



A to Z of D&H Welding Products

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SHIELDED METAL ARC
WELDING ELECTRODES/MANUAL
METAL ARC WELDING ELECTRODES

Product data & welding Handbook

CODIFICATION : AWS : E6010
 IS : EC4310X

CHARACTERISTICS AND APPLICATIONS :

Cellutherme is a light coated cellulosic type DC(+) electrode. Ideally suited for welding in all positions including vertical down. The weld metal possesses good mechanical properties. Ideal for stove pipe technique and faster welding. Welds are of radiographic quality. Typical applications include welding of pipes, tubes, ducts, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si
Percent	0.07	0.50	0.20

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at (Joules)	
48.2	39.6	27.5	-20°C	-30°C
			70	50

CURRENT AND PACKING DATA : DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	150-200	110-160	70-100	40-65
Qty.(Pcs./Carton)	55	80	120	200

APPROVALS : BV, PDIL, EIL

PRECAUTIONS :

1. In order to achieve best results, ensure a good joint fit-up and avoid uneven or excessive gap.
2. Do not use high current, which may lead to high spatter loss.

CODIFICATION : AWS : E7010-G

CHARACTERISTICS AND APPLICATIONS :

Cellutherme-Mo is a light coated cellulosic type electrode. This electrode operates with a forceful penetrating arc. Ideally suited for welding in all positions including vertical down. Special feature has been found extremely beneficial for welding of pipes in "Stove Pipe Technique" both for faster welding and greater control on penetration of the root runs. Electrode is designed to yield a weld deposit containing 0.5Mo and therefore is suited for welding C - 0.5Mo steels and is ideal for root passes in pipes.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	S	P	Mo
Percent	0.08	0.45	0.15	0.020	0.025	0.51

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at minus 60°C (Joules)	
51.6	43.8	26.0	35	

CURRENT AND PACKING DATA : DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5X350
Dia x Length				
Current Range (Amps)	150-200	110-150	70-100	40-65
Qty.(Pcs./Carton)	55	80	120	200

PRECAUTIONS :

1. In order to achieve best results, ensure a good joint fit-up and avoid uneven or excessive gap.
2. Do not use high current, which may lead to high spatter loss.

CODIFICATION : AWS : E6012
 IS : ER4122

CHARACTERISTICS AND APPLICATIONS :

Popular is a general purpose mild steel electrode for welding of mild carbon steels and low carbon steels for structural and general fabrication work. The electrode possesses excellent operating characteristics.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si
Percent	0.08	0.42	0.23

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at RT (Joules)
46	38	24	50

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	6.3x450	5x450	4x450	3.15x350	2.5X350
Dia x Length					
Current Range (Amps)	260-310	160-220	140-170	95-125	60-90
Qty.(Pcs./Carton):	35	55	80	120	200

APPROVAL : BIS

CODIFICATION : AWS : E6013
 IS : ER4112

CHARACTERISTICS AND APPLICATIONS :

A general purpose electrode ideally suited for welding low carbon, mild, structural steels. The electrode operates well in all positions including vertical down and operates on AC as well as DC. The electrode produces pleasing operating characteristics and weld metal of consistent quality. The slag is easily detachable. Ideal for operation under low OCV transformers. The electrode produces minimum spatter and has good striking and restriking characteristics. Some of the typical applications include welding of mild steels like IS:2062 for structures, auto bodies, furniture, tanks, frames, pipes, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si
Percent	0.06	0.35	0.20

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at RT (Joules)
47	40	25	50

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	5x450	4x450	3.15x450	3.15x350	2.5X350
Dia x Length					
Current Range (Amps)	190-240	140-190	100-130	100-140	70-100
Qty.(Pcs./Carton):	55	80	120	120	200

APPROVALS : RDSO, BIS

CODIFICATION : AWS : E6013
 IS : ER4222

CHARACTERISTICS AND APPLICATIONS :

A medium coated rutile type AC/DC all position electrode for welding mild steel structures, rail coaches, wagons, storage tanks, ships, sheet metal work etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si
Percent	:	0.08	0.44	0.22

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at 0°C (Joules)
48.6	44.0	27	62

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	:	6.3x450	5x450	4x450	3.15x350	2.5x350
Dia x Length						
Current Range	:	270-320	180-220	140-180	100-140	60-90
(Amps)						
Qty.(Pcs./Carton):		35	55	80	120	200

APPROVALS : BIS, RDSO, LRS, DNV, PDIL, EIL, ABS, BV, CIB-MP

CODIFICATION : AWS : E6013
 IS : ER4211

CHARACTERISTICS AND APPLICATIONS :

A medium coated general purpose all position electrode for welding low carbon and mild structural steels. The electrode operates well under low OCV transformers and direct current either polarity. Easy to operate in all positions including vertical down. Typical application include welding of steel structures and tanks, truck frames and bodies, machinery construction, auto bodies frames, pipes etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si
Percent	:	0.08	0.45	0.25

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at 0°C (Joules)
47.5	41.0	24	50

CURRENT AND PACKING DATA : AC / DC(±)

Size (mm)	:	6.3x450	5x450	4x450	3.15x350	2.5x350
Dia x Length						
Current Range	:	250-320	190-230	140-180	100-140	60-90
(Amps)						
Qty.(Pcs./Carton):		35	55	80	120	200

APPROVAL : BIS

PRECAUTION :

1. Redry the electrodes at 125°C for one hour, if necessary.

CODIFICATION : AWS : E6013
 IS : ER4222X

CHARACTERISTICS AND APPLICATIONS :

A medium heavy coated rutile type Touch electrode designed to operate even with 45 OCV, Suitable for all types of mild steel structures, plant machinery, pipes, dredgers, trawlers, etc. The weld metal is soft, ductile and is of radiographic quality.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si
Percent	:	0.08	0.46	0.22

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at 0°C (Joules)
49.0	44.2	28	60

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	:	6.3x450	5x450	4x450	3.15x450	3.15x350	2.5x350	2x300
Dia x Length								
Current Range (Amps)	:	280-340	200-260	140-190	100-125	100-135	60-90	40-60
Qty. (Pcs./Carton)	:	30	50	75	120	120	180	220

APPROVALS : BIS, RDSO for welding Corten steel to mild steel, CIB (M.P.), LRS, ABS, EIL, NPCIL, IRS, BV, DNV, PDIL

CODIFICATION : AWS : E6013
 IS : ER4322X

CHARACTERISTICS AND APPLICATIONS :

Medio-S is a rutile electrode ideally suited for welding of carbon steels. The weld metal is of radiographic quality and possesses excellent notch toughness at minus 20°C. Typical applications include ship construction, tanks, barges, dredgers, structures, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si
Percent	:	0.055	0.55	0.16

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at - 20°C (Joules)
49	44.0	28	50

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	:	5x450	4x450	3.15x450	2.5x350	2x300
Dia x Length						
Current Range (Amps)	:	190-240	150-180	100-130	60-90	40-60
Qty. (Pcs./Carton)	:	50	75	120	180	220

APPROVAL : LRS

CODIFICATION : AWS : E6013
 IS : ER4211X

CHARACTERISTICS AND APPLICATIONS :

Medio-V is a medium coated, rutile type, all position electrode. The electrode operates on alternating and direct current either polarity. The weld metal is soft, ductile, metallurgically clean and mechanically sound with radiographic quality. Typical applications include industrial pipes and tubes, storage tanks, boilers, fire boxes tanks, ships, barges, dredgers, trawlers, tugs rail coaches, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si
Percent	:	0.07	0.45	0.22

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at 0°C (Joules)
49	44.4	28.0	60

CURRENT AND PACKING DATA : AC / DC(±)

Size (mm)	:	6.3x450	5x450	4x450	3.15x450	3.15x350	2.5x350	2x300
Dia x Length								
Current Range:	:	260-320	190-250	140-190	100-130	100-140	60-90	40-60
(Amps)								
Qty.	:	30	50	75	120	120	180	250
(Pcs./Carton)								

APPROVAL : BIS

CODIFICATION : AWS : E6013
 IS : ERR4222X

CHARACTERISTICS AND APPLICATIONS :

A heavy coated rutile type electrode for achieving radiographic quality welds in mild steel boilers, pressure vessels, ships, hull construction, etc. Excellent bead appearance and self peeling slag. Typical applications also include storage tanks, wagons, automobile frames and bodies, rolling stocks, rail coaches locomotive fire boxes, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si
Percent	:	0.07	0.46	0.20

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at 0°C (Joules)
49.0	44.8	28	70

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	:	6.3x450	5x450	4x450	3.15x450	2.5x350	2x300
Dia x Length							
Current Range:	:	260-320	190-240	140-200	100-135	70-100	50-70
(Amps)							
Qty.(Pcs./Carton)	:	25	35	55	80	150	200

APPROVALS : BIS, CIB(M.P.), LRS, DNV, NPCIL, IRS

CODIFICATION : AWS : E6020
 IS : EA4245X

CHARACTERISTICS AND APPLICATIONS :

Unitherme is an iron oxide type electrode for welding of carbon steels. The welds are radiographic quality. Typical applications include locomotive fire boxes, rotary kilns, heavy structures, engine frames, bases, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si
Percent	0.07	0.50	0.23

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at 0°C (Joules)
48	42	24	50

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm) Dia x Length	6.3x450	5x450	4x450	3.15x450	2.5X350
Current Range (Amps)	260-350	190-260	150-210	110-150	70-100
Qty.(Pcs./Carton):	30	45	70	90	125

APPROVAL : RDSO

PRECAUTIONS :

1. Redry the electrodes at 125°C for one hour, if necessary.
2. Ensure use of electrode in horizontal and flat positions.

CODIFICATION : AWS : E7014
 IS : ES5224JX

CHARACTERISTICS AND APPLICATIONS :

A medium heavy coated, iron powder rutile type electrode suitable for welding all mild steel structures, boilers, pressure vessels. Welds are of radiographic quality. The electrode has a metal recovery of 115 %. Rapidex is suitable for all types of joints to achieve faster speed and higher welding output. Typical applications include boilers, pressure vessels, wagons, girders, tanks, ships, barges, machine parts, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si
Percent	0.07	0.58	0.24

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at 0°C (Joules)
52.0	44.8	28	60

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm) Dia x Length	6.3x450	5x450	4x450	3.15x450	2.5x350
Current Range (Amps)	260-340	200-260	160-200	100-150	70-100
Qty.(Pcs./Carton):	25	35	55	75	100

APPROVALS : LRS, RDSO for welding Corten steel to mild steel.

CODIFICATION :
 AWS : E7024
 IS : ES5245KX

CHARACTERISTICS AND APPLICATIONS :

A Super heavy coated, iron powder type electrode ideal for welding mild steel structures, plant machinery, etc. High metal recovery of 150% reduces welding time and increases the output. Weld metal is sound and is of radiographic quality. Some typical applications include mild steel structures, heavy columns, shipbuilding, locomotives, girders, boilers, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si
Percent	:	0.07	0.56	0.24

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at 0°C (Joules)
52.5	45.2	27.0	56

CURRENT AND PACKING DATA : AC / DC(±)

Size (mm)	:	6.3x450	5x450	4x450	3.15x350
Dia x Length					
Current Range (Amps)	:	320-380	220-280	190-230	140-170
Qty.(Pcs./Carton):		20	30	45	50

APPROVAL : RDSO

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 150°-200°C for one hour.
2. The electrode is meant for operation in flat and horizontal positions only.

CODIFICATION :
 AWS : E7016
 IS : EB5426H,X

CHARACTERISTICS AND APPLICATIONS :

A medium coated basic type hydrogen controlled electrode producing a tough, ductile weld metal for welding heavy sections in mild steel, medium high tensile steels, subjected to dynamic loading. Also suited 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, cast irons.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si
Percent	:	0.07	1.10	0.54

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	(J) at
56.4	48.2	28	-20°C
			-30°C
			60
			30

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	:	6.3x450	5x450	4x450	3.15x450	2.5x350
Dia x Length						
Current Range (Amps)	:	240-320	190-250	140-200	90-140	70-100
Qty.(Pcs./Carton):		25	40	65	100	150

APPROVALS : BIS, RDSO, LRS, EIL, ABS, BV, DNV, PDIL, CIB (M.P.)

PRECAUTION :

1. Ensure the electrodes are dry. Redry the moist electrodes as per our standard recommended practice.

CODIFICATION : AWS : E7018
 IS : EB5426H₃JX

CHARACTERISTICS AND APPLICATIONS :

A heavy coated low hydrogen, iron powder type electrode ideally suited for producing tough and ductile welds of radiographic quality in boilers, pressure vessels and heavy structures subjected to dynamic loading. The electrodes have a metal recovery of about 115%. Some typical applications include heavy structures subjected to dynamic loading and impact, highly restrained joints, coaches, wagons, penstocks, boilers, pressure vessels, earthmoving machines, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si
Percent	0.06	1.02	0.44

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at-30°C (Joules)
53.0	45.0	28	65

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	6.3x450	5x450	4x450	3.15x350	2.5x350	2x300
Dia x Length						
Current Range: (Amps)	270-320	200-250	150-190	100-150	70-100	50-70
Qty.(Pcs./Carton):	25	35	55	75	125	150

APPROVALS : BIS, RDSO, CIB(M.P.), LRS, ABS, BV, DNV, EIL, IRS, PDIL, NPCIL

PRECAUTION :

1. Ensure the electrodes are dry. Redry the moist electrodes as per our standard recommended practice.

CODIFICATION : AWS : E7018
 IS : EB5426H₃JX

CHARACTERISTICS AND APPLICATIONS :

A basic coated iron powder hydrogen controlled, all conventional position electrode, produces radiographic quality welds, having excellent cracking resistance. The electrode ideally suited for welding carbon steels used in the construction of equipment subject to heavy dynamic load impact and severe service conditions in sour gas service.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	S	P
Percent	0.06	1.02	0.44	0.006	0.015

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at-30°C (Joules)
52.0	42.0	30.0	65

CORROSION TEST : Passes corrosion test as per NACE standard TM-01-77-96(SSCC) and TM-02-84-96(HIC).

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	6.3x450	5x450	4x450	3.15x450	2.5x350	2x300
Dia x Length						
Current Range: (Amps)	270-320	200-250	150-190	100-140	70-100	50-70
Qty.(Pcs./Carton) :	25	35	55	75	100	150

APPROVAL : EIL (The weld metal meets the EIL specification GS-8 requirements for sour gas service.)

HARDNESS OF WELD METAL : 200 HV5 Max.
 DIFFUSIBLE HYDROGEN : Max.5ml/100gms of W.M.

PRECAUTION :

1. Ensure the electrodes are dry. Redry the moist electrodes as per our standard recommended practice.

CODIFICATION : AWS : E7018

CHARACTERISTICS AND APPLICATIONS :

Basic coated, low hydrogen and iron powder type electrode producing crack resistant, radiographic quality and tough weld metal. Ideal for welding pressure vessels, boilers, pipes and heavy sections in mild steel subjected to dynamic loading. Some typical applications include heavy, rigid mild steel and medium tensile steel structures, rail coaches and wagons and hull constructions, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si
Percent	:	0.06	0.90	0.42

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at-30°C (Joules)
52.5	44	27	40

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	:	6.3x450	5x450	4x450	3.15x450	2.5x250
Dia x Length						
Current Range:	:	260-350	190-260	140-190	100-140	50-80
(Amps)						
Qty.(Pcs./Carton):		25	35	55	75	125

APPROVALS : LRS, BV, BIS

PRECAUTION :

1. Ensure the electrodes are dry. Redry the moist electrodes as per our standard recommended practice.

CODIFICATION : AWS : E9018-G

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen, iron powder type electrode for welding steels having tensile strength up to 70kgf/mm². Ideally suited for welding fine-grained steels, high tensile steels used in bridges, penstocks, tanks, etc. The weld metal possesses excellent toughness at sub-zero temperatures down to minus 50°C. Typical applications include welding of grain-refined steels, Q&T steels, HSLA steels, pressure vessels, structural fabrication, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si	Ni	Mo
Percent	:	0.065	1.20	0.40	1.20	0.50

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at-51°C (Joules)
68.0	59.0	22	40

CURRENT AND PACKING DATA : DC(+)

Size (mm)	:	6.3x450	5x450	4x450	3.15x450	2.5x350
Dia x Length						
Current Range	:	280-350	200-250	140-190	100-140	70-100
(Amps)						
Qty.(Pcs./Carton):		25	35	55	75	125

APPROVAL : CIB (M.P.)

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 250-300°C for one hour before use.
2. When welding grain refined and Q&T steels, control the heat input by using: (a) Stringer bead. (b) Control over preheat and interpass temperature. (c) Short arc.

CODIFICATION : AWS : E9018-M

CHARACTERISTICS AND APPLICATIONS :

Extra low hydrogen type electrodes depositing a high strength weld metal. Ideally suited for welding fine-grained steels, high strength steels, Q&T steels used in the fabrication of structures, bridges, penstocks and other components.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni	Mo
Percent	0.06	1.20	0.35	1.60	0.30

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at-51°C (Joules)
65.0	56.0	26	50

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	6.3x450	5x450	4x450	3.15x450	2.5x350
Dia x Length					
Current Range : (Amps)	280-350	200-250	140-190	100-140	80-100
Qty. (Pcs./Carton)	25	35	55	75	125

PRECAUTIONS :

1. During welding keep the heat input to a minimum.
2. Ensure the electrodes are dry. Rebake electrode at 400°C for one hour before use.

CODIFICATION : AWS : E10018-D2

CHARACTERISTICS AND APPLICATIONS :

A basic coated low hydrogen iron powder type electrode for welding high tensile steels. The weld metal is of radiographic quality. Ideally suited for welding high tensile steels, Q&T steels, castings, etc. with UTS range of 71 kgf/mm². The weld metal possesses high strength combined with excellent toughness at sub-zero temperatures.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Mo
Percent	0.06	1.85	0.45	0.40

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at-51°C (Joules)
71.8	66.0	22.0	30

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x450	3.15x450	2.5x350
Dia x Length					
Current Range : (Amps)	280-350	200-250	140-190	100-140	70-100
Qty. (Pcs./Carton)	25	35	55	75	125

PRECAUTIONS :

1. Ensure the electrodes are dry. Rebake as per our standard recommended practice.
2. When welding grain refined and Q&T steels, control the heat input by using: (a) Stringer bead. (b) Control over preheat and interpass temperature. (c) Short arc.

CODIFICATION : AWS : E10016-G

CHARACTERISTICS AND APPLICATIONS :

A basic coated, extra low hydrogen electrode ideally suited for welding high strength steels, Q&T steels, having UTS in the range of 70 kgf/mm². The weld metal is of radiographic quality and possesses excellent strength combined with good toughness.

Ideal for welding high strength steels under the site conditions having high relative humidity and higher joint restraints, as the extra low hydrogen levels ensure freedom from hydrogen induced cracking.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni	Mo	Cr
Percent	0.06	1.20	0.30	1.90	0.35	0.25

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at-51 °C (Joules)
74.0	65.0	19.0	50

DIFFUSIBLE HYDROGEN CONTENT: 3ml/100gms of weld metal or less

CURRENT AND PACKING DATA : DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	190-260	140-190	100-150	70-100
Weight/carton:(kgs)	3.0	3.0	3.0	3.0

PRECAUTIONS :

1. Rebake the electrodes at 400°C for one hour and cool them in the same oven to about 100°C and then transfer them to a holding oven maintained at 50°C and draw for use.
2. Keep the heat input during welding to a minimum by controlling the preheat and interpass temperatures between 120- 150 °C.
3. use stringer beads and minimise weaving.

CODIFICATION : AWS : E11018M

CHARACTERISTICS AND APPLICATIONS :

A basic coated, extra low hydrogen electrode ideally suited for welding high strength Q&T steels like Welten 80, SA517 grades and their equivalents. The weld metal has excellent crack resistance and displays high strength combined with good sub-zero impact strength. Ideal for welding high strength steels under site conditions having high relative humidity and higher joint restraints as the extra low hydrogen levels ensure freedom from hydrogen induced cracking.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni	Mo	Cr
Percent	0.06	1.35	0.36	2.10	0.40	0.25

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at-51 °C (Joules)
79.0	70	21	40

DIFFUSIBLE HYDROGEN CONTENT : 3ml/100gms of weld metal or less

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x350	4x350	3.15x350	2.5x350
Dia x Length					
Current Range (Amps)	270-320	180-240	140-180	90-140	50-90
Weight/carton:(kgs)	3.0	3.0	3.0	3.0	3.0

PRECAUTIONS :

1. Rebake the electrodes at 400°C for one hour and cool them in the same oven to about 100°C and then transfer them to a holding oven maintained at 50°C and draw for use.
2. Keep the heat input during welding to a minimum by controlling the preheat and interpass temperatures between 120-150 °C.
3. Use stringer bead and minimise weaving.

CODIFICATION : AWS : E11018-G

CHARACTERISTICS AND APPLICATIONS :

Ultratherme is a low hydrogen type electrode ideally suited for welding high strength steels, fine-grained steels, HSLA, Q&T steels, etc. The weld metal possesses high strength combined with good toughness properties. Ideal for welding high strength steels used in earth moving industry, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si	Mo	Ni	Cr
Percent	:	0.06	1.4	0.25	0.50	2.20	0.20

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at- 40°C (Joules)
79.0	69.0	19	30

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	:	6.3x450	5x450	4x450	3.15x450	2.5x350
Dia x Length						
Current Range:	:	280-350	200-260	140-190	100-150	70-100
(Amps)						
Qty.(Pcs./Carton):		25	35	55	75	125

APPROVAL : CIM-Ichapur

PRECAUTIONS :

1. Rebake the electrodes as per our standard recommended practice.
2. Use short arc and minimise heat input during welding.

CODIFICATION : AWS : E12018-G

CHARACTERISTICS AND APPLICATIONS :

CNM(Special) is a special formulated electrode to deposit a very high strength weld metal. The weld metal possesses high strength and toughness and is ideally suited for welding high strength steels.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si	Cr	Ni	Mo	S	P
Percent	:	0.07	1.0	0.35	1.0	2.2	0.95	0.025	0.025

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at 0°C (Joules)
98.0	87.0	16.0	50

CURRENT AND PACKING DATA : DC(+)

Size (mm)	:	6.3x450	5x450	4x450	3.15x450	2.5x350
Dia x Length						
Current Range :		270-320	200-250	150-190	100-140	60-90
(Amps)						
Qty.(Pcs./Carton):		25	35	55	75	125

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 250-300°C for one hour as per our standard practice.
2. Use short arc and stringer beads.
3. Use a carefully formulated welding procedure with preheat and post weld heat treatment.

CODIFICATION : AWS : E8018-W2

CHARACTERISTICS AND APPLICATIONS :

Corotherme (SPL) is a special electrode depositing a 0.5Cr - 0.7Ni - 0.5Cu weld metal ideally suited for welding weathering steels to resist high temperature atmospheric corrosion. Ideal for welding steels like Corten steels used in chemical, petrochemical and railway industries to resist atmospheric corrosion.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Cu
Percent	0.065	0.65	0.40	0.55	0.75	0.50

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at -20°C (Joules)
56.2	48.0	27	30

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	6.3x450	5x450	4x450	3.15x450	2.5x350
Dia x Length					
Current Range: (Amps)	250-300	200-250	150-190	110-150	70-100
Qty.(Pcs./Carton):	25	35	55	75	125

APPROVAL : MDL

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, rebake as per our standard practice.

CODIFICATION : AWS : E7018-1
IS : EB5626H,JX

CHARACTERISTICS AND APPLICATIONS :

An iron powder, low hydrogen type electrode producing a tough and ductile weld metal for welding heavy and rigid structures subjected to dynamic loading and impact. The weld metal is of radiographic quality and displays remarkable impact strength even at minus 50°C.

Typical applications include welding of carbon steels, steels sensitive to hydrogen embrittlement, heavy and rigid structures, pressure vessels and equipment subjected to severe stress and requiring good toughness properties at sub-zero temperatures down to -50°C

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si
Percent	0.06	1.40	0.25

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at -46°C (Joules)
53.0	46.0	28.0	50

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	6.3x450	5x450	4x450	3.15x450	2.5x350	2x300
Dia x Length						
Current Range: (Amps)	270-350	200-280	150-180	100-135	80-100	60-80
Qty.(Pcs./Carton):	25	35	55	75	125	150

APPROVALS : ABS, EIL, PDIL, NPCIL, CIB(M.P.)

PRECAUTIONS :

1. Redry the electrodes at 250-300°C for one hour and cool them to 100°C transfer them to a holding oven at 50-60°C and use.
2. Minimise heat input.

CODIFICATION : AWS : E7018-1
 IS : EB5626H,JX

CHARACTERISTICS AND APPLICATIONS :

Basic coated iron powder type, high yield, and hydrogen-controlled electrode. Easy to operate in all conventional welding positions. Radiographic quality welds having excellent cracking resistance. Ideally suited for welding carbon steels used in the construction of equipment subjected to heavy dynamic load, impact, and severe service conditions in sour gas service.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element :	C	Mn	Si	S	P	Ni+Cr+Mo+V
Percent :	0.06	1.40	0.40	0.010	0.019	< 1.75

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength at
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	minus 46°C (Joules)
54.0	43.0	29.0	82.0

CORROSION TESTS : Passes corrosion test as per NACE standard TM-01-77- 96 (SSCC) and TM-02-84-96 (HIC)

HARDNESS OF WELD METAL : 200 BHN max.

DIFFUSIBLE HYDROGEN : Max. 5ml/100 gms of weld metal

CURRENT AND PACKING DATA : AC/DC(+)

Size (mm)	: 5x450	4x450	3.15x350	2.5x350
Dia x Length				
Current Range	: 200-250	150-190	100-140	70-100
(Amps)				
Qty.(Pcs./Carton):	35	55	75	100

PRECAUTIONS :

1. Redry the moist electrodes at 250-300°C for one hour as per standard recommended practice.

CODIFICATION : AWS : E7018-G
 IS : E49 B G 1 2 6 Fe

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen, iron powder type electrode yielding a 0.5% Ni in the weld metal. Ideally suited for welding fine-grained steels, heavy sections, and restrained joints requiring good impact strength at sub-zero temperatures down to minus 50°C.

Typical applications include welding of C-Mn grain refined steels, heavy sections, and restrained joints requiring good impact strength at sub-zero temperatures down to minus 50°C.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni
Percent	0.06	1.0	0.30	0.55

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at -50°C (Joules)
53.0	45.0	28.0	45

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x450	3.15x450	2.5x350
Dia x Length					
Current Range (Amps)	270-350	200-280	160-190	110-135	80-100
Qty.(Pcs./Carton)	25	35	55	75	125

APPROVAL : NPCIL

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Prevent excessive heat input during welding.

CODIFICATION : AWS : E8018-G

CHARACTERISTICS AND APPLICATIONS :

A basic coated, low hydrogen, iron powder type electrode yielding a weld metal containing 1.5% Mn and 0.7% Ni. Excellent quality welds for welding heavy sections of fine-grained high strength steels with particular reference to low temperature service down to minus 60°C. Typical applications include welding of fine grained Q&T steels for pressure vessels, tanks, penstocks, where high strength and sub-zero temperature toughness properties are of importance.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni
Percent	0.07	1.50	0.30	0.65

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at -50°C (Joules)
57.0	52.0	27.0	40

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x450	3.15x450	2.5x350
Dia x Length					
Current Range (Amps)	270-330	220-280	160-190	110-135	80-100
Qty.(Pcs./Carton)	25	35	55	75	125

APPROVALS : PDIL, EIL, CIB-MP

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Minimise heat input during welding.

NIMOTHERME-1



CODIFICATION : AWS : E8016-C3

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen electrode yielding a tough and ductile weld deposit having 1% Ni-0.25% Mo suitable for welding fine-grained and Ni steels for service temperatures down to minus 60°C. Typical applications include storage tanks for liquefied gases, distillers in coke oven batteries and petrochemical industries. Ideal for welding high strength and fine-grained steels subjected to sever dynamic loading and sub-zero temperature service.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si	Ni	Mo
Percent	:	0.06	0.90	0.30	0.90	0.25

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at- 50°C (Joules)
58.0	51.0	27.0	50

CURRENT AND PACKING DATA : DC(+)

Size (mm)	:	5x350	4x350	3.15x350	2.5x350
Dia x Length	:				
Current Range	:	210-270	150-190	100-135	80-100
(Amps)	:				
Qty.(Pcs./Carton):	:	35	55	75	125

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Restrict the heat input during welding.



NITHERME-2.5

CODIFICATION : AWS : E8016-C1

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen DC(+) electrode yielding 2.5% Ni in the weld deposit, ideally suited for welding fine-grained steels and Ni steels especially for service temperatures down to minus 60°C. The weld metal possesses strength combined with excellent sub-zero temperature notch toughness. Typical applications include storage tanks, pressure vessels, containers and piping for liquefied gases like propane and butane.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si	Ni
Percent	:	0.06	0.80	0.30	2.40

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at- 60°C (Joules)
57.5	50.0	24.0	50

CURRENT AND PACKING DATA : DC(+)

Size (mm)	:	5x350	4x350	3.15x350	2.5x350
Dia x Length	:				
Current Range	:	210-270	150-190	100-135	80-100
(Amps)	:				
Qty.(Pcs./Carton):	:	35	55	75	125

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Restrict the heat input to a minimum during welding to achieve better properties.

Note: Low carbon version Nitherme-2.5L conforming to AWS : E7018-C1L is also available.

NITHERME-2.5 (MOD)



CODIFICATION : AWS : E10018-G

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen electrode depositing 2.2%Ni, 0.3%Cr and 0.3%Mo weld metal. Easy to operate in all conventional welding positions. Radiographic quality welds possesses excellent toughness even at minus 50°C. Ideally suited for welding grain refined steels and nickel steels. Typical applications include storage tanks for liquefied gases like Ammonia, distillers in coke oven batteries, petrochemical industries, DMR 249B steel, etc. Also suitable for welding heavy sections and highly restrained joints.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element :	C	Mn	Si	Cr	Ni	Mo	V	P	S
Percent :	0.08	0.90	0.30	0.25	2.2	0.20	0.02	0.012	0.010

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at minus 50°C (Joules)
68.0	61.0	21.0	62

DIFFUSIBLE HYDROGEN: Max. 2 ml/100 gms of weld metal.(Electrodes tested after baking at 420°C/2 Hours.)

CURRENT AND PACKING DATA : AC/DC(+)

Size (mm)	: 5x450	4x350/450	3.15x350/450	2.5x350
Dia x Length				
Current Range (Amps)	: 190-250	150-200	100-140	70-100
Qty.(Pcs./Carton)	: 35	55	75	125

PRECAUTIONS :

- For best impact properties, accomplish minimum heat input by:
 - * Using smallest size of electrode possible.* Minimum weaving.* Proper control over interpass temperatures.* Maximum number of layers.* Welding in down hand position wherever possible.
- For best results, redry the electrodes at 250-300°C for one hour.



NITHERME-2.5 (SPL)

CODIFICATION : AWS : E8018-C1

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen iron powder electrode depositing 2.5%Ni steel weld metal. Easy to operate in all conventional welding positions. Radiographic quality welds possesses excellent toughness even at minus 60°C. Ideal for welding fine grained and Nickel steels. Typical applications include containers and piping systems and tanks used for storage, transportation of liquefied propane and butane, A&P brackets etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element :	C	Mn	Si	Cr	Ni	Ti	P	S
Percent :	0.08	0.80	0.20	0.30	2.2	0.03	0.015	0.012

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at minus 60°C (Joules)
69.0	59.0	21.0	50

CURRENT AND PACKING DATA : DC(+)

Size (mm)	: 5x450	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	: 220-270	160-200	110-140	80-110
Qty.(Pcs./Carton)	: 35	55	75	100

PRECAUTIONS :

- For best impact properties, accomplish minimum heat input by:
 - * Using smallest size of electrode possible.* Minimum weaving.* Proper control over interpass temperatures.* Maximum number of layers.* Welding in down hand position wherever possible.
- For best results, redry the electrodes at 250-300°C for one hour.

CODIFICATION : AWS : E8016-C2

CHARACTERISTICS AND APPLICATIONS :

A unique low hydrogen type electrode yielding 3.5% Ni in the weld deposits. Specially designed for welding fine-grained steels and nickel steels for service temperatures down to minus 80°C. Typical applications include pressure vessels, piping systems, valves and tanks used for liquefied propane, butane, ethane, acetylene, CO, and even liquefied ethylene.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni
Percent	0.06	0.80	0.30	3.2

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at- 73°C (Joules)
57.0	51.0	23.0	42

CURRENT AND PACKING DATA : DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	190-240	140-190	100-130	70-100
Qty.(Pcs./Carton):	35	55	75	125

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Restrict the heat input to a minimum during welding to achieve better properties.

CODIFICATION : AWS : E7016-C2L

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen electrode depositing 3.5% Ni weld metal. Specially designed for welding fine-grained steels and nickel steels for service temperatures down to minus 101°C. Typical applications include pressure vessels, piping, valves, tanks, transportation and distribution of liquefied gases, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni
Percent	0.045	0.8	0.25	3.10

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at- 101°C (Joules)
53.0	43.0	29.0	30

CURRENT AND PACKING DATA : DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	190-240	140-190	100-130	70-100
Qty.(Pcs./Carton):	35	55	75	125

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Restrict the heat input to a minimum during welding to achieve better properties.

CODIFICATION : AWS : E7018-C2L

CHARACTERISTICS AND APPLICATIONS :

Low hydrogen iron powder electrode depositing 3.5% Ni in weld metal. Easy to operate in all conventional welding positions. Radiographic quality welds possesses excellent toughness even at sub-zero temperatures down to minus 101°C. Ideal suited for welding fine-grained and Nickel steels. Typical applications include pressure vessels, piping, valves, and tanks used for storage, transportation, and distribution of liquefied gases.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element :	C	Mn	Si	P	S	Ni
Percent :	0.045	0.80	0.25	0.020	0.020	3.10

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at minus 101°C (Joules)
53.0	43.0	29.0	50

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm) Dia x Length	: 5x450	4x350	3.15x350	2.5x350
Current Range (Amps)	: 190-240	140-190	100-130	70-100
Qty.(Pcs./Carton):	2.5	2.5	2.5	2.5

PRECAUTIONS :

- For best impact properties, accomplish minimum heat input by:
 - * Using smallest size of electrode possible. * Minimum weaving. * Proper control over interpass temperatures. * Maximum number of layers. * Welding in down hand position wherever possible.
- For best results, redry the electrodes at 250-300°C for one hour.

CODIFICATION : IS : E49 R A1 2 4 Fe

CHARACTERISTICS AND APPLICATIONS :

A medium coated rutile type electrode yielding a weld deposit containing 0.50 Mo. the weld metal possesses good elevated temperature strength and creep properties and is ideally suited for welding C-0.5% Mo steels used in the fabrication of pressure vessels, boilers, piping, etc. Ideal for welding C- 0.5% Mo creep resisting steels for service temperature up to 500°C. Ideal for root runs on pipes.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Mo
Percent	0.08	0.50	0.30	0.50

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%
52.0	44.0	22.0

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	5x450	4x450	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	190-210	145-180	95-135	65-90	45-65
Qty.(Pcs./Carton):	50	75	120	180	220

NOTE : Cr - Mo version like Medio-Cr/Mo depositing 1Cr - 0.5Mo and Medio-2Cr/Mo depositing 2.25Cr - 1 Mo are also available.

CODIFICATION : AWS : E7018-A1
IS : E49 B A1 2 6 Fe

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen iron powder type electrode yielding a weld deposit containing 0.5% Mo. Ideal for welding creep resistant C - Mo steels for service temperatures up to 525°C. Typical applications include boilers, pressure vessels, pipes and tubes of similar composition.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Mo
Percent	0.06	0.85	0.42	0.52

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at 27°C (Joules)	Creep Strength at 525°C (1%offset in 10,000hrs) kgf/mm ²
54.0	46.0	28.0	140	12.5

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x350	3.15x350	2.5x350	2x300
Dia x Length						
Current Range (Amps)	270-340	170-240	140-170	90-120	70-90	60-75
Qty.(Pcs./Carton):	25	35	55	75	125	150

APPROVALS : CIB(M.P.) , PDIL, EIL, NPCIL

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Use short arc during welding.

CODIFICATION : AWS : E8018-D3

CHARACTERISTICS AND APPLICATIONS :

Molytherme (Extra) is a low hydrogen electrode yielding a weld deposit containing Mn-Mo. The electrode is ideally suited for welding steels of similar composition. The weld metal possesses good high temperature properties and has excellent toughness.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Mo	S	P
Percent	0.07	1.25	0.40	0.55	0.015	0.018

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at -51°C (Joules)
61.0	50.0	25.0	28

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x350	3.15x350	2.5x350	2x300
Dia x Length						
Current Range (Amps)	270-340	170-240	140-170	100-130	70-90	60-75
Qty.(Pcs./Carton):	25	35	55	75	125	150

APPROVAL : CIB (M.P.)

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Use short arc during welding.

CODIFICATION : AWS : E7018-A1
IS : E49 B A1 2 6 Fe**CHARACTERISTICS AND APPLICATIONS :**

A low hydrogen iron powder electrode depositing 0.5%Mo with excellent toughness. Weld metal retains mechanical properties after prolonged heat treatments. Ideal for welding C-0.5 Mo steels, plates, pipes for pressure vessel, boilers, etc. where toughness at -20°C is required. The weld metal possesses good creep strength up to 525°C.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	S	P	Mo
Percent	0.06	0.85	0.42	0.015	0.02	0.5

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at -20°C (Joules)
53.0	47.0	27.0	75

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x450	4x350	3.15x350	2.5x350	2x300
Dia x Length							
Current Range (Amps)	270-320	200-250	140-170	140-180	100-130	70-90	60-75
Qty.(Pcs./Carton) :	25	35	55	55	75	100	150

PRECAUTIONS :

1. Rebake the electrodes at 250-300°C for one hour as per our standard recommended practice.
2. Use short arc and stringer bead.

CODIFICATION : IS : E63 B D1 2 4 J

CHARACTERISTICS AND APPLICATIONS :

Molytherme-R is a low hydrogen electrode yielding a weld deposit containing Mn-Mo. The electrode is ideally suited for welding steels of similar composition CONCOR BOGIES etc. The weld metal possesses good high temperature properties and has excellent toughness. The deposits will also meet the metal recovery of 110% minimum requirements.

CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Mo	S	P
Range (%)	: 0.10max	1.25-1.75	0.80 max	0.25-0.45	0.030max	0.030max

MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	RA%	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%		at 27°C (Joules)
64.0 min	54.0 min	20.0 min	40 min	90 min

CURRENT AND PACKING DATA : AC / DC(±)

Size (mm)	:	6.3x450	5x450	4x350	3.15x350	2.5x350	2x300
Dia x Length							
Current Range (Amps)	:	270-340	170-240	140-170	100-130	70-90	60-75
Qty.(Pcs./Carton)	:	25	35	55	75	125	150

APPROVAL : RDSO (For CONCOR BOGIES)

PRECAUTIONS :

1. Rebake the electrodes at 250-300°C for 1 hr.
2. Use short arc during welding.

CODIFICATION : AWS : E9018-D1

CHARACTERISTICS AND APPLICATIONS :

Extra low hydrogen type electrodes depositing a high strength weld metal. The electrode possesses excellent operating characteristics and is suitable for welding in all positions. Weld metal has good toughness even at subzero temperatures. Ideally suited for welding fine-grained steels, high strength steels, and low-pressure vessel steels.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Mo	S	P
Range (%)	: 0.06	1.10	0.50	0.40	0.025	0.022

MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	minus 50°C (Joules)
64.0	55.0	22.0	50

CURRENT AND PACKING DATA : DC(+)

Size (mm)	:	5x450	4x450	3.15x450	2.5x350
Dia x Length					
Current Range (Amps)	:	200-250	140-190	100-140	80-100
Qty.(Pcs./Carton)	:	35	55	75	125

PRECAUTIONS :

1. During welding keep the heat input to a minimum.
2. Ensure the electrodes are dry. Rebake electrode at 300°C for one hour before use.

CODIFICATION : AWS : E8018-B1

CHARACTERISTICS AND APPLICATIONS :

Cromotherme is a basic coated hydrogen controlled electrode. Ideally suited for welding of creep resistant steels of similar composition used in power plants, boilers, oil refineries and chemical plants.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	:	C	Mn	Si	Cr	Mo
Percent	:	0.07	0.60	0.30	0.50	0.50

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%
57.0	45.0	20.0

CURRENT AND PACKING DATA : DC(+)

Size (mm)	:	6.3x450	5x450	4x350	3.15x350	2.5x350	2x300
Dia x Length							
Current Range:	:	250-300	180-240	140-180	100-130	70-100	50-70
(Amps)							
Qty.(Pcs./Carton):		25	35	55	75	125	150

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Use short arc during welding.

CODIFICATION : AWS : E8018-G

CHARACTERISTICS AND APPLICATIONS :

Cromotherme-20 is a low hydrogen type electrode depositing a radiographic quality weld metal with 1Cr - 0.5Mo - 0.20V. Ideally suited for welding of steels of similar composition.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Mo	V
Percent	0.09	0.60	0.25	1.20	0.55	0.25

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%
57.4	50.8	24.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x450	4x450	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	180-240	140-180	110-140	70-100
Qty.(Pcs./Carton)	50	80	120	180

PRECAUTIONS :

1. Use short arc during welding.
2. Ensure that electrodes are dry. In case of moisture pick-up, redry the electrodes as per our standard recommended practice.

NOTE : A rutile version Cromotherme-20(R) is also available.

CHARACTERISTICS AND APPLICATIONS :

Cromotherme - 0.5 is a low hydrogen electrode yielding a weld metal containing 0.5Cr - 0.8Mo - 0.3V. Cromotherme 0.5 is ideally suited for welding Cr-Mo-V steels used in boilers, pipelines in chemical and power plants.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Mo	V
Percent	0.06	0.80	0.35	0.50	0.85	0.30

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

(After SR at 690°C/1Hour)

UTS	YS	Elongation	Creep Strength at 550°C
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	(1% offset in 10,000 hrs)
59.0	52.0	21.0	15 kgf/mm ²

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x350	3.15x350	2.5x350
Dia x Length					
Current Range (Amps)	270-340	180-240	140-180	100-130	70-100
Weight/Carton:(kgs)	3.5	3.5	3.0	2.5	2.5

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Maintain short arc during welding.

CODIFICATION : AWS : E8018-B2
 IS : E55 B B2 2 6 Fe

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen iron powder type electrode yielding a weld deposit containing 1.25% Cr - 0.5% Mo. Excellent for welding creep resistant 0.5Cr - 0.5Mo, 1Cr - 0.5Mo steels. The weld deposit has excellent creep resistance at service temperatures up to 550°C.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Mo
Percent	: 0.06	0.80	0.44	1.35	0.55

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	Creep Strength at 550°C
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	(1%offset in 10,000 hrs)
60	52	25	12 kgf/mm ²

CURRENT AND PACKING DATA : DC(+)

Size (mm)	: 6.3x450	5x450	4x350	3.15x350	2.5x350	2x300
Dia x Length						
Current Range:	: 250-300	180-240	140-180	100-130	70-100	50-70
(Amps)						
Qty.(Pcs./Carton):	25	35	55	75	125	150

APPROVALS : EIL, PDIL, CIB(M.P.)

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Use short arc during welding.

CODIFICATION : AWS : E7018-B2L

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen basic coated all position electrodes with low carbon, suitable for welding of 1.25Cr - 0.5Mo creep resisting steel. The weld metal possesses excellent mechanical properties and crack resistance together with toughness. Ideal for welding 1.25Cr-0.5Mo material.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Mo
Percent	: 0.045	0.80	0.50	1.25	0.50

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at- 20°C (Joules)
57	48	22	40

CURRENT AND PACKING DATA : DC(+)

Size (mm)	: 6.3x450	5x450	4x450	3.15x450	2.5x350	2.0x300
Dia x Length						
Current Range:	: 250-300	180-240	140-180	100-130	70-100	50-70
(Amps)						
Qty.(Pcs./Carton):	25	35	55	75	125	150

APPROVAL : EIL

PRECAUTIONS :

1. Use a short arc during welding.
2. Ensure that electrodes are completely dry, moist electrodes must be redry at 250-300°C for one hour.

CODIFICATION : AWS : E8018-B2
 IS : E55 B B2 2 6 Fe

CHARACTERISTICS AND APPLICATIONS :

An electrode depositing 1.25Cr - 0.5Mo weld metal having excellent sub-zero impact properties at -20°C. The weld metal possesses excellent tensile strength, creep strength and toughness. Weld metal withstands prolonged heat treatments. Ideal for welding similar composition materials to achieve sub-zero toughness.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Mo	S	P	P+Sn
Percent	0.06	0.76	0.49	1.25	0.5	0.007	0.015	0.018

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at- 20°C (Joules)
62.2	53	21	47

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x350	3.15x350	2.5x350	2.0x300
Dia x Length						
Current Range (Amps)	250-300	200-250	140-180	100-130	70-100	50-70
Qty.(Pcs./Carton):	25	35	55	75	100	150

PRECAUTIONS :

1. Rebake the electrodes at 250-300°C as per our standard recommended practice.
2. Use short arc.

NOTE : Low carbon version Cromotherme - 1L (MOD) conforming to
 AWS : E 7018-B2L is also available

CODIFICATION : AWS : E9018-B3
 IS : E63 B B3 2 6 Fe

CHARACTERISTICS AND APPLICATIONS :

An iron powder, low hydrogen electrode producing a weld deposit containing 2.25Cr - 1Mo which is oxidation resistant up to 575°C. Suitable for welding 2.25Cr - 1Mo, Cr-Mo-V steels as well as cast steels of similar composition.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Mo
Percent	0.06	0.80	0.44	2.40	1.10

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	Creep Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	(1% offset in 10,000 hrs)
65.0	56.0	22.0	at 550°C-12 kgf/mm ² at 575°C-8.5 kgf/mm ²

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x350	3.15x350	2.5x350
Dia x Length					
Current Range (Amps)	260-320	180-240	140-180	100-130	70-100
Qty.(Pcs./Carton):	25	35	55	75	125

APPROVALS : PDIL, CIB(M.P.), NPCIL, EIL

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Use short arc during welding.

CODIFICATION : AWS : E8018-B3L

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen type electrode depositing 2Cr - 1Mo low carbon weld metal. The weld metal possesses controlled hardness, excellent mechanical properties, creep properties. Suitable for service temperature up to 600°C.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Mo
Percent	0.045	0.78	0.50	2.20	1.0

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%
64.0	54.0	18

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x350	3.15x350	2.5x350
Dia x Length					
Current Range (Amps)	260-320	180-240	140-180	100-130	70-100
Qty.(Pcs./Carton):	25	35	55	75	125

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Use short arc during welding.

CODIFICATION : AWS : E9018-B3
IS : E63 B B3 2 6 Fe

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen iron power electrode depositing 2.25Cr -1Mo weld metal having low level of impurities and exhibiting excellent toughness up to -18°C. Weld metal retains its mechanical properties even after prolonged heat treatments. Ideal for welding steels of similar composition to achieve tough weld metals.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Mo	S	P	P+Sn
Percent	0.055	0.69	0.30	2.25	1.1	0.007	0.010	0.016

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at -18°C (Joules)
65.2	56.0	22.0	100

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x350	3.15x350	2.5x350	2x300
Dia x Length						
Current Range (Amps)	260-320	180-240	140-180	100-130	70-100	50-70
Qty.(Pcs./Carton):	25	35	55	75	100	150

PRECAUTIONS :

1. Rebake the electrodes at 250-300°C for one hour as per our standard recommended practice.
2. Use short arc during welding.

NOTE : Low carbon version cromotherme -2L (MOD) conforming to AWS : E8018 - B3L is also available.

CODIFICATION : AWS : E8018-B6

CHARACTERISTICS AND APPLICATIONS :

Low hydrogen, iron powder electrode producing a weld deposit containing 5Cr - 0.5 Mo, which has excellent creep resistance at elevated temperatures up to 550°C. Typical applications include welding of 4-6% Cr steels in oil refinery, chemical plant and equipment.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Mo
Percent	0.06	0.90	0.40	5.20	0.50

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact strength at 0°C(Joules)	Creep Strength at 550°C (1% offset in 10,000 hrs)
62.0	51.0	22.0	60	7 kgf/mm ²

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x350	3.15x350	2.5x350
Dia x Length					
Current Range (Amps)	240-300	180-240	140-180	100-130	70-100
Qty.(Pcs./Carton):	25	35	55	75	125

APPROVAL : EIL

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Use short arc during welding.

NOTE : Low carbon version Cromotherme - 5L conforming to AWS : E8018-B6L is also available.

CODIFICATION : AWS : E8018-B6

CHARACTERISTICS AND APPLICATIONS :

Cromotherme-5 (Mod) is a basic coated, low hydrogen type electrode depositing a weld metal with 5Cr - 0.5Mo ideally suited for welding of creep resisting steels of similar composition where superior notch toughness required at sub-zero temperatures. The weld metal possesses excellent creep properties up to 550°C. Typical applications include welding of 5Cr - 0.5Mo steels in oil refinery, chemical plant, and equipments. Specifically applicable wherever prolonged heat treatments are involved.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Mo	S	P+Sn
Percent	0.06	0.90	0.40	5.20	0.50	0.007	0.018

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact strength at minus 30°C(Joules)	Creep Strength at 550°C (1% offset in 10,000 hrs)
62.0	51.0	24.0	72	7kgf/mm ²

CURRENT AND PACKING DATA : DC(+)

Size (mm)	5x450	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	180-240	140-180	100-130	70-100
Qty.(Pcs./Carton):	35	55	75	100

PRECAUTIONS :

- 1 Redry the moist electrodes at 250-300°C for one hour as per standard recommended practice.
2. Use short arc and stringer bead.

NOTE : Low carbon version Cromotherme-5L (Mod) conforming to AWS : E8018 B6L is also available.

CODIFICATION : AWS : E8018-B8

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen electrode yielding 9Cr -1Mo deposit having excellent creep strength up to 600°C and resistance to oxidising atmospheres up to 700°C. Ideal for combating mineral oil attack at elevated temperatures. Applications include welding of 7 to 10Cr-1Mo steels.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Mo
Percent	0.06	0.60	0.40	9.0	0.90

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation	CVN Impact Strength	Creep Strength at 600°C
(kgf/mm ²)	(kgf/mm ²)	(L= 4d)%	at 0°C (Joules)	(1% offset in 10,000 hrs)
58.0	49.0	21.0	50	6.5 kgf/mm ²

CURRENT AND PACKING DATA : DC(+)

Size (mm)	6.3x450	5x450	4x350	3.15x350	2.5x350
Dia x Length					
Current Range (Amps)	280-350	180-240	140-180	100-130	70-100
Qty.(Pcs./Carton):	25	35	55	75	125

APPROVAL : CIB - MP

PRECAUTIONS :

1. Redry the electrodes as per our standard recommended practice.
2. Use short arc during welding.

CODIFICATION : AWS : E8018-B8L

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen type electrode specially designed for welding of ferritic-martensitic chrome steels. The weld deposit contains low carbon 9Cr - 1Mo air hardenable weld metal calls for suitable preheat and post weld heat treatment. Weld deposits are of radiographic quality. Typical applications include welding of A387 Gr. 9 plate, A335 P9 pipe, A217 C12 castings, A213 T9 tubes, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	P	S	Ni	Cr	Mo
Percent	0.04	0.60	0.45	0.021	0.020	0.10	9.50	1.00

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	YS	Elongation
(kgf/mm ²)	(kgf/mm ²)	(L=4d) %
58.0	49.0	24.0

CURRENT & PACKING DATA : DC(+)

Size (mm)	6.3 x 450	5 x 450	4 x 350	3.15 x 350	2.5 x 350
Dia x Length					
Current Range (Amps)	280-350	180-240	140-180	100-130	70-100
Qty.(Pcs. / Carton):	25	35	55	75	125

PRECAUTIONS:

1. Use a short arc.
2. Ensure that the electrodes are perfectly dry. It is a safe and good practice to rebake electrodes at 300°C for an hour, cool in the oven to 100°C and transfer them to another oven maintain at 70°C for direct use.

CODIFICATION : AWS : E9018-B9

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen depositing 9Cr - 1Mo weld metal together with Nb, V & N. Weld metal has excellent creep strength, toughness fatigue life, oxidation, and corrosion resistance. Ideal for welding P91/T91 materials in power plants, refineries.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	V	P	S	Nb	N	Al
Percent	: 0.11	1.10	0.30	9.35	0.90	1.0	0.20	0.01	0.01	0.03	0.03	0.01

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at 20°C (Joules)
82	70	19	50

CURRENT AND PACKING DATA : DC(+)

Size (mm)	5x450		4x350		3.15x350		2.5x350	
Dia x Length	180-240		140-180		100-130		70-100	
(Amps)	35		55		75		100	
Qty.(Pcs./Carton):	35		55		75		100	

APPROVAL : CIB(M.P.)

PRECAUTIONS :

1. Use short arc and stringer bead.
2. Ensure the electrodes are perfectly dry.
3. If necessary rebake at 300°C for one hour, cool in the same oven at 100°C and transfer them to portable oven maintained at 70°C for direct use.

CODIFICATION : AWS : E9018-G

CHARACTERISTICS AND APPLICATIONS :

A low hydrogen electrode deposits 9Cr - 1Mo and enriched with Niobium, Vanadium, Nitrogen and Tungsten. Tungsten addition provides adequate creep rupture strength at higher steam pressures and temperatures. Ideal for welding steels of similar composition in power plants, refineries etc. Some typical materials, where this electrode can be used are rotor steel E, E911 steels, GX12CrMoWVNbWII, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	V	P	S	Nb	N	Al	W
Percent	: 0.12	0.5	0.42	9.20	0.50	0.40	0.22	0.011	0.007	0.06	0.05	0.01	1.6

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	YS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at RT (Joules)
85.0	74.0	16.0	35

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350		4x350		3.15x350		2.5x350	
Dia x Length	180-240		140-180		100-130		70-100	
(Amps)	35		55		75		125	
Qty.(Pcs./Carton):	35		55		75		125	

PRECAUTIONS :

1. Use short arc and stringer bead.
2. Ensure the electrodes are perfectly dry.
3. If necessary rebake at 300°C for one hour, cool in the same oven to 100°C and transfer them to portable oven maintained at 70°C for direct use.

CODIFICATION : IS : E18.8 MnB16

CHARACTERISTICS AND APPLICATIONS :

A basic coated multi purpose stainless steel electrode producing a weld metal of 18Cr - 9Ni - 5Mn. The weld metal has excellent crack resistance and has good scaling resistance up to 850°C. Ideal for joining ferritic to austenitic steels, armour plates, austenitic manganese steels, heat resistant steels, dissimilar materials, for buffer layers etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni
Percent	0.09	5.50	0.60	19.5	9.20

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
65.0	38

CURRENT AND PACKING DATA : DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	170-200	130-170	90-130	60-90
Qty.(Pcs./Carton):	35	55	75	100

PRECAUTIONS :

1. Use short arc and minimise weaving.
2. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 250-300°C for one hour.

CODIFICATION : AWS : E308-16
IS : E19.9 R16

CHARACTERISTICS AND APPLICATIONS :

Rutox-A is a stainless steel electrode yielding a weld metal of 19Cr - 10Ni. The weld metal displays good resistance to cracking, corrosion and scaling. Ideally suited for welding stainless steel materials of similar composition like AISI 301, 302, 304, 308, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni
Percent	0.05	1.40	0.40	19.5	9.50

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
61.0	38

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	140-180	110-140	80-100	60-80	40-55
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : EIL, PDIL, NPCIL, RDSO

PRECAUTIONS :

1. Use short arc, low current and minimum weaving.
2. Ensure the electrodes are dry. Electrodes should be redry at 200-250°C and cool to 50-60°C in the same oven before use.

RUTOX-AH



CODIFICATION : AWS : E308H-16

CHARACTERISTICS AND APPLICATIONS :

A stainless steel electrode depositing 19Cr - 10Ni stainless steel weld metal with carbon in the range of 0.04 - 0.08. Weld metal possesses excellent crack resistance and displays good elevated temperature properties. Ideally suited for joining 18/8 stainless steels where the carbon content is in the range of 0.04-0.08 i.e. AISI 304H material.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni
Percent	: 0.06	1.40	0.40	19.5	10.0

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
62.0	38

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	: 140-180	110-140	80-100	60-80	40-55
Qty.(Pcs./Carton):	35	55	75	100	150

PRECAUTIONS :

1. If necessary, redry the electrodes at 200-250°C for one hour.
2. Use short arc, stringer bead and low current.
3. Avoid build-up of heat during welding.



RUTOX-B

CODIFICATION : AWS : E308L-16
IS : E19.9L R16

CHARACTERISTICS AND APPLICATIONS :

A semi-basic electrode producing an extra low carbon 19Cr - 10Ni weld metal which has excellent resistance to intergranular corrosion. The weld metal has higher resistance to cracking, oxidation and scaling at elevated temperatures. Ideally suited for welding of stainless steels of similar composition like AISI 304L, 308L and their equivalents for overlays, surfacing applications, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni
Percent	: 0.03	1.40	0.40	19.8	10.0

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
57	40

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	: 150-180	110-140	80-100	60-80	40-55
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : EIL, NPCIL, PDIL

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.
2. Use short arc and low currents.

NOTE : Batox-B conforming to AWS E308L-15 is also available.

CHARACTERISTICS AND APPLICATIONS :

D&H 920B is a basic coated stainless steel electrode depositing a weld metal whose chemical composition nearly conforms to E308L-15. The weld metal has exceptional impact strength at minus 196°C. It is ideally suited for welding AISI 304, 304L types stainless steel used for the fabrication of liquid oxygen plant where ductility and impact strength at minus 196°C are of great importance.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni
Percent	: 0.030	2.30	0.40	18.8	12.5

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation	CVN Impact Strength	Lateral
(kgf/mm ²)	(L= 4d)%	at -196°C (Joules)	Expansion
54.0	35.0	30	15 mils (0.4mm) min.

CURRENT AND PACKING DATA : DC(+)

Size(mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range	: 150-180	110-140	80-100	60-80	40-55
(Amps)					
Weight/Carton:(kgs):	2.5	2.5	2.5	2.5	2.5

PRECAUTIONS :

1. Redry the electrodes at 200-250°C for one hour.
2. Use short arc, stringer bead and minimum possible size of electrode and current to reduce heat input.

CODIFICATION : AWS : E309-16
 IS : E23.12R16

CHARACTERISTICS AND APPLICATIONS :

A 25Cr - 12Ni electrode producing high strength stainless steel weld metal having good oxidation resistance up to 1100°C. The weld metal possesses excellent resistance to corrosion and oxidation. Ideal for welding 18/8 type steels to mild steels, clad side of 18/8 clad steels, lining of 12Cr steels on mild steels, overlays of ferritic steels, dissimilar steels and difficult to weld steels.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni
Percent	: 0.06	1.80	0.50	23.5	12.5

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
60.0	36

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	: 150-180	110-140	80-110	60-80	40-55
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : EIL, NPCIL, PDIL, RDSO

PRECAUTIONS :

1. Use lowest possible current, short arc and stringer bead.
2. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.

NOTE : D&H 309-15 conforming to AWS E309-15 is also available.

CODIFICATION : AWS : E309L-16
 IS : E23.12L R16

CHARACTERISTICS AND APPLICATIONS :

D&H 309L is a stainless steel electrode depositing an extra low carbon 24Cr - 12Ni weld metal. The weld metal has excellent mechanical properties and possesses good oxidation and scaling resistance at elevated temperatures. Ideally suited for welding stainless steels, wrought and cast materials of similar composition, welding of 18/8 type stainless steels to carbon steels for buffer layers, for welding clad side of 18/8 clad stainless steels, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni
Percent	: 0.03	1.60	0.50	23.6	12.80

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
58.2	38.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	: 150-180	110-140	80-100	60-80	40-55
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : EIL, NPCIL

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.
2. Use short arc and stringer bead.

NOTE : D&H 309L-15 conforming to AWS E309L-15 is also available.

CODIFICATION : AWS : E309Cb-16
 IS : E23.12 Nb R16

CHARACTERISTICS AND APPLICATIONS :

D&H 309Cb is a stainless steel electrode depositing a 25Cr - 12Ni columbium stabilised weld metal. Ideally suited for welding stabilised and unstabilised steels to mild steels, welding the clad side of 18-8 or 18-8-Cb clad steels, overlays on ferritic steels, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni	Cb
Percent	: 0.07	1.50	0.50	23.50	13.00	0.80

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
63.0	33.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	: 140-180	110-140	80-100	60-80	40-60
Qty. (Pcs./Carton)	: 35	55	75	100	150

PRECAUTIONS :

1. Use short arc, stringer bead and low currents.
2. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.

CODIFICATION : AWS : E309Mo-16
 IS : E23.12.2 R16

CHARACTERISTICS AND APPLICATIONS :

D&H 309 Mo is a stainless steel electrode yielding a weld deposit of 25Cr - 12Ni - 2.5Mo, which has good oxidation resistance up to 1050°C. Ideally suited for welding 18-11-Mo type steels to mild steel, welding the clad side of 18-11-Mo clad steels, overlays on ferritic steels, buffer layers, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni	Mo
Percent	: 0.05	1.80	0.50	23.50	13.0	2.4

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
62.0	33.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	: 150-180	120-150	80-100	60-80	40-65
Qty. (Pcs./Carton)	: 35	55	75	100	150

APPROVALS : PDIL, EIL**PRECAUTIONS :**

1. Arc should be as short as possible and welding current should not be too high.
2. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.

NOTE : D&H 309 Mo-15 conforming to AWS E309 Mo-15 is also available.

CODIFICATION : AWS : E310-16
 IS : E25.20 R16

CHARACTERISTICS AND APPLICATIONS :

D&H 310-16 is a 25Cr - 20Ni type electrode for welding steels of similar composition. The weld metal has excellent resistance to oxidation and scaling up to 1200°C. the electrode is also suitable for welding of hardenable steels, clad steels, C-Mn, Cr-Mo steels where pre-heat and post weld heat treatment are not feasible.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni
Percent	0.17	2.40	0.50	25.8	21.0

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L= 4d)%
61.0	32.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	: 140-180	110-140	80-100	60-80	40-60
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : PDIL

PRECAUTIONS :

1. Use low current, short arc length and minimum weaving.
2. Electrodes should be dry. In case of moisture pick-up redry the electrodes at 200-250°C for one hour.

NOTE : A high carbon version containing 0.4C D&H 310HC is also available for welding similar composition alloys like HK40, Thermalloy 47, etc.

CODIFICATION : AWS : E312-16

CHARACTERISTICS AND APPLICATIONS:

D&H 312 is a rutile type electrode which can be considered as outstanding by virtue of its excellent performance, characteristics and weld metal of controlled chemical composition. The weld metal is highly resistant to cracks and fissures. These electrodes were designed to weld cast alloys of similar composition. The typical applications include, welding dissimilar metals, unknown metals, leaf and coil springs, gear teeth, forged shafts, earth moving equipment and machine parts. Applications should be limited to service temperature below 420°C to avoid formation of secondary brittle phase.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	S	P
Percent	0.08	1.40	0.55	28.8	10.10	0.012	0.025

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L=4d) %
84.0	22.0

CURRENT & PACKING DATA : AC / DC(+)

Size (mm) Dia x Length	: 5 x 350	4 x 350	3.15 x 350	2.5 x 350
Current Range (Amps)	: 150-180	110-140	80-100	60-80
Weight / Carton : (kgs)	3	3	3	3

PRECAUTIONS :

1. Arc should be as short as possible.
2. Welding current should not be too high.
3. Electrodes must be dry, moist electrodes should be redry at 200°C for one hour.

CODIFICATION : AWS : E316-16
 IS : E19.12.2R16

CHARACTERISTICS AND APPLICATIONS :

Rutox-Mo is a stainless steel electrode depositing a weld metal containing 18Cr - 11Ni - 2.3Mo. The weld metal displays good crack resistance, excellent creep strength and resists scaling at elevated temperatures up to 850°C. The weld metal has excellent resistance to corrosion and pitting. Ideal for joining wrought and cast material of similar composition.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo
Percent	0.05	1.25	0.45	18.8	12.0	2.3

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
57	38.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	150-180	110-140	80-100	60-80	40-55
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : CIM, Ichapur, PDIL, NPCIL, EIL

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.
2. Use low current, short arc length and avoid weaving of the electrodes.

NOTE : Batox-Mo conforming to AWS E316-15 is also available.

CODIFICATION : AWS : E316L-16
 IS : E19.12.2LR16

CHARACTERISTICS AND APPLICATIONS :

Rutox-D is a stainless steel electrode depositing an extra low carbon 18Cr - 12Ni - 2.3Mo stainless steel weld metal. The weld metal has excellent resistance to intergranular corrosion even at elevated temperatures. Ideally suited for welding stainless steels of similar composition.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo
Percent	0.035	1.75	0.45	18.5	12.5	2.3

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
54.0	38.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	150-180	110-140	80-100	60-80	40-60
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : EIL, PDIL, NPCIL

PRECAUTIONS :

1. Use short arc and stringer bead to restrict heat input.
2. Ensure the electrodes are dry. In case of moisture pick-up redry the electrodes at 200-250°C for one hour.

NOTE : Batox-D conforming to AWS E316L-15 is also available.

CODIFICATION : AWS : E316L-16
 IS : E19.12.2L R16

CHARACTERISTICS AND APPLICATIONS :

Rutox-F is a stainless steel electrode depositing a weld metal containing 18Cr - 13Ni - 2.3Mo, which is unique in combination to produce a maximum ferrite content of 2% in the weld metal. This extra low ferrite content ensures excellent corrosion resistance against severe corrosive media. Ideal for welding AISI 316L, 316 particularly when the weld metal ferrite content has to be controlled below 2% as in the case of urea equipments.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo
Percent	0.03	1.80	0.45	18.0	13.5	2.3

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
55.0	38.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range : (Amps)	150-180	110-140	80-100	60-80	40-55
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVAL : PDIL

PRECAUTIONS :

1. Use short arc and stringer bead to restrict heat input.
2. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.

NOTE : Batox-F conforming to AWS E316L-15 is also available.

CODIFICATION : AWS : E316L-16 (Nearest)

CHARACTERISTICS AND APPLICATIONS :

Rutox-F(SPL) is a stainless steel electrode depositing zero ferrite weld metal which displays excellent resistance to corrosion particularly in urea service. The welds are of radiographic quality and possess excellent corrosion resistance. Ideally suited for welding AISI 316L and their equivalents for chemical and fertilizer industries.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo
Percent	0.025	2.0	0.50	17.5	15.0	2.60

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
58	36

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range : (Amps)	150-180	110-140	80-100	60-80	40-55
Qty.(Pcs./Carton):	35	55	75	100	150

PRECAUTIONS :

1. Welding should be carried out taking care to avoid build up of heat. It is imperative that due control is exercised for keeping interpass temperature low and in any case below 150°C.
2. Size of electrode should be smallest practicable.
3. Arc should be as short as possible.
4. Weaving should be minimised.
5. Electrodes should be redry at 200-250°C for one hour, then cool slowly to 50-60°C and maintained at this temperature before removing from oven for use.

CHARACTERISTICS AND APPLICATIONS :

Batox-F(U) is a semi-basic coated electrode depositing a weld metal which is a modified AWS E316L. The weld metal, which is fully austenitic in structure, has high strength and good crack resistance. The weld metal displays remarkable corrosion resistance particularly in urea service. Ideally suitable for welding of AISI 316L and their nitrogen bearing versions particularly for urea service.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni	N	Mo
Percent	: 0.03	4.0	0.45	19.5	16.0	0.15	2.8

FERRITE CONTENT : Nil

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation	Corrosion Rate
(kgf/mm ²)	(L= 4d)%	(ASTM A262 Practice C)
64.0	37.0	7 mils/year

CURRENT AND PACKING DATA : DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range	: 150-180	110-140	80-100	60-80	40-55
(Amps)					
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVAL : PDIL

PRECAUTIONS :

1. The electrode should be dry. In case of moisture pick-up, redry the electrodes at 250°C for one hour.
2. Use short arc, stringer bead, smallest size of electrode and minimum current to ensure minimum heat input.

CHARACTERISTICS AND APPLICATIONS :

Batox-F(U)M is a semi-basic type electrode depositing fully austenitic stainless steel weld metal which is modified AWS E316L-16. The deposit possesses excellent crack resistance and is ideally suited for welding special stainless steels used for high pressure parts of urea plant equipment to resist severe corrosion.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni	Mo	N
Percent	: 0.03	5.30	0.48	19.8	15.5	2.70	0.15

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation	Corrosion Rate
(kgf/mm ²)	(L= 4d)%	(ASTM A262 Practice C)
65.0	36.0	6.0 mils/year

FERRITE CONTENT : NIL

CURRENT AND PACKING DATA : DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range	: 150-180	110-140	80-100	60-80	40-55
(Amps)					
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : Stamicarbon bv, Snamprogetti Spa-Italy, PDIL

PRECAUTIONS :

1. Ensure the electrodes are dry. Redry the moist electrodes at 250°C for one hour.
2. Use short arc, stringer bead and smallest size of electrode, minimum current to ensure minimum heat input.

CODIFICATION : AWS : E317L-16
 IS : E19.12.3LR16

CHARACTERISTICS AND APPLICATIONS :

Rutox-E is a stainless steel electrode depositing an extra low carbon weld metal containing 18Cr-12Ni-3Mo. It is ideally suited for welding stainless steels of similar composition and AISI316L varieties and their equivalents. The extra low carbon content ensures excellent corrosion resistance against sulphuric acids, phosphoric acids, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni	Mo
Percent	: 0.035	1.60	0.46	19.0	12.2	3.20

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
61.0	36.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range	: 150-180	110-140	80-100	60-80	40-55
(Amps)					
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : EIL, NPCIL

PRECAUTIONS :

1. The electrode should be dry. In case of moisture pick-up, redry the electrodes at 200-250 °C for one hour.
2. Use short arc length and stringer bead to reduce heat input.

RUTOX-MO (ST)



CODIFICATION : AWS : E318-16
 IS : E19.12.2Nb R16

CHARACTERISTICS AND APPLICATIONS :

Rutox-Mo (St) is a stainless steel electrode producing a columbium stabilised 18Cr - 12Ni - 2.3Mo weld metal. The weld metal possesses good resistance to corrosion and pitting and improved creep strength. The weld metal has excellent resistance to intergranular corrosion. Ideally suited for joining stainless steels of similar composition.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	Cb
Percent	0.05	1.5	0.42	18.5	12.0	2.3	0.60

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
60	35.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	150-180	110-140	80-110	60-80	40-60
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : CIM-Ichapur, EIL

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick up, redry the electrodes at 200-250°C for one hour.
2. Use low current, short arc and stringer bead.

NOTE : Battox-Mo (ST) conforming to AWS E318-15 is also available.



RUTOX-C

CODIFICATION : AWS : E318L-16
 IS : E19.12.2L Nb R16

CHARACTERISTICS AND APPLICATIONS :

Rutox-C is a stainless steel electrode depositing a columbium stabilised 19Cr-12Ni-2.2Mo weld metal having an extra low carbon content. Ideal for welding of AISI 316, 316L, 316Ti, 317, 317Ti and their equivalents. The extra low carbon content and the stabilisation imparts excellent corrosion resistance against intergranular corrosion.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	Cb
Percent	0.03	1.70	0.40	18.9	12.6	2.10	0.45

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
58.4	36.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	150-180	110-140	80-100	60-80	40-55
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVAL : PDIL

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.
2. Use short arc and stringer bead.

NOTE : Battox-C conforming to AWS E318L-15 is also available.

RUTOX-A(ST)



CODIFICATION : AWS : E347-16
 IS : E19.9Nb R16

CHARACTERISTICS AND APPLICATIONS :

Rutox-A (St) is an electrode depositing 18Cr-10Ni-Cb stabilised weld metal, suitable for joining of stainless steels of similar composition. Ideal for welding of AISI 304, 304L, 321, 347 and their equivalents. The weld metal has excellent resistance to intergranular corrosion.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Cb
Percent	0.05	1.40	0.45	19.0	10.0	0.60

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
60.0	34.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range	140-180	110-140	80-110	60-80	40-60
(Amps)					
Qty.(Pcs./Carton):	35	55	75	100	150

APPROVALS : PDIL, EIL, NPCIL

PRECAUTIONS :

1. Ensure the electrodes are dry. Redry the moist electrodes at 200-250° C for one hour.
2. Use short arc length and stringer bead to reduce heat input.

NOTE : Batox-A (ST) conforming to AWS E347-15 is also available.



RUTOX-B(ST)

CODIFICATION : AWS : E347L-16
 IS : E19.9LNbR16

CHARACTERISTICS AND APPLICATIONS :

Rutox-B (St) is a semi-basic coated stainless steel electrode depositing an extra low carbon, 18Cr-10Ni-Cb stabilised deposit. Ideally suited for welding stabilised and unstabilised low carbon version of 18-8 type stainless steels. The weld metal has excellent resistance to intergranular corrosion.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Cb
Percent	0.030	1.20	0.45	19.0	10.0	0.50

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
59.0	38.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range	150-180	110-140	80-100	60-80	40-55
(Amps)					
Qty.(Pcs./Carton):	35	55	75	100	150

PRECAUTIONS :

1. Use short arc, low current and stringer bead to reduce heat input.
2. Electrodes should be dry. In case of moisture pick-up, redry the electrodes at 200-250° C for one hour.

NOTE : Batox-B (ST) conforming to AWS E347L-15 is also available.

CODIFICATION : AWS : E383-16

CHARACTERISTICS AND APPLICATIONS:

D&H 150L(Spl) is a special AC/DC(+) electrode producing a low carbon 28Cr - 31.5Ni - 3.7Mo - 1Cu fully austenitic weld metal which exhibits excellent resistance to corrosion in non-oxidising media like Sulfuric acid, Phosphoric acid, etc. The elements C, Si, P and S are also maintained at low levels to eliminate hot cracking & fissuring problems in weld metal. Ideally suited for welding stainless steels of similar composition and other equivalent grades of stainless steels.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	Cu
Percent	0.030	1.5	0.90	27.7	31.5	3.7	1.0

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf / mm ²)	(L=4d) %
54.0	31.0

FISSURE TEST : Weld metal passes the fissure test as per Thomas & A.L. Schaffler test.

CURRENT & PACKING DATA: AC / DC(+)

Size (mm) Dia x Length :	5 x 350	4 x 350	3.15 x 350	2.5 x 350
Current Range (Amps) :	150-180	110-140	80-100	60-80
Weight / Carton: (kgs) :	3	3	3	3

PRECAUTIONS :

1. The electrodes should be kept dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.
2. Use stringer beads, short arc and smallest possible size, which helps in reducing the heat input.

CODIFICATION : AWS : E385-16

CHARACTERISTICS AND APPLICATIONS :

D&H 150L is a special type electrode producing an extra low carbon weld metal containing 20Cr - 25Ni - 5Mo - 2Cu. The weld metal exhibits excellent corrosion resistance to sulphuric acid, phosphoric acid, acetic acid, formic acid, fatty acids, oxalic acid, etc. Ideally suited for welding carpenter 20, HV9, HV 9A, Uranus B-6, UHB904L, Sandvik 2RK65 and other similar materials.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	Cu
Percent	0.030	2.0	0.40	20.0	24.0	4.4	1.80

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
54.0	31.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm) :	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range :	150-180	110-140	80-100	60-80
(Amps)				
Weight/ Carton :	3	3	3	3
(kgs)				

APPROVAL : PDIL

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250 °C for one hour.
2. Use short arc, stringer bead, smallest possible size of electrodes and minimum current to reduce heat input.

CODIFICATION : AWS : E410-15

CHARACTERISTICS AND APPLICATIONS :

D&H 13Cr is a special flux coated hydrogen controlled electrode depositing 13Cr weld metal. Ideally suited for joining similar alloys, resurfacing of valve seats, steam and gas turbine components. Ideal for joining straight chromium stainless steels.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni
Percent	: 0.07	0.80	0.60	12.5	0.35

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
56.0	25.0

CURRENT AND PACKING DATA : DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range	: 180-220	130-170	90-120	60-80
(Amps)				
Qty.(Pcs./Carton):	35	55	75	100

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.
2. Use minimum current and stringer bead.

CODIFICATION : AWS : E430-15

CHARACTERISTICS AND APPLICATIONS :

D&H 17Cr is a heavy coated low hydrogen electrode depositing a weld metal containing 17Cr. The weld deposit displays good resistance to corrosion and heat. The electrode is suitable for joining stainless steels of similar composition. It is also suitable for surfacing carbon steels, low alloy steels and chromium steels. Typical applications include surfacing of valves, impellers, turbine blades, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni
Percent	: 0.075	0.60	0.50	17.0	0.35

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
49.0	20.0

CURRENT AND PACKING DATA : DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range	: 130-170	100-130	80-110	70-90
(Amps)				
Qty.(Pcs./Carton):	35	55	75	100

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 250-300°C for one hour.
2. Use minimum current and stringer bead.

CODIFICATION : AWS : E2209-16

CHARACTERISTICS AND APPLICATIONS :

D&H 2093L is a specially formulated electrode depositing a stainless steel weld metal and is ideal for welding duplex stainless steels. The weld metal possesses excellent corrosion resistance in marine environments.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	N
Percent	0.035	1.5	0.4	22.0	9.4	2.9	0.14

CORROSION PROPERTY : Weld metals meets ASTM A262 practice C requirements in as welded condition.

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation	CVN Impact Strength at	
(kgf/mm ²)	(L= 4d)%	20°C	- 30°C
73.0	25.0	105J	70J

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	: 150-180	110-140	80-110	60-80
Qty.(Pcs./Carton):	35	55	75	100

CODIFICATION : AWS : E2553-16

CHARACTERISTICS AND APPLICATIONS :

D&H 25/5/3 is an electrode depositing a super duplex stainless steel weld metal having a nominal composition on 25.0 Cr, 7.5 Ni, 3.3 Mo, 2Cu and 0.17 N. Weld metal has 'duplex' micro structure consisting of austenite and ferrite matrix. Ideal for welding duplex stainless steels having approximately 25% chromium. The major application areas includes, oil & gas industry, offshore platforms, petrochemical plants, mechanical and structural components demanding high strength together with high corrosion resistance.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Cu	N	P	S	Mo
Percent	0.04	1.10	0.45	25.0	7.5	2.0	0.17	0.025	0.02	3.3

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation	CVN Impact Strength at	
(kgf/mm ²)	(L= 4d)%	RT (Joules)	
78.0	24.0	25	

PITTING RESISTANCE NUMBER : Meet the requirement of PREN > 40

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	: 150-180	110-140	80-110	60-80
Qty.(Pcs./Carton):	35	55	75	100

PRECAUTIONS :

1. The electrodes should be dry. In case of moisture pick-up rebake at 250°C for 1 hour.
2. Ensure the interpass temperature is less than 150°C and better less than 102°C
3. Use the preheat required for the base material.

CHARACTERISTICS AND APPLICATIONS :

A super duplex stainless steel electrode depositing 25Cr-10Ni-4Mo weld metal. The balance chemistry results in excellent corrosion resistance. Weld metal possesses PREN > 40. The weld metal has high strength, toughness, resistance to pitting, crevice corrosion and stress corrosion cracking. Ideal for welding materials like *Use in offshore platforms * Petro chemical plants *Oil & Gas industry.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element :	C	Mn	Si	P	S	Cr	Ni	Mo	N
Percent :	0.035	1.45	0.42	0.023	0.025	25.0	9.3	4.0	0.21

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at	
		-20°C	20°C
79.0	23.0	40 J	55 J

PITTING RESISTANCE NUMBER : Meets the requirement of PREN > 40

CORROSION PROPERTY : Weld metal meets ASTM A 262 Practice C requirements in as welded condition.

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	150-180	110-140	80-110	60-80
Qty.(Pcs./Carton):	35	55	75	100

PRECAUTIONS :

1. The electrodes should be dry. In case of moisture pick-up rebake at 250°C for one hour.
2. The heat input should be in the range of 0.5-1.5 KJ/mm.

CODIFICATION : AWS : E2595-16

CHARACTERISTICS AND APPLICATIONS :

D&H-25/10/4 W is a special electrode producing super duplex stainless steel weld metal. The weld metal exhibits high strength, high impact energy, and resistance to stress corrosion cracking, pitting, and crevice corrosion. Examples of application areas are:

Oil and gas industry Oil country tubular Food processing Valves and fittings Flue gas de-sulfurizers Offshore platforms Petrochemical plants Mechanical and structural components.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element :	C	Mn	Si	Cr	Ni	Mo	N	P	S	Cu	W
Percent :	0.035	0.80	0.42	25.0	9.3	4.0	0.20	0.020	0.020	0.70	0.70

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L= 4d)%	CVN Impact Strength at	
		-20°C	20°C
79.0	23.0	40 J	55 J

PITTING RESISTANCE NUMBER : Meets the requirement of PREN ≥ 40

CORROSION PROPERTY : Weld metal meets ASTM A 262 Practice C requirements in as welded condition.

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	150-180	110-140	80-100	60-80
Qty.(Pcs./Carton):	35	55	75	100

PRECAUTIONS :

1. The electrodes should be dry. In case of moisture pick up rebake at 250°C for one hour.
2. The heat input should be in the range of 0.5-1.5 KJ/mm.
3. For better results solution annealing at 1080-1120°C is required.

CHARACTERISTICS AND APPLICATIONS :

D&H 888 is a versatile AC / DC(+) electrode designed for crack free high strength joints in carbon, low alloy, stainless steels and dissimilar materials. Ideally suited for welding of variety of unknown composition steels, leaf and coil springs and other difficult to weld steels.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo
Percent	0.04	1.50	0.56	24.2	10.5	2.20

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L= 4d)%
61.0	33.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	150-180	110-140	80-100	60-80	40-60
Weight/Carton (kgs)	3	3	3	3	3

PRECAUTIONS :

1. Use short arc and minimum heat input.
2. Ensure the electrodes are dry. Re bake the moist electrodes at 200-250°C for one hour.

CHARACTERISTICS AND APPLICATIONS :

D&H 100 is a rutile coated electrode producing a fully austenitic stainless steel weld deposit which is ideally suited for a variety of applications. The weld deposit has excellent crack resistance and is ideally suited for joining several dissimilar compositions. The weld deposits exhibit excellent resistance to corrosion, oxidation at elevated temperature. Typical applications include welding of stainless steel of similar composition, welding Cr-Mo and Cr-Mo-V steels where PWHT cannot be done, surfacing of steels to resist various environment, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo
Percent	0.04	1.50	0.44	15.50	24.0	5.0

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L= 4d)%
59.0	35.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350	2x300
Dia x Length					
Current Range (Amps)	150-180	110-140	80-100	60-80	40-55
Weight/Carton (kgs)	3	3	3	3	3

PRECAUTIONS :

1. Use short arc and minimum heat input.
2. Ensure the electrodes are dry. Redry the moist electrodes at 200-250°C for one hour.

NOTE : The stabilised version D&H 111 is also available.

CHARACTERISTICS AND APPLICATIONS :

D&H 45S is a special purpose electrodes depositing almost pure iron weld metal which is ideally suited for welding galvanizing baths. The very low silicon content ensures excellent resistance to corrosion by molten zinc. Typical applications include welding of galvanizing baths and filling up of worn out bodies of galvanizing bath to resist corrosion by molten zinc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si
Percent	: 0.06	0.20	0.05

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L= 4d)%
41.2	30.0

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x450	4x450	3.15x450
Dia x Length			
Current Range	: 200-240	160-180	110-135
(Amps)			
Weight/Carton	: 4	4	4
(kgs)			

PRECAUTION :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250 °C for one hour.

NOTE : The low hydrogen version D&H 45S(LH) is also available.

CHARACTERISTICS AND APPLICATIONS :

An electrode specially designed for increased wear resistance of components subjected to high abrasion, moderate impact and elevated temperatures. Ideal for hardfacing components like excavator teeth, plough shears, coal handling machinery, exhaust blades, etc.

WELD METAL HARDNESS : 56-60 RC (on two layer deposit)

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 8x450	6.3x400/450	5x450	4x350	3.15x350	2.5x350
Dia x Length						
Current Range:	300-340	240-290	150-180	120-150	100-130	60-80
(Amps)						
Weight/Carton	: 4	3.5/4	4	2	2	2
(kgs)						

PRECAUTIONS :

1. Redry the electrode at 250 °C for an hour before use.
2. Clean the weld area thoroughly from rust, scale, paint, oil, grease or any other contaminants.
3. Use short weld bead and avoid weaving of the electrode.
4. While surfacing medium and high carbon steels, use Indotherme for buffer layers to avoid chances of cracking.
5. Use of intermediate buffer layers may also be necessary in case of heavy build-up.

CODIFICATION : IS : E Fe-A312(Nearest)

CHARACTERISTICS AND APPLICATIONS :

BOR-A (R) is a hardfacing electrode operating on AC / DC(-) depositing an air hardening weld metal . The deposit displays excellent toughness and ability to withstand heavy impact loads and has excellent resistance to rolling and sliding friction. The weld deposit is machinable. Ideal for rail points and crossings, axles, wheels, gear shafts, couplings, pinion teeth, rollers, sprockets, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr
Percent	: 0.20	0.60	0.40	1.80

WELD METAL HARDNESS : 250-280 BHN

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	: 5x450	4x450	3.15x450	2.5x350
Dia x Length				
Current Range (Amps)	: 190-220	140-180	100-130	65-90
Qty.(Pcs./Carton):	50	80	120	180

PRECAUTIONS :

1. Use short arc.
2. Use low current.
3. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 150°C for one hour.
4. If the base material has the carbon content of more than 0.25% a buffer layer using a low hydrogen electrode is recommended.

CHARACTERISTICS AND APPLICATIONS :

BOR-B is a rutile coated AC / DC(-) type electrode producing an air hardening type weld metal for hardfacing of carbon and low alloy steels. The weld metal is highly resistant to abrasive wear and has a fair degree of toughness. Ideally suited for applications in which abrasion resistance is required with a fair degree of toughness. Typical applications include brake shoes, shear blades, wheels, cams, gears, pullies, drive sprockets, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr
Percent	: 0.20	0.60	0.40	3.20

WELD METAL HARDNESS : 350-400 BHN

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	: 5x450	4x450	3.15x450	2.5x350
Dia x Length				
Current Range (Amps)	: 180-220	140-180	100-130	65-90
Qty.(Pcs./Carton):	50	80	120	180

PRECAUTIONS :

1. Ensure the electrodes are dry. Moist electrodes should be redry at 150°C for one hour.
2. Maintain short arc and avoid weaving.
3. Use suitable buffer layers and preheating, depending on the material composition and thickness.

CHARACTERISTICS AND APPLICATIONS :

BOR-C is a basic coated AC/DC(+) electrode producing an air hardening weld metal which has excellent resistance to abrasion or heavy impact or both together. The welds are non-machinable and are ideally suited for applications involving severe abrasion and impact. Typical applications include cane cutting knives, crusher hammers, jaws, rollers, rock drills, tractor grousers, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Mo	V
Percent	: 0.60	0.70	0.50	6.2	0.45	0.30

WELD METAL HARDNESS : 52-60RC

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 6.3x450	5x450	4x450	3.15X450	2.5x350
Dia x Length					
Current Range (Amps)	: 250-300	200-250	150-180	100-130	65-90
Qty.(Pcs./Carton):	25	35	55	75	125

PRECAUTIONS :

1. Ensure the electrodes are dry. Moist electrodes should be redry at 250-300°C for one hour.
2. Use short arc and stringer bead.

CHARACTERISTICS AND APPLICATIONS :

CCR-20 is a special type hardfacing electrode depositing chromium carbide rich weld metal. The electrode operates on AC / DC(+). The weld metal has excellent resistance to severe abrasion with mild impact. Ideally suited for a wide range of hardfacing applications to enhance resistance to severe abrasion, erosion and oxidation. Typical applications include coal crushing hammers, plough shares, drag line bucket lips, tractor grousers, cane knives, rolling mill guides, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr
Percent	: 2.10	0.60	0.70	20.8

WELD METAL HARDNESS : 52-58 RC

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350
Dia x Length			
Current Range (Amps)	: 200-250	160-200	120-160
Weight/Carton (kgs)	: 2.5	2.5	2.5

PRECAUTIONS :

1. Ensure the electrodes are dry. Rebake the moist electrodes at 200-250°C for one hour.
2. Do not deposit more than two layers of CCR-20. In case a heavy build-up is required, use buffer layers with Indotherme electrodes and then continue the build-up for two more layers.

CHARACTERISTICS AND APPLICATIONS :

CCR(Special) is a semi-basic super heavy coated hardfacing electrode producing a high carbon, high chromium and nickel alloy weld deposit. The weld metal is extremely hard at room temperature and retains its hardness up to 550°C. The weld metal has excellent resistance to high temperature abrasion. Typical applications include hardfacing of blast furnace bells, hoppers, parts in coke chutes, coal handling equipments, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni
Percent	: 3.0	1.0	0.60	29.0	4.0

WELD METAL HARDNESS :

At room temperature : 48-54 RC

At 500°C: 40-44 RC

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350
Dia x Length			
Current Range (Amps)	: 200-240	160-180	120-140
Weight/Carton (Kgs)	: 2.5	2.5	2.5

PRECAUTIONS :

1. Ensure the electrodes are dry. Rebake the moist electrodes at 250°C for one hour.
2. Do not use excess current.

CODIFICATION : AWS : ECoCr-A

CHARACTERISTICS AND APPLICATIONS :

Cobaltherme-6 is a cobalt based electrode depositing a weld metal having 28Cr - 5W - 1C. The weld metal possesses excellent resistance to oxidation, impact, corrosion and heat. The electrode operates well in AC as well as DC.

There are several applications in which this electrode can be used. These include overlay, surfacing applications which require heat resistance, oxidation resistance in combination with impact and mild abrasion. Typical applications include, shear blades, dies, valve seats, hot metal handling equipments, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr	Ni	Mo	W	Co	Fe
Percent	: 1.0	1.8	0.94	28.0	2.80	1.0	5.0	Balance	4.5

WELD METAL HARDNESS : 40-45 RC**CURRENT AND PACKING DATA : AC / DC(+)**

Size (mm)	: 5x350	4x350	3.15x350
Dia x Length			
Current Range (Amps)	: 130-190	100-150	70-120
Weight/Carton (kgs)	: 1	1	1

PRECAUTIONS :

1. Ensure the electrodes are dry. Redry the electrodes at 200°C for one hour before use.
2. Follow a carefully designed welding procedure which will use preheating only wherever necessary.
3. The pot-weld heat treatment is not normally recommended.

CHARACTERISTICS AND APPLICATIONS :

Croma is a AC/DC (+) type electrode depositing a 16Cr-4Mn weld metal which has work hardening characteristics. The weld metal resists impact abrasion and corrosion. Ideally suited for hardfacing applications to enhance resistance to impact abrasion. Ideal for buffer layers before depositing air hardening deposits. Typical applications include surfacing and building up of austenitic manganese steel components, crusher jaws, crusher hammers, roll crushers, mining machineries, dipper teeth, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr
Percent	: 0.12	4.30	0.55	16.5

WELD METAL HARDNESS : As welded: 200-250 BHN

Work hardens (under impact) to 550 BHN

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range	: 180-250	150-180	100-140	70-90
(Amps)				
Qty.(Pcs./Carton):	30	45	65	100

PRECAUTIONS :

1. Ensure the electrodes are dry. Moist electrodes should be redry at 200-250°C for one hour.
2. Use minimum current and as low heat input as possible.

CODIFICATION : AWS : E410-26

CHARACTERISTICS AND APPLICATIONS :

D&H 410 is a high deposition electrode designed for joining of similar alloys and for surfacing and overlay applications on unalloyed steels and chromium steel having 12.5Cr. The weld deposit displays good resistance to corrosion, erosion, pitting and abrasion. Ideally suited for surfacing of valves and other components of turbine, steam valves made of 13Cr steel, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr
Percent	: 0.08	0.70	0.6	12.5

WELD METAL HARDNESS : 370-400 VHN

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range	: 180-220	140-180	90-130	70-100
(Amps)				
Weight/Carton	: 2	2	2	2
(kgs)				

PRECAUTIONS :

1. Ensure the electrodes are dry. Redry moist electrodes at 200-250°C for one hour.
2. Use short arc and minimum heat input.

CHARACTERISTICS AND APPLICATIONS :

D&H 415 is a rutile type electrode producing a ferritic stainless steel weld deposit. The deposit has good resistance to abrasion, erosion, corrosion and heat. Ideally suited for rebuilding of refiner cones and shells in paper mills, surfacing of industrial valves, surfacing of parts in brewery industry.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr
Percent	0.08	0.60	0.60	17.00

WELD METAL HARDNESS : 275-325 VPN

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	180-250	150-180	100-140	80-100
Weight/Carton (kgs)	3	3	3	3

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.
2. Use short arc and minimum heat input.

CODIFICATION : AWS : E430-26

CHARACTERISTICS AND APPLICATIONS :

D&H 430 is a heavy rutile type electrode depositing a 17Cr weld metal. The weld metal displays good resistance to corrosion and heat. Ideally suited for surfacing of straight chromium steels and similar materials.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr
Percent	0.07	0.65	0.50	17.00

WELD METAL HARDNESS : 200-280 VPN

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	180-230	150-180	100-140	70-100
Weight/Carton (kgs)	2	2	2	2

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.
2. Use short arc and minimum heat input.

CODIFICATION : AWS : E410NiMo-16

CHARACTERISTICS AND APPLICATIONS :

D&H 444L is a special purpose electrode depositing 12Cr - 4.6Ni - 0.5Mo weld metal, which has excellent resistance to corrosion, erosion, pitting and impact. Ideally suited for joining of similar composition materials, groove welding and surfacing applications. Typical applications include surfacing of high pressure valves, turbine blades, valve seats, repairs of runners, pulp and paper plant equipment, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo
Percent	0.05	0.60	0.50	12.0	4.60	0.50

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL

UTS (kgf/mm ²)	Elongation (L=4d)%	Hardness (VPN)
79.0	17.0	325-360

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	150-190	110-150	80-100	60-80
Weight/Carton (kgs)	3	3	3	3

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250 °C for one hour.
2. Use short arc and minimum heat input.

NOTE :D&H 444L-15 Conforming to AWS : E410NiMo-15 is also available.

CHARACTERISTICS AND APPLICATIONS :

A unique hardfacing electrode with controlled hydrogen depositing a low alloy steel weld metal. The weld metal possesses excellent resistance to heat, retention of hardness. Ideal for surfacing hot forging dies, repair work of hot working tools which are subjected to heavy impact and heat.

CHEMICAL COMPOSITION OF ALL WELD METAL:

Element	C	Mn	Si	Cr	Ni	Mo	V
Range%	0.08-0.11	1.3-1.8	0.2-0.5	2.7-3.2	1.9-2.4	1.3-1.6	0.2-0.35

WELD METAL HARDNESS : 360-400 BHN (S.R. 560°C for one hour)

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	8x450	6.3x450	5x450	4x450
Dia x Length				
Current Range (Amps)	280-350	250-280	200-250	150-180
Weight/Carton (kgs)	4	4	4	4

PRECAUTIONS :

1. The electrodes should be dry. Redry the moist electrodes at 250 °C for one hour.
2. When welding on high hardenable materials of large thicknesses, adequate care for preheating, slow cooling & PWHT are necessary.
3. Use short arc and minimum weaving.

CHARACTERISTICS AND APPLICATIONS :

D&H 630-H is a medium coated rutile type hardfacing electrode depositing an air hardening weld metal resistant to severe abrasion and moderate impact. Ideal for hardfacing applications to combat severe abrasion combined with moderate impact. Typical applications include dredger bucket lips, plough shares, excavator teeth, conveyer buckets, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr
Percent	: 0.50	0.30	0.45	6.5

WELD METAL HARDNESS : 55-60RC

CURRENT AND PACKING DATA : AC / DC(-)

Size (mm)	: 5x450	4x450	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	: 175-210	140-175	90-125	70-90
Qty.(Pcs./Carton):	50	80	120	180

PRECAUTION :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.

CHARACTERISTICS AND APPLICATIONS :

A specially developed AC or DC(+) electrode to produce extra high performance weld metal. Superior operating characteristics. Deposit sound weld metal reaching maximum hardness as deposited. Weld metal highly resistant to heat, corrosion and wear with the shock resistance necessary for forging dies. Ideal for reclamation of forging die, hot working tools impressions, reducers guides-ways, flat dies, etc. Also excellent for a tough build-up when a higher hardness material is required on the surface.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Ni	Cr	Mo	V
Percent	: 0.20	1.25	0.60	2.02	10.25	2.75	0.35

WELD METAL HARDNESS : 380-480 VHN

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 6.3x450	5x350	4x350	3.15x350
Dia x Length				
Current Range (Amps)	: 250-300	180-225	125-175	80-125
Weight/Carton (kgs)	: 4	4	4	4

PRECAUTIONS :

1. Remove all the material by scarfing or grinding.
2. Rebake the moist electrodes at 250-300°C for one hour.
3. Use the preheat required for the base material.
4. A carefully designed welding procedure with proper preheat, peening, cleaning, interpass temperature and PWHT will yield the desired results.

CHARACTERISTICS AND APPLICATIONS :

A hardfacing electrode depositing low hydrogen, low alloy steels weld metal for surfacing hammer dies. The weld metal possesses good toughness and resistance to heat for enhancing the life of the dies.

CHEMICAL COMPOSITION OF ALL WELD METAL :

Element :	C	Mn	Si	Cr	Ni	Mo	V
Range :	0.10	2.0	1.0	1.9-2.5	1.75-2.30	0.8-1.2	0.20-0.40
(%)	(max)	(max)	(max)				

WELD METAL HARDNESS : 34-38 RC(On die material after S.R. at 560°C for one hour)

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 8x450	6.3x450	5x450	4x450	3.15x450
Dia x Length					
Current Range (Amps)	: 300-350	270-320	200-250	150-180	100-130
Weight/Carton (kgs)	: 4	4	4	4	4

PRECAUTIONS :

1. The electrodes should be dry. Redry the moist electrodes at 250°C for one hour.
2. When welding on high hardenable materials of large thicknesses, adequate care for preheating, slow cooling & PWHT are necessary.
3. Use short arc and minimum weaving.

CHARACTERISTICS AND APPLICATIONS :

SHC-Six is a unique electrode operating on AC / DC(+) depositing an air hardening weld metal which has excellent resistance to severe abrasion with moderate impact as in the case of oil expeller worms, dipper teeth, scraper blades, screw conveyers, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element :	C	Mn	Si	Cr
Percent :	3.0	1.50	1.50	5.0

WELD METAL HARDNESS : 54-60 RC

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x450	4x450	3.15x350
Dia x Length			
Current Range (Amps)	: 170-200	140-170	110-130
Qty.(Pcs./Carton)	: 40	60	80

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-250°C for one hour.
2. Use short arc and stringer beads.
3. Use suitable buffer layers and preheat depending on base material composition and thickness.

SIA (RUTILE)



CODIFICATION : IS : E18.8Mn-R-26X

CHARACTERISTICS AND APPLICATIONS :

SIA(Rutile) is an electrode depositing 18Cr-8Ni-5Mn weld metal. Ideally suited for joining and surfacing applications to enhance resistance to impact and abrasion. Ideally suited for joining austenitic manganese steel to carbon steel, low alloy steel, etc., and also for buffer layers on a variety of steels.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni
Percent	0.07	6.0	0.60	19.0	9.0

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL

UTS (kgf/mm ²)	Elongation (L=4d)%	Hardness
62.0	35.0	200-220 BHN (As welded)
		500 BHN (Work hardens under impact)

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	190-240	140-190	90-130	60-100
Qty.(Pcs./Carton)	25	40	60	80

PRECAUTIONS :

1. Ensure the electrodes are dry. Moist electrodes should be redry at 200-250°C for one hour.
2. Use short arc and minimum heat input.



SMA

CHARACTERISTICS AND APPLICATIONS :

SMA is a basic coated electrode operating on AC/DC(+) producing a tough austenitic manganese steel weld metal. The deposit work hardens in service and has excellent resistance to wear by impact. Typical applications include surfacing of parts subjected to abrasion and heavy impact as in the case of crusher jaws, bucket teeth and lips, rail crossing, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si
Percent	0.85	14.5	0.55

WELD METAL HARDNESS : As welded: 200-250 BHN

Work hardens (under impact) to 500 BHN

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	6.3x450	5x450	4X450	3.15x350
Dia x Length				
Current Range (Amps)	200-270	160-200	130-160	90-120
Qty.(Pcs./Carton)	20	35	55	75

PRECAUTIONS :

1. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 250-300°C for one hour.
2. While welding of austenitic manganese steel, restrict the heat input by:
 - a) Short arc;
 - b) Stringer bead;
 - c) Deposit in short length;
 - d) Intermittent welding;
 - e) Keeping the base material partly immersed in water.

CHARACTERISTICS AND APPLICATIONS :

Super-Mn is an electrode depositing high manganese steel weld metal. The weld metal possesses excellent toughness and work hardens under impact. The deposit exhibits an austenitic structure and is ideally suited for re-surfacing austenitic manganese steel components like crusher jaws, hammers, etc. for resistance against wear by impact and abrasion.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Cr
Percent	: 0.85	15.5	0.55	2.5

WELD METAL HARDNESS :

As welded (on mild steel-two layers): 200-250 BHN
 Work hardens (under impact) to 500 BHN

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 6.3X450	5x450	4x450	3.15X450
Dia x Length				
Current Range (Amps)	: 200-270	160-200	130-160	90-120
Qty.(Pcs./Carton):	20	35	50	75

PRECAUTIONS :

1. Ensure the surface to be built-up is free of all contaminants.
2. Remove by grinding any work hardened zone. A magnet can detach a work hardened zone.
3. Ensure the electrodes are dry. Redry the moist electrodes at 200-250°C for one hour.
4. When welding on austenitic manganese steels, restrict heat input by:
 - a) Short arc;
 - b) Stringer bead;
 - c) Deposits of short lengths and thickness;
 - d) Intermittent welding;

CHARACTERISTICS AND APPLICATIONS :

A special type hardfacing electrode depositing Ni-Mo alloy. The weld metal possesses high hardness which is retained even at elevated temperature of 550°C. Ideal for hardfacing components which are subjected to abrasion in combination with impact like blast furnace, belt, hoppers, rolls, tongpins, etc.

WELD METAL HARDNESS :

At room temperature	: 50-55 RC
At 500°C	: 45 RC

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 6.3x450	5x450	4x450	3.15x450
Dia x Length				
Current Range (Amps)	: 200-250	160-190	130-160	100-130
Weight/Carton (kgs)	: 4	4	4	4

PRECAUTIONS :

1. The electrode should be redry at 250°C for one hour before use.
2. Clean the weld area thoroughly from rust, scale, paint, oil, grease or any other contaminants.
3. Use short arc.

CODIFICATION : AWS : ENiCrFe-2

CHARACTERISTICS AND APPLICATIONS :

D&H 1200T is a high nickel alloy electrode ideally suited for welding of NiCrFe alloy to themselves, welding of dissimilar metals such as carbon steels, stainless steels, nickel based alloys and pure nickel to themselves or to each other for overlaying applications. The weld metal has excellent crack resistance and has good high temperature properties like creep strength and oxidation resistance.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	Fe	Cb
Percent	0.04	2.5	0.40	15.0	balance	1.50	7.0	1.5

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L=4d)%
59.0	35.0

CURRENT AND PACKING DATA : DC(+)

Size (mm)	4x350	3.15x350	2.5x350	2x300
Dia x Length				
Current Range (Amps)	140-170	100-130	70-100	60-80
Weight/Carton (kgs)	3	3	3	3

APPROVAL : PDIL

PRECAUTIONS :

1. Use DC(+) and short arc.
2. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-300°C for one hour.
3. Minimise weaving.

CODIFICATION : AWS : ENiCrFe-3

CHARACTERISTICS AND APPLICATIONS :

D&H 1212 is a basic coated electrode which deposits an inconel type weld metal. The electrode is specially suited for welding of 9% nickel steels, joining dissimilar materials, joining of Ni-Cr-Fe alloy to themselves and to dissimilar materials, cladding and surfacing of parts subjected to corrosion and heat. The weld metal possesses excellent high temperature as well as sub-zero temperature properties.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Fe	Cb
Percent	0.04	6.0	0.45	15.0	balance	6.0	1.3

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L=4d)%
59.0	34.0

CURRENT AND PACKING DATA : DC(+)

Size (mm)	4x350	3.15x350	2.5x350
Dia x Length			
Current Range (Amps)	140-170	100-130	80-100
Weight/Carton (Kgs)	3	3	3

APPROVAL : PDIL

PRECAUTIONS :

1. Use DC(+) and short arc.
2. Ensure the electrodes are dry. In case of moisture pick-up, redry the electrodes at 200-300°C for one hour.
3. Minimise weaving.
4. Weld in flat position wherever possible.

CODIFICATION : AWS : ENiCrMo-3

CHARACTERISTICS AND APPLICATIONS:

A high nickel alloy weld metal containing Ni-Cr-Mo. Excellent resistance to heat, strength and toughness up to 980°C. Ideal for welding Ni-Cr-Mo alloys to themselves and to steel, and for surfacing steel with Ni-Cr-Mo weld metal for increased resistance to abrasion, oxidation and corrosion. Ideal for valves, valve seats, impellers, guide points, bushing, bearings, journals, hot working tools like hot shear blades, forging dies, trimming dies, piercing punches, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	Cb+Ta	Fe	P	S
Percent	0.06	0.6	0.50	21.0	Balance	9.0	3.5	5.0	0.02	0.015

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L=4d) %
78.0	34

CURRENT & PACKING DATA: DC(+)

Size (mm) Dia x Length :	5 x 350	4 x 350	3.15 x 350
Current Range (Amps) :	200-240	160-200	110-150
Weight / Carton : (kgs) :	3	3	3

PRECAUTIONS :

1. Redry the electrodes at 300-350°C for one hour.
2. Clean the weld area thoroughly free of any contamination.
3. Use short arc, low current to minimise dilution.
4. Weld in flat position wherever possible.
5. Electrodes larger than 3.15 mm are used only in flat & horizontal position.

CODIFICATION : AWS : ENiCrCoMo-1

CHARACTERISTICS AND APPLICATIONS :

D&H 1225 is an inonel type of electrode. The weld metal has excellent crack resistance, strength and oxidation resistance up to 1150°C. Ideally suited for welding Ni-Cr-Co-Mo alloys to themselves and to steel. Specially recommended for welding furnace heating elements, reformer tubes, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Fe	Si	Ni	Co	Cr	Cb+Ta	Mo
Percent	0.07	1.5	4.5	0.50	48.0	12.0	24.0	0.3	9.0

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS	Elongation
(kgf/mm ²)	(L=4d) %
68	29

CURRENT & PACKING DATA: DC(+)

Size (mm) Dia x Length :	4 x 350	3.15 x 350	2.5 x 350
Current Range (Amps) :	150-170	100-130	80-100
Weight / Carton : (kgs) :	3	3	3

PRECAUTIONS :

1. Redry the electrode at 350°C for one hour before use.
2. Operate the electrodes in DC (+) & wherever possible, weld in flat position only.
3. Maintain a short arc, use stringer bead and minimise the heat input.

CODIFICATION : AWS : ENiCrMo-7

CHARACTERISTICS AND APPLICATIONS :

D&H 1227 is a nickel base electrode. The weld deposit resists corrosion resistance at room temperature as well as resistance to oxidation and reducing atmospheres at elevated temperatures. Ideally suited for welding Ni-Cr-Mo alloy, for the welding of the clad side of joints in steel clad with Ni-Cr-Mo alloy, and for joining Ni-Cr-Mo alloys to steel and to other nickel base alloys. Some of the materials, which are welded with these electrodes, are ASTM B574, B575, B619, B622 and B626 having UNS number N06985.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	S	P	Fe	Ni	Cr	Mo	Co	Ti	W
Percent	0.06	0.9	0.12	0.020	0.024	2.5	Bal.	14.5	15.0	1.50	0.15	0.45

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (MPa)	Elongation (L=4d) %
725	31.0

CURRENT & PACKING DATA : DC(+)

Size (mm)	: 5 x 350	4 x 350	3.15 x 350	2.5 x 350
Dia x Length				
Current Range (Amps)	: 240-280	160-200	110-150	80-100
Weight / Carton (kgs)	: 3	3	3	3

PRECAUTIONS :

1. Redry the electrodes at 350-400°C for one hour.
2. Clean the weld area thoroughly free of any contamination.
3. Use short arc, low current to minimise heat input.
4. Weld in flat position wherever possible.

CODIFICATION : AWS : ENiCu-7

CHARACTERISTICS AND APPLICATIONS :

D&H 1250 is a basic coated electrode depositing monel weld metal. Ideal for welding of monel to monel, Ni-Cu alloys to themselves, Ni-Cu alloy to steels, for welding clad side of Ni-Cu clad steel and for surfacing on steel parts for service against corrosion by sea water, chlorinated solvents, sulphuric acid and alkalies; ideal for marine, chemical, food, dairy and oil refining industries.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni	Al	Ti	Fe	Cu
Percent	0.05	2.80	0.50	66.0	0.60	0.60	1.30	Balance

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L=4d) %
51.0	34.0

CURRENT AND PACKING DATA : DC(+)

Size (mm)	: 4x350	3.15x350	2.5x350
Dia x Length			
Current Range (Amps)	: 150-170	100-130	80-100
Weight/Carton (kgs)	: 3	3	3

PRECAUTIONS :

1. Redry the electrodes at 300-350°C for one hour.
2. Use DC(+) and minimise heat input by using low current and stringer bead.
3. Wherever possible weld in flat position only.

CODIFICATION : AWS : ENiCrMo-6

CHARACTERISTICS AND APPLICATIONS:

D&H 1260 electrode is depositing a Ni-Cr-Mo alloy. The weld metal displays a good combination of strength and impact strength even at minus 196°C. Ideally suited for welding 9% Ni steels used in LNG terminal etc. and other similar composition alloy to themselves. Typical specifications of base metal which can be welded with this electrode are ASTM A333, A334, A353, A522 & A553 etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Fe	P	S	Si	Cu	Ni	Cr	Cb+Ta	Mo	W
Percent	0.08	2.8	8.0	0.02	0.02	0.45	0.3	66.0	13.0	1.5	6.0	1.5

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L=4d) %	CVN Impact strength at -196°C (J)	Lateral expansion (mm)
71	36	50	0.40

CURRENT & PACKING DATA : AC / DC(+)

Size (mm)	4 x 350	3.15 x 350	2.5 x 350
Dia x Length			
Current Range (Amps)	150-170	110-130	80-100
Weight / Carton (kgs)	3	3	3

PRECAUTION :

1. Redry the electrodes at 300°C for one hour before use.

CODIFICATION : AWS : ENi-1

CHARACTERISTICS AND APPLICATIONS :

D&H 1280 is a basic coated electrode depositing a pure nickel weld metal, ideally suited for welding wrought and cast of commercially pure nickel to themselves, welding nickel to carbon steels, overlays on steels to resist corrosion in caustic soda service and marine atmosphere.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni	Fe	Ti	Al
Percent	0.04	0.60	0.50	balance	0.60	2.0	0.60

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L=4d)%
44.0	25.0

CURRENT AND PACKING DATA : DC(+)

Size (mm)	4x350	3.15x350	2.5x350	2x300
Dia x Length				
Current Range (Amps)	150-170	100-130	80-100	60-80
Weight/Carton (kgs)	3	3	3	3

PRECAUTIONS :

1. Redry the electrode at 350-400°C for one hour.
2. Clean the weld area thoroughly free from all contamination.
3. Use DC(+), short arc and minimise heat input.
4. Wherever possible weld in flat position only.

CODIFICATION : AWS : ENiCrMo-5

CHARACTERISTICS AND APPLICATIONS :

D&H 1400 is a nickel base electrode depositing a Ni-Cr-Mo-W-Co deposit. The weld deposit has excellent heat resistance and strength up to 1000°C. The deposit work hardens under impact load and the hardness is retained even at elevated temperatures. The deposit has high resistance to static or cyclic loads at high temperatures. Ideally suited for surfacing applications and joining applications to resist corrosion due to chloride environment and for surfacing of hot working tools, dies, punches, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Cr	Ni	Mo	W	Fe	Co
Percent	0.05	0.60	0.50	15.0	balance	15.5	3.5	5.0	2.0

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL :

UTS (kgf/mm ²)	Elongation (L=4d)%
72.0	28.0

CURRENT AND PACKING DATA : DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	: 240-280	160-200	110-150	80-100
Weight/Carton (kgs)	: 3	3	3	3

PRECAUTIONS :

1. Redry the electrode at 350-400°C for one hour.
2. Use short arc and minimise heat input.
3. Clean the area thoroughly free from all contamination.
4. Wherever possible weld in flat position only.

CODIFICATION : AWS : ENiMo-1

CHARACTERISTICS AND APPLICATIONS:

D&H 1425 is a high nickel alloy weld metal containing 'Mo' up to 28%. The weld deposit has excellent heat resistance, high strength up to 540°C and good corrosion resistance. Ideal for welding Ni-Mo alloys as well as the clad side of joints in steel clad with a Ni-Mo alloy and for welding Ni-Mo alloys to steel and to other nickel base alloys. Suitable for the most chemical process applications in the as welded condition. Ideally suited for welding ASTM B333, B335, B619, B622 and B626 materials.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL:

Elements	C	Mn	Si	Cr	Ni	Mo	Fe	V	Co	W	P	S
Percent	0.05	0.6	0.5	0.65	Bal.	28.0	5.0	0.4	2.0	0.8	0.025	0.02

TYPICAL MECHANICAL PROPERTIES OF ALL WELD METAL:

UTS (kgf/mm ²)	Elongation (L=4d) %
74.0	28.0

CURRENT & PACKING DATA: DC(+)

Size (mm) Dia x Length	: 5 x 350	4 x 350	3.15 x 350
Current Range (Amps)	: 200-240	160-200	110-150
Weight / Carton (kgs)	: 3	3	3

PRECAUTIONS:

1. Redry the electrodes at 300-350°C for one hour.
2. Clean the weld area thoroughly free of any contamination.
3. Use short arc, low current to minimise dilution.
4. Weld in flat position wherever possible.

CODIFICATION : AWS : ENiCuB

CHARACTERISTICS AND APPLICATIONS :

D&H Monel is a nickel-copper alloy electrode depositing a monel weld metal for welding of cast irons. The weld metal bonds easily and strongly with the cast iron. Ideal for repairing defects in foundry cast iron castings, repairing of cracks, broken parts of cast iron, etc.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni	Fe	Cu
Percent	0.42	1.0	0.6	64.0	3.5	Balance

WELD METAL HARDNESS : 150-175 VPN

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	140-170	100-130	70-100	50-70
Weight/Carton (kgs)	3	3	3	3

PRECAUTIONS

1. Ensure the electrode are dry. In case of moisture pick-up, redry the electrodes at 120°C for one hour.
2. Over heating of casting should be avoided by putting intermittent weld beads
3. Allow the weld to cool slowly.

CODIFICATION : AWS : ENiCl

CHARACTERISTICS AND APPLICATIONS :

NFM is an electrode depositing high nickel weld metal for welding of cast irons. The deposit is soft and has good resistance to cracking. Ideally suited for welding of cast iron to produce machinable weld deposit. Also suitable for repairing of cracks filling up and surfacing applications.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	C	Mn	Si	Ni	Fe
Percent	0.80	0.15	0.80	Balance	4.0

TYPICAL WELD METAL HARDNESS : 150VPN

CURRENT AND PACKING DATA : AC/DC(+)

Size (mm)	5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	140-180	110-130	80-110	60-80
Weight/Carton (kgs)	3	3	3	3

PRECAUTIONS

1. Ensure the electrode are dry. In case of moisture pick-up, redry the electrodes at 120°C for one hour.
2. Over heating of casting should be avoided by putting intermittent weld beads
3. Allow the weld to cool slowly.

CODIFICATION : AWS : ENiFeCl

CHARACTERISTICS AND APPLICATIONS :

D&H 1111CI is an electrode depositing a ferro nickel alloy weld metal, ideal for welding of several types of cast irons and components for producing strong crack free weld joints. The weld deposit has good machinability and good colour match with the parent metal.

TYPICAL CHEMICAL COMPOSITION OF ALL WELD METAL :

Element	: C	Mn	Si	Ni	Fe
Percent	: 0.90	0.70	0.90	54.0	Balance

TYPICAL WELD METAL HARDNESS : 190 VPN

CURRENT AND PACKING DATA : AC / DC(+)

Size (mm)	: 5x350	4x350	3.15x350	2.5x350
Dia x Length				
Current Range (Amps)	: 170-200	130-170	90-130	60-90
Weight/Carton (kgs)	: 3	3	3	3

PRECAUTIONS

1. Ensure the electrode are dry. In case of moisture pick-up, redry the electrodes at 120°C for one hour.
2. Over heating of casting should be avoided by putting intermittent weld beads
3. Allow the weld to cool slowly.