ador
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CREATING THE BEST WELDING EXPERIENCE

Welding Consumables

PROUDLY MADE IN INDIA

Edition: Ador International 2023

SUMMARY

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Welding Electrodes

Welding Electrodes

Section I

SUPERBOND S

MILD STEEL GENERAL PURPOSE (MSGP)

AWS A/SFA 5.1 **E6013**

CLASSIFICATION:

ISO 2560-A
E38 0 R 1 2

KEY FEATURES:

- Rutile type medium coated
- Outstanding welding characteristics
- X-ray quality weld deposit
- All position capability

APPROVALS: ABS/IRS/LRA/IBR/CE

TYPICAL APPLICATIONS:

- Boiler tubes
- Storage tanks
- Railway wagons
- Shipbuilding, Bridges
- Pressure vessels
- Joining steels like - ASTM SA 36/36M, SA 283/283M Gr.A/B/C/D, SA 285/285M Gr.A/B/C, SA 414/414M Gr.A/B

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.06	0.5	0.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

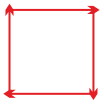
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at 0°C, J
Typical	As Welded	510	440	25	68
Specification		430 min	330 min	17 min	47 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
1.6 x 250	WCE.GN.002.1601	30-50
2.0 x 300	WCE.GN.002.2002	40-60
2.5 x 350	WCE.GN.002.2503	60-90
3.2 x 350	WCE.GN.002.3203	100-140
3.2 x 450	WCE.GN.002.3204	100-140
4.0 x 450	WCE.GN.002.4004	140-190
5.0 x 450	WCE.GN.002.5004	180-250

AC (50 OCV min.)
DCEN

All Positions



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

KINGBOND S

MILD STEEL GENERAL PURPOSE (MSGP)

AWS A/SFA 5.1 **E6013**

CLASSIFICATION:

ISO 2560-A
E38 0 RC 1 1

KEY FEATURES:

- Rutile type coating
- Superior welding characteristics
- All position welding capability
- Radiographic weld quality

TYPICAL APPLICATIONS:

- General purpose fabrication
- Light construction work
- Sheet metal work
- Steel furniture

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.1	0.35	0.35

MECHANICAL PROPERTIES OF ALL WELD METAL:

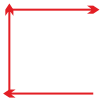
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at 0°C, J
Typical	As Welded	430 min	330 min	17 min	55

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 300	WIE.GN.016.2503	90-130
3.2 x 350	WIE.GN.016.3203	90-130
3.2 x 450	WIE.GN.016.3204	90-130
4.0 x 450	WIE.GN.016.4004	140-180
5.0 x 450	WIE.GN.016.5004	180-240

AC (50OCV) /DCEN/DCEP

All Positions Except Vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

X BOND

C-Mn STEEL (Low Hydrogen)

AWS A/SFA 5.1 **E7018**

CLASSIFICATION:

ISO 2560-A
E 42 2 B 32

KEY FEATURES:

- Basic coated electrode
- Low hydrogen iron powder type
- Tough and ductile weld
- Radiographic weld deposit
- Deposition efficiency is typically 110%
- All position capability
- Pipe welding in 5G and 6G positions

APPROVALS: ABS/IRS/LRA/CE

TYPICAL APPLICATIONS:

- Structural welding
- Storage tanks
- Boilers, Pressure vessels
- Bridges, Pipes
- Joining steel ASTM SA 414/414M Gr.C/D/E, SA 516/516M Gr.55/60

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.1	1.0	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact - 30°C, J
Typical	As Welded	525	440	26	55
Specification		490 min	400 min	22 min	27 min

Diffusible H2 Content: <5 ml/100 gm

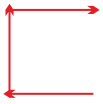
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.MR.025.2503	60-90
3.2 x 350	WCE.MR.025.3203	100-130
3.2 x 350	WCE.MR.025.3204	100-130
4.0 x 450	WCE.MR.025.4004	140-180
5.0 x 450	WCE.MR.025.5004	180-240

AC (70 OCV)
DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions Except Vertical Down



Available in Standard carton packing of 18 kg box containing 9 vacuum packed cartons of 2 kg each.

SUPABASE X PLUS

C-Mn STEEL (Low Hydrogen)

AWS A/SFA 5.1 **E7018-H4R**

CLASSIFICATION:

ISO 2560-A
E 42 3 B 32 H5

KEY FEATURES:

- Basic coated electrode
- Low hydrogen iron powder type
- Medium penetration
- High deposition rate
- Radiographic weld quality
- All position capability

APPROVALS: ABS/BV/DNV/IRS/GL/LRA/NPCIL/CE

TYPICAL APPLICATIONS:

- Boilers, Pressure vessels
- Heavy structures subject to dynamic loading
- Ship building, Storage tanks
- Bridges, Pipe lines, Penstocks
- Joining IS 2002, 2062 steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.05	1.1	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact -30°C, J
Typical	As Welded	555	480	26	60
Specification		490 min	400 min	22 min	47 min

Hardness, 3 Layer: 200 BHN max **Diffusible H2 Content:** <5 ml/100 gm **Special Test:** HIC & SSCC (NACE)

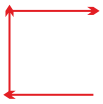
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.MR.003.2503	60-90
3.2 x 350	WCE.MR.003.3203	100-130
3.2 x 450	WCE.MR.003.3204	100-130
4.0 x 450	WCE.MR.003.4004	140-180
5.0 x 450	WCE.MR.003.5004	180-240

AC (70 OCV)
DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions Except Vertical Down



Available in Standard carton packing of 18 kg box containing 9 vacuum packed cartons of 2 kg each.

TENALLOY Z PLUS

C-Mn STEEL (Low Hydrogen)

AWS A/SFA 5.1 **E7018-1 H4R**

CLASSIFICATION:

EN ISO 2560-A
E 42 4 B 32 H5

KEY FEATURES:

- Basic coated iron powder type
- Suitable for pipe welding in 5G, 6G & 6GR positions
- Excellent toughness down to -50°C
- Radiographic weld deposit
- All position capability

APPROVALS: ABS/BV/DNV/IRS/LRA/NPCIL/BHEL/NTPC/CE

TYPICAL APPLICATIONS:

- Storage tanks, pipes, boilers
- Bridges & heavy structures subject to dynamic loading
- Joining ASTM SA 414/414M Gr.C/D, SA 516/516M Gr.55/60, IS 2002, IS 2062 steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.06	1.5	0.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -46°C, J
Typical	As Welded	560	480	27	60
Specification		490 min	400 min	22 min	50 min

Hardness (3 Layer): 200 BHN max **Diffusible H2 Content:** <5 ml/100 gm **Special Test:** HIC & SSCC (NACE)

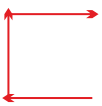
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.MR.016.2503	60-90
3.2 x 350	WCE.MR.016.3203	90-140
3.2 x 450	WCE.MR.016.3204	90-140
4.0 x 450	WCE.MR.016.4004	140-180
5.0 x 450	WCE.MR.016.5004	180-240

AC (70 OCV)
DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions Except Vertical Down



Available in Standard carton packing of 18 kg box containing 9 vacuum packed cartons of 2 kg each.

TENALLOY S PLUS

C-Mn STEEL (Low Hydrogen)

AWS A/SFA 5.1 E7018-1 H4R

CLASSIFICATION:

ISO 2560-A
E 42 5 B 32 H5

KEY FEATURES:

- Basic coated iron powder type
- Excellent toughness down to -60ºC
- Radiographic weld deposit
- Suitable for pipe welding in 5G and 6G positions

APPROVALS: ABS/DNV/LRA/CE

TYPICAL APPLICATIONS:

- Storage tanks, pipes, boilers
- Bridges & heavy structures subject to dynamic loading
- Joining ASTM SA 414/414M Gr.C/D,SA 516/516M Gr.55/60/65/70, IS 2002, IS 2062 steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.06	1.5	0.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -46°C, J
Typical	As Welded	550	470	28	100
Specification		490 min	400 min	22 min	80 min

Hardness (3 Layer): 200 BHN max
Diffusible H2 Content: <5 ml/100 gm

Special Test: HIC and SSCC (NACE), CTOD at -10°C
Hot tensile at 200°C

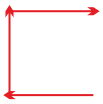
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.MR.019.2503	60-90
3.2 x 450	WCE.MR.019.3204	90-140
4.0 x 450	WCE.MR.019.4004	140-180
5.0 x 450	WCE.MR.019.5004	180-240

AC (70 OCV)
DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions Except Vertical Down



Available in Standard carton packing of 18 kg box containing 9 vacuum packed cartons of 2 kg each.

TENALLOY 16

C-Mn STEEL (Low Hydrogen)

AWS A/SFA 5.1 E7016

CLASSIFICATION:

ISO 2560-A
E 42 3 B 12 H5

KEY FEATURES:

- Basic coated low hydrogen electrode
- Ductile weld metal provide superior crack resistance
- All position capability
- Excellent impact properties down to -30˚C
- Radiographic weld deposit

APPROVALS: ABS/DNV/IRS/LRA/CE

TYPICAL APPLICATIONS:

- Buffer layer before hard facing
- Joining cast iron to mild steel
- Repair of cast iron
- Butt welding of rail ends
- Fixing of rails to mild steel girders

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.06	1.2	0.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact, J -30°C
Typical	As Welded	560	475	27	60
Specification		490 min	400 min	22 min	50 min

Hardness (3 Layer): 200 BHN max.

Diffusible H2 Content: <5 ml/100 gm

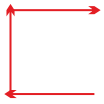
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.001.2503	60-80
3.2 x 350	WCE.LN.001.3203	90-120
3.2 x 450	WCE.LN.001.3204	90-120
4.0 x 450	WCE.LN.001.4004	130-170
5.0 x 450	WCE.LN.001.5004	180-230

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, Except Vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

TENALLOY 16 SPL

C-Mn STEEL (Low Hydrogen)

AWS A/SFA 5.1 **E7016-1**

CLASSIFICATION:

ISO 2560-A
E 42 5 B 12 H5

KEY FEATURES:

- Medium coated basic electrode
- Moisture resistant coating
- Weld metal resistant to cold and hot cracking and tri-axial stressings
- Positional welding characteristics with medium coating ideal for full penetration root run in pipe welding
- DCEN preferred for root run welding of pipes

APPROVALS: - LRA/CE

TYPICAL APPLICATIONS:

- Root welding of pipes in 6G position
- Horton spheres, Penstocks
- Carbon steel and low alloy steel pressure vessels fabrications and where severe service conditions exists
- For NACE quality carbon steel pipes
- Off-shore process platform structures
- Medium, high tensile structural steels
- Heavy sections and restrained joints in high tensile structural steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.06	1.45	0.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -46°C, J
Typical	As Welded	570	490	25	100
Specification		490 min	400 min	22 min	80 min

Hardness (3 Layer): 200BHN max

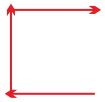
Diffusible H2 Content: <5 ml/100 gm

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.MN.023.2503	60-90
3.2 x 450	WCE.MN.023.3204	90-140
4.0 x 450	WCE.MN.023.4004	140-180
5.0 x 450	WCE.MN.023.5004	180-250

AC (70 OCV)
DCEP / DCEN

All Positions, Except Vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

SILOX Fe

C-Mn STEEL (Special Purpose)

KEY FEATURES:

- Deposit pure iron with low impurities
- Low Silicon content
- Resistant to corrosion by molten Zinc
- Easy slag removal

TYPICAL APPLICATIONS:

- Welding and repairing of hot dip galvanizing baths
- Windows, door frames
- Filling holes, building up worn out parts not subjected to excessive wear

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.05	0.5	0.06

MECHANICAL PROPERTIES OF ALL WELD METAL:

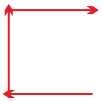
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at-20°C, J
Typical	As Welded	460	400	25	66
Specification		415 min	330 min	22 min	50 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.MN.007.3204	90-130
4.0 x 450	WCE.MN.007.4004	140-180
5.0 x 450	WCE.MN.007.5004	180-220

AC (70 OCV)/ DCEN

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

CELWEL 60

CELLULOSIC

AWS A/SFA 5.1 E6010

CLASSIFICATION:

ISO 2560-A
E 38 3 C 21

KEY FEATURES:

- Cellulose coated electrode
- Exhibits deep penetration and fast freezing
- All position operating characteristics
- Ideal for root pass and capping runs
- Radiographic quality welding

APPROVALS: ABS/LRA/CE

TYPICAL APPLICATIONS:

- Cross country pipelines subject to dynamic loading and mechanical restraint
- Suitable for sour gas pipes
- Suitable for steel grades ASTM A106 Gr. A/B, API 5L X42 and for root pass of X56

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.15	0.5	0.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact, J at -30°C
Typical	As Welded	525	410	26	55
Specification		430 min	330 min	22 min	47 min

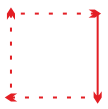
Hardness (3 Layer): 235 BHN max

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.CN.001.2503	50-90
3.2 x 350	WCE.CN.001.3203	80-140
4.0 x 350	WCE.CN.001.4003	120-180
5.0 x 350	WCE.CN.001.5003	160-200

DCEP

All Positions, specifically in vertical down



Available in Standard carton packing of 18 kg box containing 3 tins of 6 kg each.

CELWEL 70G

CELLULOSIC

AWS A/SFA 5.5 **E7010-G**

CLASSIFICATION:

EN ISO 2560-A
E 42 2 Mo C21

KEY FEATURES:

- High cellulose type coating
- Ideal for root pass and capping runs
- Best suited for vertical down stove-pipe technique
- Radiographic quality weld

APPROVALS: LRA

TYPICAL APPLICATIONS:

- Cross country pipelines subject to dynamic loading and mechanical restraint
- Best suited for site welding
- Suitable for pipe grades API 5L X42 to X60

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Mo
0.13	0.5	0.4	0.40

MECHANICAL PROPERTIES OF ALL WELD METAL:

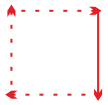
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact, J at -30°C
Typical	As Welded	555	470	24	55
Specification		530 min	450 min	22 min	47 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.CN.004.2503	60-90
3.2 x 350	WCE.CN.004.3203	80-140
4.0 x 350	WCE.CN.004.4003	120-180
5.0 x 350	WCE.CN.004.5003	160-200

DCEP

All Positions, specifically in vertical down



Available in Standard carton packing of 18 kg box containing 3 tins of 6 kg each.

CELWEL 70P

CELLULOSIC

AWS A/SFA 5.5 E7010-P1

CLASSIFICATION:

EN ISO 2560-A
E 42 2 C 21

KEY FEATURES:

- Cellulose type coating
- Ideal for root pass and capping runs
- All position welding characteristics
- Welding with Stove-pipe technique
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Cross country pipelines subject to dynamic loading and mechanical restraint
- Joining ASTM SA-283 Gr.A/B/C/D, API 5L X42, X46, X52, X56, X60 and X65

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Mo
0.1	0.8	0.3	0.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

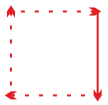
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at-30°C, J
Typical	As Welded	560	450	24	40
Specification		490 min.	415 min	22 min	27 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.CN.005.2503	50-70
3.2 x 350	WCE.CN.005.3203	80-120
4.0 x 350	WCE.CN.005.4003	110-160
5.0 x 350	WCE.CN.005.5003	160-210

DCEP

All Positions, specifically in vertical down



Available in Standard carton packing of 18 kg box containing 3 tins of 6 kg each.

CELWEL 80G

CELLULOSIC

AWS A/SFA 5.5 E8010-G

CLASSIFICATION:

EN ISO 2560-A
E 46 3 1Ni C 21

KEY FEATURES:

- Cellulose type coating
- Ideal for root pass and capping runs
- Recommended for hot passes
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Vertical down welding of high strength, medium and large diameter pipelines
- Suitable for high tensile pipe steels like API 5L X60, X65 and X70
- Welding of thin API 5L X80 pipes

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.1	1.0	0.2	0.1	0.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

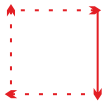
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact, J at -30°C
Typical	As Welded	610	520	22	60
Specification		550 min	460 min	19 min	47 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.CN.003.2503	60-90
3.2 x 350	WCE.CN.003.3203	80-140
4.0 x 350	WCE.CN.003.4003	120-180
5.0 x 350	WCE.CN.003.5003	160-200

DCEP

All Positions, specifically in vertical down



Available in Standard carton packing of 18 kg box containing 3 tins of 6 kg each.

CELWEL 80P

CELLULOSIC

AWS A/SFA 5.5 **E8010-P1**

CLASSIFICATION:

EN ISO 2560-A
E 46 3 1Ni C 21

KEY FEATURES:

- Cellulose type coating
- Ideal for root pass and capping runs
- Recommended for hot passes
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Vertical down welding of high strength, medium and large diameter pipelines
- Suitable for high tensile pipe steels like API 5L X60, X65 and X70
- Welding of thin API 5L X80 pipes

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Ni	Cr
0.1	1.0	0.2	0.6	0.1

MECHANICAL PROPERTIES OF ALL WELD METAL:

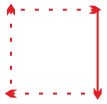
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact, J at -30°C
Typical	As Welded	555	470	24	60
Specification		550 min	460 min	19 min	47 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.CN.006.2503	60-90
3.2 x 350	WCE.CN.006.3203	80-140
4.0 x 350	WCE.CN.006.4003	120-180
5.0 x 350	WCE.CN.006.5003	160-200

DCEP

All Positions, specifically in vertical down



Available in Standard carton packing of 18 kg box containing 3 tins of 6 kg each.

MOLYTEN

LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.5 E7018-A1

CLASSIFICATION:

EN ISO 3580-A
E Mo B 32 H5

KEY FEATURES:

- Basic coated electrode
- Good creep rupture strength at elevated temperature up to 550°C
- High recovery electrode
- Preheat and PWHT at 620°C is required
- Radiographic quality welds
- All position capability

APPROVALS: ABS/NPCIL/CE/BHEL/NTPC

TYPICAL APPLICATIONS:

- Welding 0.5 Mo and 1 Cr - 0.5 Mo steels and similar composition steels
- High temperature and high pressure boilers
- Chemical industries, Oil refining industries, Turbine casting
- Suitable for 15Mo3, 16Mo3, 14Mo6
- Joining ASTM SA 182/182M Gr.F1, SA 204/204M Gr.A, SA 209/209M Gr.T1/T1A/T1B, SA 217/217M Gr.WCI

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Mo
0.06	0.7	0.4	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at 0°C, J
Typical	PWHT: 620°C for 1 hr.	550	460	27	80
Specification		490 min.	400 min	22 min	-

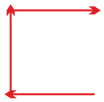
Hardness (3 Layer): 200 BHN max **Diffusible H2 Content:** <5 ml/100 gm

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.024.2503	60-90
3.2 x 450	WCE.LN.024.3204	100-140
4.0 x 450	WCE.LN.024.4004	140-180
5.0 x 450	WCE.LN.024.5004	190-250

AC (70 OCV)/DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

CROMOTEN

LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.5 **E8018-B2**

CLASSIFICATION:

EN ISO 3580-A
E CrMo1 B 32 H5

KEY FEATURES:

- Basic coated iron powder electrode
- 1.25Cr-0.5Mo type weld deposit
- Resistant to creep and heat upto 550°C
- Preheat and interpass temperature of 150-200°C followed by PWHT
- Radiographic quality weld deposit
- Positional welding capability

APPROVALS: ABS/NPCIL/BHEL/NTPC/CE

TYPICAL APPLICATIONS:

- Welding of 1.25Cr-0.5Mo, 1Cr-0.5Mo steels in refineries, power plants, chemical plants
- Pressure vessels and Boilers
- Cr and Cr-Mo bearing steels at elevated temperature service e.g. steam production plants, steam pipes
- Joining P4 materials e.g. ASTM SA 182/182M Gr.F2/F11/F12, SA 213/213M Gr.T11/T12, SA 335/335M Gr.P11/P12, SA 387/387M Gr.2/11/12
- Suitable for 13CrMo44, 15CrMo5, 15Cr3, 16MnCr5, 20MnCr5

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Mo
0.06	0.7	0.6	1.3	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at 27°C, J
Typical	PWHT: 690°C for 1 hr.	615	525	24	70
Specification		550 min	460 min	19 min	-

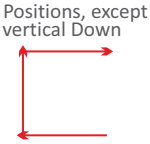
Diffusible H2 Content: <5 ml/100 gm

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.027.2503	60-90
3.2 x 450	WCE.LN.027.3204	100-140
4.0 x 450	WCE.LN.027.4004	140-180
5.0 x 450	WCE.LN.027.5004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

CROMOTEN STC

LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.5 **E8018-B2**

CLASSIFICATION:

EN ISO 3580-A
E CrMo1 B 32 H5

KEY FEATURES:

- Non Synthetic, basic coated iron powder electrode
- 1.25Cr-0.5Mo type weld deposit
- Resistant to creep and heat upto 550°C
- Preheat and interpass temperature of 150-200°C followed by PWHT
- Radiographic quality weld deposit
- Positional welding capability

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of 1.25Cr-0.5Mo, 1Cr-0.5Mo steels in refineries,power plants, chemical plants
- Pressure vessels and Boilers
- Cr and Cr-Mo bearing steels at elevated temperature service e.g. steam production plants, steam pipes
- Joining P4 materials e.g. ASTM SA 182/182M Gr.F2/F11/F12, SA 213/213M Gr.T11/T12, SA 335/335M Gr.P11/P12, SA 387/387M Gr.2/11/12
- Suitable for 13CrMo44, 15CrMo5, 15Cr3, 16MnCr5, 20MnCr5

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Mo
0.055	0.6	0.45	1.1	0.45

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	PWHT: 690°C for 1 hr.	615	525	24	100
Specification		550 min	460 min	19 min	-

Hardness, 3 Layer: 220BHN max

X factor = (10P + 5Sb + 4Sn + As)/100<15ppm

Diffusible H2 Content: <5 ml/100 gm

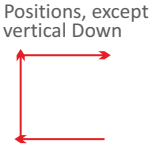
Special Tests: Creep Rupture Test at 500°C - 120 MPa, stress for min. 1000 hrs

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.071.2503	50-80
3.2 x 450	WCE.LN.071.3204	90-130
4.0 x 450	WCE.LN.071.4004	130-110
5.0 x 450	WCE.LN.071.5004	180-240

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

CROMOTEN C

LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.5 E9018-B3

CLASSIFICATION:

EN ISO 3580-A
E CrMo2 B 32 H5

KEY FEATURES:

- Basic coated
- Low alloy steel Cr-Mo deposit
- Resistant to creep and heat upto 600°C
- Ductile and crack resistant and heat treatable weld
- Radiography quality weld metal

APPROVALS: ABS/NPCIL/NTPC/CE

TYPICAL APPLICATIONS:

- Welding of 2.25Cr-0.5Mo and 2.25Cr-1Mo type creep resistant steels
- Cr-Mo and Cr-Mo-V bearing steels for high temperature applications
- Main steam pipes of boilers in electric power plant, Boiler super heaters
- Joining of P5A materials
- Suitable for 12CrMo9-10, 10CrSiMoV7 German steels
- Joining ASTM A 335 Gr.P22, A 387 Gr.22 materials
- Application in refineries, power plants, pressure vessels, boilers

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Mo
0.08	0.6	0.4	2.3	0.95

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%
Typical	PWHT: 690°C for 1 hr.	660	580	22
Specification		620 min	530 min	17 min

Hardness, 3 Layer: 220 BHN max

Diffusible H2 Content: <5 ml/100 gm

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.034.2503	60-90
3.2 x 450	WCE.LN.034.3204	100-140
4.0 x 450	WCE.LN.034.4004	140-180
5.0 x 450	WCE.LN.034.5004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

CROMOTEN 2 STC

LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.5 E9018-B3

CLASSIFICATION:

EN ISO 3580-A
E CrMo2 B 32 H5

KEY FEATURES:

- Non synthetic, basic coated iron powder electrode
- Low alloy steel Cr-Mo deposit
- Resistant to creep and heat upto 600°C
- Ductile and crack resistant and heat treatable weld
- Radiography quality weld metal

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of 2.25Cr-0.5Mo and 2.25Cr-1Mo type creep resistant steels
- Cr-Mo and Cr-Mo-V bearing steels for high temperature applications
- Main steam pipes of boilers in electric power plant, Boiler super heaters
- Joining of P5A materials
- Suitable for 12CrMo9-10, 10CrSiMoV7 German steels
- Joining ASTM A 335 Gr.P22, A 387 Gr.22 materials
- Application in refineries, power plants, pressure vessels, boilers

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Mo
0.08	0.6	0.4	2.25	1.0

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -18°C, J
Typical	PWHT: 690°C for 1 hr.	660	580	22	70
Specification		620 min	530 min	17 min	-

Hardness, 3 Layer: 220 BHN max
X factor = (10P + 5Sb + 4Sn + As)/100<15ppm

Diffusible H2 Content: <5 ml/100 gm
Special Tests: Creep Rupture Test at 550°C - 160 MPa, stress for min. 1000 hrs

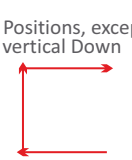
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.072.2503	50-80
3.2 x 450	WCE.LN.072.3204	90-130
4.0 x 450	WCE.LN.072.4004	130-170
5.0 x 450	WCE.LN.072.5004	180-240

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

CROMOTEN D

LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.5 **E8018-B6**

CLASSIFICATION:

EN ISO 3580-A
E CrMo5 B 32 H5

KEY FEATURES:

- Basic type iron powder electrode
- Low carbon 5 Cr-0.5 Mo type weld
- Weld deposit highly resistant to creep and heat upto 650°C
- Air hardenable weld
- Preheat and interpass should be maintained during welding
- All position capability

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of 5 Cr-0.5 Mo creep resistant steels and equivalent grades
- Application in refineries, chemical and power plants, pressure vessels, boiler
- Joining P5B materials e.g. SA 336/336M Gr.F5, SA 387/387MGr.5

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Mo
0.06	0.8	0.3	4.75	0.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -20°C, J
Typical	PWHT: 740°C for 1 hr.	610	490	22	70
Specification		550 min	460 min	19 min	47 min

Diffusible H2 Content: <5 ml/100 gm

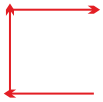
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.038.2503	60-90
3.2 x 450	WCE.LN.038.3204	100-140
4.0 x 450	WCE.LN.038.4004	140-180
5.0 x 450	WCE.LN.038.5004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

CROMOTEN 9M

LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.5 **E9018-B91**

CLASSIFICATION:

EN ISO 3580-A
E CrMo9L B 32 H5

KEY FEATURES:

- Basic coated electrode
- 9Cr-1Mo-V-Nb type weld deposit
- Excellent strength and creep resistance at high temperature upto 600°C
- Addition of V and Nb increases the resistance to strain, corrosion & oxidation
- Radiographic quality weld deposit
- Positional welding capability

APPROVALS: CE

TYPICAL APPLICATIONS:

- Suitable for welding of Cr-Mo-V-Nb steels such as P91, T91 and F91
- Suitable for material 1.4903 and similar steel Grades
- For Turbine rotors, Thermoelectric power plants, Petrochemical plants

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Mo	V	Cu	Al	Nb	N	Ni
0.1	0.6	0.2	9	1.1	0.25	0.005	0.001	0.05	0.04	0.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at 27°C, J
Typical	PWHT: 760°C for 2 hr.	675	590	20	30
Specification		620 min	530 min	17 min	-

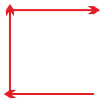
Diffusible H2 Content: <5 ml/100 gm

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.051.2503	60-90
3.2 x 350	WCE.LN.051.3203	100-140
4.0 x 350	WCE.LN.051.4003	140-180
5.0 x 450	WCE.LN.051.5004	190-250

AC (70 OCV)/DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

CROMOTEN 9M-15

LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.5 **E9015-B91**

CLASSIFICATION:

EN ISO 3580-A
E CrMo91 B 42 H5

KEY FEATURES:

- Basic coated low hydrogen Non synthetic electrode
- Nb and V modified 9Cr-1Mo weld deposit
- Good impact toughness at subzero temperatures
- Excellent strength and creep resistance at high temperature under prolong holding
- All positional capability
- Radiographic quality weld deposit

APPROVALS: CE

TYPICAL APPLICATIONS:

- Suitable for welding similar composition creep resistant steels such as P91, T91 and F91
- Welding of material 1.4903 and similar steel Grades
- Application in Petrochemical plants, Power plants, Boilers, Oil refineries

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Mo	V	Cu	Al	Nb	N	Ni
0.1	0.5	0.15	8.7	1.0	0.2	0.01	0.001	0.06	0.03	0.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact, J at 27°C
Typical	PWHT 760°C for 2hrs	670	580	22	40
Specification		620 min	530 min	17 min	-

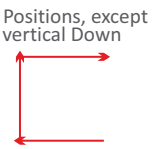
Diffusible H2 Content: <5 ml/100 gm **Special Tests**: Creep Rupture Test at 600°C (100 MPa Stress for min. 1000 hrs.)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.066.2503	50-80
3.2 x 350	WCE.LN.066.3203	90-130
4.0 x 350	WCE.LN.066.4003	130-170
5.0 x 450	WCE.LN.066.5004	180-240

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.



Available in Standard carton packing of 20 kg box containing 4 cartons 5 kg each. Also available in vacuum packing

TENALLOY 70A

LOW ALLOY STEEL (Low Temperature)

AWS A/SFA 5.5 **E8018-C1**

CLASSIFICATION:

EN ISO 2560-A
E 46 6 2Ni B 32 H5

KEY FEATURES:

- Basic coated electrode
- Ni-Mn type low alloy steel deposit
- Tough and crack free weld
- Excellent fracture toughness at subzero temperatures
- Radiographic quality weld
- All position capability

APPROVALS: ABS/CE

TYPICAL APPLICATIONS:

- Welding of 2.5% Ni steel and similar low alloyed steel for impact at -60°C
- Suitable for ASTM SA 203/203M Gr.A/B
- Shipbuilding, Bridge structure
- In refineries, power plants e.g. Pressure vessels, Heat exchanger
- Cast steels, Low temperature steel pipes, Aluminium killed steels, Low Mn alloy steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Ni
0.04	0.8	0.3	2.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -60°C, J
Typical	As Welded	610	515	26	70
Specification		550 min	460 min	19 min	47 min

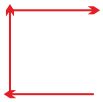
Diffusible H2 Content: <5 ml/100 gm

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.012.2503	60-90
3.2 x 450	WCE.LN.012.3204	100-140
4.0 x 450	WCE.LN.012.4004	140-180
5.0 x 450	WCE.LN.012.5004	190-250

AC (70 OCV)/DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

TENALLOY 70B

LOW ALLOY STEEL (Low Temperature)

AWS A/SFA 5.5 **E8018-C2**

CLASSIFICATION:

EN ISO 2560-A
E 46 6 3Ni B 32 H5

KEY FEATURES:

- Basic coated electrode
- Good impact toughness at subzero temperatures
- Ni-Mn type low alloy steel weld
- Radiographic weld deposit
- Positional welding capability

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of 3.5% Ni steel and equivalent alloy demanding toughness down to -75°C
- Application in refineries, power plants e.g. Pressure vessels & heat exchangers
- Recommended for fine grained steel used at low temperature
- Petrochemical and Cryogenic industries
- Suitable for ASTM SA 203/203M Gr.B/D/E

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Ni
0.05	0.8	0.3	3.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -75°C, J
Typical	PWHT: 600°C for 1 hr.	590	500	26	60
Specification		550 min	460 min	19 min	47 min

Diffusible H2 Content: <5 ml/100 gm

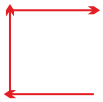
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.013.2503	60-90
3.2 x 450	WCE.LN.013.3204	100-140
4.0 x 450	WCE.LN.013.4004	140-180
5.0 x 450	WCE.LN.013.5004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

TENALLOY 70C

LOW ALLOY STEEL (LowTemperature)

AWS A/SFA 5.5 **E8018-C3**

CLASSIFICATION:

EN ISO 2560-A
E 4641 Ni B32 H5

KEY FEATURES:

- Basic coated electrode
- Typical Ni-Mo type welds
- Excellent fracture toughness at -40°C
- Superior crack resistance
- Radiographic quality welds
- All position capability

APPROVALS: ABS/CE

TYPICAL APPLICATIONS:

- Welding of high tensile steel, 1% Ni steel and equivalent steels
- Storage tanks for low temperature
- Off shore platforms, bridge
- Application in refineries, power plants e.g. pressure vessels and heat exchangers, machinery

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Ni
0.06	0.6	0.3	0.90

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact, J	
					at -40°C	at -50°C
Typical	As Welded	600	530	26	90	60
Specification		550 min	460 min	19 min	47 min	-

Diffusible H2 Content: <5 ml/100 gm

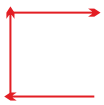
Special Tests: HIC & SSCC (NACE)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.015.2503	60-90
3.2 x 350	WCE.LN.015.3203	100-140
3.2 x 450	WCE.LN.015.3204	100-140
4.0 x 450	WCE.LN.015.4004	140-180
5.0 x 450	WCE.LN.015.5004	190-250

AC (70 OCV)/DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

TENALLOY 55

LOW ALLOY STEEL (Low Temperature)

AWS A/SFA 5.5 **E8018-G**

CLASSIFICATION:

EN ISO 2560-A
E 46 5 1Ni B 12 H5

KEY FEATURES:

- Basic coated electrode
- Excellent fracture toughness down to -50°C
- Resist atmospheric corrosion
- Weld metal is tough & highly crack resistant
- Radiographic quality weld
- Suitable for positional welding

APPROVALS: CE

TYPICAL APPLICATIONS:

- Suitable for joining steels containing 1%
- Ni and 0.5% Cu
- Storage tanks, Pipes
- Pressure vessels, Boilers
- Bridges, Heavy structures

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Ni
0.07	1.35	0.3	0.90

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -50°C, J
Typical	As Welded	610	570	25	55
Specification		550 min	460 min	19 min	47 min

Diffusible H2 Content: <5 ml/100 gm

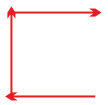
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.005.2503	60-90
3.2 x 450	WCE.LN.005.3204	100-140
4.0 x 450	WCE.LN.005.4004	140-180
5.0 x 450	WCE.LN.005.5004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

TENALLOY 16E SPL

LOW ALLOY STEEL (Low Temperature)

AWS A/SFA 5.5 **E8016-G**

CLASSIFICATION:

EN ISO 2560-A
E 46 5 Mn1Ni B 12 H5

KEY FEATURES:

- Basic type low hydrogen electrode
- Excellent impact properties at sub zero temperature
- Exhibits excellent mechanical properties in the as welded and post weld condition

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of steels with high yield strength upto 450 Mpa
- Welding and repairing high strength steels such as BS 4360-55 E/F

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Ni
0.06	1.6	0.3	0.8

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -50°C, J
Typical	As Welded	580	500	23	65
Specification		550 min	460 min	19 min	47 min

Diffusible H2 Content: <5 ml/100 gm

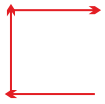
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.067.2503	60-90
3.2 x 450	WCE.LN.067.3204	100-140
4.0 x 450	WCE.LN.067.4004	140-180
5.0 x 450	WCE.LN.067.5004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

TENALLOY 60D-3

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 **E8018-D3**

CLASSIFICATION:

EN ISO 2560-A
E 46 5 Mn1Ni B 12 H5

KEY FEATURES:

- Medium-heavy coated electrode
- Mn-Mo type low alloy steel welds
- Exhibit good toughness at subzero temperatures
- All position capability
- Weld metal meets X-ray quality, ultrasonic and other code requirements
- Suitable for fully killed fine grained steels

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of Mn-Mo type steels and equivalent grades
- Penstocks, Pressure vessels
- Welding low alloy high strength steels in 540 MPa UTS range
- Earth moving equipments

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Mo
0.09	1.5	0.4	0.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -50°C, J
Typical	PWHT: 620°C for 1 Hr	605	510	24	55
Specification		550 min	460-560	19 min	47 min

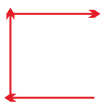
Diffusible H2 Content: <5 ml/100 gm

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.046.2503	60-90
3.2 x 450	WCE.LN.046.3204	90-140
4.0 x 450	WCE.LN.046.4004	140-180

AC (70 OCV)/DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons each. Also available in vacuum packing

TENALLOY 80P2

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 E8045-P2 H4R

CLASSIFICATION:

EN ISO 2560-A
E 46 5 1Ni B 4 5

APPROVALS: CE

KEY FEATURES:

- Medium-heavy coated electrode
- Mn-Mo type low alloy steel welds
- Exhibit good toughness at subzero temperatures
- Exhibit excellent performance in vertical down
- All position capability
- Weld metal meets X-ray quality, ultrasonic and other code requirements
- Suitable for fully killed fine grained steels

TYPICAL APPLICATIONS:

- Basic type coating
- Easy to use with controllable slag system
- Deposit is extremely crack resistant
- High toughness and a very low hydrogen content
- Suitable for filler and cover pass welding in pipeline construction

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Mo
0.06	1.3	0.6	0.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	As Welded	600	500	23	60
Specification		550 min	460 min	19 min	27 min

Diffusible H2 Content: <4 ml/100 gm

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.077.2503	60-90
3.2 x 450	WCE.LN.077.3204	90-140
4.0 x 450	WCE.LN.077.4004	140-180

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

TENALLOY 90P2

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 E9045-P2 H4R

CLASSIFICATION:

EN ISO 2560-A
E 50 5 1Ni B 4 5

KEY FEATURES:

- Basic coated electrode
- Easy to use with controllable slag system
- Deposit is extremely crack resistant
- Deposition rate is higher than for vertical up welding
- High toughness and a very low hydrogen content
- Exceptional striking characteristics
- Suitable for filler and cover pass welding in pipeline construction

TYPICAL APPLICATIONS:

- Vertical-down welds of large diameter pipelines and for structural work
- It can be used in sour gas application
- Fill and cap application
- Circumferential joints in pipelines API 5LX70, X80

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Mo
0.09	1.5	0.6	0.35

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	As Welded	690	590	23	60
Specification		620 min	530 min	17 min	47 min

Diffusible H2 Content: <4 ml/100 gm

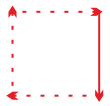
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.091.2504	60-90
3.2 x 450	WCE.LN.091.3154	90-140
4.0 x 350	WCE.LN.091.4004	140-180

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, specifically in vertical down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

TENALLOY 90D3

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 **E9018-D3**

CLASSIFICATION:

EN ISO 2560-A
E 50 3 Z B 32 H5

KEY FEATURES:

- Basic coated electrode
- Typical Mn-Mo type weld deposit
- Excellent fracture toughness down to -50°C
- Suitable for welding fully killed fine grained steel
- Suitable preheat, interpass and PWHT is required depending on base metal composition
- All position capability
- Radiographic quality welds

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of low alloy high tensile steels of typical UTS 650 Mpa
- Welding of Q&T fine grained steels
- Penstocks, Earth moving equipments
- Suitable for low alloy structural steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Mo
0.09	1.65	0.80	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	PWHT: 620°C for 1 hr.	620 min	530 min	17 min	47 min
Specification					

Diffusible H2 Content: <5 ml/100 gm

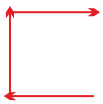
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.LN.092.2504	100-140
4.0 x 450	WCE.LN.092.3154	140-180
5.0 x 450	WCE.LN.092.4004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

TENALLOY 65

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 E9018-G

CLASSIFICATION:

EN ISO 18275-A
E 55 5 Z B 32 H5

KEY FEATURES:

- Basic coated iron powder electrode
- Ni-Mn-Mo type weld deposit
- Good impact toughness at -60°C
- All position capability
- Radiographic quality weld
- Suitable for medium-high tensile structural steels, heavy sections

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of low alloy high tensile steels of typical UTS 650 Mpa
- Penstocks, Earth moving equipments and other similar fabrications

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Ni	Mo
0.06	1.7	0.3	1.5	0.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -60°C, J
Typical	As Welded	655	580	23	60
Specification		620 min	530 min	17 min	47 min

Diffusible H2 Content: <5 ml/100 gm

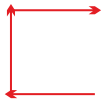
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 450	WCE.LN.008.2504	100-140
3.2 x 450	WCE.LN.008.3204	100-140
4.0 x 450	WCE.LN.008.4004	140-180
5.0 x 450	WCE.LN.008.5004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

TENALLOY 75D-2

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 **E10018-D2**

CLASSIFICATION:

EN ISO 18275-A
E 55 4 Z B 32 H5

KEY FEATURES:

- Basic type electrode
- Mn-Ni-Mo type weld deposit
- High resistance to cracking and cold toughness at temperatures as low as -50°C
- Suitable preheat, interpass and PWHT is necessary to achieve desired properties
- Radiographic weld deposit
- Positional welding capability

APPROVALS: ABS/CE

TYPICAL APPLICATIONS:

- Welding of fully killed fine grained high tensile steels used for fabrication of penstock, earthmoving equipments
- Heavy structures under restraint
- Used for materials with minimum tensile strength of 690 Mpa

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Mo	Ni
0.09	1.8	0.5	0.3	0.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -50°C, J
Typical	PWHT: 620°C for 1 Hr	725	640	19	55
Specification		690 min	600 min	16 min	47 min

Diffusible H2 Content: <5 ml/100 gm

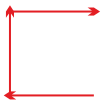
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.018.2503	60-90
3.2 x 450	WCE.LN.018.3204	100-140
4.0 x 450	WCE.LN.018.4004	140-180
5.0 x 450	WCE.LN.018.5004	180-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

TENALLOY 80

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 **E11018-M**

CLASSIFICATION:

EN ISO 18275-A
E 69 4 Z B 32 H5

KEY FEATURES:

- Basic type coating
- Ni-Mn-Mo-Cr-V type electrode
- Excellent crack resistant
- Excellent toughness at subzero temperature
- Radiographic quality weld metal

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of high tensile steels like USS T-1, Fine grained steels like HY 80, HY 90, HY 100, NAXTRA 70
- Penstocks, Earthmoving equipments
- Heavy structures under restraint
- Suitable for ASTM SA 225/225M Gr.C/ D, SA 533/533M Gr.B/C/D, SA 543/ 543M Gr.B/

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Ni	Cr	Mo
0.06	1.6	0.35	1.75	0.2	0.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -50°C, J
Typical	As Welded	820	730	22	60
Specification		760 min	680 - 760	20 min	47 min

Diffusible H2 Content: <5 ml/100 gm

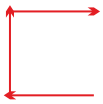
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.070.2503	60-90
3.2 x 450	WCE.LN.070.3204	100-140
4.0 x 450	WCE.LN.070.4004	140-180
5.0 x 450	WCE.LN.070.5004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

TENALLOY 110

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 E11018-G H4R

CLASSIFICATION:

EN ISO 18275-A
E69 4 Z B 32 H5

KEY FEATURES:

- Extra low hydrogen electrode
- Low alloy high tensile steel electrode
- Good impact toughness at -50°C
- Weld metal exhibit better ductility
- All position capability
- Radiographic quality weld
- Suitable for welding fully killed fine grained steels

APPROVALS: ABS/CE

TYPICAL APPLICATIONS:

- Penstocks, Earth moving equipments & other heavy steel fabrications made from high tensile steels
- Welding USS T-1 steel, Heat treated fine grained steels, NAXTRA 70, Hy80
- Suitable for ASTM SA 225/225M Gr.C/D, SA 533/533M Gr.B/C/D Class 2 and 3, SA 543/543M Gr.B/C Class 1 and 2, SA 612/612M, SA 738/738M Gr.A/B/C

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.07	1.5	0.4	1.5	2.1	0.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -50°C, J
Typical	As Welded	790	700	19	50
Specification		760 min	670 min	15 min	47 min

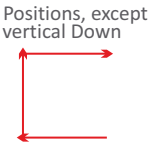
Diffusible H2 Content: <5 ml/100 gm

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.074.2503	60-90
3.2 x 450	WCE.LN.074.3204	90-140
4.0 x 450	WCE.LN.074.4004	140-180
5.0 x 450	WCE.LN.074.5004	180-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

TENALLOY 120

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 **E12018-M**

CLASSIFICATION:

EN ISO 18275-A
E 69 4 Z B 32 H5

KEY FEATURES:

- Basic type coating
- Ni-Mn-Mo-Cr alloyed electrode
- Excellent crack resistance
- Excellent toughness at subzero temperature
- Radiographic quality weld metal

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of high tensile steels and fine grained steels like HY 80, HY 90, HY 100
- Joining high strength, low alloy or microalloyed steels to themselves or to lower strength steels, including carbon steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.065	1.9	0.3	0.4	2.2	0.35

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -50°C, J
Specification	As Welded	830 min	745 - 830	18 min	47 min

Diffusible H2 Content: <5 ml/100 gm

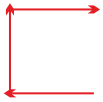
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.081.2503	60-90
3.2 x 450	WCE.LN.081.3204	100-140
4.0 x 450	WCE.LN.081.4004	140-180
5.0 x 450	WCE.LN.081.5004	180-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

TENALLOY 120G

LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.5 **E12018-G**

CLASSIFICATION:

EN ISO 18275-A
E 69 4 Z B 32 H5

KEY FEATURES:

- Basic type coating
- Ni-Mn-Mo-Cr alloyed electrode
- Excellent crack resistance
- High strength and toughness at -50°C
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of high tensile steels and fine grained steels like HY 80, HY 90, HY 100
- Joining high strength, low alloy or microalloyed steels to themselves or to lower strength steels, including carbon steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.06	1.75	0.4	0.35	2.1	0.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -50°C, J
Specification	As Welded	830 min	740	14 min	47 min

Diffusible H2 Content: <5 ml/100 gm

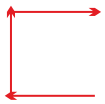
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.LN.079.2503	60-90
3.2 x 450	WCE.LN.079.3204	100-140
4.0 x 450	WCE.LN.079.4004	140-180
5.0 x 450	WCE.LN.079.5004	190-250

AC (70 OCV)/DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

ULTRACORTEN III

LOW ALLOY WEATHERING STEEL ELECTRODE

AWS A/SFA 5.5 **E8018-W2**

CLASSIFICATION:

EN ISO 2560-A
E 46 2 Z B 32 H5

KEY FEATURES:

- Basic type iron powder electrode
- Cr-Ni-Cu type low alloy steel welds
- High crack resistance under restraint
- Radiographic quality weld deposit
- Exhibits excellent atmospheric corrosion resistance compared to normal steels
- All position capability

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of weathering steels e.g. CORTEN-A and CORTEN-B and their equivalents
- Bridges, Architectural structures, Exhaust gas flues, Chimneys
- Suitable for ASTM A36, A283 Gr.B/C

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Ni	Cr	Cu
0.04	1.0	0.6	0.5	0.5	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -20°C, J
Typical	As Welded	605	460	22	66
Specification		550 min	520 min	19 min	47 min

Diffusible H2 Content: <5 ml/100 gm

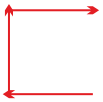
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 450	WCE.LN.045.2504	100-140
3.2 x 450	WCE.LN.045.3204	100-140
4.0 x 450	WCE.LN.045.4004	140-180
5.0 x 450	WCE.LN.045.5004	190-250

AC (70 OCV) / DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each. Also available in vacuum packing

SUPERINOX 1C

STAINLESS STEEL (Austenitic Steel)

AWS A/SFA 5.4 E308L-16

CLASSIFICATION:

ISO 3581-A
E 19 9 L R 12

KEY FEATURES:

- Extra low carbon 19/10 type austenitic weld
- Excellent corrosion and scaling resistance upto 800°C
- Rutile based coating
- Suitable for all position welding
- Radiographic quality weld deposit
- Controlled ferrite content for maximum cracking resistance

APPROVALS: ABS/BV/IRS/NPCIL/CE

TYPICAL APPLICATIONS:

- Welding Cr-Ni steels represented by AISI 301, 302, 304, 304L, 308, 308L
- Fabrication of boilers, reactors and turbines
- Build up application on SS
- SS piping in refineries, oil and gas Industries, chemical plants
- Suitable for material no. 1.4300, 1.4301, 1.4310, 1.4312, 1.4550, 1.4001, 1.4016, 1.4057

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.03	0.9	0.4	19.6	9.1

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	Ferrite No.
Typical	As Welded	590	37	5
Specification		520 min	30 min	3-8

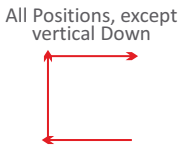
Special Tests: IGC Practice E/C of ASTM A262

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.0 x 300	WCE.SN.031.2002	35-45
2.5 x 350	WCE.SN.031.2503	50-75
3.2 x 350	WCE.SN.031.3203	80-100
4.0 x 350	WCE.SN.031.4003	110-140
5.0 x 350	WCE.SN.031.5003	150-180

AC (70 OCV) /DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

STRIKER 308L

STAINLESS STEEL (Austenitic Steel)

AWS A/SFA 5.4 E308L-16

KEY FEATURES:

- Rutile type coating
- Excellent corrosion and scaling resistance
- Smooth and stable arc
- Minimal spatter
- Self peeling slag
- Excellent welder appeal
- All position capability
- Radiographic quality welds

TYPICAL APPLICATIONS:

- Welding Cr-Ni steels represented by AISI 301, 302, 304, 304L, 308, 308L
- For cladding applications

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.03	1.5	0.7	18.5	9

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	UTS, Mpa	EL%
As Welded	520 min	35 min

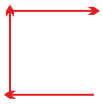
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.110.2503	55-75
3.2 x 350	WCE.SN.110.3203	85-100
4.0 x 350	WCE.SN.110.4003	110-140

AC (50 OCV) / DCEP

REDRYING CONDITION:
300°C for 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

SUPERINOX 1C-15 LT

STAINLESS STEEL (Austenitic Steel)

AWS A/SFA 5.4 **E308L-15**

CLASSIFICATION:

ISO 3581-A
E 19 9L B 22

APPROVALS: - ABS/CE

KEY FEATURES:

- Basic coated electrode
- Extra low carbon 19/10 type weld
- Resist inter-crystalline corrosion
- Exhibit excellent toughness properties at subzero temperatures
- Controlled ferrite content of 0 to 2 for cryogenic applications
- Excellent corrosion and scaling resistance at high temperatures
- Radiographic quality weld deposit

TYPICAL APPLICATIONS:

- For cryogenic applications of AISI 302, 304, 304L steels
- Dairy industry, chemical and fibre industry
- Welding of 18/8 type steels represented by AISI 301, 302, 304, 304L, 308, 308L

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.025	0.9	0.4	19.5	10.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	CVN Impact at -196°C, J	Ferrite No.
Typical	As Welded	580	37	52	2
Specification		520 min	30 min	30 min	5 max

Special Tests: IGC Practice E of ASTM A262/C

Typical lateral expansion: 0.50 min at -196°C

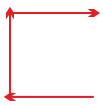
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.040.2503	50-75
3.2 x 450	WCE.SN.040.3203	80-100
4.0 x 350	WCE.SN.040.4003	110-140

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX 308L PLUS

STAINLESS STEEL (Austenitic Steel)

AWS A/SFA 5.4 **E308L-17**

CLASSIFICATION:

ISO 3581-A
E 19 9L R 13

KEY FEATURES:

- Acid-Rutile based coating
- Extra low carbon 19/10 type austenitic weld deposit
- Excellent corrosion and scaling resistance upto 800°C
- Resistant to cracking
- Easy slag removal
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding Cr-Ni steels such as AISI 301,302, 304, 304L, 308, 308L
- Fabrication of boilers, reactors and turbines
- Build up application on SS
- SS piping in refineries, oil and gas industries, chemical plants
- Suitable for material no. 1.4300, 1.4301, 1.4310, 1.4312, 1.4550, 1.4001, 1.4016, 1.4057

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.02	0.7	0.6	20.5	8.7

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	Ferrite No.
Typical	As Welded	580	37	6
Specification		520 min	30 min	3-8

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.019.2503	45-65
3.2 x 350	WCE.SN.019.3203	90-110
4.0 x 350	WCE.SN.019.4003	110-140

AC (70 OCV) /DCEP

Flat butt and fillet welds only

REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

SUPERINOX 2C

STAINLESS STEEL (Austenitic Steel)

AWS A/SFA 5.4 **E316L-16**

CLASSIFICATION:

ISO 3581-A
E (19 12 3 L) R 12

APPROVALS: BV/IRS/NPCIL/CE

KEY FEATURES:

- Rutile type coating
- Extra low carbon 19/13/Mo type weld
- High resistance against intergranular corrosion
- Resistant to SCC, hot cracking & chemical attack upto 850°C
- Offers improved corrosion and pitting resistance in marine and industrial environment
- Suitable for all position
- Radiographic quality weld

TYPICAL APPLICATIONS:

- Welding Mo bearing austenitic alloys represented by AISI 316, 316L, 317, 317L, 318 types
- Welding of equipments in textile processing, Naval and Chemical environments, Paper and pulp, Paint and dye industries
- Joining similar grade wrought and cast material
- Cladding stainless steels
- Suitable for material no. 1.4401, 1.4404, 1.4406, 1.4408, 1.4429, 1.4435, 1.4436, 1.4437, 1.4571, 1.4580, 1.4583

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.03	0.85	0.4	18.5	11.2	2.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	Ferrite No.
Typical	As Welded	565	35	4
Specification		490 min	30 min	3-8

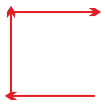
Special Tests: IGC Practice E/C of ASTM A262

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.0 x 300	WCE.SN.034.2002	35-45
2.5 x 350	WCE.SN.034.2503	50-75
3.2 x 350	WCE.SN.034.3203	80-100
4.0 x 350	WCE.SN.034.4003	110-140

AC (70 OCV) /DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX K

STAINLESS STEEL (Austenitic Steel)

AWS A/SFA 5.4 E316L-15

CLASSIFICATION:

ISO 3581-A
E (19 12 3 L) B 22

KEY FEATURES:

- Basic type coating
- Extra low carbon 17/13/Mo type deposit provide resistance to intergranular corrosion
- Low ferrite content
- All position capability
- Excellent corrosion resistance at high temperature service
- Smooth arc characteristics
- Suitable for all position
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Specially designed for Urea reactors and Chemical industries
- Welding of Mo bearing austenitic alloys such as AISI 316, 316L, 317, 317L, 318 types
- Suitable for material no. 1.4401, 1.4404, 1.4406, 1.4408, 1.4429, 1.4435, 1.4436, 1.4437, 1.4571, 1.4580, 1.4583

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.025	2.1	0.4	18	13.1	2.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	CVN Impact at -196°C, J	Ferrite No.
Typical	As Welded	580	36	45	1
Specification		490 min	30 min	27 min	2 max

Special Tests: IGC Practice E of ASTM A262

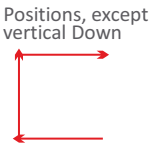
Typical lateral expansion: 0.5 mm at -196°C, J

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.014.2503	50-75
3.2 x 350	WCE.SN.014.3203	80-100
4.0 x 350	WCE.SN.014.4003	100-130

AC (70 OCV) /DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX 316L PLUS

STAINLESS STEEL (Austenitic Steel)

AWS A/SFA 5.4 **E316L-17**

CLASSIFICATION:

ISO 3581-A
E (19 12 3 L) R 13

APPROVALS: CE

KEY FEATURES:

- Acid-Rutile based coating
- Extra low carbon 18/13/2.5Mo type weld deposit
- Offers improved corrosion and pitting resistance in marine and industrial environment
- Easy slag removal
- Resist Stress Corrosion Cracking, Hot cracking, Chemical corrosion at high temperature
- Smooth arc characteristics
- Radiographic quality weld deposit

TYPICAL APPLICATIONS:

- Welding Mo bearing austenitic alloys such as AISI 316, 316L, 317
- Suitable for material no. 1.4401 and similar grades
- Welding of equipments in Chemical, Paper and pulp, Paint and dye industries

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.02	0.7	0.9	19.3	11.35	2.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	Ferrite No.
Typical	As Welded	580	36	6
Specification		490 min	30 min	3-8

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.021.2503	50-75
3.2 x 350	WCE.SN.021.3203	80-100
4.0 x 350	WCE.SN.021.4003	100-130

AC (70 OCV) /DCEP

Flat butt and fillet welds only

REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

SUPERINOX 1B

STAINLESS STEEL (Austenitic Steel)

AWS A/SFA 5.4 **E347-16**

CLASSIFICATION:

ISO 3581-A
E 19 9 Nb R 12

KEY FEATURES:

- Rutile based coating
- Resistance to cracking and embrittlement
- Resistance to intergranular corrosion and scaling upto 850°C
- 19/10/Nb stabilized weld deposit
- Smooth operating characteristics
- All position capability
- Radiographic quality weld

APPROVALS: BV/IRS/CE

TYPICAL APPLICATIONS:

- Fabrication of equipments in refineries, power plants, centrifugal pump impellers and shafts, valve faces, seats
- Suitable for material no. 1.4300, 1.4301, 1.4306, 1.4308, 1.4310, 1.4541, 1.4543, 1.4550, 1.4552, 1.4878, 1.6905
- Fabrication of boiler and gas turbine paper and pulp, paint and dye industries
- Welding of stainless steel tanks, valves, pipes in food, chemical and petrochemical industries
- Welding stabilized Cr-Ni steels such as AISI 321, 321H, 347, 347H

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Nb
0.035	1.1	0.75	20.7	9.9	0.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	Ferrite No.
Typical	As Welded	600	35	7
Specification		520 min	30 min	3-9

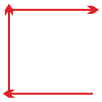
Special Tests: IGC Practice E/C of ASTM A262

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.030.2503	50-75
3.2 x 350	WCE.SN.030.3203	80-100
4.0 x 350	WCE.SN.030.4003	110-140
5.0 x 300	WCE.SN.030.5003	150-180

AC (70 OCV) /DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX 347 PLUS

STAINLESS STEEL (Austenitic Steel)

AWS A/SFA 5.4 E347-17

CLASSIFICATION:

ISO 3581-A
E 19 9 Nb R 13

KEY FEATURES:

- Acid-Rutile based coating
- 19/10/Nb stabilized weld deposit
- Resistance to cracking
- Less susceptible to embrittlement
- Resistant to scaling upto 850°C
- Excellent resistance to intergranular corrosion due to Nb addition
- Easy slag removal
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding stabilized Cr-Ni steels such as AISI 321, 321H, 347, 347H
- Fabrication of equipments in refineries, power plants, centrifugal pump impellers and shafts, valve faces, seats
- Fabrication of boiler and gas turbine
- Welding of stainless steel tanks, valves, pipes in food, chemical and petrochemical industries
- Suitable for material no. 1.4300, 1.4301, 1.4306, 1.4308, 1.4310, 1.4541, 1.4543, 1.4550, 1.4552, 1.4878, 1.6905

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Nb
0.05	1.2	0.7	18.9	9.3	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	Ferrite No.
Typical	As Welded	615	34	8
Specification		520 min	30 min	3-9

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.028.2503	50-75
3.2 x 350	WCE.SN.028.3203	80-100
4.0 x 350	WCE.SN.028.4003	100-130

AC (70 OCV) /DCEP

Flat butt and fillet welds only

REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX D

STAINLESS STEEL (Dissimilar Steel Welding)

AWS A/SFA 5.4 **E309-16**

CLASSIFICATION:

ISO 3581-A
E (23 12) R 12

KEY FEATURES:

- Rutile type medium coating
- 23/12 type SS deposit
- Exhibit excellent corrosion and oxidation resistance upto 1100°C
- Highest resistance to cracking
- Low dilution on mild and low alloy steels due to higher alloy content
- All position capability
- Radiographic quality weld

APPROVALS: LRA/IBR/CE

TYPICAL APPLICATIONS:

- Dissimilar joints between stainless steels and low alloy or carbon steels
- Welding of AISI 309 type steels
- Buffer layer on low alloy and carbon steels
- Joining corrosion resistant clad steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.04	0.9	0.7	23.5	12.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	610	38
Specification		550 min	30 min

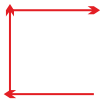
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.008.2503	50-75
3.2 x 350	WCE.SN.008.3203	80-100
4.0 x 350	WCE.SN.008.4003	100-130

AC (70 OCV) /DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX DL

STAINLESS STEEL (Dissimilar Steel Welding)

AWS A/SFA 5.4 **E309L-16**

CLASSIFICATION:

ISO 3581-A
E 23 12L R 12

KEY FEATURES:

- Rutile type coating
- High ferrite content for highest resistance to cracking
- Low dilution on mild and low alloy steels due to higher alloy content
- Extra low carbon 23/12 type deposit
- Exhibit excellent corrosion and oxidation resistance upto 1100°C
- Suitable for all position
- Radiographic quality welds

APPROVALS: ABS/BV IRS/NPCIL/IBR/CE

TYPICAL APPLICATIONS:

- Dissimilar joints between stainless steels and low alloy or carbon steels
- Welding of AISI 309, 309L type steels
- For buffer layer on low alloy and carbon steels
- Joining corrosion resistant clad steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.03	1.7	0.5	23.5	12.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	560	36
Specification		520 min	30 min

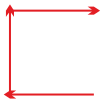
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.009.2503	50-75
3.2 x 350	WCE.SN.009.3203	80-100
4.0 x 350	WCE.SN.009.4003	100-130

AC (70 OCV) /DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX DCb

STAINLESS STEEL (Dissimilar Steel Welding)

AWS A/SFA 5.4 **E309Nb-16**

CLASSIFICATION:

ISO 3581-A
E 23 12 Nb R 12

KEY FEATURES:

- Rutile coated electrode
- Deposit is 23/12/Nb stabilized
- Low dilution on mild and low alloy steels due to higher alloy content
- Intergranular corrosion and oxidation resistance upto 1100°C
- Suitable for all position
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of AISI 309, 309 Nb stabilized steels
- Dissimilar joints between 347 type and low alloy or carbon steels
- Buffer layer on low alloy and carbon steels
- Joining corrosion resistant clad steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Nb
0.04	0.9	0.5	23	12.1	0.8

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	600	36
Specification		550 min	30 min

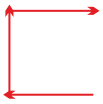
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.009.2503	50-75
3.2 x 350	WCE.SN.009.3203	80-100
4.0 x 350	WCE.SN.009.4003	100-130

AC (70 OCV) /DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX DMo

STAINLESS STEEL (Dissimilar Steel Welding)

AWS A/SFA 5.4 **E309Mo-16**

CLASSIFICATION:

ISO 3581-B
ES 309Mo-16

KEY FEATURES:

- Rutile coated electrode
- High ferrite content ensures maximum cracking resistance
- Mo addition provides high strength and corrosion resistance
- Deposit is 23/12/2.5Mo type
- Excellent corrosion and oxidation resistance upto 1100°C
- Suitable for all position
- Radiographic quality welds

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of AISI 309 Mo type steels
- Dissimilar joints between 316 type and low alloy or carbon steels
- Buffer layer on low alloy and carbon steels before deposition of 316 type weld metal

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.05	1.2	0.5	23.5	12.7	2.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

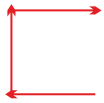
	Condition	UTS, MPa	EL%
Typical	As Welded	650	36
Specification		550 min	30 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.012.3203	50-75
3.2 x 350	WCE.SN.012.4003	80-100
4.0 x 350	WCE.SN.012.5003	100-130

AC (70 OCV) /DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX DMoL

STAINLESS STEEL (Dissimilar Steel Welding)

AWS A/SFA 5.4 E309LMo-16

CLASSIFICATION:

ISO 3581-A
E (23 12 2L) R 12

APPROVALS: IBR/CE

KEY FEATURES:

- Rutile coated electrode
- Extra low carbon 23/12/2.5Mo type weld deposit
- Low carbon ensures resistance to intergranular corrosion and cracking
- Mo addition provides high strength
- Excellent corrosion and oxidation resistance at elevated temperatures
- All position capability
- Radiographic quality welds

TYPICAL APPLICATIONS:

- Welding of AISI 316, 316L type steels
- Buffer layer on low alloy and carbon steels to improve corrosion and wear resistance
- Joining difficult to weld steels
- Dissimilar joints between austenitic stainless steels containing Mo and low alloy or carbon steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.025	0.7	0.9	23.6	13	2.1

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	600	37
Specification		550 min	30 min

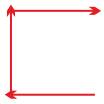
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.013.2503	50-75
3.2 x 350	WCE.SN.013.3203	80-100
4.0 x 350	WCE.SN.013.4003	100-130

AC (70 OCV) /DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Downwards



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

SUPERINOX 312

STAINLESS STEEL (Dissimilar Steel Welding)

AWS A/SFA 5.4 **E312-16**

CLASSIFICATION:

ISO 3581-A
E 29 9 R 12

APPROVALS: CE

KEY FEATURES:

- Rutile type medium heavy coating
- 30/10 type SS deposit
- High strength weld with excellent resistance to cracking, fissuring and oxidation
- Two phase structure with high ferrite
- Quiet and stable arc
- Low spatter, Smooth weld bead
- Easy slag detachability
- All position welding capability
- Radiographic quality weld

TYPICAL APPLICATIONS:

- Welding difficult to weld steels ex. high C hardenable tool, die and spring steels, 13% Mn steels, free cutting steels, high temperature steels, cast steels
- Repair of worn out parts and underlay before hardfacing
- Dissimilar joints between stainless and high carbon steels and unknown steels
- Suitable for problematic steels with higher strength such as pressing dies, trimming tools, armor plates

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.07	0.9	0.95	29.5	8.7

MECHANICAL PROPERTIES OF ALL WELD METAL:

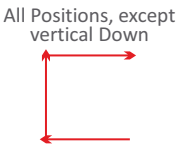
	Condition	UTS, MPa	EL%
Typical	As Welded	760	29
Specification		660 min	22 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
1.6 X 250	WCE.SN.044.1602	30-45
2.0 x 300	WCE.SN.044.2002	50-80
2.5 x 350	WCE.SN.044.2503	80-100
3.2 x 350	WCE.SN.044.3203	110-140
4.0 x 350	WCE.SN.044.4003	150-180

AC (70 OCV) /DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX C

STAINLESS STEEL (Heat Resisting)

AWS A/SFA 5.4 **E310-16**

CLASSIFICATION:

ISO 3581-A
E 25 20 R 12

KEY FEATURES:

- Rutile coated electrode
- 25/20 type SS deposit
- Excellent resistance to cracking and fissuring
- Provides excellent stability and oxidation resistance upto 1150°C
- Excellent arc stability
- Low spatter loss
- Easy slag removal
- Suitable for all position
- Radiographic quality weld deposit

APPROVALS: CE

TYPICAL APPLICATIONS:

- Joining difficult to weld steels such as armor plates and ferritic stainless steels as well as dissimilar steels
- Furnace parts, Annealing boxes, Carburizing pots, Gas turbine combustion chamber parts, hydrogenation and polymerization plant
- Welding of AISI 310 and similar steel
- Cladding side of stainless steels and dissimilar steels
- Suitable for materials 1.4710, 1.4713, 1.4745,1.4762, 1.4823, 1.4832, 1.4837, 1.4840, 1.4841, 1.4845, 1.4846, 1.4848, 1.4849

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.11	1.5	0.5	27	20.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	600	37
Specification		550 min	30 min

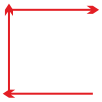
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.006.2503	50-75
3.2 x 350	WCE.SN.006.3203	80-100
4.0 x 350	WCE.SN.006.4003	100-130

AC (70 OCV) /DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETACHROME ND

STAINLESS STEEL (Plain Chrome Series)

CLASSIFICATION:

ISO 3581-A
E 18 8 Mn B 22

KEY FEATURES:

- Basic coated electrode
- 18/8/5Mn type austenitic weld deposit
- Excellent heat resistant properties upto 900°C
- Radiographic quality weld
- Work hardenable alloy with excellent crack resistance
- Excellent arc characteristics
- Suitable for all position

APPROVALS: CE

TYPICAL APPLICATIONS:

- For joining austenitic Mn (12%) steel to mild steel
- Surfacing Mn steel, Crane wheels
- Joint welding between unalloyed or low alloyed steels with high alloyed steels or cast steels
- For buffer layer on difficult steels before hardfacing
- Welding steel with difficult weldability
- Armour plates, Crusher cones, Crusher hammers, Rail crossings, Shovel bucket teeth

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni
0.035	5.5	0.75	19	9.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	600	36
Specification		550 min	30 min

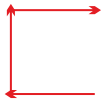
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.005.2503	50-75
3.2 x 350	WCE.SN.005.3153	80-100
4.0 x 350	WCE.SN.005.4003	100-130

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETACHROME 13/4 LB-R

AWS A/SFA 5.4 E410NiMo-16

STAINLESS STEEL (Plain Chrome Series)

CLASSIFICATION:

ISO 3581-A
E 13 4 R 12

KEY FEATURES:

- Rutile type electrode
- High strength, toughness and cracking resistance
- Smooth ARC characteristics
- Easy slag removal
- Martensitic type alloy resistant to corrosion, erosion, pitting and impact
- Preheat and PWHT recommended
- All position welding capability
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of ASTM CA 6NM casting or similar materials as well as light gauge 410, 410S and 405 base metals
- Welding of extra low carbon castings and forgings of similar composition and surfacing applications
- Surfacing of turbine blades, high pressure valves
- Repair of runners, valve seats, pulp and paper plant equipment
- German castings/forgings type GX5CrNi13.4 and G-5CrNi13.6, VIRGO 104 casting/forging

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.05	0.7	0.5	12.3	4.5	0.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

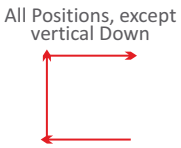
	Condition	UTS, MPa	EL%
Specification	PWHT: 600°C for 1 hr	760 min	15 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.091.2503	50-75
3.2 x 350	WCE.SN.091.3203	80-100
4.0 x 350	WCE.SN.091.4003	100-130

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX 4462

STAINLESS STEEL (Duplex SS)

AWS A/SFA 5.4 **E2209-16**

CLASSIFICATION:

ISO 3581-A
E 22 9 3 N L R 22

KEY FEATURES:

- Rutile type coated Electrode
- Austenitic-ferritic type weld deposit
- Excellent combination of high strength and resistance to chloride induced SCC and pitting
- Can be applied for operating temperature upto 200ºC
- Suitable for all position
- Uniform and fine ripples
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of 2205, 2209 type duplex stainless steels and similar composition
- Pipelines transporting chloride bearing products and sour gases
- Cladding on carbon and low alloy steels
- Cast pumps, Valve bodies and sea water handling equipment
- For chemical equipments, heat exchangers, off-shore platforms
- Suitable for materials 1.4417, 1.4460, 1.4462, 1.4362, 1.4162

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo	N
0.03	0.9	0.5	22.5	8.9	3.2	0.15

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	CVN Impact, at -40°C, J	Ferrite No.
Typical	As Welded	735	25	50	32
Specification		690 min	20 min	47 min	30-55

PREN: 35 min

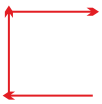
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.049.2503	50-75
3.2 x 350	WCE.SN.049.3203	80-100
4.0 x 350	WCE.SN.049.4003	100-130

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX 2594

STAINLESS STEEL (Duplex SS)

AWS A/SFA 5.4 **E2594-15**

CLASSIFICATION:

ISO 3581-A
E 25 9 4 N L B 22

APPROVALS: IBR/CE

KEY FEATURES:

- Basic coated non-synthetic electrode
- Austenitic-ferritic duplex micro structure
- Excellent high strength combined with improved resistance to pitting and SSC in chloride environment
- Super duplex SS weld with N addition
- Weld metal characteristics similar to super duplex wrought and cast alloys
- Easy slag removal
- Uniform and fine ripples
- Radiographic quality weld

TYPICAL APPLICATIONS:

- Welding of super duplex stainless steels UNS S 32750, S 32760, SFA 2507, Zeron 100 and Casting alloys e.g. ASTM A890 Gr.5A
- Suitable for materials 1.4410, 1.4460, 1.4462, 1.4463
- Pipe work systems, flow lines, risers, manifolds, process equipment for use in offshore oil and gas industries, chemical and petrochemical plant
- Also to be used on duplex 2205 grade

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo	N
0.03	1.1	0.9	26	8.9	3.6	0.25

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	CVN Impact, J -20°C
Typical	As Welded	880	27	50
Specification		760 min	15 min	47 min

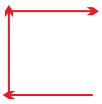
PREN: 40 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.068.2503	50-75
3.2 x 350	WCE.SN.068.3203	80-100
4.0 x 350	WCE.SN.068.4003	100-130

AC (70 OCV) /DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX 2594-16

STAINLESS STEEL (Duplex SS)

AWS A/SFA 5.4 **E2594-16**

CLASSIFICATION:

ISO 3581-A
E 25 9 4 N L R 12

KEY FEATURES:

- Rutile coated non-synthetic electrode
- Austenitic-ferritic duplex microstructure
- Excellent high strength combined with improved resistance to pitting and SSC in chloride environment
- Super duplex SS weld with N additiont
- Weld metal characteristics similar tosuper duplex wrought and cast alloys
- Easy slag removal
- Uniform and fine ripples
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of super duplex stainless steels UNS S 32750, S 32760, SFA 2507, Zeron 100 and Casting alloys e.g. ASTM A890 Gr.5A
- Suitable for materials 1.4410, 1.4460, 1.4462, 1.4463
- Pipe work systems, flow lines, risers, manifolds, process equipment for use in offshore oil and gas industries, chemical and petrochemical plant
- Also to be used on duplex 2205 grade

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo	N
0.02	0.9	0.7	25.9	10	3.9	0.23

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	CVN Impact, J -20°C
Typical	As Welded	880	27	48
Specification		760 min	15 min	47 min

PREN: 40 min

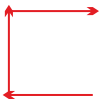
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.096.2503	70-110
3.2 x 350	WCE.SN.096.3203	90-140
4.0 x 350	WCE.SN.096.4003	140-180

AC (70 OCV) /DCEP

REDRYING CONDITION:
300°C for 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX 2595-16

STAINLESS STEEL (Duplex SS)

AWS A/SFA 5.4 **E2595-16**

CLASSIFICATION:

ISO 3581-A
E 25 9 4 N L R 12

APPROVALS: CE

KEY FEATURES:

- Rutile type non-synthetic coating
- Super duplex SS weld deposit
- Resistant to pitting, chemical attack and chloride containing media
- Tungsten provides resistance against hot cracking
- Ni and N ensures good toughness properties and freedom from weld cracking in highly restrained joints
- Easy slag detachability
- Suitable for all position
- Radiographic quality weld

TYPICAL APPLICATIONS:

- Welding of super duplex stainless steels such as UNS S32550, S32750, S32760 (wrought) and UNS J93370, J93380, J93404, CD4MCuN (cast)
- Can be used to weld standard duplex stainless steel such as UNS S31803 and UNS S32205, carbon and low alloy steels to duplex steels as well

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo	N	W
0.02	0.6	0.7	26	9.5	3.9	0.23	1.0

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	Ferrite No.
Typical	As Welded	835	27	50
Specification		760 min	15 min	40-60

Special Tests: Meets Pitting Corrosion Resistance at 25°C and 30°C as per ASTM G-48 **PREN**: 40 min

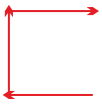
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.096.2503	50-75
3.2 x 350	WCE.SN.096.3203	80-100
4.0 x 350	WCE.SN.096.4003	100-130

AC (70 OCV) /DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

BETANOX 2595-15

STAINLESS STEEL (Duplex SS)

AWS A/SFA 5.4 **E2595-15**

CLASSIFICATION:

ISO 3581-A
E 25 9 4 N L B 22

APPROVALS: CE

KEY FEATURES:

- Basic type non-synthetic coating
- Super duplex SS deposit
- High strength and freedom from weld cracking in highly restrained joints
- Presence of Tungsten ensures highest resistance to hot cracking
- Improved resistance against pitting, chemical attack and chloride environment e.g. sea water
- Low spatter losses
- Easy slag detachability
- Radiographic quality weld

TYPICAL APPLICATIONS:

- Welding of super duplex stainless steels such as UNS S32550, S32750, S32760 (wrought) and UNS J93370, J93380, J93404, CD4MCuN (cast)
- Can be used to weld standard duplex stainless steel such as UNS S31803 and UNS S32205, carbon and low alloy steels to duplex steels as well

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo	N	W
0.03	1.0	0.9	25.5	9.9	4.0	0.25	1.1

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	Ferrite No.
Typical	As Welded	840	28	54
Specification		760 min	15 min	40-60

Special Tests: Meets Pitting Corrosion Resistance at 25°C and 30°C as per ASTM G-48 **PREN**: 40 min

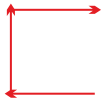
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.SN.071.2503	70-110
3.2 x 350	WCE.SN.071.3203	90-140
4.0 x 350	WCE.SN.071.4003	140-180

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 5 cartons of 2 kg each.

CASTMONEL

CAST IRON

AWS A/SFA 5.15 **ENiCu-B**

CLASSIFICATION:

ISO 1071
E C NiCu-B1

KEY FEATURES:

- Graphite based coating
- Monel type weld deposit
- Machinable weld
- Minimum dilution ensures shallow but sufficient depth of fusion
- No need of preheating

APPROVALS: CE

TYPICAL APPLICATIONS:

- Repair of cast iron castings
- Well suited for Gears, machinery parts, Pump bodies
- Rebuilding worn surfaces
- Joining cast iron to steel
- Correcting machining errors on castings

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni	Cu
0.43	1.1	0.7	3.1	63	31.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa
Specification	As Welded	350 min

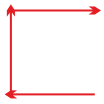
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.IN.003.2503	45-60
3.2 x 350	WCE.IN.003.3203	90-110
4.0 x 350	WCE.IN.003.4003	120-150

AC (70 OCV)/ DCEP

REDRYING CONDITION:
150°C for 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 1 cartons of 10 kg each.

CASTNICKEL

CAST IRON

AWS A/SFA 5.15 **ENi-CI**

CLASSIFICATION:

ISO 1071
E C Ni-Cl 1

KEY FEATURES:

- Graphite based coating
- High Ni alloyed electrode
- Minimum base metal dilution and penetration
- Electrode welds cast iron the cold way
- Soft, ductile and machinable weld with adequate strength
- No need of preheating even for large complicated castings
- Easy and intimated fusion with all grades of cast iron

APPROVALS: CE

TYPICAL APPLICATIONS:

- Repair of broken heavy castings, machine bases, motor blocks, sprockets, valve bodies, impellers, pump casting and gears
- Joining and build up of grey cast iron and malleable iron
- Joining cast iron to steel
- Correcting machining errors on castings
- Suitable for thin walled grey cast iron
- Sliding tables for machine tools
- Building up on cast iron parts exposed to corrosive liquids

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni
0.6	0.2	0.4	2.3	96

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS, MPa	EL, %	Hardness, BHN
Specification	As Welded	276-448	262-414	3-6	135-218

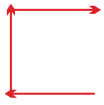
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.IN.003.2503	45-65
3.2 x 350	WCE.IN.003.3203	70-90
4.0 x 350	WCE.IN.003.4003	100-120

AC (70 OCV)/ DCEP

REDRYING CONDITION:
150°C for 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 1 cartons of 10 kg each.

FERRICAST

CAST IRON

AWS A/SFA 5.15 **ENiFe-Cl**

CLASSIFICATION:

ISO 1071
E C NiFe-11

KEY FEATURES:

- Ni-Fe type machinable electrode
- Dense, soft and ductile weld with adequate strength
- Porosity free welding
- Controlled dilution and penetration
- No need of preheating for large heavy castings

APPROVALS: CE

TYPICAL APPLICATIONS:

- Repair of broken heavy castings
- Welding and repairing of all cast iron components
- Pump casting and gears, Cast iron dies, Gear boxes, Gear teeth
- Transmission housings, Couplings
- Foundry defects, Machine build up
- Best suited for welding of Nodular graphite iron, Malleable iron subject to heavy wear
- Joining cast iron to steel
- Correcting machining errors on castings

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni
0.6	1.2	1.5	47	51

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS, MPa	EL, %	Hardness, BHN
Specification	As Welded	400-579	296-434	6-18	165-218

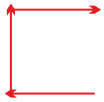
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.IN.004.2503	40-70
3.2 x 350	WCE.IN.004.3203	70-110
4.0 x 350	WCE.IN.004.4003	90-120

AC (70 OCV)/ DCEP

REDRYING CONDITION:
150°C for 1 hr.

All Positions, except vertical Down



Available in Standard carton packing of 10 kg box containing 1 cartons of 10 kg each.

ZEDALLOY 350

HARD FACING (Moderate - Abrasion Impact)

ALLOY BASIS

C, Mn, Si, Cr

KEY FEATURES:

- Rutile coated electrode
- Air hardenable deposit
- Machinable with carbide tools
- High weld metal recovery
- Good combination of abrasion and impact properties
- Resistant to friction
- Recommended buffer layer of Tenalloy-16 on hard base materials

APPROVALS: RDSO

TYPICAL APPLICATIONS:

- Excavators, Conveyor parts
- Supporting rollers of Kiln tyres
- Wobbler ends, Cams
- Gear shafts
- Plough shares
- Shear blades
- Girth gears in cement and power plants

MECHANICAL PROPERTIES OF ALL WELD METAL:

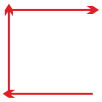
Condition	3 Layer, Hardness, HRc (BHN), Typical
As Welded	35(330)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.HN.002.3204	100-140
4.0 x 450	WCE.HN.002.4004	140-180
5.0 x 450	WCE.HN.002.5004	180-220

AC (70 OCV) / DCEN

All Positions, except vertical Down



REDRYING CONDITION:

110°C for ½ hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance

Physical Properties: With increase in number of squares, property improves

ZEDALLOY 350 LH

HARD FACING (Moderate - Abrasion Impact)

ALLOY BASIS

C, Mn, Si, Cr

KEY FEATURES:

- Basic coated electrode
- Air hardenable deposit
- Machinable with carbide tools
- Resistant to friction
- Good combination of abrasion and toughness
- Recommended buffer layer of Tenalloy-16 on hard base materials

TYPICAL APPLICATIONS:

- Conveyor parts
- Supporting rollers of Kiln tyres
- Brake shoes, Gear shafts
- Wobbler ends
- Excavators, Plough shares
- Cold punching dies
- Shear blades
- Cog wheels

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	3 Layer, Hardness, HRc (BHN),Typical
As Welded	35(330)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.HN.003.3204	100-140
4.0 x 450	WCE.HN.003.4004	140-180
5.0 x 450	WCE.HN.003.5004	180-220

AC (70 OCV) / DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance
■■	■■■■	■■■	■■

Physical Properties: With increase in number of squares, property improves

ZEDALLOY 550

HARD FACING (Moderate - Abrasion Impact)

ALLOY BASIS

C, Mn, Si, Cr

KEY FEATURES:

- Rutile coated electrode
- Air hardenable deposit
- Non machinable
- Resistant to spalling and cracking
- Resistance against high stress abrasion and friction
- Can withstand moderate impact
- Recommended buffer layer of Tenalloy-16 on hard base materials

TYPICAL APPLICATIONS:

- Dis-integrator hammers
- Excavator teeth, Shear blades
- Bulldozer blades, Bucket lip
- Metal cutting and forming tools
- Crane wheels, Caterpillar treads
- Cane cutting knives

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	3 Layer, Hardness, HRc (BHN), Typical
As Welded	56 (580)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.HN.004.3204	100-130
4.0 x 450	WCE.HN.004.4004	140-180
5.0 x 450	WCE.HN.004.5004	180-220

AC (70 OCV) / DCEN

REDRYING CONDITION:
110°C for minimum ½ hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance
	■■■■■	■■■	■■

Physical Properties: With increase in number of squares, property improves

ZEDALLOY 550 LH

HARD FACING (Moderate - Abrasion Impact)

ALLOY BASIS

C, Mn, Si, Cr

KEY FEATURES:

- Basic type coating
- Air hardenable non machinable weld
- Recommended buffer layer of Tenalloy-16 on hard base materials
- Resistance against high stress abrasion and friction
- Can withstand moderate impact
- Resistant to spalling and cracking

TYPICAL APPLICATIONS:

- Crushers and hammers
- Excavator teeth
- Shear blades
- Metal to mineral wear application
- Crane wheels, Caterpillar treads
- Bulldozer blades, Bucket lip
- Bamboo chipper knives
- Dis-integrator hammers

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	3 Layer, Hardness, HRc (BHN), Typical
As Welded	56 (580)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.HN.006.3204	100-130
4.0 x 450	WCE.HN.006.4004	140-180
5.0 x 450	WCE.HN.006.5004	180-220

AC (70 OCV) / DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance
	■■■■■	■■■	■■

Physical Properties: With increase in number of squares, property improves

ZEDALLOY 600

HARD FACING (Moderate - Abrasion Impact)

ALLOY BASIS

C, Mn, Si, Cr, Mo

KEY FEATURES:

- Rutile type heavy coating
- Extremely hard non machinable deposit
- Deposit can be finished by grinding
- High hardness in single layer
- Suitable for high carbon and high sulphur steels
- Can withstand mild impact

TYPICAL APPLICATIONS:

- Drilling bits, Punches, Dies
- Crane wheels, Shear blades
- Crushers, Hammers
- Paper cutting knives, Mine rails
- Oil expeller worms
- Conveyor parts

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	1 Layer, Hardness, HRc (BHN), Typical
As Welded	58 (600)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.HN.009.3204	100-140
4.0 x 450	WCE.HN.009.4004	140-180
5.0 x 450	WCE.HN.009.5004	180-220

AC (70 OCV) / DCEP

REDRYING CONDITION:
110°C for minimum ½ hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance
			

Physical Properties: With increase in number of squares, property improves

ZEDALLOY 12Mn

HARD FACING (High Impact - Work Hardenable)

ALLOY BASIS

C, Mn, Si

KEY FEATURES:

- Basic type coating
- Easily machinable
- Crack free and sound weld
- Recommended buffer layer of Betachrome-N on mild and low alloy steels
- Typical 12% Mn deposit
- Exhibit excellent work hardening characteristics under severe impact conditions
- Ideal for gouging type abrasion wear

TYPICAL APPLICATIONS:

- Rock crushing jaws
- Cement grinding rings
- Mn steel rails
- Suitable for build-up and cushioning
- Dredger bucket teeth
- Austenitic Mn steel castings
- Hammers
- Crusher mantles

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	3 Layer, Hardness, HRc (BHN), Typical
As Welded	16 (200)
Work Hardened	52 (500)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.HN.010.3204	100-140
4.0 x 450	WCE.HN.010.4004	140-180
5.0 x 450	WCE.HN.010.5004	180-230
6.3 x 450	WCE.HN.010.6304	230-290

AC (70 OCV) / DCEP

REDRYING CONDITION:

250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance
■■■	■■	■■■■	■■

Physical Properties: With increase in number of squares, property improves

SUPER ZEDALLOY

HARD FACING (High Abrasion)

ALLOY BASIS

C, Cr

KEY FEATURES:

- Basic type coating
- High Carbon and Cr content in the weld metal
- Non machinable deposit
- Exhibit good corrosion resistance
- High volume fraction of primary carbides offer excellent wear resistance up to 1000°C
- Apply one or two layer to avoid cracking

TYPICAL APPLICATIONS:

- Coke chutes, Screws
- Cultivator shovels, Plough shares,
- Mining, Agriculture, Earth moving and Sand blasting equipments
- Edge runner scrappers
- Conveyors, Grinding rings
- Cement clinker crushing rollers
- In Ceramic industries

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	3 Layer, Hardness, HRc (BHN), Typical
As Welded	58 (600)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.HN.014.3204	90-120
4.0 x 450	WCE.HN.014.4004	120-160
5.0 x 450	WCE.HN.014.5004	160-200

AC (70 OCV) / DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance

Physical Properties: With increase in number of squares, property improves

MAGANACANE

HARD FACING (High Abrasion)

ALLOY BASIS

C, Cr, Si

KEY FEATURES:

- Super heavy coated electrode
- Special design to resist heavy loads produced during cane crushing in sugar mills
- Electrode strikes easily even on wet mill rollers
- Deposits hemispherical dots on the rolls which imparts better grip during cane crushing
- Faster build up due to high deposition rate
- Non machinable deposit

TYPICAL APPLICATIONS:

- For Spot-Arc building/roughening Sugar mill rolls, chilled cast iron rolls
- Reclamation of Sand mixing blades, Scrapers, Screw flights, Mixing paddles

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	Hardness HRc (BHN), Typical
As Welded	56 (580)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A	
3.2 x 450	WCE.HN.016.3204	110-130	AC (70 OCV) / DCEP
4.0 x 450	WCE.HN.016.4004	160-210	
5.0 x 450	WCE.HN.016.5004	220-280	

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance
			

Physical Properties: With increase in number of squares, property improves

ZEDALLOY 680

HARD FACING (High Abrasion)

ALLOY BASIS

C, Cr, Nb, V, Mo

KEY FEATURES:

- Excellent arc stike/re-strike
- Complex refractory carbides in eutectic matrix
- Minimal slag, smooth weld bead
- Non machinable deposit
- High volume fraction carbides offer excellent wear resistance up to 650°C
- Recommended for single pass deposit

TYPICAL APPLICATIONS:

- Clinker grinders, Conveyor chains, Sinter handling equipment, Auger flights, Sinter star breakers, Slurry pumps
- Coke pusher shoes, Billet conveyor guides, Hot slag conveyors, Pug mill knives, Coal burner nozzles, Conveyor screw

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	Hardness,1 Layer HRc, Typical
As Welded	64

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 450	WCE.HN.030.3204	90-160
4.0 x 450	WCE.HN.030.4004	120-180
5.0 x 450	WCE.HN.030.5004	180-220

AC (70 OCV) / DCEP

REDRYING CONDITION:
105°C for 1 hr

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance
	■■■■■■■		■■■

Physical Properties: With increase in number of squares, property improves

ZEDALLOY CoCr-A

HARD FACING (High Temperature Oxidation - Impact - Abrasion)

AWS A/SFA 5.13 E CoCr-A

ALLOY BASIS

C, Co, Cr

KEY FEATURES:

- Rutile coated electrode
- Machinable weld deposit
- Retains hardness up to 600ºC
- Resistant to Metal to Metal Wear, High temperature Oxidation and Mechanical and Thermal Shocks

TYPICAL APPLICATIONS:

- Valves, Valve seats
- Sealing surfaces
- Hot pressing tools
- Conveyer screws
- Hot shear blades, Knives
- Dies and cutting edges in chemical, rubber, oil, sugar industries and Steel mills

MECHANICAL PROPERTIES OF ALL WELD METAL:

Condition	Hardness, HRc (BHN)	
As Welded	At Room Temp	35-40 (320-370)
As Welded	At 600°C	33 (310)

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
3.2 x 350	WCE.HN.024.3203	100-140
4.0 x 350	WCE.HN.024.4003	140-180
5.0 x 350	WCE.HN.024.5003	180-220

AC (70 OCV) / DCEN

REDRYING CONDITION:
250-300°C for 1 hr min

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Machinability	Abrasion Resistance	Impact Resistance	Corrosion Resistance
■■■	■■■	■■■	■■■

Physical Properties: With increase in number of squares, property improves

SUPERMONEL

NON FERROUS (Ni Alloys)

AWS A/SFA 5.11 **ENiCu-7**

CLASSIFICATION:

ISO 14172
E Ni 4060 (NiCu30Mn3Ti)

KEY FEATURES:

- Monel electrode
- Low iron in the deposit exhibit maximum corrosion resistance
- Medium penetration weld
- Easily machinable deposit in as welded and stress relieved condition
- Passes 180° bend test on monel alloy 400 plate

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding monel to itself, to stainless steels or carbon steels
- Overlaying on steel to obtain a corrosion resistant surface
- Welding of ASTM B127/163/164/165
- Refineries, Off shore, Foundries, Chemical and Fertilizer plants
- Heat exchanger, Pressure vessel and Column manufacturing units
- Food, Pumps & Valves manufacturing units

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni	Al	Ti
0.02	3.1	1.0	1.0	65	0.04	0.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	535	34
Specification		480 min	30 min

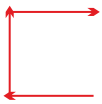
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.001.2503	45 - 70
3.2 x 350	WCE.NN.001.3203	80 - 100
4.0 x 350	WCE.NN.001.4003	90 - 130

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

NICALLOY 1

NON FERROUS (Ni Alloys)

AWS A/SFA 5.11 ENi-1

CLASSIFICATION:

ISO 14172
E Ni 2061 (NiTi3)

KEY FEATURES:

- Basic type coating
- Low carbon pure Ni deposit
- Medium penetration weld
- Extremely strong and ductile weld metal
- Resistant to cracking and oxidation
- Low iron level ensure maximum corrosion resistance
- Positional welding capability

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of wrought and cast form of commercially pure Ni (99.5%)
- Welding of Nickel 200 and 201
- Suitable for ASTM B160/161/162/163
- For dissimilar welding between Nickel 200/201 and various iron-base and nickel-base alloys
- Overlay on carbon and low alloy steel
- Applications in Refineries, Heat exchanger, Pressure vessel, Pumps and valves, Cryogenics, Chemical plants, Caustic handling equipments, Food processing equipments
- Used for handling corrosive alkalis & halides

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni	Al	Ti
0.03	0.4	0.75	0.35	96.65	0.025	1.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Specification	As Welded	410 min	20 min

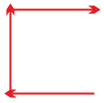
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.009.2503	45 - 70
3.2 x 350	WCE.NN.009.3203	80 - 100
4.0 x 350	WCE.NN.009.4003	90 - 130

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

NICALLOY Fe-2

NON FERROUS (Ni Alloys)

AWS A/SFA 5.11 ENiCrFe-2

CLASSIFICATION:

ISO 14172
E Ni 6133 (NiCr16Fe12NbMo)

APPROVALS: IBR/CE

KEY FEATURES:

- Basic type coating
- Ni-Cr-Fe type deposit
- Ductile weld resistant to cracking
- Outstanding strength and resistance to oxidation at high temperature
- Application from cryogenic to 820°C
- Resistant to embrittlement and creep at high temperatures upto 820°C
- Versatile product for dissimilar joining
- Positional welding capability
- For overlay applications minimum three layers must be deposited

TYPICAL APPLICATIONS:

- Welding of wrought and cast form of Ni-Cr-Fe alloys
- Joining carbon, SS or low alloy steel or combinations of any of them
- Welding of ASTM E163/166/167/168, Alloy 600/601
- Joining Ni based alloys to steel
- Fabrication of Corrosion resistant tanks, Furnace components
- Applications in Refineries, Foundries, Heat exchanger, Pressure vessel manufacturing, Chemical plants

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni	Cr	Nb+Ta	Mo
0.025	3.25	0.5	2.9	72.5	16.5	1.9	1.35

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Specification	As Welded	550 min	30 min

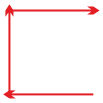
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.009.2503	45 - 70
3.2 x 350	WCE.NN.009.3203	80 - 100
4.0 x 350	WCE.NN.009.4003	90 - 130

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

NICALLOY Fe-3

NON FERROUS (Ni Alloys)

AWS A/SFA 5.11 **ENiCrFe-3**

CLASSIFICATION:

ISO 14172
E Ni 6182 (NiCr15Fe6Mn)

KEY FEATURES:

- Basic type coating
- Ni-Cr-Fe type deposit
- Ductile weld resistant to thermal shocks and hot cracking
- Outstanding strength and resistance to corrosion from normal to high temperatures
- Application from cryogenic to 480°C
- Positional welding capability
- For overlay applications minimum three layers must be deposited

APPROVALS: IBR/CE

TYPICAL APPLICATIONS:

- Welding of wrought and cast form of Ni-Cr-Fe alloys to themselves and to carbon steels
- Joining carbon, SS or low alloy steel or combinations of any of them
- Welding of ASTM E163/166/167/168, Inconel 600 and similar nickel alloys
- Joining Ni based alloys to steel
- Fabrication of Corrosion resistant tanks, Furnace components
- Applications in Refineries, Foundries, Heat exchanger, Pressure vessel manufacturing, Chemical plants

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni	Ti	Cr	Nb+Ta
0.02	5.5	0.6	5.8	70	0.05	14.5	2.1

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Specification	As Welded	550 min	30 min

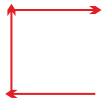
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.009.2503	45 - 70
3.2 x 350	WCE.NN.009.3203	80 - 100
4.0 x 350	WCE.NN.009.4003	90 - 130

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

NICALLOY Mo-3

NON FERROUS (Ni Alloys)

AWS A/SFA 5.11 **ENiCrMo-3**

CLASSIFICATION:

ISO 14172
E Ni 6625 (NiCr22Mo9Nb)

KEY FEATURES:

- Basic coated electrode
- Ni based high Cr-Mo-Nb deposit
- Scale resistant in low sulphur atmosphere upto 1100°C
- Positional welding capability
- For overlay applications minimum three layers must be deposited
- Application from cryogenic to 480°C

APPROVALS: IBR/CE/ABS/LRA

TYPICAL APPLICATIONS:

- Joining and surfacing Ni alloys, austenitic steel, austenitic ferritic joints
- Welding of ASTM E163/166/167/168, Inconel 625, Incoloy 825, Alloy 20
- Overlay cladding where similar chemical composition is required on the clad side
- Suitable for material 2.4856, 1.4876

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni	Cr	Nb+Ta	Mo
0.025	0.30	0.5	1.0	63.5	21.5	3.5	8.75

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	760 min	30 min

Impact @-196°C-50J

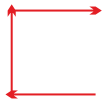
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.007.2503	55-75
3.2 x 350	WCE.NN.007.3203	90-110
4.0 x 350	WCE.NN.007.4003	100-140
5.0 x 350	WCE.NN.007.5003	150-210

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each. Also available in vacuum pack.

NICALLOY Mo-4

NON FERROUS (Ni Alloys)

AWS A/SFA 5.11 **ENiCrMo-4**

CLASSIFICATION:

ISO 14172
E Ni 6276 (NiCr15Mo15Fe6W4)

APPROVALS: CE

KEY FEATURES:

- Basic type coating
- Resistant to abrasion, impact, corrosion and high temperatures
- Resistant to contaminated mineral acids, chloride containing media and chlorine-contaminated media
- Ni based Cr-Mo-W alloyed deposit
- Excellent resistance against Pitting and Crevice corrosion
- Can resist wet chlorine gas and strong oxidizers such as ferric and cupric chlorides

TYPICAL APPLICATIONS:

- Welding of alloy C-276 & similar composition steels
- Suitable for material 2.4819 (NiMo16Cr15W)
- Dissimilar joints between nickel alloys, stainless and low alloy steels
- Surfacing on low alloy steels0
- Application in chemical plants with highly corrosive conditions
- For surfacing press tools, punches, forge dies, hot-stripping tools, pump rotors, valves

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni	Cr	Mo	W
0.019	0.6	0.17	6.0	58	15.7	16	3.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	690 min	25 min

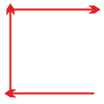
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.014.2503	45 - 70
3.2 x 350	WCE.NN.014.3203	80 - 100
4.0 x 350	WCE.NN.014.4003	90 - 130

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

NICALLOY Mo-10

NON FERROUS (Ni Alloys)

AWS A/SFA 5.11 ENiCrMo-10

CLASSIFICATION:

ISO 14172
E Ni 6022 (NiCr21Mo13W3)

APPROVALS: CE

KEY FEATURES:

- Basic coated non synthetic electrode
- Weld metal is of C-22 type
- Offers excellent corrosion resistance in oxidizing and reducing media
- Spectacular resistance to stress corrosion cracking, pitting and crevice corrosion
- Resistant to corrosion against acetic hydride, acetic and phosphoric acids, hot contaminated sulphuric and other contaminated oxidizing mineral acids
- Versatile product for the chemical, power, petroleum and marine industries

TYPICAL APPLICATIONS:

- Joining materials of the same nature, e.g. material 2.4602 (NiCr21Mo14W) and these materials with low alloyed steels such as for surfacing on low alloy steels
- Welding components in chemical processes handling highly corrosive media
- Dissimilar joints between Ni-Cr-Mo alloys and stainless, carbon or low alloy steels
- Overlay cladding on carbon, low alloy and stainless steels
- Digesters and paper making equipment, Scrubbers for flue gas desulphurization

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni	Cr	Mo	W
0.015	0.6	0.15	5	59	21.5	13.5	3.0

MECHANICAL PROPERTIES OF ALL WELD METAL:

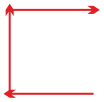
	Condition	UTS, MPa	EL%
Specification	As Welded	690 min	25 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.013.2503	45 - 70
3.2 x 350	WCE.NN.013.3203	80 - 100
4.0 x 350	WCE.NN.013.4003	90 - 130

AC (70 OCV)/DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

NICALLOY Mo-12

NON FERROUS (Ni Alloys)

AWS A/SFA 5.11 **ENiCrMo-12**

CLASSIFICATION:

ISO 14172
E Ni 6627 (NiCr21MoFeNb)

KEY FEATURES:

- Basic coated electrode
- Weld metal is highly resistant to hot cracking, stress corrosion cracking and thermal shock
- Works smoothly with negligible spatter
- Reduces carbon diffusion at high temperature
- Recommended for high temperature and creep resisting steels

APPROVALS: CE

TYPICAL APPLICATIONS:

- Joining materials of the same nature, e.g. material 2.4602 (NiCr21Mo14W) and these materials with low alloyed steels such as for surfacing on low alloy steels
- Welding components in chemical processes handling highly corrosive media
- Dissimilar joints between Ni-Cr-Mo alloys and stainless, carbon or low alloy steels
- Overlay cladding on carbon, low alloy and stainless steels
- Digesters and paper making equipment, Scrubbers for flue gas desulphurization

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Fe	Ni	Nb+Ta	Mo
0.017	2.0	0.5	66.5	20.9	1.6	9.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

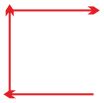
	Condition	UTS, MPa	EL%
Specification	As Welded	650 min	35 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.016.2503	45 - 70
3.2 x 350	WCE.NN.016.3203	80 - 100
4.0 x 350	WCE.NN.016.4003	90 - 130

AC (70 OCV)/DCEP

All Positions, except vertical Down



REDRYING CONDITION:
250-300°C for minimum 1 hr.

Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

ALBOND 5 Si

NON FERROUS (Al Alloys)

AWS A/SFA 5.3 E4043

KEY FEATURES:

- Special coated electrode
- Keep short arc to avoid burn through and excessive spattering
- Electrode dia. should roughly be equivalent to plate thickness
- Provide high melting rate
- Slag residues should be thoroughly removed to obtain non corrosive weld
- Section thickness above 8 mm should be preheated to min. 200ºC

TYPICAL APPLICATIONS:

- Fabrication and repair of wrought and cast Al alloys with Si upto 7%
- Welding of similar grade Al alloys in the form of pipe, plate, forging & casting

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

Si	Fe	Al
5.0	0.35	Bal

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	145	6
Specification		100-175	4-8

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.004.2503	60-90
3.2 x 350	WCE.NN.004.3203	80-110
4.0 x 350	WCE.NN.004.4003	110-150

DCEP

REDRYING CONDITION:
Keep electrodes dry.

Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

ALBOND 12 Si

NON FERROUS (Al Alloys)

KEY FEATURES:

- Aluminium alloy with typical 12% Si
- Special coating to reduce moisture pickup
- Electrode dia. should roughly be equivalent to plate thickness
- Provide high melting rate
- Slag residues should be thoroughly removed to obtain non corrosive weld
- Section thickness above 8 mm should be preheated to min. 200°C
- Deposit of 4047 type alloys

TYPICAL APPLICATIONS:

- Welding and repair of cast Al alloys containing more than 7% Si
- Engine blocks, Gear box units, Automotive parts
- Window frames, Tubes, Furniture
- Al alloys such as G-AlSi 12, G-AlSi 12 (Cu), G-AlSi 10Mg, G-AlSi 10Mg (Cu)

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

Si	Fe	Al
11.2	0.2	Bal

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	195	5.5
Specification		180 min	4-8

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.005.2503	60-90
3.2 x 350	WCE.NN.005.3203	80-110
4.0 x 350	WCE.NN.005.4003	110-150

DCEP

REDRYING CONDITION:
Keep electrodes dry.

Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

BRONZE

NON FERROUS (Cu Alloys)

AWS A/SFA 5.6 ECuSn-A

CLASSIFICATION:

ISO 17777
E Cu S180 (CuSn 5P)

KEY FEATURES:

- Copper-Tin electrode
- Due to high heat conductivity of Cu alloys, preheat of 260-370°C is recommended for heavy sections
- Typical 93% Cu-6% Sn deposit
- No preheat is required on thin sections and ferrous base material

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of Copper or Bronze to steel
- Impeller blades, Valve seats
- Brass, Galvanized iron, Malleable Iron
- Ship propellers, Bearings, Bushing
- Cast iron welding where colour match is not necessary
- Joining dissimilar metals such as mild steel to phosphorus bronze and brass

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

Cu	Sn	P
94.8	5.0	0.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	275	24
Specification		240 min	20 min

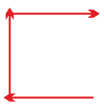
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.002.2503	40-70
3.2 x 350	WCE.NN.002.3203	80-110
4.0 x 350	WCE.NN.002.4003	110-160

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr.

All Positions, except vertical Down



Available in packing of 10 kg box containing 10 plastic cartons of 1 kg each.

SUPER CuNi

NON FERROUS (Ni Alloys)

AWS A/SFA 5.6 ECuNi

CLASSIFICATION:

ISO 17777
E Cu 7158 (CuNi30Mn2FeTi)

KEY FEATURES:

- Typical 70Cu-30Ni type weld deposit
- Easy slag removal
- Shiny and uniform bead
- Crack resistant weld
- No preheating required
- Weld deposit resistant to sea water

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of wrought and cast 70/30, 80/20, 90/10 Copper-Nickel alloys to themselves or to each other
- Welding of Copper-Nickel alloys of up to 30% Ni
- Clad side of copper-nickel clad steels
- Surfacing applications where high resistance to corrosion, erosion or cavitation is required
- Ship building, food industries, desalinization plants, refrigerators, heat exchangers

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

Mn	Si	Fe	Ni	Cu
1.7	0.3	0.65	31.5	68.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	Hardness, HBS
Specification	As Welded	350 min	20 min	60-80

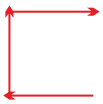
PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A
2.5 x 350	WCE.NN.022.2503	60-80
3.2 x 350	WCE.NN.022.3203	90-100
4.0 x 350	WCE.NN.022.4003	110-130

DCEP

REDRYING CONDITION:
250-300°C for minimum 1 hr

All Positions, except vertical Down



Available in Ivory packing of 10 kg box containing 10 cartons of 1 kg each.

CAG 9900

GOUGING and CUTTING

KEY FEATURES:

- Special electrode with high blowing effect
- Produce hot exothermic penetrating arc
- Molten metal is blown away quickly
- Provides good visibility
- The cut is smooth, molten and blown away material can be removed easily
- Does not damage the metal structure

TYPICAL APPLICATIONS:

- For chamfering, gouging and making grooves in all conductive metals
- For removing defective welds and rivets without using oxyacetylene and compressed air
- Removing flashers and risers in foundry castings
- For bevelling cracks in machine frames without dismantling
- Cutting of metal parts on building sites

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A	
3.2 x 450	WFN.CG.006.3204	250-350	 AC/DCEP
4.0 x 450	WFN.CG.006.4004	300-400	
5.0 x 450	WFN.CG.006.5004	350-500	

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

CAG 9901

GOUGING and CUTTING

KEY FEATURES:

- Cutting electrode with special coating
- Special coating gives a stable arc during the cutting or piercing process
- The kerfs are clean and narrow
- Suitable for all positions
- Produce negligible slag

TYPICAL APPLICATIONS:

- Cutting and piercing of steel, cast iron, copper materials, aluminium
- Excellent for burning rivets
- Dismantling work at sites
- Cutting out unwanted metal in foundry castings
- Oxyacetylene or compressed air need not be used

PARAMETERS - PACKING DATA:

Ø x L, mm	Item Code	Amperage, A	
3.2 x 450	WFN.CG.005.3204	150-250	 AC/DCEP
4.0 x 450	WFN.CG.005.4004	200-300	
5.0 x 450	WFN.CG.005.5004	250-400	

Available in Standard carton packing of 20 kg box containing 4 cartons of 5 kg each.

Wires and Fluxes

Section II

AUTOMIG I

GMAW/GTAW C-Mn Steel

AWS A/SFA 5.18 **ER70S-6**

CLASSIFICATION:

EN ISO 14341-A	CSA W48
G 42 3 C1 3Si1	B-G 49A 3C1 S6
G 46 4 M21 3Si1	
G 46 4 M24 3Si1	

KEY FEATURES:

- C-Mn steel solid wire
- Uniform copper coating
- Smooth wire feeding
- Can be use with 100% CO_2, Ar+CO_2
- Higher level of de-oxidizers makes it suitable for applications where dirt, rust or mill-scale is present
- Radiographic quality weld

APPROVALS: ABS/BV/DNV/IRS/LRA/CE/CWB

TYPICAL APPLICATIONS:

- Truck bodies, Storage tanks
- Construction equipment
- Light gauge work
- Steel furniture, Machinery
- Foundry equipment, Barges
- Tacking work, Small parts repair

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si
0.075	1.45	0.85

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	Shielding Gas	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact, J	
						@-30°C	@-50°C
Typical	As Welded	100% CO_2	570	470	25	50	-
Typical	As Welded	80Ar + 20CO_2	580	480	26	80	50

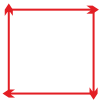
Special Test: HIC and SSCC (NACE)

PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
0.8	15	WCW.ML.018.0802
0.9	15	WCW.ML.018.0902
1.0	15	WCW.ML.018.1002
1.2	15	WCW.ML.018.1202
1.4	15	WCW.ML.018.1402
1.6	15	WCW.ML.018.1602

DCEP

All Positions



STORAGE / HANDLING : Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM	Stickout, mm
CO_2	12-18	10-20
80Ar+20CO_2	17-22	10-20

Available in Plastic Spool & Wire Basket. Also Available in 100, 150 & 250Kg Drums

TIGFIL 70S-6

GTAW C-Mn Steel

AWS A/SFA 5.18 **ER70S-6**

CLASSIFICATION:

EN ISO 636-A
W 46 5 3Si1

KEY FEATURES:

- C-Mn steel filler rod
- Uniform copper coating
- Controllable weld pool
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Root pass pipe welding
- Thin sheet metal, Auto body
- Farm implements, Steel casings
- Collision repair, Pressure vessels
- Application in high pressure piping for shipbuilding, petro chemical and nuclear power plant

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si
0.075	1.45	0.85

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -50°C, J
Typical	As Welded	560	485	27	50

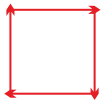
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TC.020.1606
2.0 x 1000	20	WCW.TC.020.2006
2.4 x 1000	20	WCW.TC.020.2406
3.2 x 1000	20	WCW.TC.020.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGFIL 70S-2

GTAW C-Mn Steel

AWS A/SFA 5.18 **ER70S-2**

CLASSIFICATION:

EN ISO 636-A
W 42 3 2Ti

KEY FEATURES:

- Triple deoxidized copper coated C-Mn steel filler rod
- High quality, high toughness welds
- Excellent choice for welding over rust and mill scale
- Radiographic quality weld

APPROVALS: ABS/DNV/LRA/CE

TYPICAL APPLICATIONS:

- Welding of Pressure vessel, Boilers involving unalloyed and micro-alloyed structural steels with specified UTS up to 520 Mpa
- High quality pipe welding of mild and medium tensile steels
- Best suited for single side, melt through welding

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Ti	Zr	Al
0.055	1.1	0.45	0.08	0.04	0.08

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	As Welded	560	470	26	65

Special Test: Hot Tensile Test at 196°C / HIC and SSCC (NACE)

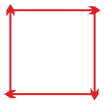
PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg/Box	Item Code
1.6 x 1000	20	WCW.TC.002.1606
2.0 x 1000	20	WCW.TC.002.2006
2.4 x 1000	20	WCW.TC.002.2406
3.2 x 1000	20	WCW.TC.002.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGFIL 70S-2 SPL

GTAW C-Mn Steel

AWS A/SFA 5.18 **ER70S-2**

CLASSIFICATION:

EN ISO 636-A
W 42 5 2Ti

KEY FEATURES:

- Triple deoxidized C-Mn steel filler rod with very low impurities
- Uniform copper coating
- Strong, tough and ductile weld metal
- Meets impact requirement at -46°C
- Radiographic weld quality

APPROVALS: ABS/BV/CE

TYPICAL APPLICATIONS:

- Welding NACE pipes-type A106 Gr.B or equivalent material
- Recommended for root runs of pipes and tubes for offshore application
- Pressure vessels, Boilers involving unalloyed and micro-alloyed structural steels with specified UTS up to 520 Mpa

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Ti	Zr	Al
0.05	1.1	0.5	0.1	0.06	0.1

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -46°C, J
Typical	As Welded	560	480	27	50

Hardness, 3 Layers: 210 BHN max

Special Test: HIC and SSCC (NACE)

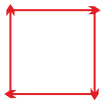
PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg/Box	Item Code
1.6 x 1000	20	WCW.TC.003.1606
2.0 x 1000	20	WCW.TC.003.2006
2.4 x 1000	20	WCW.TC.003.2406
3.2 x 1000	20	WCW.TC.003.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGFIL 70S-A1

GTAW LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.28 **ER70S-A1**

CLASSIFICATION:

EN ISO 21952-B
W 52 I1 1M3

KEY FEATURES:

- Copper coated low alloy GMAW wire
- Typical 0.5Mo content
- Smooth feeding and stable arc under optimum welding conditions
- Increase strength at elevated temperature
- Weld deposit highly resistant to cold cracking
- Shiny welds of radiographic quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding creep resistant 0.5% Mo steels and fine grained steels with service temperatures up to 500°C
- High temperature and high pressure boilers
- Suitable for 15Mo3, 16Mo3, 14Mo6
- Welding low alloy steels such as type ASTM A335 grade P1 and similar materials
- Pipe line and crane construction as well as in structural steel engineering

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Mo
0.08	1.1	0.55	0.45

MECHANICAL PROPERTIES OF ALL WELD METAL:

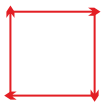
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%
Typical	PWHT: 620°C for 1 hr	580	470	24

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg/Box	Item Code
1.6 x 1000	20	WCW.TC.004.1606
2.0 x 1000	20	WCW.TC.004.2006
2.4 x 1000	20	WCW.TC.004.2406
3.2 x 1000	20	WCW.TC.004.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGFIL 80S-B2

GTAW LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.28 **ER80S-B2**

CLASSIFICATION:

EN ISO 21952-B
W 55 I13 1CM

KEY FEATURES:

- Copper coated low alloy steel solid filler wire
- Uniform copper coating
- Deposit notch free welds with excellent mechanical properties
- Typical 1.25 Cr-0.5 Mo weld deposit
- Careful control of pre-heat, interpass temperature & PWHT is essential to avoid cracking
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of 0.5Cr-0.5Mo, 1Cr-0.5Mo and 1.25Cr-0.5Mo steel pipes, plates and castings
- Elevated temperature and corrosive service applications in Refineries, Petrochemicals & fertilizers plant
- Can be used for joining dissimilar combinations of Cr-Mo and Carbon steels
- Suitable for ASTM A 199-76, A 200-75, A 213-76D, A 335 Gr.P11, A 369-76, A 387 Gr.B, DIN 15CrMo3

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Mo
0.1	0.6	0.5	1.25	0.52

MECHANICAL PROPERTIES OF ALL WELD METAL:

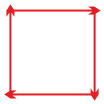
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%
Typical	PWHT: 620°C for 1 hr	620	530	22

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg/Box	Item Code
1.6 x 1000	20	WCW.TC.007.1606
2.0 x 1000	20	WCW.TC.007.2006
2.4 x 1000	20	WCW.TC.007.2406
3.2 x 1000	20	WCW.TC.007.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGFIL 80S-B2 SPL

GTAW LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.18 **ER80S-B2**

CLASSIFICATION:

EN ISO 21952-B
W 55 I1 1CM

KEY FEATURES:

- Copper coated low alloy steel solid filler rod
- Typical 1.25 Cr-0.5 Mo weld deposit
- Notch free welds with excellent mechanical properties
- Meets X factor requirement
- Control on pre-heat, interpass temperature required
- PWHT is essential to avoid cracking
- Radiographic quality weld

TYPICAL APPLICATIONS:

- Welding of 0.5Cr-0.5Mo, 1Cr-0.5Mo and 1.25Cr0.5Mo steel pipes, plates and castings
- Elevated temperature and corrosive service applications in Refineries, Petrochemicals & fertilizers plant
- Can be used for joining dissimilar combinations of Cr-Mo and Carbon steels
- Suitable for ASTM A 199-76, A 200-75, A 213-76D, A 335 Gr.P11, A 369-76, A 387 Gr.B, DIN 15CrMo3

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Mo
0.1	0.6	0.5	1.25	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	PWHT: 620°C for 1 Hr	600	570	21	40

Special Test: X Factor = (10P + 5Sb + 4Sn + As)/100<15ppm

CREEP TEST DATA:

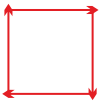
Condition	Temperature, °C	Stress, Mpa	Duration, Hrs	Strain% after 1000 Hrs
PWHT: 695°C for 1 Hr	500	300	1000	1.54
	550	140	1000	0.99

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg/Box	Item Code
1.6 x 1000	20	WCW.TC.023.1606
2.0 x 1000	20	WCW.TC.023.2006
2.4 x 1000	20	WCW.TC.023.2406
3.2 x 1000	20	WCW.TC.023.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGFIL 90S-B3

GTAW LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.28 **ER90S-B3**

CLASSIFICATION:

EN ISO 21952-B
W 62 I1 2C1M

KEY FEATURES:

- Copper coated low alloy steel solid filler wire & rod
- Uniform copper coating
- Deposit notch free welds with excellent mechanical properties
- Typical 2.25 Cr-1 Mo weld deposit
- Superior strength and toughness after PWHT
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of 2.25Cr-0.5Mo and 2.25Cr-1Mo type creep resistant steels
- Joining ASTM A 335 Gr.P22, A 387 Gr.22 materials
- Refineries, Petrochemicals and fertilizers plant
- Joining of P5A materials
- Cr-Mo and Cr-Mo-V bearing steels for hightemperature applications
- Suitable for 12CrMo9-10, 10CrSiMoV7 German steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Mo
0.09	0.6	0.5	2.45	0.95

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%
Typical	PWHT: 690°C for 1 hr	680	600	20

CREEP TEST DATA:

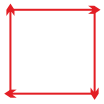
Condition	Temperature, °C	Stress, Mpa	Duration, Hrs	Strain% after 1000 Hrs
PWHT: 690°C for 1 Hr	550	140	1000	0.92
	600	80	1000	1.28

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TC.008.1606
2.0 x 1000	20	WCW.TC.008.2006
2.4 x 1000	20	WCW.TC.008.2406

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGFIL 90S-B3 SPL

FCAW LOW ALLOY STEEL (High Temperature)

AWS A/SFA 5.28 ER90S-B3

CLASSIFICATION:

EN ISO 21952-A
W 62 I1 2C1M

KEY FEATURES:

- Copper coated low alloy steel solid filler rod
- Typical 2.25 Cr-1 Mo weld deposit
- Notch free welds with excellent mechanical properties
- Superior strength and toughness after PWHT
- Meets X factor requirement
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of 2.25Cr-0.5Mo and 2.25Cr-1Mo type creep resistant steels
- Joining ASTM A 335 Gr.P22, A 387 Gr.22 materials
- Refineries, Petrochemicals and fertilizers plant
- Joining of P5A materials
- Cr-Mo and Cr-Mo-V bearing steels for hightemperature applications
- Suitable for 12CrMo9-10, 10CrSiMoV7 German steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Mo
0.1	0.6	0.5	2.5	0.95

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	PWHT: 690°C for 1 hr	700	600	20	50

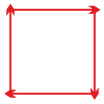
Special Test: X Factor = (10P + 5Sb + 4Sn + As)/100<15ppm

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TC.021.1606
2.0 x 1000	20	WCW.TC.021.2006
2.4 x 1000	20	WCW.TC.021.2406
3.2 x 1000	20	WCW.TC.021.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGIL 80S-Ni1

GMAW LOW ALLOY STEEL (Low Temperature)

AWS A/SFA 5.28 **ER80S-Ni1**

CLASSIFICATION:

EN ISO 636-B
W 55A 5U N2

KEY FEATURES:

- Copper coated low alloy steel solid filler wire & rod
- Typical 1%Ni-Mn alloy
- Uniform copper coating
- Medium strength weld deposit gives high impact at -45°C
- Radiographic quality weld

APPROVALS: ABS/BV/CE

TYPICAL APPLICATIONS:

- Welding of 1% Ni steels
- Welding fine grained and low alloyed Ni steels
- Welding of steels for application at sub-zero temperature

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Ni
0.065	1.0	0.5	0.9

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -46°C, J
Typical	As Welded	565	490	27	55

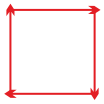
Hardness, 3 Layer: 200 BHN max

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TC.011.1606
2.0 x 1000	20	WCW.TC.011.2006
2.4 x 1000	20	WCW.TC.011.2406
3.2 x 1000	20	WCW.TC.011.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGFIL 80S-Ni2

GTAW LOW ALLOY STEEL (Low Temperature)

AWS A/SFA 5.28 ER80S-Ni2

CLASSIFICATION:

EN ISO 636-A
W 55P 5U N5

KEY FEATURES:

- Copper coated low alloy steel solid filler wire & rod
- Typical 2.5% Ni-Mn alloy
- Uniform copper coating
- Tough, crack resistant weld deposit gives high impact at -60°C
- Radiographic quality weld

APPROVALS: ABS/BV/CE

TYPICAL APPLICATIONS:

- Welding of 2.5% Ni steels
- Welding fine grained and low alloyed Ni steels
- Welding of storage tanks for low temperature application
- Offshore applications

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Ni
0.06	1.0	0.5	2.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -60°C, J
Typical	PWHT: 620°C for 1 hr	590	510	28	50

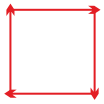
Hardness, 3 Layer: 200 BHN max

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TC.013.1606
2.0 x 1000	20	WCW.TC.013.2006
2.4 x 1000	20	WCW.TC.013.2406
3.2 x 1000	20	WCW.TC.013.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

AUTOMIG 80S-G

GMAW LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.28 **ER80S-G**

CLASSIFICATION:

EN ISO 16834-B
G 4M31

KEY FEATURES:

- Copper coated low alloy steel solid filler wire & rod
- Characterized by smooth and shiny welds
- Uniform copper coating
- Provide good wetting, rust and scale tolerance
- Weld deposit is resistant to cold cracking
- Radiographic quality even over poor cleaned base metals

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of Mn-0.5 Mo steel
- Pipelines and pressure vessels with operating temperatures of about 500°C
- Repair of medium strength steel castings
- Suitable for a wide range of base metals such as problem steels containing high sulfur to the basic carbon and low alloy Cr-Mo base metals

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Mo
0.09	1.7	0.6	0.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	As Welded	600	540	24	50

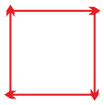
Mechanical properties will vary with the type of shielding gas used.

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
1.2	15	WCW.ML.003.1202
1.6	15	WCW.ML.003.1602

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
CO_2	15-20

TIGFIL 80S-G

GTAW LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.28 **ER80S-G**

CLASSIFICATION:

EN ISO 16834-B
W 4M31

KEY FEATURES:

- Copper coated low alloy steel solid filler wire & rod
- Characterized by smooth and shiny welds
- Uniform copper coating
- Provide good wetting, rust and scale tolerance
- Weld deposit is resistant to cold cracking
- Radiographic quality even over poor cleaned base metals

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of Mn-0.5 Mo steel
- Pipelines and pressure vessels with operating temperatures of about 500°C
- Repair of medium strength steel castings
- Suitable for a wide range of base metals such as problem steels containing high sulfur to the basic carbon and low alloy Cr-Mo base metals

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Mo
0.09	1.6	0.6	0.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

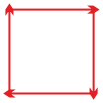
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	As Welded	600	540	24	40 min

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TC.005.1606
2.0 x 1000	20	WCW.TC.005.2006
2.4 x 1000	20	WCW.TC.005.2406
3.2 x 1000	20	WCW.TC.005.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

AUTOMIG 90S-G

GMAW LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.28 **ER90S-G**

CLASSIFICATION:

EN ISO 16834-B
G 4M31

KEY FEATURES:

- Copper coated high strength low alloy steel GMAW wire & rod
- Welds even over poor cleaned base metals
- Recommended Ar+O2 shielding gas
- Moderately high strength with adequate low temperature toughness
- Exhibits excellent out of position characteristics
- Radiographic weld quality

APPROVALS: LRA/CE

TYPICAL APPLICATIONS:

- Welding high sulfur bearing free machining steels, medium carbon steels, 0.5 Mo steels and high temperature resistant steels
- Pipelines and pressure vessels with operating temperatures of about 500°C
- Repair of medium strength steel castings

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Mo
0.09	1.7	0.55	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	As Welded	650	570	25	45

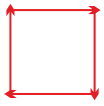
Mechanical properties will vary with the type of shielding gas used.

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
1.2	15	WCW.ML.007.1202
1.6	15	WCW.ML.007.1602

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar/1-5O_2 or 80Ar + 20CO_2	15-20

TIGFIL 90S-G

GTAW LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.28 **ER90S-G**

CLASSIFICATION:

EN ISO 16834-B
W 4M31

KEY FEATURES:

- Copper coated high strength low alloy steel GMAW wire & rod
- Welds even over poor cleaned base metals
- Recommended Ar+O2 shielding gas
- Moderately high strength with adequate low temperature toughness
- Exhibits excellent out of position characteristics
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding high sulfur bearing free machining steels, medium carbon steels, 0.5 Mo steels and high temperature resistant steels
- Pipelines and pressure vessels with operating temperatures of about 500°C
- Repair of medium strength steel castings

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Mo
0.09	1.7	0.55	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

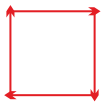
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -30°C, J
Typical	As Welded	650	570	25	45

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TC.006.1606
2.0 x 1000	20	WCW.TC.006.2006
2.4 x 1000	20	WCW.TC.006.2406
3.2 x 1000	20	WCW.TC.006.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

AUTOMIG 100S-G

GMAW LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.28 **ER100S-G**

CLASSIFICATION:

EN ISO 16834-A
G 62 4 C1 Mn3Ni1CrMo

KEY FEATURES:

- Copper coated alloy steel wire
- Ni-Cr-Mo alloyed
- Smooth feedability, low spatter
- Exhibit high strength as well as low temperature toughness
- Radiographic quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of HY 80 and other similar grade materials
- Welding of high strength and low alloy steels
- Joining large vehicles and crane manufacturing
- Suitable for single and multi-pass welding of low alloy steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.07	1.4	0.6	0.45	1.4	0.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -40°C, J
Typical	As Welded	800	710	24	60

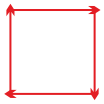
Mechanical properties will vary with the type of shielding gas used.

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
1.2	15	WCW.ML.022.1202
1.6	15	WCW.ML.022.1602

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar/1-5O_2	15-20

TIGFIL 100S-G

GTAW LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.28 **ER100S-G**

CLASSIFICATION:

EN ISO 16834-A
W 62 4 I1 Mn3Ni1CrMo

KEY FEATURES:

- Copper coated alloy steel wire
- Ni-Cr-Mo alloyed
- Smooth feedability, low spatter
- Exhibit high strength as well as low temperature toughness
- Radiographic quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of HY 80 and other similar grade materials
- Welding of high strength and low alloy steels
- Joining large vehicles and crane manufacturing
- Suitable for single and multi-pass welding of low alloy steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.07	1.4	0.6	0.45	1.4	0.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

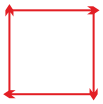
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -40°C, J
Typical	As Welded	800	710	24	60

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TC.036.1606
2.0 x 1000	20	WCW.TC.036.2006
2.4 x 1000	20	WCW.TC.036.2406
3.2 x 1000	20	WCW.TC.036.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

AUTOMIG 110S-G

GMAW LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.28 **ER110S-G**

CLASSIFICATION:

EN ISO 16834-A
G 69 4 M21 Mn3Ni1CrMo

KEY FEATURES:

- Copper coated medium alloy steel wire
- Exhibit high strength as well as low temperature toughness
- Excellent welding characteristics
- Exhibit excellent out of position characteristics
- Radiographic quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of high strength low alloy steels
- Welding of HY 80 and other similar grade materials
- Joining large vehicles and crane manufacturing
- Pipelines, tankers, containers

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.08	1.6	0.6	0.3	1.4	0.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

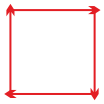
	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -40°C, J
Typical	As Welded	830	735	23	70

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
1.2	15	WCW.ML.020.1202
1.6	15	WCW.ML.020.1602

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar/1-5O_2	15-20

TIGFIL 110S-G

GTAW LOW ALLOY STEEL (High Strength)

AWS A/SFA 5.28 **ER110S-G**

CLASSIFICATION:

EN ISO 16834-A
W 69 4 I1 Mn3Ni1CrMo

KEY FEATURES:

- Copper coated medium alloy steel wire
- Exhibit high strength as well as low temperature toughness
- Excellent welding characteristics
- Exhibit excellent out of position characteristics
- Radiographic quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of high strength low alloy steels
- Welding of HY 80 and other similar grade materials
- Joining large vehicles and crane manufacturing
- Pipelines, tankers, containers

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.08	1.6	0.6	0.3	1.4	0.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -40°C, J
Typical	As Welded	830	735	23	70

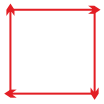
PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TC.025.1606
2.0 x 1000	20	WCW.TC.025.2006
2.4 x 1000	20	WCW.TC.025.2406
3.2 x 1000	20	WCW.TC.025.3206

DCEN

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

MIGINOX 307

GMAW STAINLESS STEEL

CLASSIFICATION:

EN ISO 14343-A
G 18 8 Mn

KEY FEATURES:

- 18-8-Mn type stainless steel solid wire
- Smooth operating characteristics
- Good crack resistance
- High work hardening characteristics
- Non magnetic weld deposit

TYPICAL APPLICATIONS:

- Suitable for austenitic manganese steels and dissimilar metal welding
- Welding of manganese steels to carbon steels castings or forgings

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni
0.05	5.3	0.7	18.5	8.0

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%
Typical	As Welded	600	500	28

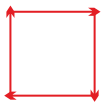
Mechanical properties will vary with the type of shielding gas used.

PARAMETERS - PACKING DATA:

Ø x L, mm	Kg/Spool	Item Code
1.2	12.5	WCW.MX.031.1204
1.6	12.5	WCW.MX.031.1604

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
98Ar/2O_2 or Ar+1-5CO_2	15-22

MIGINOX 308L

GMAW STAINLESS STEEL

AWS A/SFA 5.9 **ER308L**

CLASSIFICATION:

EN ISO 14343-A
G 19 9 L

KEY FEATURES:

- An extra low carbon 308L type stainless steel solid wire
- Excellent corrosion & scaling resistance up to 800°C
- Excellent crack resistance
- Resistance to intergranular corrosion
- Radiographic quality welds

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding Cr-Ni steels represented by AISI 301, 302, 304, 304L, 308, 308L
- Fabrication of boilers, reactors, turbines, pipes, tubes
- SS piping in refineries, oil and gas industries, chemical plants, food processing industries

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni
0.027	1.7	0.4	19.7	9.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	570	39

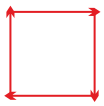
Mechanical properties will vary with the type of shielding gas used.

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	12.5	WCW.MX.002.0804
1.2	12.5	WCW.MX.002.1204
1.6	12.5	WCW.MX.002.1604

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
98Ar + $2O_2$ or Ar+1-5CO_2	15-22

TIGINOX 308L

GTAW STAINLESS STEEL

AWS A/SFA 5.9 **ER308L**

CLASSIFICATION:

EN ISO 14343-A
W 19 9 L

KEY FEATURES:

- An extra low carbon 308L type stainless steel solid wire
- Excellent corrosion & scaling resistance up to 800°C
- Excellent crack resistance
- Resistance to intergranular corrosion
- Radiographic quality welds

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding Cr-Ni steels represented by AISI 301, 302, 304, 304L, 308, 308L
- Fabrication of boilers, reactors, turbines, pipes, tubes
- SS piping in refineries, oil and gas industries, chemical plants, food processing industries

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni
0.027	1.7	0.4	19.7	9.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

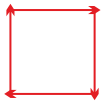
	Condition	UTS, MPa	EL%
Typical	As Welded	570	39

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TU.002.1606
2.0 x 1000	20	WCW.TU.002.2006
2.4 x 1000	20	WCW.TU.002.2406
3.2 x 1000	20	WCW.TU.002.3206

DCEN

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

MIGINOX 308LSi

GMAW STAINLESS STEEL

AWS A/SFA 5.9 **ER308LSi**

CLASSIFICATION:

EN ISO 14343-A
G 19 9 LSi

KEY FEATURES:

- An extra low carbon 20Cr/10Ni type stainless steel solid wire
- High Si content improves wetting characteristics
- Resists intergranular corrosion
- Controlled ferrite content ensures excellent crack resistance
- Excellent corrosion & scaling resistance up to 800°C
- Radiographic quality welds

TYPICAL APPLICATIONS:

- Welding Cr-Ni steels represented by AISI 301, 302, 304, 304L, 308, 308L
- Fabrication of boilers, reactors, turbines, pipes, tubes
- SS piping in refineries, oil and gas industries, chemical plants, food processing industries

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni
0.03	1.8	0.7	19.6	9.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	590	39

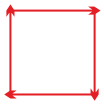
Mechanical properties will vary with the type of shielding gas used.

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
1.2	12.5	WCW.MX.024.1204
1.6	12.5	WCW.MX.024.1604

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
98Ar/2O_2 or Ar+1-5CO_2	15-22

MIGINOX 309L

GMAW STAINLESS STEEL

AWS A/SFA 5.9 **ER309L**

CLASSIFICATION:

EN ISO 14343-A
G 23 12 L

KEY FEATURES:

- An extra low carbon 23Cr/12Ni type stainless steel wire
- Excellent corrosion and oxidation resistance up to 1100°C
- High ferrite content ensures highest cracking resistance
- Radiographic quality weld

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of AISI 309, 309L type steels
- Dissimilar joints between stainless steels and low alloy or carbon steels
- Buffer layer on low alloy and carbon steels
- Joining corrosion resistant clad steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni
0.027	1.9	0.4	23.5	12.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	590	40

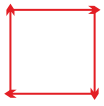
Mechanical properties will vary with the type of shielding gas used.

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	12.5	WCW.MX.004.0804
1.2	12.5	WCW.MX.004.1204
1.6	12.5	WCW.MX.004.1604

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
98Ar/2O_2 or Ar+1-5CO_2	15-22

TIGINOX 309L

GTAW STAINLESS STEEL

AWS A/SFA 5.9 **ER309L**

CLASSIFICATION:

EN ISO 14343-A
W 23 12 L

KEY FEATURES:

- An extra low carbon 23Cr/12Ni type stainless steel wire
- Excellent corrosion and oxidation resistance up to 1100°C
- High ferrite content ensures highest cracking resistance
- Radiographic quality weld

APPROVALS: ABS/LRA/CE

TYPICAL APPLICATIONS:

- Welding of AISI 309, 309L type steels
- Dissimilar joints between stainless steels and low alloy or carbon steels
- Buffer layer on low alloy and carbon steels
- Joining corrosion resistant clad steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni
0.027	1.9	0.4	23.5	12.3

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	590	40

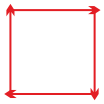
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt, Kg	Item Code
1.6 x 1000	20	WCW.TC.004.1606
2.0 x 1000	20	WCW.TC.004.2006
2.4 x 1000	20	WCW.TC.004.2406
3.2 x 1000	20	WCW.TC.004.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

MIGINOX 309LSi

GMAW STAINLESS STEEL

AWS A/SFA 5.9 **ER309LSi**

CLASSIFICATION:

EN ISO 14343-A
G 23 12 LSi

KEY FEATURES:

- An extra low carbon 24Cr/13Ni type stainless steel solid wire
- High Si content improves wetting characteristics
- Excellent corrosion and oxidation resistance up to 1100°C
- Highest cracking resistance
- Radiographic quality welds

TYPICAL APPLICATIONS:

- Welding of AISI 309, 309L type steels
- Dissimilar joints between stainless steels and low alloy or carbon steels
- Buffer layer on low alloy and carbon steels
- Joining corrosion resistant clad steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni
0.026	1.9	0.7	23.4	12.6

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	600	38

Mechanical properties will vary with the type of shielding gas used.

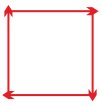
PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
1.2	12.5	WCW.MX.025.1204
1.6	12.5	WCW.MX.025.1604

DCEP

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
98Ar/2O_2 or Ar+1-5CO_2	15-22

MIGINOX 316L

GMAW STAINLESS STEEL

AWS A/SFA 5.9 **ER316L**

CLASSIFICATION:

EN ISO 14343-A
G (19 12 3 L)

KEY FEATURES:

- An extra low carbon 19Cr/12Ni/Mo type stainless steel wire
- Offers improved corrosion and pitting resistance in marine and industrial environment
- High resistance against intergranular corrosion
- Resistant to SCC, hot cracking and chemical attack upto 850°C
- Radiographic quality welds

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding austenitic alloys represented by AISI 316, 316L, 317, 317L, 318 types
- Joining similar grade wrought and cast material
- Application in textile processing, Naval and Chemical environments, Paper and pulp, Paint and dye industries
- Cladding stainless steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.03	1.7	0.4	18.3	11.5	2.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	550	36

Mechanical properties will vary with the type of shielding gas used.

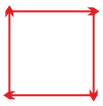
PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	12.5	WCW.MX.009.0804
1.2	12.5	WCW.MX.009.1204
1.6	12.5	WCW.MX.009.1604

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions



Shielding Gas	Gas Flow Rate, LPM
98Ar/2O_2 or Ar+1-5CO_2	15-25

TIGINOX 316L

GTAW STAINLESS STEEL

AWS A/SFA 5.9 **ER316L**

CLASSIFICATION:

EN ISO 14343-A
W (19 12 3 L)

KEY FEATURES:

- An extra low carbon 19Cr/12Ni/Mo type stainless steel wire
- Offers improved corrosion and pitting resistance in marine and industrial environment
- High resistance against intergranular corrosion
- Resistant to SCC, hot cracking and chemical attack upto 850°C
- Radiographic quality welds

APPROVALS: ABS/IRS/CE

TYPICAL APPLICATIONS:

- Welding austenitic alloys represented by AISI 316, 316L, 317, 317L, 318 types
- Joining similar grade wrought and cast material
- Application in textile processing, Naval and Chemical environments, Paper and pulp, Paint and dye industries
- Cladding stainless steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.03	1.7	0.4	18.3	11.5	2.2

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	550	36

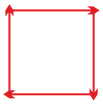
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt, Kg	Item Code
1.6 x 1000	20	WCW.TU.009.1606
2.0 x 1000	20	WCW.TU.009.2006
2.4 x 1000	20	WCW.TU.009.2406
3.2 x 1000	20	WCW.TU.009.3206

DCEN

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

MIGINOX 316LSi

GMAW STAINLESS STEEL

AWS A/SFA 5.9 **ER316LSi**

CLASSIFICATION:

EN ISO 14343-A
G (19 12 3 LSi)

KEY FEATURES:

- An extra low carbon 19Cr/12Ni/Mo type stainless steel solid wire
- High Si content improves wetting characteristics
- High resistance against intergranular corrosion
- Resistant to SCC, hot cracking and chemical attack up to 850°C
- Offers improved corrosion & pitting resistance in marine and industrial environment
- Radiographic quality welds

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding austenitic alloys represented by AISI 316, 316L, 317, 317L, 318 types
- Joining similar grade wrought and cast material
- Application in textile processing, Naval and Chemical environments, Paper and pulp, Paint and dye industries
- Cladding stainless steels

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cu	Ni	Mo
0.025	1.7	0.7	18.3	11.3	2.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	570	36

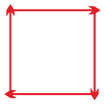
PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	12.5	WCW.MX.041.0804
1.2	12.5	WCW.MX.041.1204
1.6	12.5	WCW.MX.041.1604

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions



Shielding Gas	Gas Flow Rate, LPM
98Ar/2O_2 or Ar+1-5CO_2	15-22

MIGINOX 347

GMAW STAINLESS STEEL

AWS A/SFA 5.9 **ER347**

CLASSIFICATION:

EN ISO 14343-A
G 19 9 Nb

KEY FEATURES:

- 19Cr/9Ni/Nb type stabilized stainless steel wire
- Resistance to intergranular corrosion and scaling up to 850°C
- Resistance to cracking and embrittlement
- Smooth operating characteristics
- Radiographic quality welds

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding stabilized Cr-Ni steels such as AISI 321, 321H, 347, 347H
- Refineries, power plants, centrifugal pump impellers and shafts, valve faces, seats
- Recommended for use at high temperatures
- Fabrication of boiler and gas turbine
- Welding of stainless steel tanks, valves, pipes in food, chemical and petrochemical industries

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Nb
0.04	1.9	0.4	19.7	9.5	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	580	36

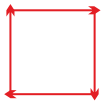
Mechanical properties will vary with the type of shielding gas used.

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	12.5	WCW.MX.010.0804
1.2	12.5	WCW.MX.010.1204
1.6	12.5	WCW.MX.010.1604

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
98Ar/2O_2 or Ar+1-5CO_2	15-25

TIGINOX 347

GTAW STAINLESS STEEL

AWS A/SFA 5.9 **ER347**

CLASSIFICATION:

EN ISO 14343-A
W 19 9 Nb

KEY FEATURES:

- 19Cr/9Ni/Nb type stabilized stainless steel wire
- Resistance to intergranular corrosion and scaling up to 850°C
- Resistance to cracking and embrittlement
- Smooth operating characteristics
- Radiographic quality welds

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding stabilized Cr-Ni steels such as AISI 321, 321H, 347, 347H
- Refineries, power plants, centrifugal pump impellers and shafts, valve faces, seats
- Recommended for use at high temperatures
- Fabrication of boiler and gas turbine
- Welding of stainless steel tanks, valves, pipes in food, chemical and petrochemical industries

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Nb
0.04	1.9	0.4	19.7	9.5	0.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Specification	As Welded	580	36

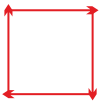
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt, Kg	Item Code
1.6 x 1000	20	WCW.TU.010.1606
2.0 x 1000	20	WCW.TU.010.2006
2.4 x 1000	20	WCW.TU.010.2406
3.2 x 1000	20	WCW.TU.010.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

MIGINOX 347Si

GMAW STAINLESS STEEL

AWS A/SFA 5.9 **ER347Si**

CLASSIFICATION:

EN ISO 14343-A
G 19 9 NbSi

KEY FEATURES:

- 19Cr/9Ni type Nb stabilized stainless steel solid wire
- High Si content improves wetting characteristics
- Resistance to cracking and embrittlement
- Resistance to intergranular corrosion and scaling up to 850°C
- Smooth operating characteristics
- Radiographic quality welds

TYPICAL APPLICATIONS:

- Welding stabilized Cr-Ni steels such as AISI 321, 321H, 347, 347H
- Refineries, power plants, centrifugal pump Impellers and shafts, valve faces, seats
- Fabrication of boiler and gas turbine
- Welding of stainless steel tanks, valves, pipes in food, chemical and petrochemical industries

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Nb
0.025	1.79	0.7	19.5	9.5	0.45

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	570	35

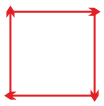
PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	12.5	WCW.MX.028.0804
1.2	12.5	WCW.MX.028.1204
1.6	12.5	WCW.MX.028.1604

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions



Shielding Gas	Gas Flow Rate, LPM
98Ar/2O_2 or Ar+1-5CO_2	15-22

TIGINOX 2209

GTAW DUPLEX STAINLESS STEEL

AWS A/SFA 5.9 **ER2209**

CLASSIFICATION:

EN ISO 14343-A
W 22 9 3 N L

KEY FEATURES:

- An extra low carbon 22Cr/9Ni/3Mo/N type duplex stainless steel wire
- Austenitic-ferritic type weld deposit
- Can be applied for operating temperature upto 200°C
- Excellent combination of high strength and resistance to chloride induced SCC and pitting
- Radiographic quality welds

TYPICAL APPLICATIONS:

- Welding of 2205, 2209 type duplex stainless steels and similar grades
- Pipelines transporting chloride bearing products and sour gases
- Cladding on carbon and low alloy steels
- Cast pumps, Valve bodies and sea water handling equipment
- For chemical equipments, heat exchangers, off-shore platforms

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Mo	N
0.015	1.5	0.4	22.5	8.7	3.3	0.15

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Specification	As Welded	690 min	20 min

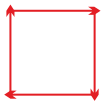
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt, Kg	Item Code
1.6 x 1000	20	WCW.TU.022.1606
2.0 x 1000	20	WCW.TU.022.2006
2.4 x 1000	20	WCW.TU.022.2406
3.2 x 1000	20	WCW.TU.022.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGINOX 2594

GTAW SUPER DUPLEX STAINLESS STEEL

AWS A/SFA 5.9 **ER2594**

CLASSIFICATION:

EN ISO 14343-A
W 25 9 4 N L

KEY FEATURES:

- 25/9/4 type super duplex SS TIG rod
- Austenitic-ferritic duplex microstructure
- Improved resistance to pitting and SSC in chloride environment
- High Pitting Resistance Equivalent Number (PREN)
- Radiographic quality weld
- High tensile and yield strength

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of super duplex stainless steels UNS S 32750, S 32760, SFA 2507, Zeron 100 and Casting alloys e.g. ASTM A890 Gr.5A
- Pipe work systems, flow lines, risers, manifolds, pumps & valves
- Process equipment in offshore oil and gas industries, petrochemical plant
- Also to be used on duplex 2205 grade

TYPICAL CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Mo	Cu	N
0.02	0.9	0.45	24.3	8.5	3.2	0.17	0.30

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%	PREN
Specification	As Welded	760 min	15 min	40 min

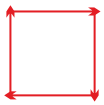
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TU.020.1606
2.0 x 1000	20	WCW.TU.020.2006
2.4 x 1000	20	WCW.TU.020.2406
3.2 x 1000	20	WCW.TU.020.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

AUTOMIG NiCr-3

GMAW NICKEL ALLOYS

AWS A/SFA 5.14 **ERNiCr-3**

CLASSIFICATION:

EN ISO 18274
S Ni 6082 (NiCr20Mn3Nb)

KEY FEATURES:

- A low carbon Ni-Cr solid wire
- Typical 72Ni / 20Cr / 3Mn/ 2.5Nb+Ta alloy
- Suitable for cryogenic to high temperature application
- High corrosion and oxidation resistance
- Excellent toughness at low temperatures
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of Ni-Cr-Fe alloys
- Dissimilar welding of Ni based alloys and cladding
- For joints sensitive to thermal loading above 300°C to prevent carbon diffusion
- Joining steels to stainless steels or Ni based alloys
- Applications in pressure vessels, boilers, fittings, machines and apparatus constructions

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Fe	Si	Cu	Al	Ti	Cr	Nb + Ta	Ni
0.10 max	2.5-3.5	3.0 max	0.50 max	0.50 max	0.12 max	0.75 max	18.0-22.0	2.0-3.0	67.0 min

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	550	33

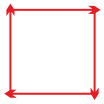
PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
1.2	12.5	WCW.MF.011.1204
1.6	12.5	WCW.MF.011.1604

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions



Shielding Gas	Gas Flow Rate, LPM
75Ar/25He	15-22

TIGFIL NiCr-3

GTAW NICKEL ALLOYS

AWS A/SFA 5.14 **ERNiCr-3**

CLASSIFICATION:

EN ISO 18274
S Ni 6082 (NiCr20Mn3Nb)

KEY FEATURES:

- A low carbon Ni-Cr solid wire
- Typical 72Ni / 20Cr / 3Mn/ 2.5Nb+Ta alloy
- Suitable for cryogenic to high temperature application
- High corrosion and oxidation resistance
- Excellent toughness at low temperatures
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of Ni-Cr-Fe alloys
- Dissimilar welding of Ni based alloys and cladding
- For joints sensitive to thermal loading above 300°C to prevent carbon diffusion
- Joining steels to stainless steels or Ni based alloys
- Applications in pressure vessels, boilers, fittings, machines and apparatus constructions

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Fe	Si	Cu	Al	Ti	Cr	Nb + Ta	Ni
0.10 max	2.5-3.5	3.0 max	0.50 max	0.50 max	0.12 max	0.75 max	18.0-22.0	2.0-3.0	67.0 min

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	550	33

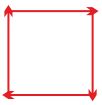
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt, Kg	Item Code
1.6 x 1000	20	WCW.TT.001.1606
2.0 x 1000	20	WCW.TT.001.2006
2.4 x 1000	20	WCW.TT.001.2406
3.2 x 1000	20	WCW.TT.001.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

AUTOMIG NiCrMo-3

GMAW NICKEL ALLOYS

AWS A/SFA 5.14 **ERNiCrMo-3**

CLASSIFICATION:

EN ISO 18274
S Ni 6625 (NiCr22Mo9Nb)

KEY FEATURES:

- A low carbon Ni-Cr-Mo solid wire
- Typical 61Ni / 22Cr/ 9Mo / 3.5Nb+Ta alloy
- Suitable for cryogenic to high temperature application up to 540°C
- Exceptional resistance to pitting, crevice and stress corrosion cracking in severe chloride media
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Joining Ni-Cr-Mo alloys
- Welding of Inconel 625, Incoloy 825, Alloy 20
- Cladding steel with Ni-Cr-Mo weld metal
- Suitable for joining ASTM B443, B444, B446 to itself, to steel, to other Ni-based alloys

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Fe	Si	Cu	Al	Ti	Cr	Nb + Ta	Mo
0.10 max	0.50 max	5.0 max	0.50 max	0.50 max	0.40 max	0.40 max	20.0-23.0	3.15-4.15	8.0-10.0

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	760	32

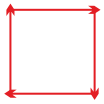
PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	12.5	WCW.MF.012.0804
1.2	12.5	WCW.MF.012.1204
1.6	12.5	WCW.MF.012.1604

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions



Shielding Gas	Gas Flow Rate, LPM
75Ar/25He	15-22

TIGFIL NiCrMo-3

GTAW NICKEL ALLOYS

AWS A/SFA 5.14 **ERNiCrMo-3**

CLASSIFICATION:

EN ISO 18274
S Ni 6625 (NiCr22Mo9Nb)

KEY FEATURES:

- A low carbon Ni-Cr-Mo solid wire
- Typical 61Ni / 22Cr/ 9Mo / 3.5Nb+Ta alloy
- Suitable for cryogenic to high temperature application up to 540°C
- Exceptional resistance to pitting, crevice and stress corrosion cracking in severe chloride media
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Joining Ni-Cr-Mo alloys
- Welding of Inconel 625, Incoloy 825, Alloy 20
- Cladding steel with Ni-Cr-Mo weld metal
- Suitable for joining ASTM B443, B444, B446 to itself, to steel, to other Ni-based alloys

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Fe	Si	Cu	Al	Ti	Cr	Nb + Ta	Mo
0.10 max	0.50 max	5.0 max	0.50 max	0.50 max	0.40 max	0.40 max	20.0-23.0	3.15-4.15	8.0-10.0

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Typical	As Welded	760	32

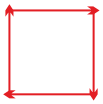
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt, Kg	Item Code
1.6 x 1000	20	WCW.TT.003.1606
2.0 x 1000	20	WCW.TT.003.2006
2.4 x 1000	20	WCW.TT.003.2406
3.2 x 1000	20	WCW.TT.003.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

AUTOMIG NiCrMo-4

GMAW NICKEL ALLOYS

AWS A/SFA 5.14 **ERNiCrMo-4**

CLASSIFICATION:

EN ISO 18274
SNi 6276 (Ni Mo 16Cr 15Fe 6W4)

KEY FEATURES:

- Ni-Cr-Mo-W solid wire
- Typical 57Ni /16Cr/15.5Mo / 5.5Fe/ 4W alloy
- Resistant to abrasion, impact, corrosion and high temperatures
- Excellent resistance to stress corrosion in reducing and oxidizing atmosphere
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of alloy C-276 and similar composition steels
- Dissimilar joints between nickel alloys, stainless and low alloy steels
- Die plates, forge dies, hot shear blades, mandrel punches for hot working
- Suitable for joining ASTM B574, B575, B619, B622, B628 to itself, to steel, to other Ni-based alloys
- Application in chemical plants with highly corrosive conditions

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Fe	Si	Cu	Co	Cr	Mo	V	W
0.02 max	1.0 max	4.0-7.0	0.08 max	0.50 max	2.50 max	14.5-16.5	15.0-17.0	0.35 max	3.0-4.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

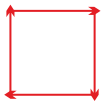
	Condition	UTS, MPa	Hardness, HRc	
			As Welded	Work Hardened
Typical	As Welded	690	20-25	30-35

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	12.5	WCW.MF.013.0804
1.2	12.5	WCW.MF.013.1604
1.6	12.5	WCW.MF.013.1204

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
75Ar/25He	15-22

TIGFIL NiCrMo-4

GTAW NICKEL ALLOYS

AWS A/SFA 5.14 **ERNiCrMo-4**

CLASSIFICATION:

EN ISO 18274
SNi 6276 (Ni Mo 16Cr 15Fe 6W4)

KEY FEATURES:

- Ni-Cr-Mo-W solid wire
- Typical 57Ni /16Cr/15.5Mo / 5.5Fe/ 4W alloy
- Resistant to abrasion, impact, corrosion and high temperatures
- Excellent resistance to stress corrosion in reducing and oxidizing atmosphere
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of alloy C-276 and similar composition steels
- Dissimilar joints between nickel alloys, stainless and low alloy steels
- Die plates, forge dies, hot shear blades, mandrel punches for hot working
- Suitable for joining ASTM B574, B575, B619, B622, B628 to itself, to steel, to other Ni-based alloys
- Application in chemical plants with highly corrosive conditions

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Fe	Si	Cu	Co	Cr	Mo	V	W
0.02 max	1.0 max	4.0-7.0	0.08 max	0.50 max	2.50 max	14.5-16.5	15.0-17.0	0.35 max	3.0-4.5

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	Hardness, HRc	
			As Welded	Work Hardened
Specification	As Welded	690	20-25	30-35

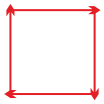
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt, Kg	Item Code
1.6 x 1000	20	WCW.TT.005.1606
2.0 x 1000	20	WCW.TT.005.2006
2.4 x 1000	20	WCW.TT.005.2406
3.2 x 1000	20	WCW.TT.005.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

AUTOMIG 4043

GMAW ALUMINIUM ALLOYS

AWS A/SFA 5.10 **ER4043**

CLASSIFICATION:

EN ISO 18273
S Al 4043 (AlSi5)

KEY FEATURES:

- Al/5Si solid wire
- Excellent feedability with consistent welding performance
- Excellent resistance to hot cracking
- Most widely used general purpose filler alloy
- Si addition improves fluidity
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of wrought and cast Al alloys with Si up to 7%
- Suitable for Al-Si and Al-Mg-Si alloys
- Ship Building, Mobile Machinery
- Automotive, General Fabrication
- Welding of similar grade Al alloys in the form of pipe, plate, forging and casting

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

Si	Fe	Cu	Mn	Mg	Zn	Ti	Al
4.5-6.0	0.8 max	0.3 max	0.05 max	0.05max	0.10 max	0.20 max	Bal.

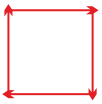
PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	7	WCW.MF.001.0807
1.0	7	WCW.MF.001.1007
1.2	7	WCW.MF.001.1207
1.6	7	WCW.MF.001.1607

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar or Ar/He	15-22

TIGFIL 4043

GTAW ALUMINIUM ALLOYS

AWS A/SFA 5.10 **ER4043**

CLASSIFICATION:

EN ISO 18273
S Al 4043 (AlSi5)

KEY FEATURES:

- Al/5Si solid wire
- Excellent feedability with consistent welding performance
- Excellent resistance to hot cracking
- Most widely used general purpose filler alloy
- Si addition improves fluidity
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of wrought and cast Al alloys with Si up to 7%
- Suitable for Al-Si and Al-Mg-Si alloys
- Ship Building, Mobile Machinery
- Automotive, General Fabrication
- Welding of similar grade Al alloys in the form of pipe, plate, forging and casting

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

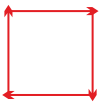
Si	Fe	Cu	Mn	Mg	Zn	Ti	Al
4.5-6.0	0.8 max	0.3 max	0.05 max	0.05max	0.10 max	0.20 max	Bal.

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	8	WCW.TT.011.1606
2.0 x 1000	8	WCW.TT.011.2006
2.4 x 1000	8	WCW.TT.011.2406
3.2 x 1000	8	WCW.TT.011.3206

AC

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 8 kg box, containing 4 plastic tubes of 2 kg each.

AUTOMIG 5183

GMAW ALUMINIUM ALLOYS

AWS A/SFA 5.10 **ER5183**

CLASSIFICATION:

EN ISO 18273
S Al 5183 (AlMg4.5Mn 0.7(A))

KEY FEATURES:

- Al-Mg-Mn solid wire
- Excellent feedability with consistent welding performance
- resistance corrosion and sea water
- Higher strength than the conventional 5% Mg alloy
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of high strength Al alloys
- Automotive, Marine application
- Structural fabrication
- Application where high strength, high impact fracture toughness and exposure to corrosive environment are important

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

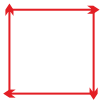
Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Al
0.40 max	0.40 max	0.10 max	0.5-1.0	4.3-5.2	0.05-0.25	0.25 max	0.15 max	Bal.

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	7	WCW.MF.005.0807
1.0	7	WCW.MF.005.1007
1.2	7	WCW.MF.005.1207
1.6	7	WCW.MF.005.1607

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar or Ar/He	15-22

TIGFIL 5183

GTAW ALUMINIUM ALLOYS

AWS A/SFA 5.10 **ER5183**

CLASSIFICATION:

EN ISO 18273
S Al 5183 (AlMg4.5Mn0.7(A))

KEY FEATURES:

- Al-Mg-Mn solid wire
- Excellent feedability with consistent welding performance
- resistance corrosion and sea water
- Higher strength than the conventional 5% Mg alloy
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of high strength Al alloys
- Automotive, Marine application
- Structural fabrication
- Application where high strength, high impact fracture toughness and exposure to corrosive environment are important

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

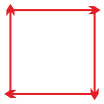
Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Al
0.40 max	0.40 max	0.10 max	0.5-1.0	4.3-5.2	0.05-0.25	0.25 max	0.15 max	Bal.

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	8	WCW.TT.013.1606
2.0 x 1000	8	WCW.TT.013.2006
2.4 x 1000	8	WCW.TT.013.2406
3.2 x 1000	8	WCW.TT.013.3206

AC

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 8 kg box, containing 4 plastic tubes of 2 kg each.

AUTOMIG 5356

GMAW ALUMINIUM ALLOYS

AWS A/SFA 5.10 **ER5356**

CLASSIFICATION:

EN ISO 18273
S Al 5356 (AlMg5Cr(A))

KEY FEATURES:

- Al-5Mg solid wire
- Excellent feedability with consistent welding performance
- Most versatile and universal ly used filler material
- High strength weld with very good corrosion resistance in marine environment
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of similar composition Al-Mg, Al-Mg-Zn and Al-Mg-Si alloys
- Automotive, Marine application
- Structural fabrication
- Welding Al alloys containing more than 3% Mg

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

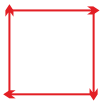
Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Al
0.25 max	0.40 max	0.10 max	0.05-0.20	4.5-5.5	0.05-0.20	0.10 max	0.06-0.20	Bal.

PARAMETERS - PACKING DATA:

Ø, mm	Kg/Spool	Item Code
0.8	7	WCW.MF.004.0807
1.0	7	WCW.MF.004.1007
1.2	7	WCW.MF.004.1207
1.6	7	WCW.MF.004.1607

DCEP

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar or Ar/He	15-22

TIGFIL 5356

GTAW ALUMINIUM ALLOYS

AWS A/SFA 5.10 **ER5356**

CLASSIFICATION:

EN ISO 18273
S Al 5356 (AlMg5Cr(A))

KEY FEATURES:

- Al-5Mg solid wire
- Excellent feedability with consistent welding performance
- Most versatile and universal ly used filler material
- High strength weld with very good corrosion resistance in marine environment
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of similar composition Al-Mg, Al-Mg-Zn and Al-Mg-Si alloys
- Automotive, Marine application
- Structural fabrication
- Welding Al alloys containing more than 3% Mg

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

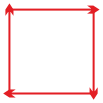
Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Al
0.25 max	0.40 max	0.10 max	0.05-0.20	4.5-5.5	0.05-0.20	0.10 max	0.06-0.20	Bal.

PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	8	WCW.TT.011.1606
2.0 x 1000	8	WCW.TT.011.2006
2.4 x 1000	8	WCW.TT.011.2406
3.2 x 1000	8	WCW.TT.011.3206

AC

All Positions



STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 8 kg box, containing 4 plastic tubes of 2 kg each.

TIGFIL CuNi

GTAW COPPER ALLOYS

AWS A/SFA 5.7 ERCuNi

CLASSIFICATION:

EN ISO 24373
S Cu 7158 (CuNi30Mn1FeTi)

KEY FEATURES:

- Copper-Nickel solid wire
- Typical 70Cu-30Ni type alloy
- No preheating is required
- Radiographic quality welds

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of wrought and cast 70/30, 80/20, 90/10 copper-nickel alloys to themselves or to each other
- Clad side of copper-nickel clad steels
- Surfacing applications where high resistance to corrosion, erosion or cavitation is required

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

Mn	Fe	Si	Ni+Co	Pb	Ti	Cu
1.0 max	0.40-0.75	0.25 max	29.0-32.0	0.02 max	0.20-0.50	Bal.

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	Average Brinell Hardness, HBW
Specification	As Welded	345 min	60-80

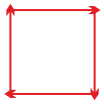
PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
1.6 x 1000	20	WCW.TT.021.1606
2.0 x 1000	20	WCW.TT.021.2006
2.4 x 1000	20	WCW.TT.021.2406
3.2 x 1000	20	WCW.TT.021.3206

DCEN

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

TIGFIL ST6

GTAW Cobalt Alloy

AWS A/SFA 5.21 ERCoCr-A

KEY FEATURES:

- Cobalt based solid filler rod
- Co-Cr-W type Stellite 6 grade alloy
- Hypoeutectic microstructure
- Resistance to low stress abrasive wear with toughness properties
- Resistance to metal to metal wear and galling
- Excellent resistance to corrosion, oxidation
- Retains hot hardness at elevated temperature upto 650°C

TYPICAL APPLICATIONS:

- Automotive and fluid flow valves
- Chain saw guides, hot punches, Valve bearing surface, roll bushings, Shear blades and extruder screws
- Applications where wear is accompanied by elevated temperatures and corrosion

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt %:

C	Mn	Si	Cr	Ni	Mo	Fe	W	Co
0.9-1.4	1.0 max	2.0 max	26.0-32.0	3.0 max	1.0 max	3.0 max	3.0-6.0	Bal

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	Hardness, HRc
Specification	As Welded	40-46

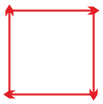
PARAMETERS - PACKING DATA:

Ø x L, mm	Net Wt., Kg	Item Code
2.4 x 1000	20	WCW.TT.027.2406
3.2 x 1000	20	WCW.TT.027.3206

DCEN

STORAGE / HANDLING :
Keep dry during storage and handling

All Positions



Shielding Gas	Gas Flow Rate, LPM
Ar	10-15

Available in Standard carton packing of 20 kg box, containing 4 plastic tubes of 5 kg each.

AUTOMIG FC 71T-1

FCAW C-Mn STEEL

AWS A/SFA 5.20 **E71T-1C**

CLASSIFICATION:

EN ISO 17632-A
T 42 2 P C1 2

KEY FEATURES:

- Rutile type gas shielded FCW wire
- Low fumes, Minimal spatters
- Easy slag removal, smooth weld bead
- High deposition rate
- Suitable for high quality single and multi pass welds
- All position capability
- Radiographic quality weld

APPROVALS: ABS/BV/DNV/LRA/IRS/CE

TYPICAL APPLICATIONS:

- Welding of C-Mn steel with tensile strength up to 500 MPa
- Bridges, Shipbuilding, Towers, Cranes
- Chemical plant machinery, Hulls
- Storage tanks, Structural steel
- Construction equipment, Farm machinery, Rolling stocks
- General carbon steel fabrication

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.06	1.4	0.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -20°C, J
Typical	As Welded	600	490	25	70

Hardness, 3 Layer: 200 BHN max

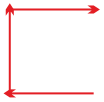
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
1.2	15	WFC.ML.001.1202
1.6	15	WFC.ML.001.1602

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions, Except Vertical Down



Shielding Gas	Gas Flow Rate, LPM
CO_2	15-20

AUTOMIG FC 71T-1C-J

AWS A/SFA 5.20 E71T-1C-J

FCAW C-Mn STEEL

CLASSIFICATION:

EN ISO 17632-A
T 42 4 P C1 2

KEY FEATURES:

- Rutile type gas shielded FCW wire
- Stable arc, Easy slag removal
- Smooth and porosity free weld
- Sound radiographic weld quality
- Excellent combination of T1 performance with very good sub-zero toughness down to -40°C
- All position capability

APPROVALS: ABS/CE

TYPICAL APPLICATIONS:

- Welding of typical structural and carbon steel SA 36/36M, SA 285/285M Gr.A/B/C, SA 414/414M Gr.A/B/C
- Application in Ship building, Off-shore platform, Pressure vessels, Piping, Low temperature serving storage tanks, Harbor equipment

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.06	1.4	0.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -40°C, J
Typical	As Welded	590	480	26	50

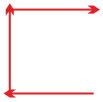
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
1.2	15	WFC.ML.015.1202
1.6	15	WFC.ML.015.1602

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions, Except Vertical Down



Shielding Gas	Gas Flow Rate, LPM
CO_2	15-20

AUTOMIG MC 70C-6M

AWS A/SFA 5.18 **E70C-6MH4**

MCAW C-Mn STEEL

CLASSIFICATION:

ISO 17632-A
T 46 4 M M21 3 H5

KEY FEATURES:

- Metal cored wire suitable with Ar-CO2 shielding gas
- Good weldability, minimal or no slag
- Excellent bead appearance
- Exceptional mechanical properties at low temperatures
- High deposition rate
- Suitable for single and multi pass welding
- Best suited for automated and robotized applications

TYPICAL APPLICATIONS:

- Welding of Carbon, C-Mn and similar types including fine grained steels
- Ship building, Boiler
- Suitable for joining SA 36/36M (P.No.1), SA 285/285M Gr.A/B/C (P.No.1)
- Pressure Vessels, Pipe steels

TYPICAL CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si
0.06	1.45	0.4

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	YS at 0.2% offset, MPa	EL%	CVN Impact at -40°C, J
Typical	As Welded	585	490	28	60

Diffusible H2 Content: <4 ml/100 gm

PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
1.2	15	WMC.ML.004.1202
1.6	15	WMC.ML.004.1602

DCEP

Flat butt and fillet welds only

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

Shielding Gas	Gas Flow Rate, LPM
80Ar+20CO_2	15-20

MIGINOX FC 308L

AWS A/SFA 5.22 E308LT1-1/4

FCAW STAINLESS STEEL

CLASSIFICATION:

EN ISO 17633-A
T 19 9 L P C1 2
T 19 9 LP M21 2

KEY FEATURES:

- Rutile based extra low carbon gas shielded stainless steel FCW wire
- Typical 19Cr-10Ni weld deposit
- Stable arc, low spatter and easy slag removal
- Excellent bead appearance
- Excellent crack resistance and corrosion resistance
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of 18Cr-8Ni stainless steels of AISI 301, 302, 304, 304L type
- Application in Chemical, Food processing industries, Pipes & tubes

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.04 max	0.50-2.50	1.0 max	18.0-21.0	9.0-11.0	0.5 max

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Specification	As Welded	520 min	30 min

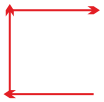
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
1.2	12.5	WFC.MX.002.1204
1.6	12.5	WFC.MX.002.1604

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions, Except Vertical Down



Shielding Gas	Gas Flow Rate, LPM
CO_2	15-20
80Ar+20CO_2	18-25

MIGINOX FC 309L

AWS A/SFA 5.22 E309LT1-1/4

FCAW STAINLESS STEEL

CLASSIFICATION:

EN ISO 17633-A
T 23 12 LP C1 2
T 23 12 LP M21 2

KEY FEATURES:

- An extra low carbon gas shielded stainless steel FCW wire
- Typical 23Cr-13Ni type weld deposit
- Stable arc, low spatter and easy slag removal
- Excellent bead appearance
- Excellent crack and corrosion resistance
- High oxidation resistance up to 1100°C
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding of AISI 309L type steels and similar grade materials, castings, pipes and tubes
- Joining stainless steel to carbon steel
- For overlays, buttering on carbon and low alloy steels

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.04 max	0.50-2.50	1.0 max	22.0-25.0	12.0-14.0	0.5 max

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Specification	As Welded	520 min	30 min

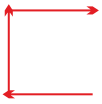
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
1.2	12.5	WFC.MX.004.1204
1.6	12.5	WFC.MX.004.1604

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions, Except Vertical Down



Shielding Gas	Gas Flow Rate, LPM
CO_2	15-20
80Ar+20CO_2	18-25

MIGINOX FC 316L

AWS A/SFA 5.22 E316LT1-1/4

FCAW STAINLESS STEEL

CLASSIFICATION:

EN ISO 17633-B
TS 316L PC1 1
TS 316L PM21 1

APPROVALS: CE

KEY FEATURES:

- Rutile based extra low carbon gas shielded stainless steel FCW wire
- Typical 18Cr/12Ni/2.5Mo weld deposit
- Controlled ferrite content ensures resistance against cracking
- Improved corrosion, pitting and intergranular corrosion resistance
- Stable arc and low spatter
- Excellent bead appearance
- Easy slag removal
- Radiographic weld quality

TYPICAL APPLICATIONS:

- Welding of AISI 316, 316L, 317, 317L, 318 type stainless steel and similar grade
- Welding pipes, tubes and vessels
- Cladding stainless steels
- Application in textile processing, Naval and Chemical environments, Paper and pulp, Paint and dye industries, Food processing industries

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo
0.04 max	0.50-2.50	1.0 max	17.0-20.0	11.0-14.0	2.0-3.0

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Specification	As Welded	485 min	30 min

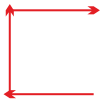
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
1.2	12.5	WFC.MX.020.1204
1.6	12.5	WFC.MX.020.1604

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions, Except Vertical Down



Shielding Gas	Gas Flow Rate, LPM
CO_2	15-20
80Ar+20CO_2	18-25

MIGINOX FC 347

FCAW STAINLESS STEEL

AWS A/SFA 5.22 **E347T1-1/4**

CLASSIFICATION:

EN ISO 17633-A
T 19 9 Nb P C1 2
T 19 9 Nb P M21 2

KEY FEATURES:

- Rutile based gas shielded stainless steel FCW wire
- Typical 19/9/Nb stabilized stainless steel deposit
- Stable arc, low spatter and easy slag removal
- Excellent bead appearance
- Resistance to cracking and embrittlement
- Resistance to intergranular corrosion and scaling up to 850°C
- Radiographic weld quality

APPROVALS: CE

TYPICAL APPLICATIONS:

- Welding stabilized Cr-Ni steels such as AISI 321, 321H, 347, 347H
- Welding of stainless steel tanks, valves, pipes in food, chemical and petrochemical industries
- Fabrication of boiler and gas turbine
- Fabrication of equipments in refineries, power plants, centrifugal pump impellers and shafts, valve faces, seats

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL, Wt %:

C	Mn	Si	Cr	Ni	Mo	Nb+Ta	Cu
0.08 max	0.50-2.50	1.0 max	18.0-21.0	9.0-11.0	0.75 max	8xC-1.0	0.75 max

MECHANICAL PROPERTIES OF ALL WELD METAL:

	Condition	UTS, MPa	EL%
Specification	As Welded	520 min	30 min

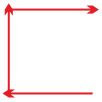
PARAMETERS - PACKING DATA:

Ø, mm	Net Wt., Kg	Item Code
1.2	12.5	WFC.MX.010.1204
1.6	12.5	WFC.MX.010.1604

DCEP

STORAGE / HANDLING :
Keep dry and follow handling instructions mentioned on the box

All Positions, Except Vertical Down



Shielding Gas	Gas Flow Rate, LPM
CO_2	15-20
80Ar+20CO_2	18-25

NOTE ON SAW FLUX

1. BASICITY OF THE FLUX:

Basicity is ratio of Basic oxides to Acidic oxides present in the flux. For the basicities mentioned in AWL literature, formula devised by Boniszewski is used, which is as below:

$$\text{Basicity} = \frac{CaO + MgO + CaF_2 + NaO + K_2O + \frac{1}{2}(MnO + FeO)}{SiO_2 + \frac{1}{2}(Al_2O_3 + TiO_2 + ZrO_2)}$$

Based on Basicity No. Flux are divided in following Types:
a. Acidic – Basicity ≤ 0.80
b. Neutral – 0.80 > Basicity ≤1.20
c. Basic – 1.20 > Basicity < 2.00
d. High Basic – Basicity > 2.00

2. ACTIVITY OF FLUXES:

Activity of the flux is devised by Wall Neutrality Number. Wall Neutrality Number is measured as below:

a. Make two chemistry pads with same wire flux combination, same welding parameters, except voltage used for 2nd pad is increased by 8V.
b. They are analyzed for Si and Mn.
c. The wall neutrality Number is calculated by following formula:
   Wall Neutrality Number = 100 (|Δ % Si| + |Δ % Mn|)
   Δ % Si – Difference in Si in two pads
   Δ % Mn – Difference in Mn in two pads
   Wall Neutrality Number is absolute value, ignoring positive and negative sign.

Based on Activity, Fluxes are divided into following types:
   A. Active Flux – Wall Neutrality Number > 35
   B. Neutral Flux – Wall Neutrality Number ≤ 35

3. RE-DRYING OF SAW FLUXES:

Recommended cycle for flux re-drying: 300-350^{o}C for minimum 2 hrs.

C-Mn STEEL WIRES FOR SAW WELDING

COPPER COATED C-Mn STEEL SOLID WIRES

CLASSIFICATION :		
Product	**EN 14171**	**AWS A/SFA 5.17**
AUTOMELT EL8	S1	EL8
AUTOMELT EL12	S1	EL12
AUTOMELT EM12K	S2Si	EM12K
AUTOMELT EH10K	S3	EH10K
AUTOMELT EH12K	S3Si	EH12K
AUTOMELT EH11K		EH11K
AUTOMELT EH14	S4	EH14

KEY FEATURES :

- Uniform copper coating
- Smooth feeding
- Close dimensional tolerances
- Controlled Chemistry

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt% (Typical, Including Cu in coating)				
Product	**C**	**Mn**	**Si**	**Cu**
AUTOMELT EL8	0.06	0.50	0.03	0.1
AUTOMELT EL12	0.09	0.50	0.03	0.1
AUTOMELT EM12K	0.09	1.00	0.20	0.1
AUTOMELT EH10K	0.08	1.40	0.15	0.1
AUTOMELT EH12K	0.10	1.55	0.25	0.1
AUTOMELT EH11K	0.09	1.50	0.90	0.1
AUTOMELT EH14	0.12	1.70	0.04	0.1

DIAMETERS - PACKING DATA :				
Product	**Ø, mm**	**Kg / Spool**	**Item Code**	**SAWPAC DRUM, Kg**
AUTOMELT EL8	1.6 2.0 2.5 3.2 4.0 5.0	25 25 25 25 25 25	WCW.SL.001.1603 WCW.SL.001.2003 WCW.SL.001.2503 WCW.SL.001.3203 WCW.SL.001.4003 WCW.SL.001.5003	1.6 - 100 / 250 Others – 350 / 500
AUTOMELT EL12	1.6 2.0 2.5 3.2 4.0 5.0 5.5	25 25 25 25 25 25 25	WCW.SL.021.1603 WCW.SL.021.2003 WCW.SL.021.2503 WCW.SL.021.3203 WCW.SL.021.4003 WCW.SL.021.5003 WCW.SL.021.5503	1.6 - 100 / 250 Others – 350 / 500
AUTOMELT EM12K	1.6 2.0 2.5 3.2 4.0 5.0	25 25 25 25 25 25	WCW.SL.002.1603 WCW.SL.002.2003 WCW.SL.002.2503 WCW.SL.002.3203 WCW.SL.002.4003 WCW.SL.002.5003	1.6 - 100 / 250 Others – 350 / 500

C-Mn STEEL WIRES FOR SAW WELDING

COPPER COATED C-Mn STEEL SOLID WIRES

DIAMETERS - PACKING DATA :				
Product	**Ø, mm**	**Kg / Spool**	**Item Code**	**SAWPAC DRUM, Kg**
AUTOMELT EL8	1.6 2.0 2.5 3.2 4.0 5.0	25 25 25 25 25 25	WCW.SL.001.1603 WCW.SL.001.2003 WCW.SL.001.2503 WCW.SL.001.3203 WCW.SL.001.4003 WCW.SL.001.5003	1.6 - 100 / 250 Others – 350 / 500
AUTOMELT EL12	1.6 2.0 2.5 3.2 4.0 5.0 5.5	25 25 25 25 25 25 25	WCW.SL.021.1603 WCW.SL.021.2003 WCW.SL.021.2503 WCW.SL.021.3203 WCW.SL.021.4003 WCW.SL.021.5003 WCW.SL.021.5503	1.6 - 100 / 250 Others – 350 / 500
AUTOMELT EM12K	1.6 2.0 2.5 3.2 4.0 5.0	25 25 25 25 25 25	WCW.SL.002.1603 WCW.SL.002.2003 WCW.SL.002.2503 WCW.SL.002.3203 WCW.SL.002.4003 WCW.SL.002.5003	1.6 - 100 / 250 Others – 350 / 500
AUTOMELT EH10K	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.003.2503 WCW.SL.003.3203 WCW.SL.003.4003 WCW.SL.003.5003	350 / 500
AUTOMELT EH12K	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.004.2503 WCW.SL.004.3203 WCW.SL.004.4003 WCW.SL.004.5003	350 / 500
AUTOMELT EH11K	1.6 2.0 2.5 3.2 4.0 5.0	25 25 25 25 25 25	WCW.SL.016.1603 WCW.SL.016.2003 WCW.SL.016.2503 WCW.SL.016.3203 WCW.SL.016.4003 WCW.SL.016.5003	1.6 - 100 / 250 Others – 350 / 500
AUTOMELT EH14	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.005.2503 WCW.SL.005.3203 WCW.SL.005.4003 WCW.SL.005.5003	350 / 500

WIRES FOR SUBMERGED ARC WELDING OF CREEP RESISTANT STEELS

COPPER COATED LOW ALLOY STEEL SOLID WIRES

CLASSIFICATION :

Product	EN 14171	EN 12070	AWS A/SFA 5.23
AUTOMELT EA2	S2Mo		EA2
AUTOMELT EA3	S4Mo		EA3
AUTOMELT EA4	S3Mo	S MnMo	EA4
AUTOMELT EB2		S CrMo1	EB2
AUTOMELT EB2R		S CrMo1	EB2R
AUTOMELT EB3		S CrMo2	EB3
AUTOMELT EB3R		S CrMo2	EB3R
AUTOMELT EB6		S CrMo5	EB6
AUTOMELT EB91		S CrMo91	EB91

KEY FEATURES :

- Uniform copper coating
- Smooth feeding
- Close dimensional tolerances
- Controlled Chemistry

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt% (Typical, Including Cu in coating)

Product	C	Mn	Si	Cr	Mo	Cu	Other
AUTOMELT EA2	0.09	1.10	0.15		0.50	0.10	
AUTOMELT EA3	0.09	1.80	0.15		0.50	0.10	
AUTOMELT EA4	0.09	1.40	0.15		0.50	0.10	
AUTOMELT EB2	0.10	0.60	0.15	1.25	0.50	0.10	
AUTOMELT EB2R	0.10	0.60	0.15	1.25	0.50	0.10	S-0.007; P-0.008; As-0.004; Sn-0.004; Sb-0.004; Bruscato factor X <15
AUTOMELT EB3	0.10	0.60	0.15	2.40	1.00	0.10	
AUTOMELT EB3R	0.10	0.60	0.15	2.40	1.00	0.10	S-0.007; P-0.008; As-0.004; Sn-0.004; Sb-0.004; Bruscato factor X <15
AUTOMELT EB6	0.08	0.60	0.30	6.00	0.6	0.10	
AUTOMELT EB91	0.10	0.40	0.25	9.00	1.00	0.07	Ni-0.5; V-0.2; Nb-0.05; N-0.05; Al-0.005

DIAMETERS - PACKING DATA :

Product	Ø, mm	Kg / Spool	Item Code	SAWPAC DRUM, Kg
AUTOMELT EA2	2.0	25	WCW.SL.007.2003	350 / 500
	2.5	25	WCW.SL.007.2503	
	3.2	25	WCW.SL.007.3203	
	4.0	25	WCW.SL.007.4003	
	5.0	25	WCW.SL.007.5003	
AUTOMELT EA3	2.5	25	WCW.SL.008.2503	350 / 500
	3.2	25	WCW.SL.008.3203	
	4.0	25	WCW.SL.008.4003	
	5.0	25	WCW.SL.008.5003	
AUTOMELT EA4	2.0	25	WCW.SL.022.2003	350 / 500
	2.5	25	WCW.SL.022.2503	
	3.2	25	WCW.SL.022.3203	
	4.0	25	WCW.SL.022.4003	
	5.0	25	WCW.SL.022.5003	

WIRES FOR SUBMERGED ARC WELDING OF CREEP RESISTANT STEELS

COPPER COATED LOW ALLOY STEEL SOLID WIRES

DIAMETERS - PACKING DATA :				
Product	**Ø, mm**	**Kg / Spool**	**Item Code**	**SAWPAC DRUM, Kg**
AUTOMELT EB2	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SL.010.2003 WCW.SL.010.2503 WCW.SL.010.3203 WCW.SL.010.4003 WCW.SL.010.5003	350 / 500
AUTOMELT EB2R	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.018.2503 WCW.SL.018.3203 WCW.SL.018.4003 WCW.SL.018.5003	350 / 500
AUTOMELT EB3	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SL.017.2003 WCW.SL.017.2503 WCW.SL.017.3203 WCW.SL.017.4003 WCW.SL.017.5003	350 / 500
AUTOMELT EB3R	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.019.2503 WCW.SL.019.3203 WCW.SL.019.4003 WCW.SL.019.5003	350 / 500
AUTOMELT EB6	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.031.2503 WCW.SL.031.3203 WCW.SL.031.4003 WCW.SL.031.5003	350 / 500
AUTOMELT EB91	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.027.2503 WCW.SL.027.3203 WCW.SL.027.4003 WCW.SL.027.5003	350 / 500

WIRES FOR SUBMERGED ARC WELDING FOR CRYOGENIC APPLICATIONS

COPPER COATED LOW ALLOY STEEL SOLID WIRES

CLASSIFICATION :		
Product	**EN 14171**	**AWS A/SFA 5.23**
Automelt ENi1	S2Ni1	ENi1
Automelt ENi2	S2Ni2	ENi2
Automelt ENi3	S2Ni3	ENi3

KEY FEATURES :

- Uniform copper coating
- Smooth feeding
- Close dimensional tolerances
- Controlled Chemistry

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt% (Typical, Including Cu in coating)						
Product	**C**	**Mn**	**Si**	**Ni**	**Cu**	**Mo**
AUTOMELT ENi1	0.10	1.00	0.20	1.00	0.10	-
AUTOMELT ENi2	0.10	1.00	0.20	2.20	0.10	-
AUTOMELT ENi3	0.10	1.00	0.20	3.25	0.10	-

DIAMETERS - PACKING DATA :				
Product	**Ø, mm**	**Kg / Spool**	**Item Code**	**SAWPAC DRUM, Kg**
AUTOMELT ENi1	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.028.2503 WCW.SL.028.3203 WCW.SL.028.4003 WCW.SL.028.5003	350 / 500
AUTOMELT ENi2	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.020.2503 WCW.SL.020.3203 WCW.SL.020.4003 WCW.SL.020.5003	350 / 500
AUTOMELT ENi3	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.011.2503 WCW.SL.011.3203 WCW.SL.011.4003 WCW.SL.011.5003	350 / 500

WIRES FOR SUBMERGED ARC WELDING OF HIGH STRENGTH STEELS

COPPER COATED LOW ALLOY STEEL SOLID WIRES

CLASSIFICATION :			
Product	**EN 14171**	**EN 26304-A**	**AWS A/SFA 5.23**
AUTOMELT EF2			EF2
AUTOMELT EF3	S3Ni1Mo		EF3
AUTOMELT S3NiCrMo2.5		S3Ni2.5CrMo	EG

KEY FEATURES :

- Uniform copper coating
- Smooth feeding
- Close dimensional tolerances
- Controlled Chemistry

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt% (Typical, Including Cu in coating)							
Product	**C**	**Mn**	**Si**	**Mo**	**Ni**	**Cr**	**Cu**
AUTOMELT EF2	0.12	1.80	0.15	0.50	0.60		0.10
AUTOMELT EF3	0.12	1.75	0.20	0.55	0.90		0.10
AUTOMELT S3NiCrMo2.5	0.12	1.50	0.20	0.50	2.50	0.60	0.10

DIAMETERS - PACKING DATA :				
Product	**Ø, mm**	**Kg / Spool**	**Item Code**	**SAWPAC DRUM, Kg**
AUTOMELT EF2	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.030.2503 WCW.SL.030.3203 WCW.SL.030.4003 WCW.SL.030.5003	350 / 500
AUTOMELT EF3	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SL.025.2503 WCW.SL.025.3203 WCW.SL.025.4003 WCW.SL.025.5003	350 / 500
AUTOMELT S3NiCrMo2.5	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SK.002.2503 WCW.SK.002.3203 WCW.SK.002.4003 WCW.SK.002.5003	350 / 500

WIRES FOR SUBMERGED ARC WELDING OF STAINLESS STEELS

STAINLESS STEEL SOLID WIRES

CLASSIFICATION :		
Product	**EN ISO 14343-A**	**AWS A/SFA 5.9**
SUBINOX 308L	S 19 9 L	ER308L
SUBINOX 308L SPL	S 19 9 L	ER308L
SUBINOX 308H		ER308H
SUBINOX 316L	S 19 12 3 L	ER316L
SUBINOX 309L	S 23 12 L	ER309L
SUBINOX 309LMo		ER309LMo
SUBINOX 347	S 19 9 Nb	ER347
SUBINOX 410	S 13	ER410
SUBINOX 410NiMo	S 13 4	ER410NiMo
SUBINOX 430	S 17	ER430
SUBINOX 2209	S 22 9 3 NL	ER2209
SUBINOX 2594		ER2594

KEY FEATURES :

- Smooth feeding
- Close dimensional tolerances
- Controlled Chemistry

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt% :							
Product	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Other Elements**
SUBINOX 308L	0.025	1.50	0.40	19.5	9.3	--	--
SUBINOX 308L SPL	0.025	1.50	0.40	19.5	9.7	--	--
SUBINOX 308H	0.05	1.50	0.40	19.5	9.2	--	--
SUBINOX 316L	0.025	1.50	0.40	18.5	11.5	2.2	--
SUBINOX 309L	0.025	1.50	0.40	23.5	12.2	--	--
SUBINOX 309LMo	0.025	1.50	0.40	23.5	12.2	2.2	--
SUBINOX 347	0.03	1.50	0.30	19.8	9.7	--	Nb + Ta – 0.60
SUBINOX 410	0.05	0.40	0.30	12.0	--	--	--
SUBINOX 410NiMo	0.03	0.40	0.30	12.0	4.5	0.45	--
SUBINOX 430	0.04	0.40	0.30	16.0	--	--	--
SUBINOX 2209	0.02	1.20	0.45	22.5	8.0	2.7	N – 0.12
SUBINOX 2594	0.015	0.55	0.40	25.2	9.1	4.0	N – 0.25, W – 0.10

WIRES FOR SUBMERGED ARC WELDING OF STAINLESS STEELS

STAINLESS STEEL SOLID WIRES

DIAMETERS - PACKING DATA :				
Product	**Ø, mm**	**Kg / Spool**	**Item Code**	**SAWPAC DRUM, Kg**
SUBINOX 308L	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.002.2003 WCW.SX.002.2503 WCW.SX.002.3203 WCW.SX.002.4003 WCW.SX.002.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 308L SPL	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.027.2003 WCW.SX.027.2503 WCW.SX.027.3203 WCW.SX.027.4003 WCW.SX.027.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 308H	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.020.2003 WCW.SX.020.2503 WCW.SX.020.3203 WCW.SX.020.4003 WCW.SX.020.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 316L	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.009.2003 WCW.SX.009.2503 WCW.SX.009.3203 WCW.SX.009.4003 WCW.SX.009.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 309LMo	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.019.2003 WCW.SX.019.2503 WCW.SX.019.3203 WCW.SX.019.4003 WCW.SX.019.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 309L	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.004.2003 WCW.SX.004.2503 WCW.SX.004.3203 WCW.SX.004.4003 WCW.SX.004.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 347	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.010.2003 WCW.SX.010.2503 WCW.SX.010.3203 WCW.SX.010.4003 WCW.SX.010.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 410	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.011.2003 WCW.SX.011.2503 WCW.SX.011.3203 WCW.SX.011.4003 WCW.SX.011.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 410NiMo	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.022.2003 WCW.SX.022.2503 WCW.SX.022.3203 WCW.SX.022.4003 WCW.SX.022.5003	1.6 - 100 / 250 Others – 350 / 500

WIRES FOR SUBMERGED ARC WELDING OF STAINLESS STEELS

STAINLESS STEEL SOLID WIRES

DIAMETERS - PACKING DATA :				
Product	**Ø, mm**	**Kg / Spool**	**Item Code**	**SAWPAC DRUM, Kg**
SUBINOX 430	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.012.2003 WCW.SX.012.2503 WCW.SX.012.3203 WCW.SX.012.4003 WCW.SX.012.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 2209	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.023.2003 WCW.SX.023.2503 WCW.SX.023.3203 WCW.SX.023.4003 WCW.SX.023.5003	1.6 - 100 / 250 Others – 350 / 500
SUBINOX 2594	2.0 2.5 3.2 4.0 5.0	25 25 25 25 25	WCW.SX.021.2003 WCW.SX.021.2503 WCW.SX.021.3203 WCW.SX.021.4003 WCW.SX.021.5003	1.6 - 100 / 250 Others – 350 / 500

WIRES FOR SUBMERGED ARC WELDING OF NICKEL & NICKEL ALLOYS

NICKEL & NICKEL ALLOY SOLID WIRES

CLASSIFICATION :	
Product	**AWS A/SFA 5.14**
AUTOMELT NiCr3	ERNiCr-3
AUTOMELT NiCrMo3	ERNiCrMo-3
AUTOMELT NiCrMo4	ERNiCrMo-4

KEY FEATURES :

- Smooth feeding
- Close dimensional tolerances
- Controlled Chemistry

CHEMICAL COMPOSITION OF BARE SOLID WIRE, Wt% :

Product	C	Mn	Fe	Si	Cr	Mo	Other Elements
AUTOMELT NiCr3	0.01	2.80	0.4	0.15	20.0	-	Nb-2.4; Ti-0.3; Ni > 67.0
AUTOMELT NiCrMo3	0.03	0.20	4.0	0.15	22.0	9.1	Nb-3.5; Al-0.1; Ti-0.1; Ni > 62.0
AUTOMELT NiCrMo4	0.01	0.60	5.0	0.03	15.0	16.0	W-4.0; Co-0.2; Cu- 0.01

DIAMETERS - PACKING DATA :

Product	Ø, mm	Kg / Spool	Item Code	SAWPAC DRUM, Kg
AUTOMELT NiCr3	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SK.001.2503 WCW.SK.001.3203 WCW.SK.001.4003 WCW.SK.001.5003	350 / 500
AUTOMELT NiCrMo3	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SK.006.2503 WCW.SK.006.3203 WCW.SK.006.4003 WCW.SK.006.5003	350 / 500
AUTOMELT NiCrMo4	2.5 3.2 4.0 5.0	25 25 25 25	WCW.SK.005.2503 WCW.SK.005.3203 WCW.SK.005.4003 WCW.SK.005.5003	350 / 500

AUTOMELT A82

SAW Flux

GENERAL DESCRIPTION:

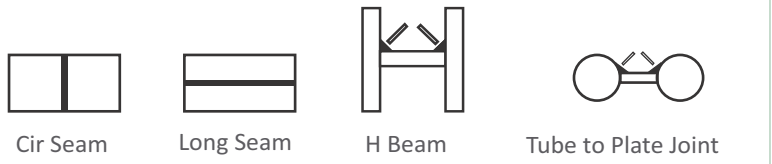
- Agglomerated Flux
- Aluminate- Rutile Type Flux
- Acidic Flux having Basicity Index of 0.6
- Active Flux with moderate Si and Mn pick-up
- For Single and Multi-pass Butt and fillet welding at very high speeds
- For C-Mn Steels
- Suitable for Single and twin Wire system
- Suitable for Welding Speeds of 0.40-1.8 m/min
- Grain Size – 0.25-1.40 mm
- Type of Current – DC / AC 1000A
- Wall Neutrality Number with EM12K Wire is 85

CLASSIFICATION :

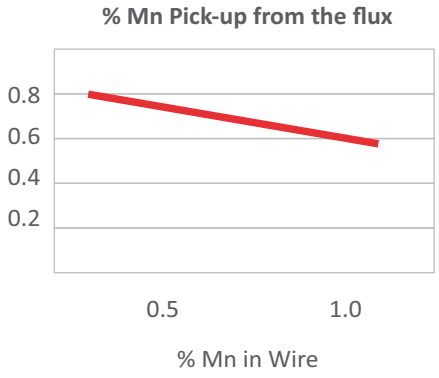
With Wire	AWS 5.17/5.23	Single / Multi-pass
AUTOMELT EL8	F7AZ-EL8	Limited Multi-pass
AUTOMELT EL12	F7AZ-EL12	Limited Multi-pass
AUTOMELT EM12K	F7AZ-EM12K	Limited Multi-pass

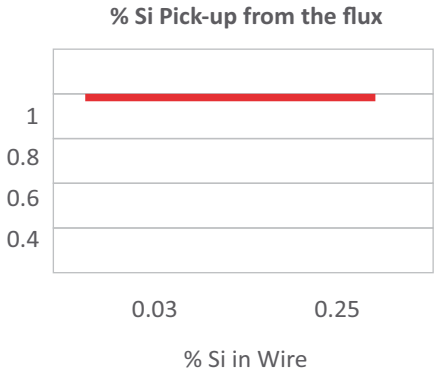
TYPICAL APPLICATIONS :

- Structural Welding
- High Speed Fillet Welding
- Fabrication of H & I Beams
- Fabrication of Boilers, Cylinders



ACTIVITY OF THE FLUX:





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AUTOMELT A82

SAW Flux

CHEMICAL COMPOSITION OF FLUX:			
$SiO_2 + TiO_2$	CaO + MgO	Al_2O_3+ MnO	CaF_2
25	10	50	10

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL (Wt%), TYPICAL:			
With wire	**C**	**Mn**	**Si**
Automelt EL8	0.06	1.20	1.00
Automelt EL12	0.07	1.20	1.00
Automelt EM12K	0.06	1.60	1.30

MECHANICAL PROPERTIES OF ALL WELD METAL, TYPICAL:				
With wire	**Condition**	**UTS, MPa**	**YS, MPa**	**% E**
Automelt EL8	AW	550	460	22
Automelt EL12	AW	560	460	23
Automelt EM12K	AW	560	470	23

AW - As Welded

The chemistry and mechanical properties will depend on actual wire chemistry and arc voltage

Available in Standard packing of 30 Kg Bag

Item Code	Packing
WCF.AC.820.BA02	30 Kg Bag

AUTOMELT B71

SAW Flux

GENERAL DESCRIPTION:

- Agglomerated Flux
- Fluoride-Basic Type Flux
- Basic Flux having Basicity Index of 1.6
- Neutral behaviour to activity
- Multi-pass Butt and Fillet Welding including "two-run" technique
- For Carbon & Low Alloy Steels
- Suitable for Narrow Gap Welding
- Suitable for Single & Multi Wire twin and Tandem System
- Suitable for Welding Speeds of 0.35-0.70 m/min
- Grain Size – 0.25-1.60 mm
- Type of Current – DCEP / AC
- Wall Neutrality Number with EM12K Wire is 12

APPROVALS: RDSO, ABS, IBR

CLASSIFICATION :

With Wire	AWS 5.17/5.23	Single / Multi-pass
AUTOMELT EL8	F7A2-EL8	Multi-pass
AUTOMELT EL12	F7A2-EL12	Multi-pass
AUTOMELT EM12K	F7A4/P4-EM12K	Multi-pass
AUTOMELT EH10K	F7A4/P4-EH10K	Multi-pass
AUTOMELT EH12K	F7A4/P4-EH12K	Multi-pass
AUTOMELT EH14	F7A4/P4-EH14	Multi-pass
AUTOMELT EA2	F8A2/P2-EA2-A2	Multi-pass
AUTOMELT EA4	F8A2/P2-EA4-A4	Multi-pass
AUTOMELT EA3	F8A2/P2-EA3-A3	Multi-pass
AUTOMELT EB2	F8PZ-EB2-B2	Multi-pass
AUTOMELT EB3	F8PZ-EB3-B3	Multi-pass
AUTOMELT ENi1	F8A5-ENi1-Ni1	Multi-pass
AUTOMELT ENi2	F8A6-ENi2-Ni2	Multi-pass
AUTOMELT ENi3	F8A8/P10-ENi3-Ni3	Multi-pass

TYPICAL APPLICATIONS :

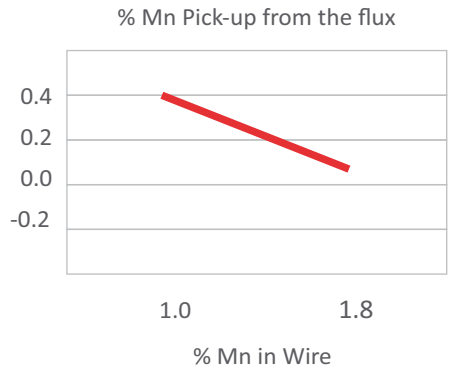
- General Structural Welding
- Long Seam and Cir Seam Welding of Pipes
- Fabrication of Pressure Vessel and Boiler
- Heavy Equipment Fabrication

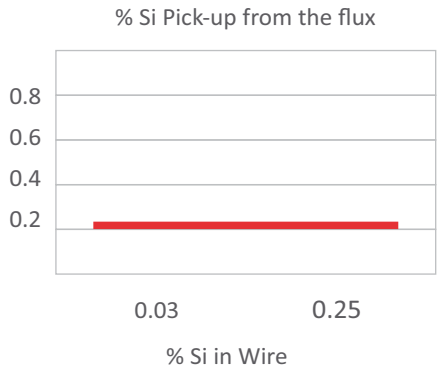
(continue...)

AUTOMELT B71

SAW Flux

ACTIVITY OF THE FLUX:





CHEMICAL COMPOSITION OF FLUX:

$SiO_2 + TiO_2$	CaO + MgO	Al_2O_3 + MnO	CaF_2
15	30	30	25

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL (Wt%), TYPICAL:

With wire	C	Mn	Si	Ni	Cr	Mo	Other Elements
AUTOMELT EL8	0.06	0.80	0.30	--	--	--	
AUTOMELT EL12	0.08	0.80	0.30	--	--	--	
AUTOMELT EM12K	0.08	1.45	0.45	--	--	--	
AUTOMELT EH10K	0.07	1.60	0.45	--	--	--	
AUTOMELT EH12K	0.08	1.75	0.50	--	--	--	
AUTOMELT EH14	0.08	1.90	0.40	--	--	--	
AUTOMELT EA2	0.08	1.35	0.30	--	--	0.50	
AUTOMELT EA4	0.08	1.50	0.30	--	--	0.50	
AUTOMELT EA3	0.08	1.80	0.30	--	--	0.50	
AUTOMELT EB2	0.07	1.10	0.40	--	1.10	0.50	
AUTOMELT EB3	0.07	1.10	0.40	--	2.10	1.00	
AUTOMELT ENi1	0.08	1.40	0.45	0.90	--	--	
AUTOMELT ENi2	0.09	1.40	0.45	2.20	--	--	
AUTOMELT ENi3	0.09	1.40	0.45	3.00	--	--	

(continue...)

AUTOMELT B71

SAW Flux

MECHANICAL PROPERTIES OF ALL WELD METAL, TYPICAL:									
With wire	**Condition**	**UTS, MPa**	**YS, MPa**	**% E**	**CVN Impact (J)**				
					-30°C	**-40°C**	**-50°C**	**-60°C**	**-70°C**
Automelt EL8	AW	500	420	26	50				
Automelt EL12	AW	520	430	26	50				
Automelt EM12K	AW	530	430	26		50			
Automelt EM12K	PW1	500	420	28		60			
Automelt EH10K	AW	590	500	26		60			
Automelt EH10K	PW1	530	460	28		70			
Automelt EH12K	AW	560	450	25		70			
Automelt EH12K	PW1	540	430	27		60			
Automelt EH14	AW	550	440	26		70			
Automelt EH14	PW1	530	430	28					
Automelt EA2	AW	600	520	24	40				
Automelt EA2	PW1	580	510	25	40				
Automelt EA4	AW	660	570	24	50				
Automelt EA4	PW1	650	560	26	60				
Automelt EA3	AW	690	590	24	40				
Automelt EA3	PW1	680	580	25	40				
Automelt EB2	PW2	600	490	24					
Automelt EB3	PW2	630	510	24					
Automelt ENi1	AW	580	470	25			40		
Automelt ENi2	AW	600	490	25			50		
Automelt ENi3	AW	620	510	26				50	
Automelt ENi3	PW1	600	490	27					50

AW – As Welded; PW1 – After Post weld heat treatment of 620°C for 1 hour
PW2 – After Post Weld Heat treatment of 690°C for 1 hour
The chemistry and mechanical properties will depend on actual wire chemistry and arc voltage
Available in Standard packing of 30 Kg Bag

Item Code	Packing
WCF.BS.710.BA02	30 Kg Bag

AUTOMELT B20 PLUS

SAW Flux

GENERAL DESCRIPTION:

- Agglomerated Flux
- Fluoride-Basic Type Flux
- High Basic Flux having Basicity Index of 3.1
- Neutral behaviour to activity
- Multi-pass Butt and Fillet Welding
- For Carbon & Low Alloy Steels
- Suitable for Narrow Gap Welding
- Suitable for Single & Multi Wire Tandem System
- Suitable for Welding Speeds of 0.40 – 0.60 m/min
- Grain Size – 0.25-1.60 mm
- Type of Current – DCEP / AC
- Wall Neutrality Number with EM12K is 23

CLASSIFICATION :

With Wire	AWS 5.17/5.23	Single / Multi-pass
AUTOMELT EM12K	F7A8/F6P8-EM12K	Multi-pass
AUTOMELT EH10K	F7A8/P8-EH10K	Multi-pass
AUTOMELT EH12K	F7A8/P10-EH12K	Multi-pass
AUTOMELT EH14	F7A6/P6-EH14	Multi-pass
AUTOMELT EB2R	F8P2-EB2R-B2R	Multi-pass
AUTOMELT EB3R	F8P0-EB3R-B3R	Multi-pass
AUTOMELT EB91	F9PZ-EB91-B91	Multi-pass
AUTOMELT ENi1	F7A6-ENi1-Ni1	Multi-pass
AUTOMELT ENi2	F7A8-ENi2-Ni2	Multi-pass
AUTOMELT ENi3	F7A10-ENi3-Ni3	Multi-pass
AUTOMELT EF2	F8A6-EF2-F2	Multi-pass
AUTOMELT EF3	F9A8-EF3-F3	Multi-pass
AUTOMELT S3NiCrMo2.5	F11A8-EG-G	Multi-pass

TYPICAL APPLICATIONS :

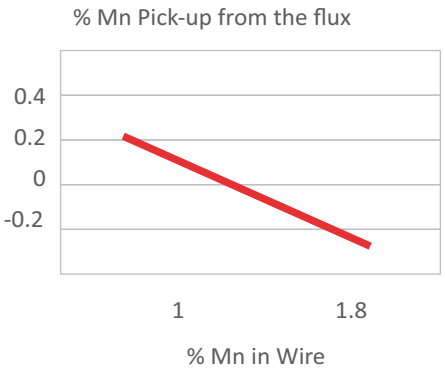
- Fabrication of Reactors, steam generators
- Long Seam and Cir Seam Welding of Pipes
- Fabrication of Pressure Vessel and Boiler
- Heavy Equipment Fabrication

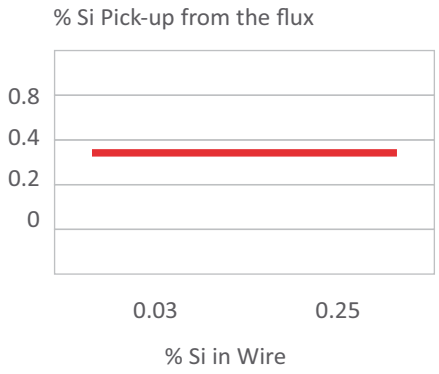
(continue...)

AUTOMELT B20 PLUS

SAW Flux

ACTIVITY OF THE FLUX:





CHEMICAL COMPOSITION OF FLUX:

$SiO_2 + TiO_2$	CaO + MgO	Al_2O_3 + MnO	CaF_2
20	15	30	30

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL (Wt%), TYPICAL:

With wire	C	Mn	Si	Ni	Cr	Mo	Other Elements
AUTOMELT EM12K	0.06	1.25	0.40	--	--	--	
AUTOMELT EH10K	0.07	1.45	0.40	--	--	--	
AUTOMELT EH12K	0.08	1.50	0.40	--	--	--	
AUTOMELT EH14	0.08	1.60	0.30	--	--	--	
AUTOMELT EB2R	0.06	0.90	0.30	--	1.10	0.50	S-0.007; P-0.009; Cu-0.05; As-0.003; Sn-0.003; Sb-0.003
AUTOMELT EB3R	0.07	0.90	0.30	--	2.10	1.00	S-0.007; P-0.009; Cu-0.05; As-0.003; Sn-0.003; Sb-0.003
AUTOMELT EB91	0.07	0.50	0.30	0.55	8.70	0.95	V-0.20; Nb-0.04; N-0.04; Mn+Ni<1.20
AUTOMELT ENi1	0.07	1.40	0.30	0.90	--	--	
AUTOMELT ENi2	0.08	1.40	0.30	2.20	--	--	
AUTOMELT ENi3	0.08	1.40	0.30	3.00	--	--	
AUTOMELT EF2	0.08	1.50	0.40	0.60	--	0.50	
AUTOMELT EF3	0.08	1.50	0.40	0.90	--	0.50	
AUTOMELT S3NiCrMo2.5	0.08	1.50	0.40	2.40	0.40	0.50	

(continue...)

AUTOMELT B20 PLUS

SAW Flux

MECHANICAL PROPERTIES OF ALL WELD METAL, TYPICAL:									
With wire	Condition	UTS, MPa	YS, MPa	% E	CVN Impact (J)				
					-30°C	-40°C	-50°C	-60°C	-70°C
Automelt EM12K	AW	510	430	28		80	50	30	
Automelt EM12K	PW1	490	400	29		80	60	40	
Automelt EH10K	AW	540	440	27			60	40	
Automelt EH10K	PW1	520	420	27			80	50	
Automelt EH12K	AW	540	450	27			70	50	50
Automelt EH12K	PW1	530	430	28			90	70	
Automelt EH14	AW	530	440	27			50		
Automelt EH14	PW1	520	430	28	40		60		
Automelt EB2R	PW2	600	490	24	30				
Automelt EB3R	PW2	630	500	24					
Automelt EB91	PW3	660	570	19					
Automelt ENi1	AW	520	430	29			50		
Automelt ENi2	AW	530	430	28			70	40	40
Automelt ENi3	AW	540	440	27			90	60	
Automelt EF2	AW	600	480	25			40		
Automelt EF3	AW	650	570	22			60	40	
AUTOMELT S3NiCrMo2.5	AW	850	770	15			60	40	

AW – As Welded; PW1 – After Post weld heat treatment of 620°C for 1 hour
PW2 – After Post Weld Heat treatment of 690°C for 1 hour
Pw3 – After Post Weld Heat treatment of 760°C for 2 hour
The chemistry and mechanical properties will depend on actual wire chemistry and arc voltage
Available in Standard packing of 30 Kg Bag

CREEP TEST DATA (Automelt B20 Plus+Automelt EB2R):				
Condition	Temperature,°C	Stress, MPa	Duration, Hrs	Strain% after 1000 Hrs
PWHT: 690°C for 2 Hrs	500	254	1000	2.40
	550	160	1000	4.09

Item Code	Packing
WCF.BS.20P.BA02	30 Kg Bag

AUTOMELT S33

SAW Fluxes

GENERAL DESCRIPTION:

- Agglomerated Flux
- Fluoride-Basic Type Flux
- High Basic Flux having Basicity Index of 3.1
- Neutral Behaviour to Carbon, so Low C weld metal is produced with Low C Wire
- Non-Chromium Compensating
- Chromium Burnout is very less
- Multi-pass Butt and Fillet Welding
- For Stainless Steels
- Suitable for Welding Speeds of 0.40 – 0.60 m/min
- Grain Size – 0.25-1.60 mm
- Type of Current – DCEP

APPROVALS: ABS

CLASSIFICATION :

With Wire	AWS 5.39	Single/Multi-pass
Subinox 308L	F75A6-ER308L/308L	Multi-pass
Subinox 308L Spl	F75A32-ER308L/308L	Multi-pass
Subinox 308H	F80AZ-ER308H/308	Multi-pass
Subinox 316L	F75A32-ER316L/316L	Multi-pass
Subinox 347	F75A6-ER347/347	Multi-pass
Subinox 309L	F75A6-ER309L/309L	Multi-pass
Subinox 309LMo	F75A6-ER309LMo/309LMo	Multi-pass
Subinox 410NiMo	F110AZ-ER410NiMo/410NiMo	Multi-pass
Subinox 2209	F100A4-ER2209/2209	Multi-pass
Subinox 2594	F110A2-ER2594/2594	Multi-pass

TYPICAL APPLICATIONS :

- Welding of High Alloy Stainless steels including Duplex and Superduplex Stainless Steels
- Most suitable for welding Cryogenic Vessels

Fillet

Single V

Double V

Single Wire

CHEMICAL COMPOSITION OF FLUX:

$SiO_2 + TiO_2$	$Al_2O_3 + MnO$	CaF_2
10	35	50

AUTOMELT S33

SAW Flux

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL (Wt%), TYPICAL:							
With wire	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Other Elements**
Subinox 308L	0.025	1.40	0.50	19.5	9.3	--	--
Subinox 308L Spl	0.025	1.40	0.50	19.5	9.7	--	--
Subinox 308H	0.05	1.40	0.50	19.5	9.2	--	--
Subinox 316L	0.025	1.40	0.50	18.5	11.5	2.3	--
Subinox 347	0.050	1.40	0.50	19.5	9.5	--	Nb + Ta – 0.50
Subinox 309L	0.025	1.40	0.50	23.5	12.5	--	--
Subinox 309LMo	0.025	1.40	0.50	23.5	12.2	2.2	--
Subinox 410NiMo	0.03	0.50	0.30	12.5	4.5	0.50	--
Subinox 2209	0.025	1.30	0.50	22.0	9.0	3.5	N – 0.12
Subinox 2594	0.025	0.60	0.50	24.5	8.5		N-0.25, W-0.1

MECHANICAL PROPERTIES OF ALL WELD METAL, TYPICAL:					
With wire	**Condition**	**UTS, MPa**	**% El.**	**CVN Impact**	
				-50°C	**-196°C**
Subinox 308L	AW	580	37	90	
Subinox 308L Spl	AW	580	37		50
SUBINOX 308H	AW	600	37		
Subinox 316L	AW	580	37	90	40
Subinox 347	AW	600	35	90	
Subinox 309L	AW	600	35	90	
SUBINOX 309LMo	AW	620	35		
Subinox 410NiMo	AW	770	23	50	
Subinox 2209	AW	780	27	70	
Subinox 2594	AW	650	27	70	

AW – As Welded

The chemistry and mechanical properties will depend on actual wire chemistry and arc voltage

Available in Standard packing of 30 Kg Bag

Item Code	Packing
WCF.SS.330.BA02	30 Kg Bag

AUTOMELT S79

SAW Flux

GENERAL DESCRIPTION :

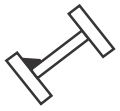
- Agglomerated Flux
- Fluoride-Basic Type Flux
- High Basic Flux having Basicity index of 3.1
- Neutral Behaviour to Manganese and Silicon
- Non-Chromium Compensating
- Chromium Burnout is very less
- Multi-pass Butt and Fillet Welding
- For welding of 9% Ni Steels
- Suitable for Welding Speeds of 0.40 – 0.60 m/min
- Grain Size – 0.25-1.60 mm
- Type of Current – DCEP / AC

CLASSIFICATION :

With Wire	AWS 5.39	Single / Multi-pass
AUTOMELT NiCr3	F80AZ-ERNiCr-3/NiCr-3	Multi-pass
AUTOMELT NiCrMo3	F110A32-ERNiCrMo-3/NiCrMo-3	Multi-pass
AUTOMELT NiCrMo4	F100A32-ERNiCrMo-4/NiCrMo-4	Multi-pass

TYPICAL APPLICATIONS :

- ASTM class 1, SA-353 class1. For welding of 9% Nickel steels for cryogenic applications, especially LNG storage systems
- Welding on stainless / heat resistant cryogenic steels and alloys for welding nickel base alloys.



Fillet

Single V

Double V

Single Wire

CHEMICAL COMPOSITION OF FLUX:

$SiO_2 + TiO_2$	$Al_2O_3 + MnO$	CaF_2
15	35	50

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL (Wt%), TYPICAL:

With wire	C	Mn	Si	Cr	Ni	Mo	Other Elements
Automelt NiCr3	0.01	2.80	0.30	20.0	Rem	8.6	Fe-0.4; Nb-2.4
Automelt NiCrMo3	0.03	0.30	0.30	22.0	Rem	8.6	Fe-4.0; Nb-3.5
Automelt NiCrMo4	0.01	0.55	0.15	14.6	Rem	16.0	Fe-5.0; W-3.6; Co-0.2; Cu-0.01

AUTOMELT S79

SAW Flux

MECHANICAL PROPERTIES OF ALL WELD METAL, TYPICAL:				
With wire	**Condition**	**UTS, MPa**	**% E**	**CVN Impact (J) -196°C**
Automelt NiCr3	AW	620	35	-
Automelt NiCrMo3	AW	780	35	50
Automelt NiCrMo4	AW	750	35	50

AW – As Welded

The chemistry and mechanical properties will depend on actual wire chemistry and arc voltage

Available in Standard packing of 30 Kg Bag

Item Code	Packing
WCF.SS.790.BA02	30 Kg Bag

AUTOMELT ES1

SAW Flux

GENERAL DESCRIPTION :

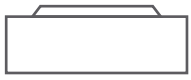
- Agglomerated Flux
- Fluoride-Basic Type Flux
- High Basic Flux having Basicity index of 4
- Excellent slag removal
- Good Wetting
- Very high deposition rates
- Cladding and Overlaying
- For Electroslag Strip Cladding
- Grain Size – 0.25-1.00 mm
- Type of Current – DCEP
- Low dilution

CLASSIFICATION :

With Strip	AWS 5.39	Single / Multi-pass
SUBINOX EQ309L	ESCLAD1-ER309L/309L	Multi-pass
SUBINOX EQ316L	ESCLAD1-ER316L/316L	Multi-pass
SUBINOX EQ347	ESCLAD1-ER347/347	Multi-pass

TYPICAL APPLICATIONS :

- For cladding and overlaying of Stainless Steel using Electroslag Strip Cladding process



Cladding

Cladding

CHEMICAL COMPOSITION OF FLUX:

Al_2O_3+ MnO	CaF_2	CaO + MgO
20	75	05

CHEMICAL COMPOSITION OF UNDILUTED WELD METAL (Wt%), TYPICAL:

Base Metal – ASTM 516 Gr 70 | **Strip Dimensions** – 60 mm (width) x 0.5mm (thickness)

With Strip	Layer	C	Mn	Si	Cr	Ni	Mo	Nb
Subinox EQ309L	Strip	0.020	1.60	0.40	24.50	12.90	--	--
	1	0.020	1.40	0.45	22.50	12.70	--	--
Subinox EQ316L	Strip	0.020	1.60	0.40	19.00	12.50	2.50	--
	1	0.020	1.40	0.45	18.00	12.00	2.50	--
Subinox EQ347	Strip	0.020	1.65	0.40	19.50	10.70	--	0.50
	1	0.020	1.50	0.50	18.00	10.30	--	0.45
	2 (1st layer with EQ309L)	0.020	1.50	0.50	19.50	11.00	--	0.45

The chemistry will depend on actual strip chemistry and welding parameters
Available in Standard packing of 30 Kg Bag

Item Code	Packing
WCF.BS.010.BA02	30 Kg Bag

Storage and Handling Instructions

Section III

STORAGE and HANDLING INSTRUCTIONS

FOR WELDING CONSUMABLES

1. General Instructions:

Welding consumables will meet their required & specified properties, only when they are stored and handled as recommended by manufacturer.

Ador Welding Limited recommend to follow, the individual and validated technical rules, regulations, recommendations and standards, during transport, storage and handling.

Below are some general recommendations for storage and handling of welding consumables. They are applicable for all type of welding consumables.

- Mechanical damage and moisture pickup should be avoided at any cost
- Welding consumables should be stored in unopened and undamaged original packaging.
- The environment must be clean, dust-free and dry.
- Direct exposure to sunlight should be avoided.
- Open pallets should not be stacked.
- Direct contact of packaging with floor and walls should be avoided.
- Welding consumables should be stored frost free.
- Suitable measures must be taken to avoid temperature below due point.
- It is preferable to store the consumables in a chamber / room with relative humidity below 40%. This relative humidity can be achieved using dehumidifiers, electrical heaters, bulbs etc. The wall of room can suitably painted to maintain the humidity. The suitable dial –gauge meter can be used to measure the relative humidity continuously inside room.

These are all recommendations, they do not discharge user from his responsibility to ensure fault free condition of the welding consumable before use

2. Storage and Handling Instructions for SMAW Electrodes:

2.1 Scope:

SMAW Electrodes manufactured by Ador Welding Limited. Electrodes which are packed in:

a. Cardboard Boxes – Primary and Secondary

b. Pouches with Secondary cardboard box.

c. Vacuum Pouches – R2U electrodes

d. Hermetically sealed metal Tins

e. Plastic Primary Cartons with Secondary cardboard box

Product Group	a	b	c	d	e
MSGP	√				
C-Mn Steels	√		√		
Cellulosic	√			√	
Low Alloy Steel	√		√		
Stainless Steel		√			
Cast Iron					√
Hard Facing	√				
Nickel Alloys					√
Copper Alloys					√
Aluminium Alloys	√				√
Cutting & Gouging Electrodes	√				

2.2 Need:

Electrodes, when stored have tendency to pick up moisture. This tendency is more in case of low hydrogen electrodes as compared to rutile type electrodes. The flux coating on the electrodes absorbs moisture from atmosphere and if they are used subsequently, this moisture can result in porosity, hydrogen induced cracking etc. depending on amount of moisture absorbed. If electrodes are stored in a highly humid atmosphere, rusting of core wire of the electrodes can take place. All these can result in deterioration of mechanical properties of the weld metal.

2.3 Storage:

a. The conditions to store electrodes in primary and/or secondary cardboard box are:
   - temperature 17-27°C, relative humidity max. 60%
   - temperature 27-37°C, relative humidity max. 50%.
   - Electrode boxes may be stored in layers to a maximum of 5.

b. Above given Temperature & humidity requirements are not applicable for Vacuum Packs (R2U) and hermetically sealed packs, provided packs are not damaged and vacuum seal is unbroken.

c. The storage period of the electrodes in cardboard boxes thus, should not exceed 3 years. Provision should be made to follow, first in first out principle to avoid aging.

d. Electrodes in opened or damaged packs (of any type of packing) should be stored in a separate, heated chamber at higher temperature.

2.4 Handling:

Re-drying:

Re-drying is required for products in below given conditions:

a. Rutile coated electrodes, being humidified for any reason
b. Low hydrogen electrodes in cardboard boxes
c. Low hydrogen electrodes, from damaged vacuum packs or which have remain unused after specified time
d. Stainless steel electrodes
e. Nickel based electrodes after long and unknown storage conditions
f. For all above mentioned products if the storage conditions deviate.

Re-drying of electrodes:

- Proper re-drying temperature depends upon electrode type and its condition.
- Cellulosic electrode must not be re-dried.
- Rutile coated mild steel electrodes does not need re-drying unless they are humidified.
- Aluminium electrodes does not need re-drying.
- Follow re-drying cycle given in table 1 or on label or on product data sheets.
- Do not re-dry the electrodes at higher temperatures than recommended.
- Re-drying of electrode can be repeated maximus 3 times at max temperature & time specified.
- Do not stack more than 4 layers of electrodes in the re-drying oven.
- The re-drying temperature is the temperature in the bulk of the electrodes. The re-drying time is measured from the point at which the re-drying temperature has been reached.
- Vacuum packed electrodes, can be used upto 8 hrs after opening the pack subject to Temperature 35°C max and relative humidity of 90% max. This period can be extended to 12 Hrs under condition of temperature 27°C max and relative humidity of 70% max.

Table 1: Recommended Re-drying Cycle for various electrodes:

Electrode product group	Re-drying time (Hr)	Re-drying Temperature (°C)	Holding
Mild Steel – Rutile coated	0.5-2	80-120	10-20°C above ambient
Mils steel – Basic coated, low hydrogen	1-6	250-300	Holding oven at 100-150°C for max 1 year. Portable oven at 70-100°C for max 10 Hrs
Low Alloy Steel – Rutile coated	1-2	80-120	10-20°C above ambient
Low alloy Steel – Basic coated	1-6	250-300	Holding oven at 100-150°C for max 1 year. Portable oven at 70-100°C for max 10 Hrs
Stainless Steel	1-6	250-300	Holding oven at 100-150°C for max 1 year. Portable oven at 70-100°C for max 10 Hrs
Cast Iron	1-6	120-150	Holding oven at 80-120°C for max 1 year.
Hard Facing – Rutile Coated	1-6	80-120	10-20°C above ambient
Hard Facing – Basic coated	1-6	250-300	Holding oven at 100-150°C for max 1 year. Portable oven at 70-100°C for max 10 Hrs
Ni alloys	1-6	250-300	
Cu Alloys	1-4	200-250	

2.5 Deteriorated products:

SMAW electrodes, that have suffered from serious water and moisture contamination, or have been exposed over long periods of time cannot be restored in their original conditions and should be discarded.

3. Storage and Handling of Solid wires and strips:

3.1 Scope:

Solid wires of GTAW, GMAW & SAW supplied in Tubes, Spools, bobbins & Drums. SAW & ESSC Strips supplied in Spools.

3.2 Storage:

Over and above general conditions, recommended storage conditions are:

- temperature 17-27°C, relative humidity max. 60%
- temperature 27-37°C, relative humidity max. 50%.

3.3 Handling:

In all conditions, while in use, opened and packed, wire & strip needs protection against contamination with moisture, dust, oil, etc.

During interruption of more than 8 hrs, the wire spool shall be stored in plastic bags in the above mentioned storage condition.

While welding with Aluminium wires, uniformity of air and metal temperature is important. Electrode and base metal should be allowed to stabilize before start of welding.

3.4Deteriorated Products:

Wires and Strips that are oxidized (rusted), have suffered from serious water and moisture contamination, or have been exposed over long periods of time cannot be restored in their original conditions and should be discarded.

4. Storage and Handling Instructions for Cored Wires

4.1 Scope:
All the Flux Cored and Metal Cored wires of GMAW, GTAW and SAW processed packed in Tubes, Spools and Drums.

4.2 Storage:
Over and above general conditions, recommended storage conditions for cardboard box packed flux cored wire are:

- temperature 17-27°C, relative humidity max. 60%
- temperature 27-37°C, relative humidity max. 50%.

Above given Temperature & humidity requirements are not applicable for material supplied in Vacuum Packs, provided packs are not damaged and vacuum seal is unbroken.

4.3 Handling:
In all conditions, while in use, opened and packed, wire & strip needs protection against contamination with moisture, dust, oil, etc.
During interruption of more than 8 hrs, the wire spool shall be stored in plastic bags in the above mentioned storage condition.

Re-drying:
Flux cored wires exhibit porosity or worm tracks, when contaminated with moisture. Wire supplied on metal spools can may be re-dried at 120-150°C for 6-8 hrs. However, wire on plastic spools cannot be reconditioned.

4.4 Deteriorated Products:
Wires that are oxidized (rusted), have suffered from serious water and moisture contamination, or have been exposed over long periods of time cannot be restored in their original conditions and should be discarded.

5. Storage and Handling of Welding Flux:

5.1 Scope:
All types of SAW and ESSC Flux packed in Plastic Bags, Metal Drum and Vacuum Pouch.

5.2 Storage:
Over and above general conditions, recommended storage conditions for Welding flux packed in plastic bags are:

- temperature 17-27°C, relative humidity max. 60%
- temperature 27-37°C, relative humidity max. 50%.

Above given Temperature & humidity requirements are not applicable for material supplied in Vacuum Packs, provided packs are not damaged and vacuum seal is unbroken. They are also not applicable to Flux packed in metal drums. Rusting and damage to the metal drums should be prevented.

5.3 Handling:
In all conditions, while in use, opened and packed, wire & strip needs protection against contamination with moisture, dust, oil, etc.
Re-drying:
Re-drying is required for products in below given conditions:

a. All the agglomerated fluxes, supplied in plastic bags and metal drums

b. Welding fluxes from damaged vacuum packs and which have remain unused after specified time

STORAGE and HANDLING INSTRUCTIONS

FOR WELDING CONSUMABLES

Re-drying Instructions:

a. Re-drying for welding fluxes is to be carried out at 300-350°C for minimum of 2 Hrs.

b. Do not re-dry the fluxes at higher temperatures than recommended.

c. Re-drying of fluxes can be repeated maximus 3 times at max temperature & time specified.

d. Holding temperature in SAW Fluxes depends on the thickness of flux layer kept for baking. 2 Hrs if holding time is applicable to 40mm thick flux layer. If the flux thickness in oven is higher than this, the holding time may be increased.

e. The re-drying temperature is the temperature in the bulk of the flux. The re-drying time is measured from the point at which the re-drying temperature has been reached.

f. After Re-drying, welding flux should be maintained in the oven at 120-150 Deg C continuously or transfer to Holding Oven as the case may be.

g. Vacuum packed fluxes, can be used upto 8 hrs after opening the pack subject to Temperature 35°C max and relative humidity of 90% max. This period can be extended to 12 Hrs under condition of temperature 27°C max and relative humidity of 70% max.

5.4 Deteriorated products:

Welding Fluxes, that have suffered from serious water and moisture contamination, or have been exposed over long periods of time, or reduced to dust after reuse, cannot be restored in their original conditions and should be discarded.

5.5 Recycling of Fluxes:

a. Unconsumed flux can be reused with addition of minimum 25% new flux.

b. Unconsumed flux collected from the weld must be cleaned from slag, metal, and / or other contaminants.

c. Damage to the flux by heavy impingement in the transportation system should be prevented.

d. The agglomerated flux grains should not be segregated based on its size during usage of welding flux.

6. Shelf life for all welding consumables:

Shelf life for all consumables is **3 Years**, with one exception of all Aluminium consumables. They have shelf life of 1 Year. All the Vacuum Packed (R2U) Mild Steel and Low Alloy Steel electrodes have shelf life of 5 Years, if the Vacuum remains intact and the packs are handled carefully.

Individual products may have higher shelf life, but as formulas and / or standards might change, one should not extend shelf life. Take manufacturing date of product to calculate shelf life.

Safety Features

Section IV

SAFETY FEATURES

IN WELDING

Welding is a safe operation when sufficient measures are taken to protect the welder from potential hazards. When these measures are overlooked or ignored, welders can encounter dangers such as electric shock, over exposure to fumes and gases, arc radiation, fire and explosion which may result in serious or even fatal injuries.

What is Personal Protective Equipment?

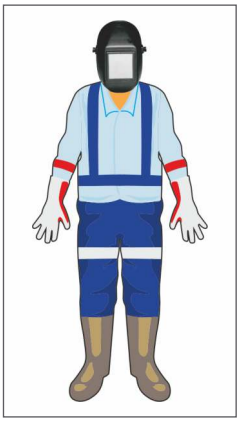
Personal Protective Equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical or other workplace hazards. PPE may include items such as gloves, safety glasses and shoes, earplugs or muffs, hard hats, respirators or coveralls, vests and full body suits.

What can be done to ensure proper use of PPE ?

All PPE should be of safe design and construction and should be maintained in a clean and reliable fashion. It should fit well and be comfortable to wear, encouraging welder to use them.

Protective Clothing

Welder, must wear clothing to protect them from being burned. Injuries like burns are the most common due to sparks landing on bare skin. Welding arcs are very intense and can cause burns to skin and eyes with just a few minutes of exposure. Many types of clothing will protect you from ultra-violet radiation exposure, which appears as a skin burn (much like sunburn).



Under the worst conditions, severe burns and skin cancer may result from excessive radiation. Because of its durability and resistance to fire, wool clothing is suggested over synthetics (which should never be worn because it melts when exposed to extreme heat) or cotton, unless it is specially treated for fire protection.

If possible keep your clothes clean of grease and oil, as these substances may ignite and burn uncontrollably in the presence of oxygen. Other protective wear for heavy work or especially hazardous situations includes flame-resistant suits, aprons, leggings, leather sleeves/shoulder capes and caps worn under your helmet. Heavy flame-resistant gloves such as leather should always be worn to protect your hands from burns, cuts and scratches.

In addition, as long as they are dry and in good condition, they will offer some insulation against electric shock. In order to prevent electric shock, the key word is dry! When working in wet conditions or when perspiring heavily, you must be even more careful to insulate your body from electrically live parts and work on grounded metal.

Carrying out welding operations exposes the welder to Safety Hazards in following areas

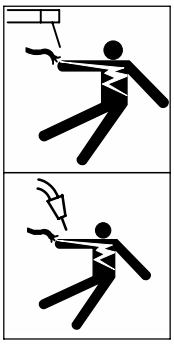
1. Electric Shock
2. Electromagnetic Radiation
3. Fire & Explosion
4. Fumes & Gases
5. Heat

1. ELECTRIC SHOCK

Arc welding equipments operate at a voltage which is safe under normal working conditions but the shock hazard should not be ignored. It increases in warm & damp conditions because welder has to work with electric current which may pass through his body. The human body resistance to current passage is not constant. The highest resistance is offered by the skin. Wet skin conducts electric current better than dry skin under normal conditions.

Safety Precautions

- Check that equipment is correctly earthed when installed & when in use
- Make sure welding cables and machines are capable of handling maximum voltage & current as rated for the equipment & for the desired applications
- Check for damage to insulation on cables, holders, guns and connectors, please do not operate the equipment without properly insulting the same
- Ensure Arc welding machines are designed as per applicable standards
- Please operate equipments strictly as per printed Instructions and rules specified by respective original equipment manufacturers
- Make sure all earthing connections are mechanically strong
- Ensure all welding equipments are inspected regularly
- Do not immerse hot electrode holder into water for cooling because retained moisture may give electric shock in later operations
- Do not carry holder and earthing together when welding machine is ON
  Always wear rubber soled safety shoes



SAFETY FEATURES

IN WELDING

2. ELECTROMAGNETIC RADIATION

The welding arc provides intense visible and invisible light (or radiation) and heat. Eyes must be protected from ultraviolet and infrared radiation to avoid Arc Eyes and Arc Burns. Light intensity of welding arc is 10,000 times that of the safe unit for human body. A welding arc should not be looked at with unprotected eyes. Failure to observe this rule may result in various degrees of eye burn or flashed eyes (Arc eyes). The affected person has pronounced irritations in the eyes and feels as if there is sand in the eyes. The symptoms remain for one to two days. Radiation effects are up to a distance of 15 meters.

Safety Precaution

- Do not look at welding arc with naked eyes
- Use heat - resisting quality of welding screen
- Use helmet or face shield fitted with the correct shade of filter glass
- Do not use cracked or defective helmets or shield
- If possible, coat individual welding booths with a mat & light absorbent type of paint with a very low reflecting quality
- Use safety clothing (safety shoes, leather hand gloves, leather apron, leather leggings and leather cap) when welding

3. FIRE & EXPLOSION

What is Fire?

When any material starts burning, we call it Fire.

Material (fuel) starts burning on application of heat in presence of air and oxygen.

Any fire requires three supports - fuel, oxygen and ignition, when these three meet proportionately with each other, then a fire breaks out.

When an outbreak of fire is discovered, immediate corrective action is essential to provide life and damage to property.

What is Explosion?

It is very rapid process of combustion, accompanied by rapid liberation of heat and formation of a very large volume of gases products.

Fire can be controlled by reducing Fuel or Heat of air.

Before extinguishing any fire, it is essential to known the classification of fire.

When material burns, it behaves in different manners, depending upon it's physical properties. Extinguishing depend on these physical properties. Portable extinguishers are used in accordance with the extinguishing method.

Safety Precautions

- While repairing tanks, vessels, drums or pipes by welding or gas cutting, remove all traces of earlier stored material to avoid possibility of explosion
- Remove all flammable materials from working areas
- Avoid excessive release of fuel gas into the atmosphere
- Ensure that appropriate fire fighting equipment is available at hand and that all concerned know how to use it
- Have a bucket of water at the work station for cooling overheated blow pipes
- Where a 'Permitted to work' system is in operation, ensure that all instruction are fully complied with
- Check emergency escape route

SAFETY FEATURES

IN WELDING

4. FUMES & GASES

Proper ventilation is a must to maintain good health. It is true that when a welder gets clean air to breathe, he can see better, work better, work longer, quality of his work improves & productivity of people working nearby increases in an improved environment.

Most common toxic fumes are from materials such as Zinc Oxide, Carbon Monoxide, Mercury, Lead and Cadmium

Safety Precautions

- Carry out all welding operations in safe, clean and at location where sufficient natural air circulation is available.
- Under normal workshop conditions, use a local fume extractor wherever possible and maintain it's position close to the weld as work progresses
- Check for possible toxic hazards from parent metal (especially if surface is pained, plated or chemically treated) or from welding consumables
- Check for adequate ventilation and/ or breathing apparatus when welding in an enclosed space
- Use a face respirator when toxic fumes are present

5. HEAT

Heat & Spatter are expelled during cutting and welding. The work piece will remain hot for some time after welding.

Safety Precautions

- Wear correct protective clothing in good condition, free from grease and oil
- Treat all metal connected with welding and cutting as HOT
- Mark work piece as HOT when it is hot (remove notice when cool)

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