

Superior Quality Stick Welding Electrodes



RAAJRATNA offers you a complete range of premium stick welding electrodes to suit your specific needs. Our products are manufactured at latest state of the art manufacturing plant to meet national & International standards such as AWS, DIN, BS, JIS etc.

- Mild steel electrodes
- Electrodes for medium & high tensile steel
- Electrodes for weathering steel
- Electrodes for low temperature service
- Electrodes for Nickel steel
- Electrodes for heat & creep resistance steel
- Electrodes for Hardfacing
- Electrodes for Galvanizing bath
- Electrodes for cutting & Gouging
- Electrodes for stainless steel
- Electrodes for cast Iron
- Electrodes for Nickel and Nickel based alloys
- Electrodes for special application
- Electrodes for Low Heat Input alloys



Raajratna
electrodes pvt. ltd.
An ISO 9001:2008 Company

Superior Quality Stick Welding Electrodes

Product Specification, Chemical Composition, Mechanical Properties & It's Applications

Raajratna Grade	AWS / ASME CLASSIFICATION	IS CLASSIFICATION	Chemical Composition of Weld Metal Elements (% by Weight)									Mechanical Properties			Approval	Applications
			C Max.	Si Max.	Mn	S Max.	P Max.	Cr	Ni	Mo	CNV Impact at °C J Min.	YS N/mm ² Min.	UTS N/mm ² Min.	% Elong Min		
Low & Medium Tensile Steel Electrodes																
RATNA FS12	A 5.1 E 6012	814 ER 4122	0.12	0.30	0.35-0.60	0.030	0.030	---	---	---	+27 47	330-400	430-560	17	---	Suitable for steel furnitures, light sheet metal works, storage tanks, truck bodies, general fabrication, foundry equipments.
RATNA 6013	A 5.1 E 6013	814 ER 4222	0.10	0.30	0.35-0.60	0.030	0.030	---	---	---	0 47	330-430	430-560	22	BIS, IRS, DNV	Suitable for tanks & vessels, general fabrication, vehicles, railway wagons and machinery, ship building construction light structural steel works, storage tanks etc.
RATNA 6013X	A 5.1 E 6013	814 ER 4222 X	0.10	0.30	0.40-0.60	0.030	0.030	---	---	---	0 47	330-430	430-560	22	NPCIL, BIS, ABS, CIB, BAX, BHEL, BV, IRS, PDIL	Suitable for storage tanks, rail coaches, pressure vessels, heavy structures, ship construction, structural work, boilers etc.
RATNA 6013XX	A 5.1 ER 6013	814 ERR 4222 X	0.10	0.30	0.40-0.60	0.030	0.030	---	---	---	0 47	330-430	430-560	22	BIS	Suitable for boilers, heavy sections, ship hull construction and repair & maintenance of pressure vessels, structural works, rail coaches / wagons, locomotive fire boxes, coach panels, bridging wide root gap.
RATNA SUPER S	A 5.1 E 6013	814 ER 4212 X	0.10	0.30	0.40-0.60	0.030	0.030	---	---	---	0 47	330-430	430-560	22	RDSO	Suitable for boilers, heavy sections, pressure vessels, structural works, rail coaches / wagons, storage tanks bridges etc. for achieving radiographic quality weld deposit with good mechanical properties.
RATNA 7016	A 5.1 E 7016	814 EB 5426 H ₃ X	0.10	0.60	0.80-1.30	0.030	0.030	---	---	---	-30 27	400	490	22	---	Suitable for overlaying buffer layer before hardfacing, joining mild steel to carbon steel. Repairing cast iron component provided non machinable welds are permitted, joining steel girders to rail, earthmoving machineries, tanks, restrained joints.
RATNA 7016W	A 5.1 E 7016	814 EB 5426 H ₃ X	0.10	0.60	0.80-1.30	0.030	0.030	---	---	---	-30 27	400	490	22	---	Suitable for welding unknown composition steels, low alloy steels, mild steel to high carbon steel, steel components with high carbon and high sulphur, cast iron repairs etc.
RATNA 7018	A 5.1 E 7018	814 EB 5426 H ₃ JX	0.10	0.60	0.80-1.50	0.030	0.030	---	---	---	-30 27	400	490	22	RDSO, TOYO, BV, BHEL, BAX, DNV, IRS, CIB, LRA, BIS, NPCIL, PDIL	Suitable for welding restrained joints, root runs, penstocks heavy structures subjected to dynamic loading and impact, rail wagons, coaches, industrial and mining machinery, bridges, boiler fabrication, steels subjected to service at -30°C down sub-zero temperature.
RATNA 7024	A 5.1 E 7024	814 ERR 5242 KX	0.10	0.35	0.50-1.00	0.030	0.030	---	---	---	0 47	400	490	22	---	Suitable for welding heavy sections machinery components, structural works, viz cranes and girders. Welding heavy columns, locomotive, mild steel sections where high productivity is called for.

Low Alloy Electrodes for Low Temperature Service

RATNA 7018 Spl	A 5.1 E 7018-1	814 EB 5426H ₂ JX	0.10	0.60	1.20-1.60	0.030	0.030	---	---	---	-45 27	400	490	22	BV, BAX, PDIL	Suitable for high pressure boilers / vessels, carbon steel rigid and heavy structures, steels sensitive to hydrogen embrittlement and prone to crack, industrial equipments subjected to severe impact.
RATNA 7018M	A 5.5 E 7018A1	1395 E 49BA 126Fe	0.12	0.60	0.90 max.	0.030	0.030	---	---	0.40-0.65	+27 140	390	490	22	---	Suitable for high pressure boiler tubes and plates, fabrication, for welding 0.50% Mo and 1% Cr-0.5% Mo steels used for elevated temperature services upto 525°C. Also suitable for fine grained and creep resistant steel welding.
RATNA 8016Ni Spl	A 5.5 E 8016G	1395 E 55BG 129Fe	0.10	0.60	1.20-1.50	---	---	---	0.50-1.00	---	-60 27	460	550	19	---	Welding suitable for mild steel, Class III & IV steel grade, fabrication of Boilers, pressure vessels, Oil tanks, Shipbuilding etc.
RATNA 8018Ni Spl	A 5.5 E 8018G	1395 E 55BG 129Fe	0.10	0.60	1.20-1.60	0.030	0.030	---	0.50-1.00	---	-60 27	460	550	19	---	Suitable for welding on Quenched & Tempered steels, pressure vessels, storage tanks, penstocks, fine grained steels, industrial equipments subjected to sub-zero temperature, other steels categorised for high strength.
RATNA 8018 C1	A 5.5 E 8018C1	1395 E 55 BC 126 Fe	0.12	0.60	1.25 max.	---	---	---	2.00-2.75	---	-60 27	460	550	19	---	Suitable for fabrication of LNG storage tanks. Liquefied gases, cryogenic vessels, to weld 2.25%Ni steels, oil refinery valves, pressure vessels, construction of components to be subjected to low temperature service in petrochemical industries.

Electrodes for Weathering Steel

RATNA 8018W	A 5.5 E 8018W2	1395 E 55BG 126Fe	0.12	0.60	0.50-1.30	---	---	0.40-0.70	0.40-0.80	Others CU 0.30-0.75	-18 27	460	550	19	---	Suitable for welding of weathering steels like SAILCOR-A & CORTEN A & B Steels & equivalent grades, medium tensile corrosion resistant structure steels and welding of high tensile steels.
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Electrodes for High Tensile and Quenched & Tempered Steel

RATNA HT	A 5.5 E 9018G	1395 E63 BG 129Fe	0.10	0.50	1.20-1.80	---	---	---	0.80-1.50	0.60 max.	-50 27	530	620	17	---	Suitable for welding high tensile steels, oil refinery components, structural fabrication, equipments such as penstocks to be subjected to -50°C, boiler fabrication, heavy earthmoving machinery, fabrication, power house construction and for welding Q & T steels / HSLA steels.
RATNA HT 75	A 5.5 E 10016G	1395 E68 BG 126Fe	0.10	0.60	1.20-1.60	---	---	0.30 max.	1.50-2.50	0.20-0.40	-50 27	600	690	16	---	Suitable for welding Quenched & Tempered steels, high tensile steels, machinery components of heavy earthmoving equipments, casting where strength coupled with toughness is called for.
RATNA HT Spl	A 5.5 E 11018M	1395 E76 BM 329Fe	0.10	0.60	1.30-1.80	---	---	0.40 max.	1.25-2.50	0.25-0.50	-50 27	680	760	20	---	Suitable for crack resistant, high strength coupled with impact resistance strength at sub-zero temperature service weld joints, earthmoving machinery, heavy structures made of high tensile steels, penstocks, extra hydrogen control ensures resistance to hydrogen induced cracking onsite conditions.
RATNA HT 65	A 5.5 E 9016G	1395 E63 BG 129Fe	0.10	0.60	1.20-1.50	---	---	---	0.80-1.50	0.60 max.	-50 27	530	620	17	---	Suitable for welding of high tensile steels, Earth moving equipment and other similar heavy fabrications. Welding of Q&T steels, HSLA steels, penstocks, tanks, pressure vessels etc.
RATNA HT 65 Spl	A 5.5 E 9018M	1395 E63 BM 129Fe	0.10	0.60	0.60-1.20	---	---	0.15 max.	1.40-1.80	0.35 max.	-50 27	540	620	24	---	Suitable for welding of grained refined steels, Q&T steels, HSLA steels, used in penstocks, tanks, pressure vessels and Bridge.

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			C Max.	Si Max.	Mn Max.	S Max.	P Max.	Cr	Ni	Mo	Others	YS N/mm ² Min.	UTS N/mm ² Min.	% Elong Min		
Creep Resistant Steel Electrodes																
RATNA CR 1	A 5.5 E 8018 B2	1395 E55 BB 226Fe	0.05-0.12	0.60	0.90	---	---	1.00-1.50	---	0.40-0.65	---	460	550	19	---	Suitable to weld creep resistant steels like Cr-Mo pipelines and plates used in oil refinery, power plants, steam boilers, equipments subjected at high temperatures in synthetic chemical units, repairs of cast steel components, parts of automobiles & earthmoving machineries.
RATNA CR 2	A 5.5 E 9018 B3	1395 E63 BB 326Fe	0.05-0.12	0.60	0.90	---	---	2.00-2.50	---	0.90-1.20	---	530	620	17	---	Suitable to weld high tensile, low alloy steels with 2.25% Cr and 1% Mo used in oil refinery / power plants, steam boilers, equipments subjected at high temperatures in synthetic chemical units, repairs of cast steel components / parts of automobiles / earthmoving machineries, also includes marine applications.
RATNA CR 5	A 5.5 E 8018 B6	1395 E41 BB 626Fe	0.05-0.12	0.60	1.00	0.030	0.030	4.00-6.00	---	0.45-0.65	---	460	550	19	---	Ideally suitable for oil refinery, petrochemical industries, chemical industries, power house applications where steels of similar compositions are used.
RATNA CR 9	A 5.5 E 8018 B8	1395 E41 BB 826Fe	0.05-0.10	0.60	1.00	0.030	0.030	8.00-10.50	---	0.85-1.20	---	460	550	19	---	Ideally suitable for oil refinery petrochemical industries, chemical industries, power house applications where steels of similar compositions are used, for welding 7-10% Cr 1% Mo steels and castings of similar compositions.
Hardfacing Electrodes																
RATNA HF 1	DIN 8555 E1-UM-250	---	0.25	0.60	0.60	---	---	1.50-2.50	---	---	---	---	200 - 300 BHN	---	---	Suitable to use on hammers, pinion teeth, railway and tram rails, gear shaft couplings, axles, cane crushers, machine parts, where toughness and hardness is desired with machinable properties.
RATNA HF 2	DIN 8555 E1-UM-400	---	0.20-0.40	0.60	0.60	---	---	2.50-3.50	---	---	---	---	350 - 400 BHN	---	---	Suitable to use on couplings, break shoes, cams, gears, cogwheels, crawler parts, shafts, plough shears, blades and components where abrasion resistance coupled with toughness is required.
RATNA HF 3	DIN 8555 E1-UM-60	---	0.40-0.70	0.60	0.60	---	---	5.00-8.00	---	---	---	---	600 BHN Avg.	---	---	Suitable for mine rails, crusher hammers, drilling bits, bamboo and cane cutting knives, conveyor buckets, crane wheels, oil expeller etc.
RATNA II LH	DIN 8555 E1-UM-400-S	---	0.20-0.40	0.60	1.00	---	---	2.50-3.50	---	---	---	---	350 - 400 BHN	---	---	Suitable to weld on Rail ends and crossing, plough shares, shear plades, brake shoes, cogwheels, conveyer parts, cold punching dies, pulleys and steel castings etc.
RATNA HF LH	DIN 8555 E2-UM-60-S	---	0.50-0.80	0.75	1.00	---	---	6.00-8.00	---	0.40-0.60	V 0.20-0.40	---	600 BHN Avg.	---	---	Suitable to work on high carbon and sulphur steels without cracks, crane wheels, drill bits, crusher hammers, shear blades, rock drill, cane cutting knives, impellers, oil expeller worms, conveyor buckets, sprockets etc.
RATNA HF MN	DIN 8555 E7-UM-250KP	---	---	0.80	12.0-14.0	---	---	---	---	---	---	---	200 - 250 BHN	---	---	Suitable for stone crushing jaws, buckets, excavator teeths, Mn steel rails, austenitic manganese steel castings, hammers, crusher mantle etc.
RATNA HF 5	DIN 8555 E1-UM-60GR	---	2.00-3.00	2.50-3.50	0.80-1.25	---	---	2.50-3.50	---	---	---	---	600 BHN Avg.	---	---	Suitable for resurfacing on mixer blades worms of oil expellers, screw conveyors, shears, bucket tips and excavators teeths.
Nickel & Nickel based Electrodes																
RATNA B Ni 65	A 5.11 E NiCrFe 2	---	0.10	0.75	1.00-3.50	---	---	13.00-17.00	62 min.	0.50-2.50	Cb 0.50-3.00 Fe 12.0 max.	---	550	30	---	Suitable to weld dissimilar materials viz carbon steel, stainless steel. Ni and Ni based alloys, have excellent applications at elevated temperatures with properties coupled with creep resistance and oxidation resistance.
RATNA B Ni 70	A 5.11 E NiCrFe 3	---	0.10	1.0	5.00-9.50	---	---	13.00-17.00	59 min.	---	Cb 1.00-2.50 Fe 10.0 max.	---	550	30	---	Suitable to weld dissimilar materials joining Ni based steel to themselves. Welding joints where creep and oxidation resistance properties are desired at elevated temperatures.
RATNA Ni Cu	A 5.11 E NiCu 7	---	0.15	1.50	4.00	---	---	---	62.00-69.00	---	Cu Bal. Al 0.75 max. Ti 2.00 max. Fe 2.50 max.	---	480	30	---	Suitable for weld monel metals to itself, monel to carbon steel or stainless steel. Welding on clad side or monel clad steel, seawater corrosion resistance applications, petrochemical, daily, beverage industries, chemical industries etc.
Cast Iron Electrodes																
CAST STEEL	A 5.15 Est (Nr.)	---	2.00-3.00	4.00-6.00	0.60	---	---	---	---	---	---	---	---	---	---	Suitable to weld mild steel to cast iron parts, repair works on cast iron where machining is not of importance and primary consideration.
CAST FN	A 5.15 E Ni Fe Cl	---	1.50-2.00	1.00	1.00	---	---	---	50 min.	---	Fe Bal.	---	Hardness 190 VPN	---	---	Suitable to weld and repair all types of cast iron components, broken castings, joining cast iron to steel. Cast iron components subjected to wear and tear etc.
CAST Ni	A 5.15 E Ni Cl	---	1.20	1.00	1.00	---	---	---	96 min.	---	Fe Bal.	---	Hardness 150VPN	---	---	Suitable to weld carbon steel to cast iron, repairs on cast iron castings, filling up casting defects, building up worn out surfaces.
CAST MONEL	A 5.15 E Ni Cu B	---	0.35-0.45	0.75	1.00	---	---	---	60.00-70.00	---	Cu 25.00-35.00 Fe 3.00 max.	---	Hardness 150 VPN	---	---	Suitable to weld carbon steel to cast iron, broken casting repairs, machining defect rectification, filling up castings, rebuilding worn out surfaces etc.
CUT ROD	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	Suitable for cutting and piercing carbon steels, stainless steels, low and high alloy steels and almost all non ferrous metals and metals which cannot be cut by conventional cutting process.
GOUGE ROD	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	Suitable for cleaning and removal of unwanted / undesirable materials, weld joints preparation, removal of cracks in welded joints, defects repair in castings, also to remove excess deposition prior to machining, weld dressing etc.

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			C Max.	Si Max.	Mn	S Max.	P Max.	Cr	Ni	Mo	Others	UTS N/mm ² Min.	% Elong Min.		
RATNA 308	A 5.4 E 308-16	5206 E 19.9R 26	0.08	1.00	0.50-2.50	0.030	0.040	18.00-21.00	9.00-11.00	---	---	550	35	RDSO	Suitable for joining AISI 301, 302, 304 and 308 steel having 18Cr/8Ni.
RATNA 308L	A 5.4 E 308L-16	5206 E 19.9LR 26	0.04	1.00	0.50-2.50	0.030	0.040	18.00-21.00	9.00-11.00	---	---	520	35	LRA, NPCIL Toyo, PDIL	Suitable for joining AISI 301L, 302L, 304L and 308L steel having 18Cr/8Ni with low carbon content.
RATNA 308H	A 5.4 E 308H-16	5206 E 19.9R 26	0.04-0.08	1.00	0.50-2.50	0.030	0.040	18.00-21.00	9.00-11.00	---	---	550	35	---	Suitable for joining AISI 304H materials. Ideally suitable for joining 18/8 SS consisting of higher carbon percentage.
RATNA 309	A 5.4 E 309-16	5206 E 23.12R 26	0.15	1.00	0.50-2.50	0.030	0.040	22.00-25.00	12.00-14.00	---	---	550	30	RDSO	Suitable for welding 24/12 stainless steel grades of AISI 309. Welding SS to carbon steel and low alloy steels.
RATNA 309L	A 5.4 E 309L-16	5206 E 23.12LR 26	0.04	1.00	0.50-2.50	0.030	0.040	22.00-25.00	12.00-14.00	---	---	520	30	LRA, Toyo	Suitable for welding 24/12 stainless steel grades of AISI 309L. Welding SS to carbon steel and low alloy steels.
RATNA 309Mo	A 5.4 E 309Mo-16	5206 E 23.12.2R 26	0.12	1.00	0.50-2.50	0.030	0.040	22.00-25.00	12.00-14.00	2.00-3.00	---	550	30	---	Suitable to weld dissimilar steels like carbon steel to stainless steel with Mo. Welding 316 type clad steel AISI 309Mo steel and to weld difficult to weld steels.
RATNA 310	A 5.4 E 310-16	5206 E 25.20R 26	0.08-0.20	0.75	1.00-2.50	0.030	0.040	25.00-28.00	20.00-22.50	---	---	520	30	---	Suitable for welding AISI 310 type steel, clad side of clad steels, high temperature furnace parts, gas turbine combustion chambers, hardenable steel and dissimilar steels.
RATNA 316	A 5.4 E 316-16	5206 E 19.12.2R 26	0.08	1.00	0.50-2.50	0.030	0.040	17.00-20.00	11.00-14.00	2.00-3.00	---	520	30	---	Suitable to weld 18/8 Mo steels such as 316/317 type, corrosion resistance applications such as tanks fabrication for storage of phosphoric acid, acetic acid and sulphuric acids.
RATNA 316L	A 5.4 E 316L-16	5206 E 19.12.2LR 26	0.04	1.00	0.50-2.50	0.030	0.040	17.00-20.00	11.00-14.00	2.00-3.00	---	490	30	LRA, Toyo, PDIL	Suitable for AISI 316L & 317L grades of stainless steels, chemical, dyes, paint, petrochemical, pharmaceutical and fertilizer industries.
RATNA 316LF	A 5.4 E 316L-16 (Nr.)	5206 E 19.12.2LR 26 (Nr.)	0.04	1.00	0.50-2.50	0.030	0.040	17.00-20.00	12.00-15.00	2.00-3.00	FN 2%	490	30	---	Suitable for welding AISI 316 & 316L steels where ferrite content in weld deposit is restricted to less than 2% and for corrosion resistance applications.
RATNA 36Cb	A 5.4 E 318-16	5206 E 19.12.2NbR 26	0.08	1.00	0.50-2.50	0.030	0.040	17.00-20.00	11.00-14.00	2.00-3.00	Cb-6xC min - 1.00 max	550	25	---	Suitable to weld Niobium and Titanium based stainless steels.
RATNA 317L	A 5.4 E 317L-16	5206 E 19.12.3LR 26	0.04	1.00	0.50-2.50	0.030	0.040	18.00-21.00	12.00-14.00	3.00-4.00	---	520	30	---	Suitable for welding stainless steel exceptional corrosion resistance against inorganic acids such as sulphuric, phosphoric, halogen etc.
RATNA 347	A 5.4 E 347-16	5206 E 19.9NbR 26	0.08	1.00	0.50-2.50	0.030	0.040	18.00-21.00	9.00-11.00	---	Cb-8xC min - 1.00 max	520	30	---	Ideally suited for welding stainless steel conforming to AISI 304, 304L, 321, 347 and their equivalents used in fertilizer, petrochemical, chemical and pharmaceutical industries.
RATNA 13CR	A 5.4 E 410-15	5206 E 13R 10	0.12	0.90	1.00 max.	0.030	0.040	11.00-13.5	---	---	---	520	20	---	Suitable for turbine construction, joining chrome steels to cast steel, joining AISI 405, 410, 414, 420 stainless steel.
RATNA 17CR	A 5.4 E 430-15	5206 E 17R 10	0.10	0.90	1.00 max.	0.030	0.040	15.00-18.00	---	---	---	450	20	---	Suitable for welding AISI 430 & 431 stainless steels and steels with higher or lower chromium content. Surfacing of impellers, turbine blades, corrosion and heat resistance applications.
RATNA 18/8/5	A 5.4 E 307-16 (Nr.)	5206 E 18.8MnR 26	0.14	1.00	5.00-8.00	0.030	0.040	18.00-21.50	9.00-10.70	---	---	590	30	RDSO	It is easy to operate in all positions at low currents and for joining and surfacing applications to enhance resistance to impact and abrasion and also for buffer layers on variety of steels.
RATNA 13/4/05	A 5.4 E 410NiMoL-15	---	0.06	0.90	1.00 max.	0.030	0.040	11.00-12.50	4.00-5.00	0.40-0.70	---	760	15	---	Surfacing of high pressure valves, turbine blades, guide vans and runners, pulp and paper plant equipments similar corrosion resisting chromium steel erosion, pitting and impact value.
RATNA 312	A 5.4 E 312-16	---	0.15	1.00	0.50-2.50	0.030	0.040	28.00-32.00	8.00-10.50	---	---	660	22	---	It is ideally suitable for welding difficult-to-weld, e. g. high hardenable tool, die & spring steel, 13% Mn steels, free cutting steels, high temperature steels. Dissimilar joints between stainless steel and high carbon steels. Surfacing to metal to metal wear areas, not working tools, furnace components etc.
RATNA 2093L	A 5.4 E 2209-16	---	0.04	1.00	0.50-2.00	0.030	0.040	21.00-23.50	8.50-10.50	2.50-3.50	N 0.08-0.20	690	20	---	To join stainless to carbon steel, for depositing austenitic weld metal on higher carbon steel, armour steel etc. Weld metal deposited by electrodes combines increase tensile strength and resistance to pitting corrosion attack and to stress corrosion cracking for satisfaction services.
RATNA 20/25/5 Cu	A 5.4 E 385-16	---	0.030	0.90	1.00-2.50	0.020	0.020	19.50-21.50	24.00-26.00	4.20-5.20	Cu 1.20-2.00	520	30	---	Ideally suited for welding carpenter 20, HV 9, HV 9A, uranus B-6, UHB 904L, sandvik 2Rk65 and other similar materials. Electrode may be used to joint type 317L material where improved corrosion resistance is needed.

Packing Type and Characteristics

Standard Sizes

Diameter in mm	2.00	2.40 / 2.50	3.20	4.00	5.00
Diameter in inch	5/64	3/32	1/8	5/32	3/16

Standard Packing :

- Stainless steel & special electrodes are packed in 2 kgs & 5 kgs (approx.) of plastic box further packed in big corrugated box
- Mild steel & other electrodes are packed in 5 kgs (approx.) of corrugated small box further packed in big corrugated box
- Vacuum packing is also available on request
- Customized packing is also available on request

Redrying Data for Electrodes :

Types of Electrodes	Redrying Temp.	Holding Time	Holding Temp.
Rutile coated, Mild Steel, Low Tensile electrodes	120°C ±10°C	1 Hour	As storage
Basic Coated & Hydrogen Controlled Electrodes	250°C ±10°C	1 Hour	100°C
Stainless Steel Electrodes & Hardfacing Electrodes	250°C ±10°C	1 Hour	100°C
Nickel & Nickel based Alloy Electrodes	250°C ±10°C	1 Hour	100°C
Cast Iron Electrodes	150°C ±10°C	1 Hour	60°C

Note : The above directives are for optimum results and is only a board guideline.

Storage & Drying :

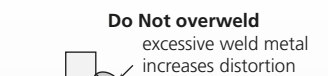
Storage is an important factor which is necessary. Electrodes are prone to absorb moisture during transportation and due to improper storage conditions and handling. Moisture in electrodes leads to bad performance and defects in welds. The shelf life of an electrode can be increased by proper storage in a dehumidified room or by maintaining the room temperature of the storage place at 15-20°C above the ambient temperature. Any storage condition other than this, requires redrying of the electrodes in a drying oven before use.

It becomes absolutely necessary for Hydrogen controlled electrodes to be designed to produce less than 15ml of diffusible hydrogen per 100gm. of weld deposit, as prescribed by ANSI / AWS A4.3-93. In order to avoid under bead cracking phenomenon in heat effected zone of the weldment, the redrying temperature for these electrodes are as per table given below, for an hour, prior to use.

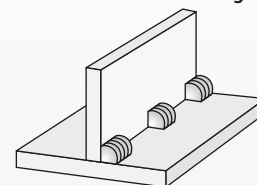
Welding Problems & Solutions

- | | |
|---|--|
| <p>I. Porosity</p> <ol style="list-style-type: none"> Wrong current setting Excessive speed Dirt or impurities in base metal <p>II. Spatter</p> <ol style="list-style-type: none"> Amperage (heat) too high Excessive arc length Arc Blow Wrong polarity <p>III. Arc Hard to Start</p> <ol style="list-style-type: none"> Current setting too low Poor or no ground Work dirty Low input line voltage Broken cable Corroded holder jaws <p>IV. Slag Inclusions</p> <ol style="list-style-type: none"> Current setting too low Too short an arc Wrong bead forming procedure <p>V. Poor Fusion</p> <ol style="list-style-type: none"> Current setting too low Wrong manipulation Too long an arc Incorrect work preparation <p>VI. Undercutting</p> <ol style="list-style-type: none"> Current amperage too high Travel speed too fast Arc length excessive Incorrect electrode to work angle Wrong diameter electrode <p>VII. Distortion</p> <ol style="list-style-type: none"> Improper set-up and jiggling Excessive heating of weld area Wrong welding procedure Dissimilar metals being joined <p>VIII. Cracking</p> <ol style="list-style-type: none"> High carbon or poor quality material Wrong bead configuration Improper electrode type Too fast cooling | <ol style="list-style-type: none"> Set proper current Reduce speed of travel Use shallow penetration electrode. <ol style="list-style-type: none"> Reduce amperage Shorten arc Direct travel to the direction of blow. Switch to opposite <ol style="list-style-type: none"> Increase current (Amperage) Attach ground to clean area of metal Remove rust, paint, oxides Check line voltage Usually in holder or ground-resolder File will clean them up nicely <ol style="list-style-type: none"> Increase amperage Increase arc length Change to proper in waving bead <ol style="list-style-type: none"> Reset current Correct speed and change weave Shorten arc length to frying sound Clean and vee out weld joint <ol style="list-style-type: none"> Lower amperage Reduce welding travel speed Shorten arc length Reducing amperage controls puddle Increase electrode diameter one size <ol style="list-style-type: none"> Correct set-up or jiggling design Reduce heat in work Use chill plate for heat dissipation Skip weld <ol style="list-style-type: none"> Preheat Avoid excessive heat and puddle size Check and use correct type of electrode Preheat and post-heat, cool slowly |
|---|--|

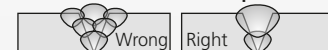
WAYS TO MINIMIZE DISTORTION



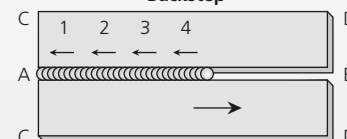
Intermittent Welding



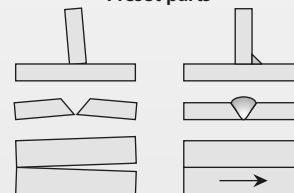
Minimum number of passes



Backstep



Preset parts



Raajratna Electrodes Pvt. Ltd.

(An ISO 9001:2008 Company)

Manufacturer-Exporter of Welding Consumables

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