Emerging
Through
Quality...

Weldfast Electrodes Pvt Ltd

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An ISO 9001 Certified Company

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WELDFAST
ELECTRODES PVT LTD

Formerly known as **Weldwell Electrodes**

Introduction

Weldfast Electrodes Pvt Ltd., an ISO 9001 certified company was formerly known as Weldwell Electrodes. Since its inception in the year 1985, it has grown into one of the leading entities in the field of manufacturing Welding Consumables.

Presently the company offers following products.

- WELDFAST series of Shielded Metal Arc Welding (SMAW) electrodes for Conventional welding,
- WELDALLOY series for Reclamation welding,
- Continuous wires for Metal Inert Gas (MIG) / Metal Active Gas (MAG) Welding,
- Tungsten Inert Gas (TIG) filler wires,
- Submerged Arc Welding (SAW) wires.

Above products conform to the requirements of BIS, ASME, BS, DIN and ISO specifications.

In addition to above mentioned products, the company has capacity to develop, test and manufacture specific and exceptional products as per requirement by the customers.

Quality Control and well established quality assurance policy are integral features of the Weldfast manufacturing process.

The company has two plants located at Nagpur (situated in central part of India), equipped with state-of-the art manufacturing and quality control equipment. Our products are approved by various inspection bodies / Corporate viz. LRS, DNV, BV, ABS, IRS, BIS, IBR Indian Railways, BHEL, NPCIL, NTPC, M.N. Dastur, Thermax etc. and find wide recognition by clients from diverse industries. Our client base ranges from mining, power sector to ship building and automobiles. Consistency in superior quality of products and user-friendly pricing has resulted in our foothold in foreign markets as well.

An ISO 9001 Certified Company

WELDFAST
ELECTRODES PVT LTD

WELDFAST

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NO	PRODUCT	CODING	TYPICAL ALL WELD ANALYSIS (%) C	Mn	Si	S	P	Cr	Ni	Mo	Cu	MECHANICAL PROPERTIES UTS N/mm²	YS N/mm²	Elongation %	Impact Value-CVN	APPLICATION
MILD STEEL ELECTRODES																
1	**WELDFAST SUPER** **Approvals :** BHEL Trichy, NTPC, LRS Gr 1, ABS Gr 1, DNV Gr 1, IRS Gr 1, BV Gr 1, BIS, IBR (CIB-Maharashtra), M.N. Dastur, MahaGenco.	E 6013, IS 814-ER 4211X	0.10 max	0.60 max	0.40 max	0.03 max	0.03 max	–	–	–	–	480-530	380-490	22-26	55-60 J at 0°C	A medium coated rutile electrode suitable for all position welding of Steel structures and tanks, truck frames and bodies, machinery construction, auto body frames, railway wagons, ships, pipelines, bridges etc.
2	**WELDFAST QUALITY** **Approvals :** LRS Gr 2, ABS Gr 2, DNV Gr 2, IRS Gr 2, BV Gr2, BIS, IBR (CIB Maharashtra), Thermax, MahaGenco, BEML.	E 6013, IS 814 -ER 4222X	0.10 max	0.60 max	0.40 max	0.03 max	0.03 max	–	–	–	–	480-540	370-500	22-27	55-60 J at 0°C	A medium coated rutile electrode suitable for all position welding and used in heavy 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** **Approvals :** LRS Gr 2, BIS, IBR (CIB Maharashtra), MahaGenco.	E 6013, IS 814 - ERR 4222X	0.10 max	0.60 max	0.40 max	0.03 max	0.03 max	–	–	–	–	480-550	370-500	23-27	60-70 J at 0°C	A heavy coated rutile electrode for very smooth bead appearance of the filling and capping runs. Applications consist of storage tanks, railway wagons, automobile frames and bodies, boilers, rail coaches, ships, locomotive, fiber boxes etc.
4	**WELDFAST ZITANK**		0.08 max	0.10-0.30	0.05 max	0.03 max	0.03 max	–	–	–	–	420-520	325-450	20-26	50-80 J at 27°C	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. 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.
LOW HYDROGEN ELECTRODES																
5	**WELDFAST LH 16** **Approvals :** RDSO CLASS A3/B1	E 7016, IS 814- EB 5426H$_5$X	0.10 max	1.60 max	0.75 max	0.03 max	0.03 max	–	–	–	–	550-610	430-540	24-28	50-60 J at -30°C	A medium coated all position, basic type hydrogen controlled electrodes for welding mild steel, medium & high tensile low alloy steels. Also suitable for depositing buffer layer before hard facing, joining cast steel to mild steel & putting non machinable deposit on cast iron. The weld deposit is of excellent X-ray quality. Applications include coaches, ships, heavy duty structures, earth moving machinery, boilers & pressure vessels.
6	**WELDFAST LH 18** **Approvals :** NPCIL, NTPC, BHEL Trichy, LRS 3YH5, ABS 3YH5, DNV 3YH5, IRS 3YH5, BV, BIS, IBR (CIB Maharashtra), Thermax, M.N.Dastur & Co., MahaGenco, RDSO CLASS A4/B2, BEML.	E 7018, IS 814- EB 5426H$_5$JX	0.10 max	1.60 max	0.75 max	0.03 max	0.03 max	–	–	–	–	550-610	430-540	24-28	50-60 J at -30°C	A basic coated low hydrogen all position 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. Used in welding Boiler and pressure vessels, penstocks, storage tanks, bridges, heavy structures subjected to dynamic loading and under restrained conditions.
7	**WELDFAST LH 18-1** **Approvals :** NPCIL, LRS 4Y40H5, DNV 4Y40H5, BV 4Y40H5.	E 7018-1, IS 814-EB 5526H$_5$JX	0.10 max	1.60 max	0.75 max	0.03 max	0.03 max	–	–	–	–	550-610	440-530	24-28	55-65 J at -45°C	A basic coated low hydrogen all position electrode with deposition efficiency of 110%. The weld deposit has good toughness even at-50°C and satisfies X-ray, ultrasonic & radiographic requirements. It gives excellent arc stability, smooth arc and is very easy in slag removal. Used in welding Boiler and pressure vessels, penstocks, storage tanks, bridges, heavy structures subjected to dynamic loading and under restrained conditions. 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).
8	**WELDFAST LH 18 (NACE)**	E 7018-1, IS 814 - EB 5629H$_5$JX	0.10 max	1.40 max	0.60 max	0.015 max	0.018 max	–	–	–	–	520-600	430-530	24-28	40 J at -46°C	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. Suitable for 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.
LOW ALLOY HIGH TENSILE STEEL ELECTRODES																
9	**WELDFAST CROMO 0500** **Approval :** NPCIL, IBR (CIB Maharashtra), BHEL Trichy.	E 7018-A1	0.12 max	0.90 max	0.80 max	0.03 max	0.03 max	–	–	0.4-0.65	–	550-630	500(min)	23-27	90-120J at +27°C	A medium heavy basic coated, hydrogen controlled, iron powder electrode, gives weld deposit containing 0.5% Mo. Used 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
10	**WELDFAST CROMO 1500** **Approval :** NPCIL, IBR (CIB Maharashtra), Thermax.	E 8018-B2	0.06-0.09	0.90 max	0.80 max	0.03 max	0.03 max	1.0-1.5	–	0.4-0.65	–	550-630	500(min)	23-27	50-90 J at +27°C	A medium heavy coated, low hydrogen iron powder type electrode gives weld deposit of 1.3% Cr & 0.5% Mo steel. Suitable for welding of 1Cr/0.5Mo and similar creep resistant steels, welding of flange, forged fittings, valves, seamless tubes and pipes for high temperature applications in power plants, refinery, petro-chemical and fertilizer units & P11, P12 type of steels.
11	**WELDFAST CROMO 2251** **Approval :** NPCIL, IBR (CIB Maharashtra), Thermax	E 9018-B3	0.05-0.12	0.90 max	0.80 max	0.03 max	0.03 max	2.0-2.5	–	0.9-1.2	–	630-690	540(min)	21-24	50-100 J at +27°C	A medium heavy coated, low hydrogen, iron powder type, all position electrode with weld deposit of approximately 2.30% Cr and 1% Mo steel of 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.
12	**WELDFAST CROMO 5500**	E 8018-B6	0.05-0.12	1.00 max	0.90 max	0.03 max	0.03 max	4.0-6.0	0.40 max	0.45-0.65	–	550-650	480(min)	19-22	50-100J at +27°C	A medium heavy coated, low hydrogen, iron powder type all position electrode with weld deposit of approximately 5% Cr and 0.5% Mo steel 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.
13	**WELDFAST CROMO 9100**	E 8018-B8	0.05-0.10	1.00 max	0.90 max	0.03 max	0.03 max	8.0-10.5	0.40 max	0.85-1.2	–	600-650	480-550	20-25	47 J at +20°C	A basic coated electrode for welding Chrome Moly creep resistant steels in all positions. Weld Deposit gives approximately 9% Cr and is air hardenable and requires pre-heat & post weld heat treatment. Used in Welding of cast or forged fitting, flanges, valves, seamless tubes or pipes used in power plants, refinery, petrochemical and fertilizer units.





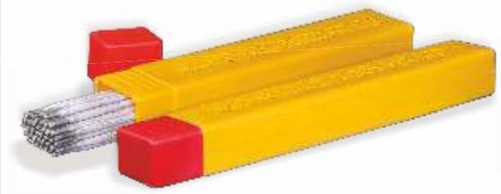
STAINLESS STEEL ELECTRODES

NO	PRODUCT	CODING	TYPICAL ALL WELD ANALYSIS (%)									MECHANICAL PROPERTIES				APPLICATION
			C	Mn	Si	S	P	Cr	Ni	Mo	Cb	UTS N/mm²	Elongation %	Ferrite %	Impact Value-CVN	
14	**WELDFAST 308** Approval : RDSO : CLASS M1	E 308-16	0.08 max	0.6-1.2	1.0 max	0.03 max	0.04 max	18.0-21.0	9.0-11.0	-	-	560-630	35-40	3-7	-	A rutile basic coated all position electrode. For welding of corrosion resistant Cr-Ni steels of AISI grades 301, 302, 304, 308 used in dairy, food processing and chemical industries.
15	**WELDFAST 308L** Approval : NPCIL	E 308L-16	0.04 max	0.6-1.2	1.0 max	0.03 max	0.04 max	18.0-21.0	9.0-11.0	-	-	540-580	35-40	3-7	-	A rutile basic coated all position electrode. For welding of Cr-Ni steels of AISI grades 301, 302, 304, 308 equipments used in chemical processing, dairy & food industry.
16	**WELDFAST 308Mo**	E 308Mo-16	0.08 max	0.8-1.2	1.0 max	0.03 max	0.04 max	18.0-21.0	9.0-11.0	2.0-3.0	-	580-630	35-40	-	-	A rutile basic coated all position electrode. For welding of steels where severe stresses or risk of cracking are involved.
17	**WELDFAST 347**	E 347-16	0.08 max	0.6-1.2	0.9 max	0.03 max	0.04 max	18.0-21.0	9.0-11.0	-	1.00 max	560-620	30-35	6-9	-	A rutile basic coated all position electrode for welding stabilized version of corrosion resistant Cr-Ni Steels. 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.
18	**WELDFAST 316**	E 316-16	0.08 max	0.6-1.2	0.9 max	0.03 max	0.04 max	17.0-20.0	11.0-14.0	2.0-3.0	-	580-630	30-35	3-8	-	A rutile basic coated all position electrode, 18/12 Mo Stainless Steel weld deposit. 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.
19	**WELDFAST 316L** Approval : NPCIL	E 316L-16	0.04 max	0.6-1.2	0.9 max	0.03 max	0.04 max	17.0-20.0	11.0-14.0	2.0-3.0	-	560-600	30-40	3-8	-	A rutile basic coated all position electrode having extra low carbon with weld deposit of 18Cr/13Ni/2.5Mo stainless steel. For welding of stainless steels such as AISI 316, 316L, 316H, 317 and 317L, in chemical plants, paint industries and dye industries.
20	**WELDFAST 317L**	E317L-16	0.04 max	0.5-2.5	1.0 max	0.03 max	0.04 max	18.0-21.0	12.0-14.0	3.0-4.0	-	560-600	30-40	3-8	-	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. 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.
21	**WELDFAST 309** Approvals : RDSO : CLASS M4	E 309-16	0.1 max	0.6-1.2	1.00 max	0.03 max	0.04 max	22.0-25.0	12.0-14.0	-	-	550-650	30-35	–	-	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. 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.
22	**WELDFAST 309L** Approvals : NPCIL, Thermax	E 309L-16	0.04 max	0.6-1.2	1.00 max	0.03 max	0.04 max	22.0-25.0	12.0-14.0	-	-	520-650	30-35	–	-	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. 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.
23	**WELDFAST 309Mo**	E 309Mo-16	0.1 max	0.6-1.2	0.9 max	0.03 max	0.04 max	22.0-25.0	12.0-14.0	2.0-3.0	-	550-650	30-35	–	-	A rutile basic coated all position electrodes giving 25/12/2.5 Mo weld deposit. 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.
24	**WELDFAST 309MoL** Approvals : NPCIL	E 309L-Mo-16	0.04 max	0.6-1.2	0.90 max	0.03 max	0.04 max	22.0-25.0	12.0-14.0	2.0-3.0	-	520-650	30-35	–	-	A rutile basic coated all position electrode giving 25/12/2.5 Mo weld deposit. 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.
25	**WELDFAST 309Cb**	E 309Cb-16	0.10 max	0.6-1.2	0.9 max	0.03 max	0.04 max	22.0-25.0	12.0-14.0	--	0.70-1.0	580-650	30-35	–	-	It is rutile basic coated all position electrode gives smooth arc, easy slag removal and uniform weld bead. 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.
26	**WELDFAST 310**	E 310-16	0.1-0.15	1.0-2.5	0.75 max	0.03 max	0.03 max	25.0-28.0	20.0-22.5	-	-	550-580	30-35	-	-	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. 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.
27	**WELDFAST 312**	E 312-16	0.08-0.15	1.0-1.5	0.90 max	0.03 max	0.04 max	28.0-32.0	8.0-10.50	-	-	750-800	22 min	-	-	A rutile basic coated all position electrode giving 30/10 Cr-Ni deposit which has excellent oxidation resistance. 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.
28	**WELDFAST 318**	E318-16	0.08 max	0.6-1.2	0.90 max	0.03 max	0.04 max	17.0-20.0	11.0-14.0	2.0-3.0	1.00 max	600-650	25-30	4-8	-	A rutile basic coated all position electrode for welding stabilized version of corrosion resistant Cr-Ni-Mo Steels. 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.
29	**WELDFAST 410**	E 410-15	0.10 max	1.00 max	0.90 max	0.03 max	0.04 max	11.0-13.5	0.7 max	0.75 max	–	520-570	24-28	–	--	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. Very much suitable for refiner plug and socket, sleeves, turbine runners, valve seats etc.
30	**WELDFAST 430**	E 430-15	0.10 max	1.00 max	0.90 max	0.03 max	0.04 max	15.0-18.0	0.6 max	0.75 max	--	470-550	20 min	–	--	A basic coated electrode for welding of AISI 430 stainless steel and steels of slightly lower or higher Cr content. For welding of AISI 430 stainless steels, automobile body moulding, oil burner parts, equipments in chemical & food industries.
31	**WELDFAST 307S** Approvals : RDSO : CLASS M5	E 307-16	0.04-0.14	3.30-4.75	0.50-0.80	0.03 max	0.03 max	18.0-21.0	9.0-10.7	--	--	580-620	30-35	Hardness (As Welded) 180-220BHN	Hardness (Work Hardened) 500-550BHN	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.
32	**WELDFAST 13**	E 410-15	0.06-0.09	0.50-0.90	0.40-0.60	0.03 max	0.04 max	11.0-13.0	--	--	--	530-580	20-27	–	--	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.

STAINLESS STEEL ELECTRODES

NO	PRODUCT	CODING	TYPICAL ALL WELD ANALYSIS (%) C	Mn	Si	S	P	Cr	Ni	Mo	Cb	MECHANICAL PROPERTIES N	Cu	UTS N/mm²	YS N/mm²	Elongation %	CVN Impact at 23±5°C	CVN Impact at 0°C
33	WELDFAST 2209	E 2209-16	0.04max	0.50-2.00	1.00 max	0.03 max	0.04 max	21.5-23.5	8.50-10.50	2.50-3.50	–	0.08-0.20	0.75 max	690	–	20 min	–	-
34	WELDFAST 2594	E 2594-16	0.04 max	0.50-2.00	1.00 max	0.03 max	0.04 max	24.0-27.0	8.00-10.50	3.50-4.50	–	0.20-0.30	0.75 max	760	–	20 min	–	-
35	WELDFAST 2553	E 2553-16	0.06 max	0.50-1.50	1.00 max	0.03 max	0.04 max	24.0-27.0	6.50-8.50	2.90-3.90	–	0.10-0.25	1.50-2.50	760	–	15 min	–	-
36	WELDFAST 410Ni-Mo	E 410NiMo-15	0.06 max	1.00 max	0.90 max	0.03 max	0.04 max	11.0-12.5	4.0-5.0	0.4-0.7	–	–	0.75 max	760 min	–	15 min	50 J min	45 J min

PWHT @ 600°C for 8 hrs is necessary to achieve desired properties



HARDFACING ELECTRODES

NO	PRODUCT	CODING	TYPICAL ALL WELD ANALYSIS (%) C	Mn	Si	Cr	Ni	Mo	S	P	V	MECHANICAL PROPERTIES As Welded - BHN	Work Hardened - BHN	APPLICATION
37	WELDFAST HARDEX I		0.2-0.3	0.8-1.2	0.5-0.8	–	–	–	0.03 max	0.04 max	–	As Welded : 250 - 300 BHN Heat Treated : 450 - 500 BHN (Three layer deposit)	–	A low hydrogen type electrode deposits wear resistant material with excellent resistance to heavy shocks. For rebuilding wagon wheels, gear teeth, sprockets, idler shafts, wire drawing drums etc.
38	WELDFAST HARDEX II		0.15-0.25	3.0-3.5	0.5-0.8	0.3-0.7	–	–	0.03 max	0.03 max	–	350- 450 BHN (Three layer deposit)	–	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. 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.
39	WELDFAST HARDEX II R Approvals : RDSO : CLASS H4B		0.05-0.15	0.5-1.0	0.3-0.5	2.0-3.0	–	–	0.03 max	0.03 max	–	350- 450 BHN (Three layer deposit)	–	It is a medium-heavy coated rutile, air hardening type electrode for hardfacing on mild steel, carbon steel and low alloy steels. 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.
40	WELDFAST HARDEX III		0.4-0.6	0.6-1.2	0.5-0.8	5.0-7.0	–	0.5-1.0	0.03 max	0.03 max	0.4-0.8	600- 650 BHN (Three layer deposit)	–	A low hydrogen type electrode and deposits are wear resistant with excellent resistance to abrasion even under moderate shocks. 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.
41	WELDFAST HARDEX III R		0.6-1.0	0.3-0.8	0.3-0.6	7.0-9.0	–	0.4-0.6	0.03 max	0.03 max	0.4-0.8	600- 650 BHN (Three layer deposit)	–	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. 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.
42	WELDFAST HARDEX IV		2.0-4.0	0.5-2.5	3.0-4.0	5.0-8.0	–	--	0.03 max	0.03 max	0.40 max	580- 630 BHN (Three layer deposit)	–	A low hydrogen type electrode which deposits wear resistant material with excellent resistance to abrasion. For oil expeller worms, ploughshears, sand gravel, coal conveyor parts etc.
43	WELDFAST MANGAN Approvals : BEML		0.50-1.00	12.00-14.00	1.0 max	--	2.5-3.5	--	0.03 max	0.03 max	–	240-260 BHN (Three layer deposit)	500-550 BHN	A highly alloyed austenitic electrode, depositing wear resistant material with excellent resistance under heavy impact loads. 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.
44	WELDFAST MANGAN (SPL)		0.50-1.00	12.00-14.00	--	--	--	--	0.03 max	0.03 max	–	240-260 BHN (Three layer deposit)	500-550 BHN	A hard facing electrode, depositing wear resistant material with excellent resistance under moderate impact loads. Useful for hard facing on various grades of carbon steel & Mn steels.

NO	PRODUCT	CODING	TYPICAL ALL WELD ANALYSIS (%)											MECHANICAL PROPERTIES			APPLICATION
			C	Mn	Si	Cr	Ni	Cu	S	P	Fe	Al		UTS N/mm²	Elongation %	Hardness	
CAST IRON ELECTRODES																	
45	WELDFAST CI	AWS A/SFA 5.15 E St	2.0 max	1.2 max	2.5 max	0.7 max	--	--	0.03 max	0.03 max	Bal	--		--	--	300-400 BHN	Weldfast CI is electrode for depositing non machinable layer on various cast irons. It deposits weldmetal with exceptional colour match. 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.
46	WELDFAST CIMAC	AWS A/SFA 5.15 E NiFeCI	2.0 max	2.5 max	4.0 max	-	45.0-60.0	2.5 max	0.03 max	0.03 max	Bal	1.0 max		400-580	6-18	165-218 BHN	A nickel based alloy depositing very dense and highly crack resistant weld metal. Useful in repairing wornout gears, cams, impeller rings, cracked bearing blocks, cast iron frames etc.
CUTTING & GOUGING ELECTRODES																	
47	WELDFAST GROOVECUT	--	–	--	--	--	--	--	–	--	--	--		Current : AC / DC +			A medium heavy coated electrode for cutting and piercing ferrous and non ferrous metals. 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.
48	WELLGOUGE	--	–	--	--	--	--	--	–	--	--	--		Current : AC / DC +			Wellgouge has a special coating to produce high blowing effects and a hot exothermic arc to remove metal efficiently. 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.

NO	PRODUCT	CODING	TYPICAL CHEMICAL ANALYSIS OF WIRE (%)								APPLICATION
			C	Mn	Si	S	P	Cu	Mo		
SOLID WIRES FOR SUBMERGED ARC WELDING (SAW)											
49	WELDFAST EL 8	AWS/ SFA 5.17 EL8	0.10 max	0.25-0.60	0.07 max	0.03 max	0.03 max	0.35 max	–		Low Manganese-Silicon copper coated wire is suitable for welding of Mild steel, medium, high tensile steel and unalloyed steels in combination with agglomerated SAW flux. Typical applications are LPG cylinders, long seam welded pipes, butt and fillet welds in general structural welding.
50	WELDFAST EL 12	AWS/ SFA 5.17 EL12	0.04-0.14	0.25-0.60	0.10 max	0.03 max	0.03 max	0.35 max	–		Suitable for continuously welded pipes, wind mill towers, high speed welding pressure vessels and structures with high thickness etc. Could be used with suitable flux for obtaining good sub-zero impact properties.
51	WELDFAST EM 12K	AWS/ SFA 5.17 EM12K	0.05-0.15	0.80-1.25	0.10-0.35	0.03 max	0.03 max	0.35 max	–		Medium Manganese killed steel wire offer better radiographic quality & tough deposit. Suitable for H- SAW pipes, L-SAW Pipes, Conventional pipes and structural fabrication.
52	WELDFAST EH 14	AWS/ SFA 5.17 EH 14	0.10-0.20	1.70-2.20	0.10 max	0.03 max	0.03 max	0.35 max	–		High Manganese killed steel wire for thick joints which requires PWHT, Suitable for manufacture of pressure vessels, heat exchangers, boilers etc.
53	WELDFAST EH 10K	AWS/ SFA 5.17 EH 10K	0.07-0.15	1.30-1.70	0.05-0.25	0.025 max	0.025 max	0.35 max	–		Typical applications include manufacture of API pipes, High pressure pipelines, Pen-stocks, Nuclear reactors. Could be used for cryogenic applications by using suitable flux.
54	WELDFAST EA 2	AWS/ SFA 5.23 EA2	0.05-0.17	0.95-1.35	0.20 max	0.025 max	0.025 max	0.35 max	0.45-0.65		Medium manganese wire with moly gives higher strength and toughness of weld deposit. Can be used where PWHT is relatively long. Suitable for Pressure vessels, heat-exchangers, Welding of steel with 0.5% Mo and low alloy steels.

Packing of SAW Wire : SAW Wires are layer wound in 25 kgs (net weight) as standard spool packing. Drumpack packing in 250 kgs, 350 kgs, 500 kgs are available as per requirement of customer.

NOTE

In addition to the SAW wires described here, stainless steel SAW wires are also available. The detailed information on these wires could be provided on request.

SOLID MILD STEEL WIRES FOR MIG/ MAG WELDING

No	Product	AWS Coding	WIRE CHEMISTRY (%) C	Mn	Si	Mo	Ni	Cu	Ti	Zr	Al	S	P		Cr	Nb	V	MECHANICAL PROPERTIES UTS Mpa	YS MPa	Elongation	CVN Impact	APPLICATION
55	MIGFAST - 1 Approvals : BHEL Trichy, NPCIL, M. N. Dastur & Co., Thermax, IBR (CIB Maharashtra)	ER 70S-6	0.06-0.15	1.40 -1.85	0.80 -1.15	0.15 max	0.15 max	0.50 max	–	–	–	0.035 max	0.025 max		0.15 max	–	0.03 max	500min.	420min.	22% min	27J at -30°C	A copper coated solid Steel wire for MIG/MAG welding of carbon steels. Used in Automobile Industry, Construction and Mining Equipment, Railway Wagon and Coaches, Storage tanks, Pressure Vessels, Steel Furniture, Pipes, LPG cylinders and Structural fabrications.
56	MIGFAST - 2 Approvals : RDSO Class III (Part-I)	ER 90S-D2	0.07-0.12	1.60 - 2.10	0.50 - 0.80	0.40-0.60	0.15 max	0.50 max	–	–	–	0.025 max	0.025 max		–	–	–	620 min.	540 min.	17% min.	27J at -30°C	A copper coated MIG wire for MIG/MAGwelding of high tensile steels. 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.
57	MIGFAST - 3	ER 70S-2	0.07 max	0.90-1.40	0.40-0.70	0.15 max	0.15 max	0.5 max	0.05-0.15	0.02-0.12	0.05-0.15	0.03 max	0.025 max		0.15 max	–	–	480 min.	400 min.	22% min.	27J at -30°C	Deoxidized copper coated mild steel wire. Structural, pressure vessels and boilers involving unalloyed and micro-alloyed structural steels. It meets HIC & SSCC test as per NACE specification.
58	MIGFAST - 4	ER 80S-D2	0.07-0.12	1.60 - 2.10	0.50-0.80	0.40-0.60	0.15 max	0.50 max	--	--	--	0.025 max	0.025 max		–	–	–	590 min.	490 min.	17% min.	27J at -30°C	A copper-coated, low-alloy, solid wire with 0.5% Mo for the GAW 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.
59	MIGFAST - 5	ER 90SG	0.07-0.12	1.60 - 2.15	0.50-0.85	0.40-0.65	0.15 max	0.50 max	--	--	--	0.025 max	0.025 max		–	–	–	625 min.	550 min.	18% min.	27J at -46°C	A copper-coated low-alloy steel gas-shielded welding wire. It is use for welding of high tensile strength steel, such as steel construction.
60	MIGFAST - 6	ER 80SG	0.10 max	1.80 max	0.55 max	0.50 max	0.15 max	0.50 max	--	--	--	0.025 max	0.025 max		–	–	–	600 min.	470 min.	16% min.	40J at -20°C	

SOLID CARBON MOLYBDENUM STEEL WIRES FOR MIG WELDING

No	Product	AWS Coding	C	Mn	Si	Mo	Ni	Cu	Ti	Zr	Al	S	P		Cr	Nb	V	UTS Mpa	YS MPa	Elongation	CVN Impact
61	MIGFAST-70S A1	ER 70S-A1	0.12 max	1.30 max	0.30-0.70	0.40-0.65	–	0.35 max	–	–	–	0.025 max	0.025 max		–	–	–	515 min*	400 min*	19% min*	–

SOLID CHROMIUM MOLYBDENUM STEEL WIRES FOR MIG WELDING

No	Product	AWS Coding	C	Mn	Si	Mo	Ni	Cu	Ti	Zr	Al	S	P		Cr	Nb	V	UTS Mpa	YS MPa	Elongation	CVN Impact
62	MIGFAST - 80S B2	ER 80S-B2	0.07-0.12	0.40-0.70	0.40-0.70	0.40-0.65	0.20 max	0.35 max	–	–	–	0.025 max	0.025 max		1.20-1.50	–	–	550 min*	470 min*	19% min*	–
63	MIGFAST - 80S B6	ER 80S-B6	0.10 max	0.40-0.70	0.50 max	0.45-0.65	0.60 max	0.35 max	–	–	–	0.025 max	0.025 max		4.50-6.00	–	–	550 min***	470 min***	17% min***	–
64	MIGFAST - 80S B8	ER 80S-B8	0.10 max	0.40-0.70	0.50 max	0.80-1.20	0.50 max	0.35 max	–	–	–	0.025 max	0.025 max		8.00-10.50	–	–	550 min***	470 min***	17% min***	–
65	MIGFAST - 90S B3	ER 90S-B3	0.07-0.12	0.40-0.70	0.40-0.70	0.90-1.20	0.20 max	0.35 max	–	–	–	0.025 max	0.025 max		2.30-2.70	–	–	620 min**	540 min**	17% min**	–
66	MIGFAST - 90S B9	ER 90S-B9	0.07-0.13	1.20 max	0.15-0.50	0.85-1.20	0.80 max	0.20 max	–	–	0.04 max	0.01 max	0.01 max		8.00-10.50	–	0.15-0.30	620 min****	410 min****	16% min****	–

SOLID STAINLESS STEEL WIRES FOR MIG WELDING

No	Product	AWS Coding	C	Mn	Si	Mo	Ni	Cu	Ti	Zr	Al	S	P		Cr	Nb	V	UTS Mpa	YS MPa	Elongation	CVN Impact
67	MIGFAST 308	ER 308	0.08 max	1.00-2.50	0.30-0.65	_	9.00-11.00	–	_	_	_	_	_		19.50-22.00	_	_	550 min	_	35% min	–
68	MIGFAST 308L	ER 308L	0.03 max	1.00-2.50	0.30-0.65	_	9.00-11.00	_	_	_	_	_	_		19.50-22.00	_	_	520 Min	_	35% min	–
69	MIGFAST 347	ER 347	0.08 max	1.00-2.50	0.30-0.65	_	9.00-11.00	_	_	_	_	_	_		19.00-21.50	1.0 max	_	520 min	_	30% min	–
70	MIGFAST 316	ER 316	0.08 max	1.00-2.50	0.30-0.65	2.00-3.00	11.00-14.00	_	_	_	_	_	_		18.00-20.00	_	_	520 min	_	30% min	–
71	MIGFAST 316 L	ER 316L	0.03 max	1.00-2.50	0.30-0.65	2.00-3.00	11.00-14.00	_	_	_	_	_	_		18.00-20.00	_	_	490 min	_	30% min	–
72	MIGFAST 309	ER 309	0.12 max	1.00-2.50	0.30-0.65	_	12.00-14.00	_	_	_	_	_	_		23.00-25.00	_	_	550 min	_	30% min	–
73	MIGFAST 309L	ER 309L	0.03 max	1.00-2.50	0.30-0.65	_	12.00-14.00	_	_	_	_	_	_		23.00-25.00	_	_	520 min	_	30% min	–
74	MIGFAST 309 Mo	ER 309Mo	0.12 max	1.00-2.50	0.30-0.65	2.00-3.00	12.00-14.00	_	_	_	_	_	_		23.00-25.00	_	_	550 min	_	30% min	–
75	MIGFAST 310	ER 310	0.08-0.15	1.00-2.50	0.30-0.65	_	20.00-22.50	_	_	_	_	_	_		25.00-28.00	_	_	550 min	_	30% min	–
76	MIGFAST 312	ER 312	0.15 max	1.00- 2.50	0.30-0.65	_	8.00-10.50	_	_	_	_	_	_		28.00-32.00	_	_	660 min	_	22% min	–
77	MIGFAST 410	ER 410	0.12 max	0.60 max	00.50 max	_	_	_	_	_	_	_	_		11.50-13.50	_	_	520 min@	_	20% min@	–
78	MIGFAST 430	ER 430	0.10 max	0.60 max	00.50 max	_	_	_	_	_	_	_	_		15.50-17.00	_	_	450 min@@	_	20% min@@	–

Note : Weld Metal Properties with 100% Ar Gas Shielding. * PWHT at 620° C For 1 Hr/ ** PWHT at 690° C For 1 Hr/ *** PWHT at 745° C For 1 Hr/ **** PWHT at 760° C For 1 Hr

SOLID INCONEL WIRES FOR MIG WELDING

No	Product	Coding	C	Mn	Si	Mo	Ni	Cu	Ti	Fe	Al	S	P		Cr	Nb+Ta	V	UTS MPa	YS MPa	Elongation	CVN Impact
79	MIGFAST - 625	ER NiCrMo3	0.10 max	0.50 max	0.50 max	8.0-10.0	58% min	0.50 max	0.40 max	5.00 max	0.40 max	0.015 max	0.02 max		20.0-23.0	3.15-4.15	–	760 Typical	–	–	–

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.

MIG / MAG WIRES

MIGFAST wires are Supplied in 12.5 Kg or 15.0 Kg Plastic Spools

SOLID MILD STEEL WIRES FOR TIG WELDING

No	Product	AWS Coding	WIRE CHEMISTRY (%) C	Mn	Si	Mo	Ni	Cu	Ti	Zr	Al	S	P	Cr	Nb	V	MECHANICAL PROPERTIES UTS Mpa	YS MPa	Elongation	CVN Impact	APPLICATION
80	TIGFAST - 1	ER 70S-6	0.06-0.15	1.40 -1.85	0.80 -1.15	0.15 max	0.15 max	0.50 max	–	–	–	0.035 max	0.025 max	0.15 max	–	0.03 max	500min.	420min.	22% min	27J at -30°C	A copper coated solid Steel wire for TIG welding of carbon steels. Used in Automobile Industry, Construction and Mining Equipment, Railway Wagon and Coaches, Storage tanks, Pressure Vessels, Steel Furniture, Pipes, LPG cylinders and Structural fabrications.
81	TIGFAST - 2	ER 90S-D2	0.07-0.12	1.60 - 2.10	0.50 - 0.80	0.40-0.60	0.15 max	0.50 max	–	–	–	0.025 max	0.025 max	–	–	–	620 min.	540 min.	17% min.	27J at -30°C	A copper coated TIG wire for TIG welding of high tensile steels. 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.
82	TIGFAST - 3 Approvals : NPCIL, IBR	ER 70S-2	0.07max	0.90-1.40	0.40-0.70	0.15 max	0.15 max	0.50 max	0.05-0.15	0.02-0.12	0.05-0.15	0.03 max	0.025 max	0.15 max	–	–	480 min.	400 min.	22% min.	27J at -30°C	Deoxidized copper coated mild steel wire. Structural, pressure vessels and boilers involving unalloyed and micro-alloyed structural steels. It meets HIC & SSCC test as per NACE specification.
83	TIGFAST - 4	ER 80S-D2	0.07-0.12	1.60 - 2.10	0.50-0.80	0.40-0.60	0.15 max	0.50 max	--	--	--	0.025 max	0.025 max	–	–	–	590 min.	490 min.	17% min.	27J at -30°C	A copper-coated, low-alloy, solid wire with 0.5% Mo for the GTAW 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. TIGFAST-4 is usually welded with 100% Argon as the shielding gas. The mechanical properties are given in the stress-relieved condition.
84	TIGFAST - 5	ER 90SG	0.07-0.12	1.60 - 2.15	0.50-0.85	0.40-0.65	0.15 max	0.50 max	--	--	--	0.025 max	0.025 max	–	–	–	625 min.	550 min.	18% min.	27J at -46°C	A copper-coated low-alloy steel gas-shielded welding wire. It is use for welding of high tensile strength steel, such as steel construction.
85	TIGFAST - 6	ER 80SG	0.10 max	1.80 max	0.55 max	0.50 max	0.15 max	0.50 max	--	--	--	0.025 max	0.025 max	–	–	–	600 min.	470 min.	16% min.	40J at -20°C	

SOLID CARBON MOLYBDENUM STEEL WIRES FOR TIG WELDING

No	Product	AWS Coding	C	Mn	Si	Mo	Ni	Cu	Ti	Zr	Al	S	P	Cr	Nb	V	UTS Mpa	YS MPa	Elongation	CVN Impact
86	TIGFAST-70S A1	ER 70S-A1	0.12 max	1.30 max	0.30-0.70	0.40-0.65	–	0.35 max	–	–	–	0.025 max	0.025 max	–	–	–	515 min*	400 min*	19% min*	–

SOLID CHROMIUM MOLYBDENUM STEEL WIRES FOR TIG WELDING

No	Product	AWS Coding	C	Mn	Si	Mo	Ni	Cu	Ti	Zr	Al	S	P	Cr	Nb	V	UTS Mpa	YS MPa	Elongation	CVN Impact
87	TIGFAST - 80S B2	ER 80S-B2	0.07-0.12	0.40-0.70	0.40-0.70	0.40-0.65	0.20 max	0.35 max	–	–	–	0.025 max	0.025 max	1.20-1.50	–	–	550 min*	470 min*	19% min*	–
88	TIGFAST - 80S B6	ER 80S-B6	0.10 max	0.40-0.70	0.50 max	0.40-0.65	0.60 max	0.35 max	–	–	–	0.025 max	0.025 max	4.50-6.00	–	–	550 min***	470 min***	17% min***	–
89	TIGFAST - 80S B8	ER 80S-B8	0.10 max	0.40-0.70	0.50 max	0.80-1.20	0.50 max	0.35 max	–	–	–	0.025 max	0.025 max	8.00-10.50	–	–	550 min***	470 min***	17% min***	–
90	TIGFAST - 90S B3	ER 90S-B3	0.07-0.12	0.40-0.70	0.40-0.70	0.90-1.20	0.20 max	0.35 max	–	–	–	0.025 max	0.025 max	2.30-2.70	–	–	620 min**	540 min**	17% min**	–
91	TIGFAST - 90S B9	ER 90S-B9	0.07-0.12	1.20 max	0.15-0.50	0.85-1.20	0.80 max	0.20 max	–	–	0.04 max	0.01 max	0.01 max	8.00-10.50	–	0.15-0.30	620 min****	410 min****	16% min****	

SOLID STAINLESS STEEL WIRES FOR TIG WELDING

No	Product	AWS Coding	C	Mn	Si	Mo	Ni	Cu	Ti	Zr	Al	S	P	Cr	Nb	V	UTS Mpa	YS MPa	Elongation	CVN Impact
92	TIGFAST 308	ER 308	0.08 max	1.00-2.50	0.30-0.65	_	9.00-11.00	–	_	_	_	_	_	19.50-22.00	_	_	550 min	_	35% min	–
93	TIGFAST 308L	ER 308L	0.03 max	1.00-2.50	0.30-0.65	_	9.00-11.00	_	_	_	_	_	_	19.50-22.00	_	_	520 min	_	35% min	–
94	TIGFAST 347	ER 347	0.08 max	1.00-2.50	0.30-0.65	_	9.00-11.00	_	_	_	_	_	_	19.00-21.50	1.0 max	_	520 min	_	30% min	–
95	TIGFAST 316	ER 316	0.08 max	1.00-2.50	0.30-0.65	2.00-3.00	11.00-14.00	_	_	_	_	_	_	18.00-20.00	_	_	520 min	_	30% min	–
96	TIGFAST 316 L	ER 316L	0.03 max	1.00-2.50	0.30-0.65	2.00-3.00	11.00-14.00	_	_	_	_	_	_	18.00-20.00	_	_	490 min	_	30% min	–
97	TIGFAST 309	ER 309	0.12 max	1.00-2.50	0.30-0.65	_	12.00-14.00	_	_	_	_	_	_	23.00-25.00	_	_	550 min	_	30% min	–
98	TIGFAST 309L Approvals : Thermax	ER 309L	0.03 max	1.00-2.50	0.30-0.65	_	12.00-14.00	_	_	_	_	_	_	23.00-25.00	_	_	520 min	_	30% min	–
99	TIGFAST 309 Mo	ER 309Mo	0.12 max	1.00-2.50	0.30-0.65	2.00-3.00	12.00-14.00	_	_	_	_	_	_	23.00-25.00	_	_	550 min	_	30% min	–
100	TIGFAST 310	ER 310	0.08-0.15	1.00-2.50	0.30-0.65	_	20.00-22.50	_	_	_	_	_	_	25.00-28.00	_	_	550 min	_	30% min	–
101	TIGFAST 312	ER 312	0.15 max	1.00- 2.50	0.30-0.65	_	8.00-10.50	_	_	_	_	_	_	28.00-32.00	_	_	660 min	_	22% min	–
102	TIGFAST 410	ER 410	0.12 max	0.60 max	00.50 max	_	_	_	_	_	_	_	_	11.50-13.50	_	_	520 min@	_	20% min@	–
103	TIGFAST 430	ER 430	0.10 max	0.60 max	00.50 max	_	_	_	_	_	_	_	_	15.50-17.00	_	_	450 min@@	_	20% min@@	–

Note : Weld Metal Properties with 100% Ar Gas Shielding. * PWHT at 620° C For 1 Hr/ ** PWHT at 690° C For 1 Hr/ *** PWHT at 745° C For 1 Hr/ **** PWHT at 760° C For 1 Hr

SOLID INCONEL WIRES FOR TIG WELDING

No	Product	Coding	C	Mn	Si	Mo	Ni	Cu	Ti	Fe	Al	S	P	Cr	Nb+Ta	V	UTS MPa	YS MPa	Elongation	CVN Impact
104	TIGFAST - 625	ER NiCrMo3	0.10	0.50	0.50	8.0-10.0	58% min	0.50	0.40	5.00	0.40	0.015	0.02	20.0-23.0	3.15-4.15	–	760 Typical	–	–	–

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.

TIG FILLER WIRES

TIGFAST Filler wires are available in 1.60, 2.00, 2.40/2.50, 3.15, 4.00 mm sizes (In 1000 mm length)

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 UTS under 610 N/mm²	A5.1 A5.1	E 60XX E 70XX	Super, Quality, Supreme, LH-16, LH-18
Low Chromium Ferritic Alloys		½ Cr - ½ Mo 1 Cr - ½ Mo 1¼ Cr - ½ Mo	A5.5	E80XXB2	CROMO 1500
		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 AISI Type 410 S AISI Type 410	A5.4	E410-15	Weldfast 13/410
		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.

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