine runners, valve seats etc.
48	**WELDFAST 410Ni-Mo** AWS A/SFA - 5.4 E 410Ni Mo -15 (Nearest)	A basic coated all position electrode. It gives smooth arc, easy removal of slag and uniform weld bead. The weld deposit is of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.05 max **Mn** : 0.60-0.90 **Si** : 0.30-0.60 **Cr** : 11.5-14.0 **Mo** : 0.40-0.60 **Ni** : 3.80-5.50 **S** : 0.03 max **P** : 0.03 max	**UTS** : 790 N/mm^2 min **YS** : 590 N/mm^2 min **Elongation** : 14% min **CVN Impact at 23±5°C** : 50 J min **CVN Impact at 0°C** : 45 J min **Current** : DC$^+$ **Hardness** : 260 BHN PWHT @ 600°C for 8 hrs is necessary to achieve desired properties	For welding ASTM CA6NM (CA-6NM) castings or similar materials as well as type 410, 410S and 405 base metals.
49	**WELDFAST 430** AWS A/SFA - 5.4 E 430-15	A basic coated electrode for welding of AISI 430 stainless steel and steels of slightly lower or higher Cr content. Welding with Weldfast 430 electrodes usually require suitable preheat and post heat treatment to obtain optimum physical properties of the weldment. The weld deposits are of radiographic quality. Re-drying temperature is 300°C for 1 hr.	**C** : 0.10 max **Mn** : 1.00 max **Si** : 0.90 max **Cr** : 15.0-18.0 **Ni** : 0.60 max **Mo** : 0.75 max **S** : 0.03 max **P** : 0.03 max.	**UTS** : 580 min N/mm^2 **Elongation** : 20% min **Current** : DC$^+$	For welding of AISI 430 stainless steels, automobile body moulding, oil burner parts, equipments in chemical & food industries.

STAINLESS STEEL ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
50	**WELDFAST 630** AWS A/SFA- 5.4 E 630-16	It offers the combined characteristics of a strong, corrosion resistant, easily machinable weld metal. This electrode is primarily designed for welding ASTM A-564, type 630 (17Cr, 4 Ni) and precipitation hardenable steel. The composition of the weld deposit is modified to eliminate ferrite stringers in the martensitic microstructure that would improve the mechanical properties. Depending on the weld dimensions and applications, it may be used in the as welded, welded plus precipitation hardened, or welded plus solution treated plus precipitation hardened condition. Re-drying temperature is 300ºC for 1 hr.	**C** : 0.05 max **Mn** : 0.25-0.75 **Si** : 0.75 max **Ni** : 4.50-5.00 **Cr** : 16.0-16.75 **Mo** : 0.75 max **Nb** : 0.15-0.30 **Cu** : 3.25-4.0 **S** : 0.03 max **P** : 0.04 max	**UTS** : 1030 N/mm^2 min **Elongation** : 10% min **Current** : DC$^+$	Electrodes of this composition are used in a wide variety of applications including oil field valve equipment chemical process equipment, fittings, pumpshafts, gears, paper mill equipment, and aircraft parts.
51	**WELDFAST 2209** AWS A/SFA- 5.4 E 2209-16	It is a rutile basic coated electrodes giving 22.5Cr, 3.00 Mo, 0.12 N which has excellent corrosion resistant. It gives smooth arc, self removal of slag, least spatter and uniform weld bead. These electrodes give increased tensile strength with improved resistance to pitting corrosive attack and to stress corrosion cracking. This electrode is specially designed for ferritic-austenitic stainless steels or the so called "Duplex stainless steels".	**C** : 0.04max **Mn** : 0.50-2.00 **Si** : 1.00 max **Ni** : 8.50-10.50 **Cr** : 21.50-23.50 **Mo** : 2.50 - 3.50 **N** : 0.08-0.20 **Cu** : 0.75 max **S** : 0.03 max **P** : 0.04 max	**UTS** : 690 N/mm² min **Elongation** : 20% min	Electrodes of this composition are used primarily to weld duplex stainless steel which contains approximately 22 percent of chromium. It finds extensive use in welding duplex steels which needs high resistance to stress corrosion cracking and high yield strength e.g. In ship building industry, chemical industries etc.
52	**WELDFAST 2594** AWS A/SFA-5.4 E 2594-16	Duplex stainless steel all position electrodes giving 25.5 Cr,10.0 Ni, 4.0 Mo, 0.25N deposit gives smooth arc, self removal of slag, least spatter and uniform weld bead. Re-drying temperature is 300°C for 1 hr	**C** : 0.04 max **Mn** : 0.50-2.00 **Si** : 1.00 max **Ni** : 8.00-10.50 **Cr** : 24.0-27.0 **Mo** : 3.50 - 4.50 **N** : 0.20 - 0.30 **Cu** : 0.75 max **S** : 0.03 max **P** : 0.04 max	**UTS** : 760 N/mm² min **Elongation** : 15% min	It is designed for welding of type 2507 super duplex stainless steels and similar composition. It can also be used for the welding of carbon and low alloy steels to duplex stainless steels as well as to weld standard duplex stainless steels such as type 2205.
53	**WELDFAST 2553** AWS A/SFA- 5.4 E 2553-16	Rutile coated electrode for welding super duplex austenitic ferritic steels. Weldmetal deposited by these electrode combine increased tensile strength with improve resistance to pitting corrosive attack and stress corrosion. The electrode deposits weld metal having uniform and fine ripples. Slag removal is very easy and spatter loss is extremely low. Electrode works in all positions. Re-drying temperature is 300ºC for 1 hr.	**C** : 0.06 max **Mn** : 0.50-1.50 **Si** : 1.00 max **Ni** : 6.50-8.50 **Cr** : 24.00-27.00 **Mo** : 2.90-3.90 **N** : 0.10-0.25 **Cu** : 1.50-2.50 **S** : 0.03 max **P** : 0.04 max	**UTS** : 760 N/mm²min **Elongation** : 15% min	It is designed for welding of type 2553 super duplex stainless steels and similar composition. Welding of super duplex austenitic ferritic stainless steels. Used for piping in gas or oil, offshore platforms.
54	**WELDFAST 307S** AWS A/SFA 5.4 E307-16 IS 5206 / E18.8MnR26	A high deposition efficiency electrode for depositing extremely tough buffer layer prior to hardfacing or joining of dissimilar sections of almost any composition of steel. Re-drying temperature is 300ºC for 1 hr. ***Approvals :*** RDSO : CLASS M5	**C** : 0.06-0.10 **Mn** : 3.30-4.75 **Si** : 0.50-0.80 **Cr** : 18.0-21.0 **Ni** : 9.00-10.70 **S** : 0.03 max **P** : 0.03 max	**UTS** : 580-620 N/mm² **Elongation** : 30 - 35% **Hardness** (As welded) : 180-220 BHN **Hardness** (Work hardened) : 500 - 550 BHN **Current** : AC/DC$^+$	Rebuilding of austenitic manganese parts, over laying on cast steels, carbon & alloy steels, diamond crossings, forging hammer and anvil repair. The deposit can stand heavy impact loading work hardens in service.

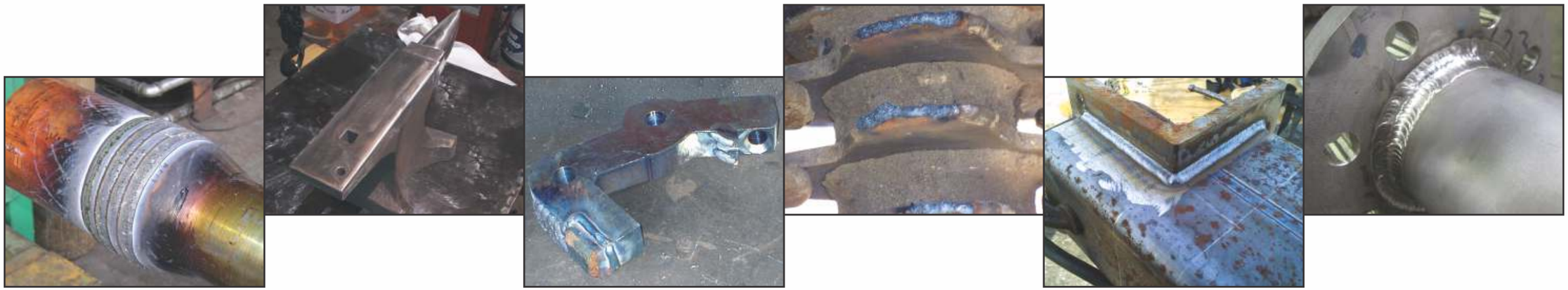


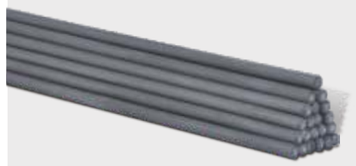
HARDFACING ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
55	**WELDFAST HARDEX I**	A low hydrogen type electrode deposits wear resistant material with excellent resistance to heavy shocks.The deposit can be heat treated and it is machinable in as welded condition. Re-drying temperature is 300°C for 1 hr.	**C** : 0.20-0.30 **Mn** : 0.80-1.20 **Si** : 0.50-0.80 **S** : 0.03 max **P** : 0.03 max	**As Welded** : 250 - 300 BHN **Heat Treated** : 450 - 500 BHN (Three layer deposit) **Current** : AC/DC+	For rebuilding wagon wheels, gear teeth, sprockets, idler shafts,wire drawing drums etc.
56	**WELDFAST HARDEX II**	A low hydrogen type electrode deposits wear resistant material with excellent resistance to moderately heavy shocks and wear caused by heavy sliding or rolling friction. Re-drying temperature is 300°C for 1 hr.	**C** : 0.15-0.25 **Mn** : 3.00-3.50 **Si** : 0.50-0.80 **Cr** : 0.30-0.70 **S** : 0.03 max **P** : 0.03 max	**As welded** : 350- 450 BHN (Three layer deposit) **Current** : AC/DC+	For pneumatic equipments, anvils, wheels flanges, sprockets, bucket chain links, bucket bases, guide rollers, actuating cams, bucket laddle tumblers. The electrode can be used on carbon, low alloy steels and on various grades of cast iron.
57	**WELDFAST HARDEX II R** IS 7303 EFe-B314	It is a medium-heavy coated rutile, air hardening type electrode for hardfacing on mild steel, carbon steel and low alloy steels. In hard base materials it is advisable to use buffer layer of Weldfast LH-16. Weld deposit is machinable with good cutting tools. Re-drying temperature is 120°C for 1/2 hr. ***Approvals :*** RDSO:CLASS H4B	**C** : 0.05-0.15 **Mn** : 0.50-1.00 **Si** : 0.30-0.50 **Cr** : 2.00-3.00 **S** : 0.03 max **P** : 0.03 max	**As welded** : 350- 450 BHN (Three layer deposit) **Current** : AC/DC+	For shear blades, cold-punching dies, converyor parts, crawler parts, axle, sprockets, latch bars, pulleys, brake shoes, large cog wheels and other steel castings, where resistance to abrasion combined with toughness is required.
58	**WELDFAST HARDEX III**	A low hydrogen type electrode and deposits are wear resistant with excellent resistance to abrasion even under moderate shocks. Re-drying temperature is 300°C for 1 hr.	**C** : 0.40-0.60 **Mn** : 0.60-1.20 **Si** : 0.50-0.80 **Cr** : 5.00-7.00 **Mo** : 0.50-1.00 **V** : 0.40-0.80 **S** : 0.03 max **P** : 0.03 max	**As welded** : 600- 650 BHN (Three layer deposit) **Current** : AC/DC+	It is very much suitable for hardfacing on carbon steels, low alloy steels and on cast irons. The applications include industrial knife edges, mill hammers, dredging bucket rims, shovel jaws and parts of agricultural and earth moving machinery.
59	**WELDFAST HARDEX III R**	A medium heavy coated rutile type electrode for hard facing on mild steel, carbon steel and low alloy steels, where approx 600 Brinell hardness is required. Weld is non-machinable and can only be ground. When used on austenitic manganese steel parts, give a buffer layer of Weldfast 307. Re-drying temperature is 120°C for 1/2 hr.	**C** : 0.40-0.60 **Mn** : 0.60-1.20 **Si** : 0.30-0.60 **Cr** : 2.50-3.00 **S** : 0.03 max **P** : 0.03 max	**As welded** : 600- 650 BHN (Three layer deposit) **Current** : AC/DC+	The electrode is suitable for abrasion, impact or a combination of both, such as metal cutting and forming tools, hot and cold punching dies, drill bits, shears and croppers, oil expeller, crusher hammers, cane and bamboo cutting knives, crane wheels, conveyor buckets etc.

HARDFACING ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
60	**WELDFAST HARDEX IV**	A low hydrogen type electrode which deposits wear resistant material with excellent resistance to abrasion. The deposit can withstand very heavy compression without crumbling. Re-drying temperature is 120°C for 1/2 hr.	**C** : 2.00-4.00 **Mn** : 0.50-2.50 **Si** : 1.50-4.00 **Cr** : 4.00-7.00 **S** : 0.03 max **P** : 0.03 max	**As welded** : 580- 630 BHN (Three layer deposit) **Current** : AC/DC$^+$	For oil expeller worms, ploughshears, sand gravel, coal conveyor parts etc.
61	**WELDFAST MANGAN**	A highly alloyed austenitic electrode, depositing wear resistant material with excellent resistance under heavy impact loads. The deposit rapidly work hardens and provides a fairly high hardness with a tough core to absorb shocks. Re-drying temperature is 300°C for 1 hr. ***Approvals :*** BEML	**C** : 0.50-1.00 **Mn** : 12.00-14.00 **Ni** : 3.00 max **S** : 0.03 max **P** : 0.03 max	**Hardness** : 240-260 BHN (As welded) **Hardness** : 500-550 BHN (Work hardened) Current : AC/DC$^+$	Ideal for deposit on mild, carbon or low alloy steels and manganese steel. It is also used to resurface roll crusher, jaw crusher, shovel and excavator bucket tooth points, rail switch over points etc.
62	**WELDFAST MANGAN (SPL)**	A hard facing electrode, depositing wear resistant material with excellent resistance under moderate impact loads. The deposit rapidly work hardens and provides a fairly high hardness with a tough core to absorb shocks. The weld may give relief cracks but that may not affect the application. Re-drying temperature is 300°C for 1 hr.	**C** : 0.50-1.00 **Mn** : 12.00-14.00 **S** : 0.03 max **P** : 0.05 max	Hardness : 240-260 BHN (As welded) Hardness : 500-550 BHN (Work hardened) **Current** : AC/DC$^+$	Useful for hard facing on various grades of carbon steel & Mn steels.





CAST IRON ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
63	**WELDFAST CI** AWS A/SFA 5.15 E St	Weldfast CI is electrode for depositing non machinable layer on various cast irons. It deposits weldmetal with exceptional colour match. Re-drying temperature is 120°C for 1/2 hr.	**C** : 2.00 max **Mn** : 1.20 max **Si** : 2.00 max **Cr** : 0.40 max **N** : 0.30 max **S** : 0.03 max **P** : 0.03 max **Fe** : Bal	**Current** : AC/DC^{+}	The electrode is ideal for filling casting defects and also for sealing runs in repairing old contaminated, oil/grease soaked castings. The deposit in first run is generally not machinable.
64	**WELDFAST CIMAC** AWS A/SFA 5.15 E NiFeCI	A nickel based alloy depositing very dense and highly crack resistant weld metal. The deposit is machinable and offers a reasonable colour match. It can weld all grades of cast irons to itself or to steel. Re-drying temperature is 120°C for 1/2 hr.	**C** : 2.00 max **Mn** : 2.50 max **Si** : 4.00 max **Ni** : 45.00-60.00 **Cu** : 2.50 max Al : 1.00 max **S** : 0.03 max **P** : 0.03 max **Fe** : Bal	**UTS** : 400-580 N/mm^{2} **Elongation** : 6-18% **Hardness** : 165-218 BHN **Current** : AC/DC^{+}	Useful in repairing wornout gears, cams, impeller rings, cracked bearing blocks, cast iron frames etc.

CUTTING & GOUGING ELECTRODES

No.	Product	Characteristics	All Weld Analysis (%)	Mechanical Properties	Application
65	**WELDFAST GROOVECUT**	A medium heavy coated electrode for cutting and piercing ferrous and non ferrous metals.	--- ---	**Current** : AC/DC^{+}	Useful on carbon steels, low alloy steels, stainless steels, cast irons and non ferrous alloys. Hold the electrodes at 45° to the job and use sawing motion to cut.
66	**WELLGOUGE**	Wellgouge has a special coating to produce high blowing effects and a hot exothermic arc to remove metal efficiently.	--- ---	**Current** : AC/DC^{+}	The electrodes is useful in chamfering gouging and grooving all metals commonly used in industry. It is useful for gouging out old/ defective weldmetal, bevelling cracks, removing unwanted sections, flashes, risers etc.

LABORATORY FACILITIES

- Technical modification reserved.
- Chemical analysis wherever provided are guiding values of pure all weld deposit, values in percentage.
- WELDWELL R & D has the capacity to develop, test and produce new products as per the specific requirement of the customer.
- Any of the products can be withdrawn without prior notice.

STORAGE AND DRYING OF ELECTRODES

The most ideal storing conditions are well ventilated dry stores where electrode cases or packets are stored on pallets or racks off the floor. The store temperature should be minimum 2°C above the ambient and relative humidity 50% max. Wherever it is possible and when-ever optimum results from electrodes are desired, following storing, holding and redrying temperatures are recommended :

Type of Electrodes	Storing Conditions	Redrying Conditions	Holding Conditions
M. S. General Purpose Super, Quality, Supreme and Contact	30° ± 10°C, RH 50% max.	120° ± 10°C	Same as storage
Low Hydrogen LH 16, LH 18, LH 18-1, LH 28	30° ± 10°C, RH 50% max.	300° ± 20°C	120° - 150°C
Low Alloy & High Tensile CROMO & Tensal Series	30° ± 10°C, RH 50% max.	300° ± 20°C	120° - 150°C
Hardfacing Electrodes Hardex I, II, III IV Hardex IIR, IIIR	30° ± 10°C, RH 50% max. 30° ± 10°C, RH 50% max.	300° ± 20°C 120° ± 10°C	120° - 150°C Same as storage
All Stainless Steel Electrodes	30° ± 10°C, RH 50% max.	300° ± 20°C	120° - 150°C
Cast Iron Machinable	30° ± 10°C, RH 50% max.	120° ± 10°C	Same as storage

Note : *Under site working conditions, it is recommended that the electrodes for welding are drawn from hot cannisters and the balance electrodes at the end of the working day are returned to drying oven.*

MIGFAST - 1

Copper - Coated Continuous solid wire for MIG/MAG welding

Classification	AWS/SFA -5.18 ER 70S-6 ***Approvals :*** M. N. Dastur & Co., CIB (Maharashtra)
Characteristics	A copper coated solid Steel wire for MIG/MAG welding of carbon steels. Normally recommended with CO_2 Shielding, also can be used with Ar-CO_2 mixtures. Uniform copper coating, smooth feeding, stable arc and minimum spatter under optimum welding conditions are the speciality of MIGFAST-1.
Applications	Maximum applications in Automobile Industry, Construction and Mining Equipment, Railway Wagon and Coaches, Storage tanks, Pressure Vessels, Steel Furniture, Pipes, LPG cylinders and Structural fabrications.
Welding current	DCEP
Wire Chemistry (%)	C 0.06 - 0.15 · Mn 1.40 - 1.85 · Si 0.80 - 1.15 · S 0.035 max · P 0.025 max · Cu 0.50 max
All-Weld Mechanical Properties (CO_2 Shield)	UTS-N/mm² 500 min. · YS-N/mm² 420 min. · Elng.(%)-(l = 4 x d) 22min. · CVN Impact values at 0°C 50J, -30°C 27J Obtained with normal welding parameters. The values may change if parameters are changed markedly.
Shielding Gas	CO_2 Consumption rate 10-12 lit / min
Welding Position	Down hand / Horizontal / Vertical
Sizes (mm)	0.80, 1.00, 1.20, 1.60
Packing Specification	Supplied in spools.
Net Weight of Spool	12.5 / 15.0 Kg approx.
Packing	Each spool is sealed in an airtight polythene bag and then packed in a corrugated box, which is again shrink-packed for better protection.

MIGFAST - 2

Copper - Coated Continuous solid wire for MIG/MAG welding

Classification	AWS/SFA 5.28 ER 90S-D2 ***Approvals :*** RDSO : Class III						
Characteristics	A copper coated MIG wire for MIG/MAG welding of high tensile steels. Uniform copper coating, smooth feeding, stable arc and minimum spatter under optimum welding conditions. Normally recommended with Ar/O_2 Shielding, CO_2 shielding can also be used.						
Applications	Welding of SAILMA 450/450H1 steel used in CONCOR wagons is typical application for this wire. Is used for welding of high tensile steels like IS 8500 Grades 540 B, 570 B and 590B; IS 2002 Gr. III, IS 1875 Cl.						
Welding current	DCEP						
Wire Chemistry (%)	C 0.07 - 0.12	Mn 1.60 - 2.10	Si 0.50 - 0.80	Mo 0.40 - 0.60	S 0.025 max	P 0.025 max	Ni 0.15 max	Cu 0.50 max
All-Weld Mechanical Properties	YS-N/mm²		UTS-N/mm²		Elng.(%)-(L = 4 x d)		CVN Impact values at	
	Ar + 1-5%O_2 Gas Mix	540 min.		620 min.		17 min.	-30°C	27J
	100% CO_2	460 min.		590 min.		15 min.	-20°C	27J
	Values obtained with normal welding parameters. The values may change if parameters are changed markedly.							
Shielding Gas	Ar + O_2, CO_2							
Welding Position	F, H, V-up, V-down, OH							
Sizes (mm)	1.20, 1.60, 2.00							
Packing Specification	Supplied in spools.							
Net Weight of Spool	12.5 / 15.0 Kg approx.							
Packing	Each spool is sealed in an airtight polythene bag and then packed in a corrugated box, which is again shrink-packed for better protection.							






MIGFAST- 3 / TIGFAST - 3

Classification	AWS/SFA 5.18 ER 70S-2
Characteristics	Deoxidized copper coated mild steel wire. It gives stable arc, smooth flow and minimum spatter under Optimum welding conditions.Welds are of radiographic quality.
Applications	Structural, pressure vessels and boilers involving unalloyed and micro-alloyed structural steels. It meets HIC & SSCC test as per NACE specification.
Welding current	DCEP
Wire Chemistry (%)	C 0.07 max; Mn 0.90-1.40; Si 0.40-0.70; S 0.03 max; P 0.025 max; Ti 0.05-0.15; Zr 0.02-0.12; Al 0.05-0.15; Cu 0.50 max
All-Weld Mechanical Properties (Argon Shield)	UTS-N/mm^2 480 min.; YS-N/mm^2 400 min.; Elng.(%)-(L = 4 x d) 22 min.; CVN Impact values at -30°C 27J min. Obtained with normal welding parameters. The values may change if parameters are changed markedly.
Shielding Gas	Argon
Welding Position	All positions
Sizes (mm)	0.80, 1.20, 1.60, 2.00, 2.50
Packing Specification	Supplied in spools as well as in cut lengths of 1000mm (TIGFAST-3 is available in 1.60, 2.00, 2.40 & 3.15mm Sizes).
Weight	12.5 / 15.0 Kg approx. in spool and cut lengths in 5.0 Kgs telescopic tube, then 4 nos of tubes are packed in one box (20 Kg net).
Packing	Each spool is sealed in an airtight polythene bag and then packed in a corrugated box, which is again shrink-packed for better protection.

MIGFAST – 4

Copper – Coated Continuous solid wire for MIG/MAG welding

Classification	AWS/SFA 5.28 ER 80S-D2
Characteristics	A copper-coated, low-alloy, molybdenum (0.5% Mo), solid wire for the GMAW of creep-resistant steels of the same type, such as pipes in pressure vessels and boilers with a working temperature of up to 500°C. It can also be used for welding low-alloy high tensile strength steels. MIGFAST–4 is usually welded with 100% Argon as the shielding gas. The mechanical properties are given in the stress-relieved condition.
Applications	Suitable for welding of Mn and 0.5 Mo steels
Welding current	DCEP
Wire Chemistry (%)	C 0.07 - 0.12; Mn 1.60 - 2.10; Si 0.50 - 0.80; Mo 0.40 - 0.60; Ni 0.15 max; S 0.025 max; P 0.025 max; Cu 0.50 max
All-Weld Mechanical Properties 100% Ar	YS-N/mm^2 490 min.; UTS-N/mm^2 590 min.; Elng.(%)-(L= 4 x d) 17 min.; CVN Impact values at -30°C 27J min. Obtained with normal welding parameters. The values may change if parameters are changed markedly.
Shielding Gas	Argon/ CO_2 — ***Note :*** *The properties may vary with CO_2 shielding.*
Welding Position	F, H, V-Up, V-Down, OH
Sizes (mm)	1.20, 1.60, 2.00
Packing Specification	Supplied in spools.
Net Weight of Spool	12.5 / 15.0 Kg approx.
Packing	Each spool is sealed in an airtight polythene bag and then packed in a corrugated box, which is again shrink-packed for better protection.






WELDWELL ELECTRODES

MIGFAST- 5

Copper – Coated Continuous solid wire for MIG/MAG welding

Classification	AWS/SFA 5.28 ER 90SG
Characteristics	A copper-coated low-alloy steel gas-shielded welding wire. It has excellent all position welding performance.
Applications	It is use for welding of high tensile strength steel, such as steel construction, pressure vessels, vehicles and bridges.
Welding current	DCEP
Wire Chemistry (%)	C 0.07-0.12 · Mn 1.60-2.15 · Si 0.50-0.85 · Mo 0.40-0.65 · Ni 0.15max · S 0.025 max · P 0.025 max · Cu 0.50 max
All-Weld Mechanical Properties (100% Ar)	UTS N/mm² 625 min. · YS N/mm² 550 min. · Elng.(%) (L = 4 x d) 18 min. · CVN Impact values at -30°C 50J, -46°C 27J Obtained with normal welding parameters. The values may change if parameters are changed markedly.
Shielding Gas	Argon
Welding Position	F,H, V-up, V-down, OH
Sizes (mm)	1.20, 1.60, 2.00
Packing Specification	Supplied in spools.
Weight	12.5 / 15.0 Kg approx.
Packing	Each spool is sealed in an airtight polythene bag and then packed in a corrugated box, which is again shrink-packed for better protection.

SOLID STAINLESS STEEL WIRES FOR MIG / TIG WELDING

Brand Name	AWS Classification (AWS/SFA-5.9)	WIRE CHEMISTRY (%) C	Cr	Ni	Mn	Si	Mo	Nb	Mechanical Properties of All Weld Metal in As welded condition UTS Mpa	Elongation	Sizes (Dia. mm)
MIGFAST 308/ TIGFAST 308	ER 308	0.08	19.50-22.00	9.00-11.00	1.00-2.50	0.30-0.65	_	_	550 Min	35% Min	**MIGFAST** in Spools of 12.5 or 15.0kgs. **TIGFAST** in 1.20, 1.60, 2.00, 2.50, 3.15, 4.00mm sizes (in 1000 mm length)
MIGFAST 308L/ TIGFAST 308L	ER 308L	0.03	19.50-22.00	9.00-11.00	1.00-2.50	0.30-0.65	_	_	520 Min	35% Min	
MIGFAST 347/ TIGFAST 347	ER 347	0.08	19.00-21.50	9.00-11.00	1.00-2.50	0.30-0.65	_	1Max	520 Min	30% Min	
MIGFAST 316/ TIGFAST 316	ER 316	0.08	18.00-20.00	11.00-14.00	1.00-2.50	0.30-0.65	2.00-3.00	_	520 Min	30% Min	
MIGFAST 316/ TIGFAST 316 L	ER 316L	0.03	18.00-20.00	11.00-14.00	1.00-2.50	0.30-0.65	2.00-3.00	_	490 Min	30% Min	
MIGFAST 309/ TIGFAST 309	ER 309	0.12	23.00-25.00	12.00-14.00	1.00-2.50	0.30-0.65	_	_	550 Min	30% Min	
MIGFAST 309L/ TIGFAST 309L	ER 309L	0.03	23.00-25.00	12.00-14.00	1.00-2.50	0.30-0.65	_	_	520 Min	30% Min	
MIGFAST 309 Mo/ **TIGFAST 309 Mo**	ER 309Mo	0.12	23.00-25.00	12.00-14.00	1.00-2.50	0.30-0.65	2.00-3.00	_	550 Min	30% Min	
MIGFAST 310/ TIGFAST 310	ER 310	0.08-0.15	25.00-28.00	20.00-22.50	1.00- 2.50	0.30-0.65	_	_	550 Min	30% Min	
MIGFAST 312/ TIGFAST 312	ER 312	0.15	28.00-32.00	8.00-10.50	1.00- 2.50	0.30-0.65	_	_	660 Min	22% Min	
MIGFAST 410/ TIGFAST 410	ER 410	0.12	11.50-13.50	_	0.60	00.50	_	_	520 Min *	20% Min *	
MIGFAST 430/ TIGFAST 430	ER 430	0.10	15.50-17.00	_	0.60	00.50	_	_	450 Min**	20% Min**	

Note : Weld metal properties with 100 % Ar gas shielding.
* After PWHT at 750° C for 1 Hr, furnace cooled to 315° C and then air cooled to ambient.
** After PWHT at 770° C for 2 Hr, furnace cooled to 595° C and then air cooled to ambient.






CHOICE OF WELDWELL MAKE ELECTRODES FOR INDIAN & VARIOUS INTERNATIONAL SPECIFICATIONS OF STEEL

M. S. General Purpose Electrodes

Weldwell Brand	Indian Standard IS	British Standard BS	German Standard DIN	American Standard SAE/AISI	ASTM
Weldfast Super Weldfast Quality Weldfast Supreme Weldfast Contact	IS2062 plates, angles, tees, beams, channels flats IS432-1966, MS Grl&II IS1875-IS1878-1A IS1977-1975 Fe-310-0(St32), Fe 410-0 (St42) IS2073-1970-C14 IS2830-1975 Gr 1Fe410SBI Gr 2 Fe410SB2 Gr 3 Fe410SB3 IS4432+1967C10,C14 IS5489-1975-14C6	BS 970-1955 En2,ABCDE, 132A BS1970-1972 015A03, 030A04 040A04, 050A04, 040A10, 050A10 040A12, 050A12 040A15, 050A15 040A17, 050A17 45 M10	DIN 1654 1954 Cq15,Cq22 DIN 17210-1969 C10, C15, Ck10, Ck 15, Cm15	SAE - 1970 1005, 1006, 1008, 1010, 1011, 1012, 1013, 1015	A-36 A-283 Gr A,B,C,D, A-181 Gr 60,70 A-21-6ECA

Low Hydrogen Electrodes

Weldfast LH 16 Weldfast LH 18 Weldfast LH 18-1 Weldfast LH 28	IS2062, IS2002, IS432 MS Grs, I & II Medium tensile steel, IS961 Fe570HT, ST58 HT, Fe540 WHT ST 55WHT IS1875-1978- 15C8C11A, 20C8C12/2A, 30C8C13/3A, IS2073-1970-C20, C30, C40 14 Mn1 IS14, 13S25 IS2830-1975-Grs, I, II & III IS2831-1975-Fe310 OB Fe 410 OB, IS3930-30CB (C30), 35CB (C35Mn75) IS4368-20Mn2 IS4431-10C8S10, 14C14S14, 25C12S14, 11C10S25, 40C15S12, C15Mn15, 10S11, IS5489-28C6	BS970-1955 En1A, 1B, 3ABCD,4,5, 7A, 8A,B,C,D, Am,Bm,Cm,Dm, 201, 202	DIN 1645-1954 Cq15, Cq22, Cq35, DIN 17210-1969 C10, C15 C35, C45, Ck15, Cd22, Ck35, Ck45, 40 Mn4, 28 Mn6, Cm15,Cm35, Cm45,21 Mn6	SAE-1970 1005, 1006, 1008, 1010, 1011,1012, 1013, 1015 1016, 1017 1018, 1019 1020, 1021 1022, 1023 1025, 1026 1028, 1030 1035, 1024 1027, 1036 1109, 1110 1116, 1211 12L13, 12L14 1513, 1518 1522, 1525 1526	A-105, A-106, Gr.A,B,C, A-210 Gr.A1, Gr, C, A-350, Gr, LF 1&2 A-182, Gr, F1, A-333-Gr, 1&6 A-691 CMSH70 A-334-Gr.146 A-515 A-537 Gr.2 A-266, Gr,1,2,3,4 A-216-WCBB WCC A-181-Gr.60-70 A-234-WPA, WPB, WPC A-285 Gr.A, B & C

Low Hydrogen Electrodes

Weldwell Brand	Indian Standard IS	British Standard BS	German Standard DIN	American Standard SAE/AISI	ASTM
Weldfast CROMO 0500	IS39030-1977-47 Mn6 40Mn 15S12, 35Mn6 Mo3 35 Mn6 Mo4		15Mo3, 16Mo5	4012, 4023 4024, 4027, 4419	A-209 Gr. TI A-161 TI, A-182F1 A-691-CM65,70,75 A-234-WP1
Weldfast CROMO 1500	IS1570-07Cr 90 Mo55 15Cr 90Mo55, 13CrMo44, 25CrMo 44, 40Cr 4, 50 Cr4V2 40 Cr4Mo3, 17Mn5Cr4	BS970- 1955-En20A, En206 En 207	DIN 1654-1954 -34Cr4, 41Cr4, 40CrMo4, 25 Cr Mo4, 34CrMo4, 42CrMo 4, 30CrMoV9, 34CrS4, 34CrMoS4	AISI 4118	A-234-WP11,WP12 A-335, Gr. P1, P2 A-182 F11, F12, F1 A-200 T11, A-369 FP2, FP11, FP12, A-381F12, A-387B,C
Weldfast CROMO 2251	10Cr 2 Mo1				A-182 Gr. F21, F22, A-199 T22, A-200 & A-213 T22, A-336 F22, A-369 FP22
Weldfast CROMO 5500	IS1570-10Cr5 Mo55, 20CrMo55 IS5517-1978-15Cr 13Mo6, 25 Cr13Mo6, 40CrMo10V2	BS1508-625, BS1628 GrB BS1731 GrB			A-182F5, F54, A-199T5, A-200T5, A-213T5 A-335P5, F5, A-369 FP5
Weldfast CROMO 9100					A-182 F7 F9 A-691-CMS-70
Weldfast Tensal 80	40 Ni14, 35Ni5Cr2, 40Ni6CrMo2, 31Ni10Cr3 Mo6, 20Ni7Mo2 20NiCr2Mo2	En15, 325, 351	DIN17210- 15CrNi6, 16CrNiMo6, 36CrNiMo4, 34CrNiMo6, 30CRNiMo8	AISI 4320, 4340, 4615	A-202 Gr A&B A-299
Weldfast 410	IS6529-04Cr12	En56 A, B, C	X15Cr13		A-182-F6 A-473-405, 410S
Weldfast 13	12Cr13, 20Cr13, 30Cr13	BS1503-713	X07Cr13	AISI 1405, 410	A-268-TP405, A-176,A240 Gr 405, 410,A-336F6

CHOICE OF WELDFAST ELECTRODES FOR INDIAN & VARIOUS INTERNATIONAL SPECIFICATIONS OF STEEL

Weldfast Electrodes	Indian Standard IS	British Standard BS	German Standard DIN	American Standard SAE/AISI	ASTM
Weldfast 430	IS6529-05CR17	En60	X8Cr17		A-176,276 & 473 Gr.430
Weldfast 308	IS1570-02Cr18Ni11 04Cr18 Ni10, 07 CR18Ni9, 10Cr17 Ni7	En 58 ABCDEF	X5CrNi 189, X5CrNi 199	AISI 304/ SAE 303,304 AISI 4201, 202 305, 308, 301, 302, 304	A-167,240,270,276 & 314 Type 304 182F304 A-213, 376, 249, 271 GrTP 304H, A-351- CF8, CF8A, CF 8C
Weldfast 308L	02Cr18Ni11		X2CrNi189	AISI 302, 304, 304L	A-213, 249, 312 TP304L & H A-351, CF3,CF3A
Weldfast 347	04Cr19NiTi20 04CR10Ni9Nb40	BS3014 Gr3 BS3014 Gr5	X10CrNiTi189 X10CrNiNb189	SAE30321, AISI321, SAE30347, AISI347	A-213-TP321-321H 347,347H & 348H
Weldfast 316	05Cr18Ni11Mo3 04Cr17Ni12Mo2	En58H	X5CrNiMo1812	SAE30316, AISI316	A-167,240,276 473 Type 31 A-213,249,269, 312, 376 409 Gr.TP316, TP31'6H
Weldfast 316L	02Cr17Ni12Mo2	En58H	X2CrNiMo1812 X5CrNiMo1910	SAE30316L, AISI316L	A-167,240, 473 Type316L, A213, 249, 269, 312, Gr. TP A-351 CF8M, CF10 MC,CF3M, CF3MA
Weldfast 318	07Cr19Ni9Mo2Ti28	En58H		SAE30316, AISI316	A-213-Tp316,316H
Weldfast 309					A-351-CH8, CH10,CH20
Weldfast 310	10Cr25Ni18		X12CrNi2520	SAE 30310S, AISI 310S	A-213-TP310, F310 CN7M A-312-TP310, A-351-CK20, HK20, 40

COMPOSITION OF COMMONLY USED GRADES OF STEELS UNDER VARIOUS SPECIFICATIONS

Specification	Grade	Usage	Common Section	Composition in Wt.% C	Mn	Si	Cr	Ni	Mo	Other	Recommended Weldwell Electrode	Remarks
IS226		Structural Steel	Plates, angles tee, beams, channels, round, square & hexagonal bars	0.25 - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	Weldfast Super Quality, Supreme, Contact	For Joint thickness up to 20 mm Beyond 20 mm, use low H_2 type
IS432	MS Gr.I MS GR.II	Steel for concrete	Bars &Wires	0.25 0.17	- -	- -	- -	- -	- -	- 	-do-	-do-
IS 961	Fe570HT (St.58HT) FE540WHT (St55HTw)	Structural steel, high Strength	Merchant sections	0.27 0.20	- -	- -	- -	- -	- -	- -	Weldfast LH16-LH18 Weldfast LH16/LH18	Post Weld HT recommended
IS 1875	1A,15C8 2,20C8 2A,25C8 3,30C8 3A,25C8 4,45C8 5,55C8 6,66C8	Carbon steel for	Billets,blooms slabs,bars, forging	0.20 0.25 0.30 0.35 0.40 0.50 0.60 0.70	0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90	0.35 .035 0.35 0.35 0.35 0.35 0.35 0.35	- - - - - - - -	- - - - - - - -	- - - - - - - -	- - - - - - - -	Weldfast Supr., Qua., Sup. Weldfast LH16/LH18 Weldfast LH16/LH18 Weldfast LH16/LH18 Weldfast Tensal 60 Weldfast Tensal 60 Weldfast 309 Weldfast 309/312	Post Weld HT recommended
IS2073	C-14 C-20 C-30 C-40 C-45 C-55Mn-75 C-65 14Mn1S14 13S25	Carbon steel for production of machined parts for general engineering purpose Free cutting steels	Bars Bars	0.18 0.25 0.35 0.45 0.50 0.60 0.70 0.18 0.18	0.70 0.90 0.90 0.90 0.90 0.90 0.80 1.50 1.20	- 0.35 0.35 0.35 0.35 0.35 0.35 0.30 0.10	- - - - - - - - -	- - - - - - - -	- - - - - - - -	- - - - - - - -	Weldfast Super, Quality, Supreme, Contact Weldfast LH16/LH18 Weldfast LH16/LH18 Weldfast LH16/LH18 Weldfast 309/312 Weldfast 309/312 Weldfast LH16/LH18 WeldfastLH16/LH18	Upto 20 mm thick joint, otherwise LH Post Weld HT Recommended
IS2830	Gr1,Fe410SB1 Gr2,Fe410SB2 Gr3,Fe410SB3	Carbon steel for re-rolling in to structural section	Billets, blooms, slabs, bars	0.16 0.23 0.23	0.90 0.90 0.90	- - -	- - -	- - -	- - -	- - -	Weldfast Super,Supreme Quality, Contact	upto 20 mm thick joint, otherwise LH
IS2831	Fe310OB Fe410OB	Carbon steel for re-rolling into structural section	Billets, blooms, slabs, bars	0.15 0.30	1.20 1.20	- -	- -	- -	- -	- -	Weldfast Super, Supreme, Quality,Contact WeldfastLH16/LH18	upto 20 mm thick joint, otherwise LH
IS 3195	98C6 113C6 50Cr4V2 60Cr4V2	Steel for valve, helical springs	Cast, rolled, forged products	1.05 1.20 0.56 0.65	0.80 0.80 0.80 1.00	0.35 0.35 0.35 0.35	- - 1.20 1.20	- - - -	- - - -	- - 0.3V 0.15VMin	Weldfast 312 Weldfast 312 Weldfast 312 Weldfast 312	Pre/post weld HT recommended
IS 4368	20Mn2 15Cr65 17Mn1Cr95 20MnCr1 21Cr1Mo28 07CR90Mo55 10Cr2Mo1 15NiCr1Mo12 15NiC2Cr1Mo15 16NiCr2Mo20	Alloy steel or general engineering purposes	Billets,blooms slab	0.24 0.18 0.19 0.22 0.26 0.12 0.15 0.18 0.18 0.20	1.70 0.60 1.30 1.40 0.80 0.70 0.70 1.00 1.00 0.70	0.35 0.35 0.35 0.35 0.35 0.60 0.50 0.35 0.35 .035	- 0.80 1.10 1.30 1.20 1.10 2.50 1.25 1.25 1.70	- - - - - 0.30 - 1.50 2.00 2.20	- - - - 0.35 0.65 1.10 0.15 0.20 0.25	- - - - - - - - - -	Weldfast LH16/Tensal60 Weldfast CROMO1500 Weldfast CROMO1500 Weldfast CROMO1500 Weldfast CROMO1500 Weldfast CROMO1500 Weldfast CROMO2251 Weldfast Tensal 60 Weldfast Tensal 80 Weldfast Tensal 80	Pre/post weld HT recommended

WELDWELL ELECTRODES

COMPOSITION OF COMMONLY USED GRADES OF STEELS UNDERVARIOUS SPECIFICATIONS

Specification	Grade	Usage	Common Section	Composition in Wt. %							Recommended Weldwell Electrode	Remarks
				C	Mn	Si	Cr	Ni	Mo	Other		
IS 6529	04CR13, 12Cr13	Stainless	All cast,rolled,	0.35	1.00	1.00	14.50	1.00	-	-	Weldfast 410/Weldfast13	Pre/post weld HT recommended
	20Cr13,30Cr13	steels	forged sections									
	05Cr17	for corrosion/		0.10	1.00	1.00	18.00	-	-	-	Weldfast 430	
	02Cr18Ni11	oxidation		0.03	2.00	1.00	20.00	13.00	-	-	Weldfast 308 L	
	04Cr18Ni10	& high										
	07Cr18Ni9	temperature										
	10Cr17Ni7	service		0.15	2.00	1.00	20.00	12.00	-	-	Weldfast 308	
	04Cr18Ni10Ti20			0.08	2.00	1.00	19.00	12.00	-	Ti5C/0.8	Weldfast 347	
	04Cr18Ni10No40			0.08	2.00	1.00	19.00	12.00	-	No10C/10	Weldfast 347	
	02Cr17Ni12Mo2			0.03	2.00	1.00	18.5	14.00	3.00		Weldfast 316L	
	04Cr17Ni12Mo2			0.08	2.00	1.00	18.5	14.00	3.00		Wekdfast 316	
	04Cr17Ni12Mo2Ti20			0.08	2.00	1.00	18.5	14.00	3.00	Ti5C/0.80	Weldfast 318	
	10Cr17Mn6Ni4			0.15	7.50	1.00	18.0	4.50		(N2)0.25	Weldfast 307 S.	
BS 970	En1A,7,7A	Free cutting	Bars	0.15	1.20	0.10	-	-	-	(S)0.3M.	Weldfast LH16	
	En2,2A	Cold Forming	Bars	0.20	0.80	-	-	-	-	-	Weldfast Supreme/	
	2B,2E										Super/Quality	
	En2C,2D	Cold forming	Bars	0.30	0.70	-	-	-	-	-	Weldfast /Supr. Cont., LH16,	
	En3,3A,3B,			0.25	1.00	0.35	-	-	-	-	Weldfast Sup. Qua./Supr.	
	3C,3D										Supreme,LH16/LH18	
	En5,5A,5B,	General		0.35	1.00	0.35	-	-	-	-	Weldfast LH16/LH18	
	5C,5D,	Engg.	Bars									
	En6,6K,6A,	application		0.45	1.00	0.35	-	-	-	-	Weldfast LH16/LH18	
	En8,8A,8B											
	8C,8D,8E											
	En9,9K			0.60	0.80	0.35	-	-	-	-	Weldfast LH16/309	Pre/post weld, HT recommended
		Machine tools										
	En10,En11	Hardenable Steel	Bars	0.70	0.80	0.35	0.80	0.80	-	-	Weldfast 309/312	
	En12,12A	for axles,shafts	Billets	0.45	0.90	0.35	-	1.00	-	-	Weldfast Tensal 60.	
	12B,12C,	connecting rods,	Rounds								Weldfast Tensal 60,	
	En14,14A,	crank shaft etc.		0025	1.80	0.35	0.30	0.40	-	-	Weldfast Cromo 1500	
	En218,19,20			0.45	0.80	0.35	1.50	-	0.40	-	Tensal 60/309/312	
	En23, 24	Low alloy		0.45	0.70	0.35	1.40	3.50	0.40	-	Weldfast Tensal 80	
											Weldfast 309/312	
	En31	Wear resistant		1.20	0.75	0.35	1.60	-	-	-	Weldfast 312	
		Steel										
	En32	Case carburising		0.15	1.00	0.35	-	-	-	-	Weldfast Sup.,Qua.,Supr.	
		steel									or weldfast LH16/LH18	
BS 970	En34,35	High tensile steel		0.20	0.60	0.35	-	2.00	0.30	-	Weldfast Tensal 80	Pre/post weld, HT recommended
	En56	High Chromium		0.12	1.00	1.00	14.0	1.00	-	-	Weldfast 410/Weldfast 13	
		Steel for										
	En57,En60	turbine,pumps		0.20	1.00	1.00	20.0	3.00	-	-	Weldfast 430	
	En58,B,C,D,E,	Corrison heat		0.15	2.00	0.20	20.0	12.0	-	-	Weldfast 308/308L	
	FG	resistant steel										
	En58, H,J,			0.12	2.00	.020	20.0	12.0	3.00	-	Weldfast 308 Mo	
											Weldfast 316/316L	
	En206,207	Case hardening		0.20	0.80	0.35	0.80	-	-	-	Weldfast CROMO 1500	
		steel										
AISI/SAE	1005 to 1020	Plain carbon		0.20	0.90	-	-	-	-	-	Weldfast Super, Quality,	
		steel &									Supreme, Contact	
	Upto 1050	Medium carbon		0.55	1.00	-	-	-	-	-	Weldfast LH16/LH18	Pre/post weld, HT recommended
		steel for										
		general engg.										
	1108,09,10	Free cutting steel		0.20	1.20	-	-	-	-	(S),015	Weldfast LH16/LH18	
	17,18,19,1211											
	4012			0.14	1.00	-	-	-	0.25	-	Weldfast CROMO 1500	
	4118, 4419	Alloy steel		0.23	0.90	-	-	-	0.60	-	Weldfast CROMO 1500	

COMPOSITION OF COMMONLY USED GRADES OF STEELS UNDERVARIOUS SPECIFICATIONS

Specification	Grade	Usage	Common Section	Composition in Wt. %							Recommended Weldwell Electrode	Remarks
				C	Mn	Si	Cr	Ni	Mo	Other		
AISI/SAE	4320, 4615			0.22	0.90	0.30	0.50	200	0.30	-	Weldfast Tensal 80,	Post weld HT Recommended
	4621,4718,4720											
	5115, 5120	Alloy steel		0.22	0.90	0.30	0.90	-	-	-	Weldfast CROMO1500	
	6118											
	8615, 8617			0.22	0.90	0.30	0.60	0.70	0.25	-	Weldfast Tensal 60	
	8720											
AIS/SAEI	201	Corrosion/	All rolled,	0.15	7.50	1.00	18.0	5.50	-	(N)0.25	Weldfast 307/308	
	301	oxidation	forged and	0.15	2.00	1.00	18.0	8.00	-	-	Weldfast 308	
	302	resistance	case section	0.15	2.00	1.00	19.0	10.0	-	-	Weldfast 308	
	304	& high		0.08	2.00	1.00	20.0	10.5	-	-	Weldfast 308	
	304L	temperature		0.03	2.00	1.00	20.2	12.0	-	-	Weldfast 308L	
	305	service		0.12	2.00	1.00	19.0	13.0	-	-	Weldfast 308	
	308			0.08	2.00	1.00	21.0	12.0	-	-	Weldfast 308	
	309			0.20	2.00	1.00	24.0	15.0	-	-	Weldfast 309	
	309L			0.08	2.00	1.00	24.0	15.0	-	-	Weldfast 309 L	
	310			0.25	2.00	1.50	26.0	22.0	-	-	Weldfast 310	
	310S			0.08	2.00	1.50	26.0	22.0	-	-	Weldfast 310	
	316			0.08	2.00	1.00	18.0	12.0	3.00	-	Weldfast 316	
	316L			0.03	2.00	1.00	18.0	12.0	3.00	-	Weldfast 316L	
	317			0.08	2.00	1.00	20.0	15.0	4.00	T6xOmin	Weldfast 317	
	321			0.08	2.00	1.00	19.0	12.0	-	-	Weldfast 347	
	330			0.15	2.00	1.50	17.0	37.0	-	-	Weldfast 330	
	347/348			0.08	2.00	1.00	19.0	13.0	-	Cb-Ta	Weldfast 347	
										10xCmin		
	403/405			0.15	1.00	1.00	13.0	-	-	-	Weldfast 13/410	
	409/410											
AISI/SAE	414			0.15	1.00	1.00	5.540	2.50	-	-	Weldfast 13/410	
	420			0.15	12.5	1.00	14.0	-	-	-	Weldfast 13/410	
	430			0.12	1.00	1.00	18.0	-	-	-	Weldfast 430	
	501/502			0.10	1.00	1.00	6.00	-	0.65	-	Weldfast CROMO 5500	
ASTM	A 105, 106	Tubes, Flanges,		0.35	1.10	0.30	-	-	-	-	Weldfast LH16/LH18	
	Gr A,B,C,	Bolts										
	A210GrA1,C,											
	A350 GrLF1,LF2											
	A335GrP12			0.15	0.60	0.50	12.5	-	0.60	-	Weldfast CROMO 1500	Pre/ Post weld HT Recommended
	A209 GrT1,			0.25	0.90	0.35	-	-	0.60	-	Weldfast CROMO 0500	
	A182GrF1											
	A200 GrT11,			0.15	0.60	1.00	1.50	-	0.60	-	Weldfast 1500	
	A182Gr,F11,F12											
	A200 Gr T22,			0.15	0.60	0.50	2.60	-	1.10	-	Weldfast CROMO 2251	
	A182 GrF22											
	A182 Gr F5			0.15	0.60	0.50	6.00	0.50	0.60	-	Weldfast CROMO 5500	
	A182 Gr F6(a)			0.15	1.00	1.00	13.0	0.50	-	-	Weldfast 13/410	
	A182 GrF9			0.15	0.60	1.00	10.0	0.50	1.00	-	Weldfast CROMO9100	
	A213T2	Seamless boiler,		0.15	0.60	0.30	0.80	-	0.60	-	Weldfast CROMO 1500	
	A213 GrT3(b)	superheater		0.15	0.60	0.50	2.50		0.60	-	Weldfast CROMO 2251	
	A213 GrT5	and heat		0.15	0.60	0.50	6.00	-	060	-	Weldfast CROMO 5500	
	A213GrT9	exchangertubes		0.15	0.60	3.00	10.0	-	1.00	-	Weldfast CROMO 9100	
DIN1654	Cq15	Draw steel for		0.15	0.50	0.35	-	-	-	-	Weldfast Super, Quality,	
DIN17200	C22,Ck22Q&T	cold pressing		0.25	0.60	0.35	-	-	-	-	Supreme, Contact	
DIN7200	C35,CK35			0.40	0.80	0.35	-	-	-	-	WeldfastLH16/LH18	
DIN17210	C10,CK10	Case hardening		0.13	0.60	0.35	-	-	-	-	Weldfast Super,	
	C15,Ck15,Cm15			0.18	0.60	0.35	-	-	-	-	Quality, Supreme	
	20MoCr4			0.22	0.90	0.40	0.60	-	-	0.50	Weldfast CROMO 1500	PWHT

HT Stand for Heat Treatment.

Single value to be considered as max,value

A) SELECTION OF WELDFAST ELECTRODES FOR WELDING SIMILAR MATERIALS

		Materials to be welded Spec.	AWS Classification	AWS Electrodes	WELDFAST BRAND
Carbon Steels		UTS under 510 N/mm²	A5.1	E 60XX	Super, Quality, Supreme,
		UTS under 610 N/mm²	A5.1	E 70XX	Contact, LH-16, LH-18, LH-28
Low Chromium Ferritic Alloys		½ Cr - ½ Mo	A5.5	E80XXB2	CROMO 1500
		1 Cr - ½ Mo			
		1¼ Cr - ½ Mo			
		2¼ Cr - 1Mo	A5.5	E90XXB3	CROMO 2251
		5 Cr - ½ Mo	A5.5	E8018B6	CROMO 5500
		9 Cr - 1 Mo	A5.5	E8018B8	CROMO 9100
STAINLESS STEEL	Ferritic	AISI Type 405	A5.4	E410-15	Weldfast 13/410
		AISI Type 410 S			
		AISI Type 410			
		AISI Type 430	A5.4	E-430-15	Weldfast 430
	Austenitic	AISI Type 304 and 304 H	A5.4	E308-16	Weldfast 308
		AISI Type 304 L	A5.4	E308L -16	Weldfast 308L
		AISI Type 321 and 321 H			
		AISI Type 347 and 347 H	A5.4	E347-16	Weldfast 347
		AISI Type 316 and 316 H	A5.4	E316-16	Weldfast 316/308Mo*
		AISI Type 316 L	A5.4	E316L-16	Weldfast 316L
		AISI Type 309	A5.4	E309-16	Weldfast 309 L
		AISI Type 310	A5.4	E310-16	Weldfast 310

** When operating temperature is over 400°C and when thickness is over 20 mm for types 321 and 347, the recommended electrode is Weldfast 308 Mo.This electrode may also used for type 316 in service over 400°C.*

B) WELDFAST MILD STEEL ELECTRODE SELECTION CHART

Weldfast Electrode AWS Classification	Super E6013	Quality E6013	Supreme E6013	LH-16 E7016	LH-18 E7018	Contact E7024	LH-28 E7028
Groove butt welds, flat (>6mm)	6	7	8	7	9	10	10
Positional groove butt (>6mm)	8	8	5	10	10	NR	NR
Fillet welds, flat or horizontal	7	8	10	5	7	10	9
Positional fillet welds	9	9	6	10	9	NR	NR
Thin material (<6 mm)	8	7	10	2	2	NR	NR
Heavy Plate or highly restrained joint	7	7	6	10	9	7	9
High sulphur or off-analysis steel	3	3	5	10	10	5	9
Deposition rate	4	5	5	5	6	9	8
Depth of penetration	6	7	5	7	7	5	7
Appearance, absence from undercut	8	8	9	7	8	10	10
Radiographic soundness	6	7	7	10	9	8	9
Ductility	5	6	6	10	10	5	10
Low temperature impact strength	4	4	4	10	10	9	10
Low spatter loss	6	6	7	6	8	10	9
Poor fit up	8	7	6	7	7	4	4
Welder appeal	9	8	10	6	8	10	9
Slag removal	7	7	8	6	6	10	9
Current	AC/DC	AC/DC	AC/DCS	AC/DCR	AC/DC	AC/DC	AC/DCR

Rating is on comparative basis of same size of electrode with 10 as the highest value, relative rating may change with size of electrode.
NR-Not recommended. **DCR**-Direct current reverse,electrode positive. **DCS**-Direct current straight,electrode negative.
AC-Alternative current. **DC**-Direct current,either polarity.

COMMON PROBLEMS AND REMEDIES

Possible Reasons	Possible Remedies
CRACKING - WELD METAL	
1. High rigidity of joint	1. Preheat, use peening, change welding sequence, increase cross section or bead
2. Unsound welds	2. Check for porosity and inclusions.
3. Defective electrodes (high or low moisture in coating, poor core wire)	3. Change electrode, control moisture by proper storage.
4. Poor fit up.	4. Improve edge preparation and fit up Reduce root gap.
5. Small or shallow bead.	5. Increase cross selection of bead. Change electrode type/size.
6. Excessive carbon or alloy pick up from base metal.	6. Reduce penetration by low current and increase travel speed. Change to low penetration electrode.
7. Angular distortion, causing tension at root run.	7. Balance welding on both sides, use peening.
8. Excessive sulphur in base metal.	8. Use EXX16 electrodes.
CRACKING - BASE METAL	
1. Under bead or hydrogen cracking.	1. Use low hydrogen EXX16 or EXX18 electrode.
2. High harden ability.	2. Preheat, increase welding heat input, post heat immediately after welding, use lower carbon or alloy content steel.
3. High strength.	3. Use annealed or normalised metal.
4. High transition temperature.	4. Examine preheat, post heat procedure, use material in tough condition, examine possibility of using different alloy.
5. Brittle phase.	5. Heat treat before welding to bring brittle phase in solution.
6. Excessive stresses	6. Redesign, change sequences of welding use intermediate stress relief/anneal.
POROSITY	
1. Excessive hydrogen, oxygen, nitrogen or moisture in welding atmosphere.	1. Change electrode, protect arc from excessive drafts.
2. High rate of weld freezing.	2. Increase heat input, preheat.
3. High sulphur base metal.	3. Use EXX16 electrodes or low sulphur steels.
4. Oil, paint or rust on steel.	4. Clean joint surfaces.
5. Improper arc length, current or electrode manipulation.	5. Use proper are length and control/correct welding technique.
6. Excessive moisture in electrode or joint.	6. Use dry electrodes and material.
INCLUSIONS	
1. Failure to remove slag from previous deposit.	1. Clean surface and previous beads properly.
2. Improper joint design.	2. Examine joint design. Examine selection of type/size of electrode.
3. Inefficient arc shielding.	3. Observe proper arc length and manipulations.

Note

Note