XuperFab

ewac
Empowering Welding And Cutting

A Range of Stainless Steel Electrodes for Fabrication

EWAC Alloys Limited
(A Wholly Owned Subsidiary of Larsen & Toubro Limited)

XuperFab E308-16 ac / dc+

An Advanced Electrode for highest Quality Welding of Stainless Steel type AISI 304 and Equivalent Grades.

Principal Applications:
For joining and cladding applications on 18 Cr / 8 Ni type stainless steels with normal carbon content.

Outstanding Features:
- Excellent operating features and easy slag control in all positions.
- Smooth, well - rippled weld beads with negligible spatter.
- Confirms to ASME Sec II, Part C, SFA 5.4, Class E 308-16.

Characteristics:
Precisely controlled chemistry of the core wire and the flux coating enables consistent achievement of outstanding weld metal properties. High deposit strength and optimum ferrite content always assures freedom from hot cracking.

Procedure:
Clean weld area. Bevel heavy sections 60° to 90° groove. Clamp or tack long seams. Use chill bars and back-up plates to minimise distortion. Deposit stringer beads with shortest arc length. Chip slag between passes. Prevent localised heat build-up by staggered welding.

Technical Characteristics: Typical All-weld Chemistry (Wt %)

C	Mn	Si	Cr	Ni	S	P	Cu
0.04	0.75	0.50	19.00	9.50	0.02	0.03	0.20

Typical Mechanical Properties:
Tensile Strength : 590 MPa
Elongation (L=4D) : 40%

Recommended Amperages:

Size (mm)	2.5	3.15	4	5
Amps	50-80	70-110	90-140	130-180

Length of Electrode: 350mm

XuperFab E308L-16 ac / dc+

An Advanced Electrode for highest Quality Welding of Stainless Steel type AISI 304, AISI 304L and Equivalent Grades.

Principal Applications:
For joining and cladding applications on 18 Cr / 8 Ni type stainless steels with normal or extra low carbon content.

Outstanding Features:
- Excellent operating features and easy slag control in all positions.
- Smooth, well - rippled weld beads with negligible spatter.
- Confirms to ASME Sec II, Part C, SFA 5.4, Class E 308L-16.

Characteristics:
Precisely controlled chemistry of the core wire and the flux coating enables consistent achievement of outstanding weld metal properties. Extra low carbon content of weld metal keeps free from intergranular corrosion. High deposit ductility and optimum ferrite content always assures freedom from hot cracking without sacrificing corrosion resistance.

Procedure:
Clean weld area. Bevel heavy sections 60° to 90° groove. Clamp or tack long seams. Use chill bars and back-up plates to minimise distortion. Deposit stringer beads with shortest arc length. Chip slag between passes. Prevent localised heat build-up by staggered welding.

Technical Characteristics: Typical All-weld Chemistry (Wt %)

C	Mn	Si	Cr	Ni	S	P	Cu
0.03	0.80	0.50	19.00	9.50	0.02	0.03	0.20

Typical Mechanical Properties:
Tensile Strength : 550 MPa
Elongation (L=4D) : 40%

Recommended Amperages:

Size (mm)	2.5	3.15	4	5
Amps	50-80	70-110	90-140	130-180

Length of Electrode: 350mm

XuperFab E316 -16 ac / dc+

An Advanced Electrode for highest Quality Welding of Stainless Steel Type AISI 316 and Equivalent Grades

Principal Applications:
For joining and cladding applications on 18 Cr / 12 Ni / 2 Mo Type Stainless Steels with normal Carbon content.

Outstanding Features:
- Excellent operating features and easy slag control in all positions.
- Smooth, well - rippled weld beads with negligible spatter.
- Confirms to ASME Sec II, Part C, SFA 5.4, Class E 316-16.

Characteristics:
Precisely controlled chemistry of the core wire and the flux coating enables consistent achievement of outstanding weld metal properties. High strength deposit and optimum ferrite content always assures total freedom from hot cracking without sacrificing corrosion resistance.

Procedure:
Clean weld area, Bevel heavy sections 60° to 90° groove. Clamp / tack long seams. Use chill bars and back-up plates to minimise distortion. Deposit stringer beads with shortest arc length. Chip slag between passes. Prevent localised heat build-up by staggered welding.

Technical Characteristics: Typical All-weld Chemistry (Wt %)

C	Mn	Si	Cr	Ni	S	P	Mo	Cu
0.04	0.75	0.30	18.00	12.00	0.02	0.03	2.20	0.20

Typical Mechanical Properties:
Tensile Strength : 570 MPa
Elongation (L=4D) : 35 %

Recommended Amperages:

Size (mm)	2.5	3.15	4	5
Amps	50-80	70-110	90-140	130-180

Length of Electrode: 350mm

XuperFab E316L-16 ac / dc+

An Advanced Electrode for highest Quality Welding of Stainless Steel of type AISI 316, AISI316L and Equivalent Grades.

Principal Applications:
For joining and cladding applications on 18 Cr / 12Ni / 2 Mo type stainless steels with normal or extra low carbon content.

Outstanding Features:
- Excellent operating features and easy slag control in all positions.
- Smooth, well - rippled weld beads with negligible spatter.
- Confirms to ASME Sec II, Part C, SFA 5.4, Class E 316L - 16.

Characteristics:
Precisely controlled chemistry of the core wire and the flux coating enables consistent achievement of outstanding weld metal properties. Extra low carbon content of the weld metal ensures freedom from intergranular corrosion. High deposit ductility & optimum ferrite content always assures freedom from hot cracking, without sacrificing corrosion resistance.

Procedure:
Clean weld area. Bevel heavy sections 60° to 90° groove. Clamp or tack long seams. Use chill bars and back-up plates to minimise distortion. Deposit stringer beads with shortest arc length. Chip slag between passes. Prevent localised heat build-up by staggered welding.

Technical Characteristics: Typical All-weld Chemistry (Wt %)

C	Mn	Si	Cr	Ni	S	P	Mo	Cu
0.03	0.80	0.60	18.00	12.00	0.02	0.03	2.30	0.20

Typical Mechanical Properties:
Tensile Strength : 550 MPa
Elongation (L=4D) : 35%

Recommended Amperages:

Size (mm)	2.5	3.15	4	5
Amps	50-80	70-110	90-140	130-180

Length of Electrode: 350mm

XuperFab E309-16 ac / dc+

An Advanced Electrode for highest Quality Welding of Stainless Steel type AISI 309 and for Welding Carbon Steel to Stainless Steel type AISI 304 and for Equivalent Grades.

Principal Applications:
For joining and cladding applications on 25 Cr / 12 Ni type stainless steels and for welding dissimilar steels such as joining 18 Cr / 8 Ni type stainless steels to Plain Carbon or Low Alloys Steels. Also useful for depositing 'barrier' layer on Plain Carbon Steels prior to overlay with Cr / Ni containing stainless Steels.

Outstanding Features:
- Excellent operating features and easy slag control in all positions.
- Smooth, well - rippled weld beads with negligible spatter.
- Confirms to ASME Sec II, Part C, SFA 5.4, Class E 309-16.

Characteristics:
Precisely controlled chemistry of the core wire and the flux coating enables consistent achievement of outstanding weld metal properties. High deposit strength and optimum ferrite content always assures freedom from hot cracking.

Procedure:
Clean weld area. Bevel heavy sections 60° to 90° groove. Clamp or tack long seams. Use chill bars and back-up plates to minimize distortion. Deposit stringer beads with shortest arc length. Chip slag between passes. Prevent localized heat build-up by staggered welding.

Technical Characteristics: Typical All-weld Chemistry (Wt %)

C	Mn	Si	Cr	Ni	S	P	Cu
0.05	0.75	0.50	23.00	13.00	0.02	0.03	0.20

Typical Mechanical Properties:
Tensile Strength : 590 MPa
Elongation (L=4D) : 35%

Recommended Amperages:

Size (mm)	2.5	3.15	4	5
Amps	50-80	70-110	90-140	130-180

Length of Electrode: 350mm

XuperFab E309L-16 ac / dc+

An Advanced Electrode for highest Quality Welding of Stainless Steel type AISI 309L and for Welding Carbon Steel to Stainless Steel type AISI 304 and for Equivalent Grades.

Principal Applications:
For joining and cladding applications on 25 Cr / 12 Ni type stainless steels and for welding dissimilar steels such as joining 18 Cr / 8 Ni type stainless steels to Plain Carbon or Low Alloys Steels. Also useful for depositing 'barrier' layer on Plain Carbon Steels prior to overlay with Cr / Ni containing stainless Steels.

Outstanding Features:
- Excellent operating features and easy slag control in all positions.
- Smooth, well - rippled weld beads with negligible spatter.
- Confirms to ASME Sec II, Part C, SFA 5.4, Class E 309L-16.

Characteristics:
Precisely controlled chemistry of the core wire and the flux coating enables consistent achievement of outstanding weld metal properties. High deposit strength and optimum ferrite content always assures freedom from hot cracking.

Procedure:
Clean weld area. Bevel heavy sections 60° to 90° groove. Clamp or tack long seams. Use chill bars and back-up plates to minimize distortion. Deposit stringer beads with shortest arc length. Chip slag between passes. Prevent localized heat build-up by staggered welding.

Technical Characteristics: Typical All-weld Chemistry (Wt %)

C	Mn	Si	Cr	Ni	S	P	Cu
0.03	0.80	0.30	23.00	13.50	0.02	0.03	0.20

Typical Mechanical Properties:
Tensile Strength : 580 MPa
Elongation (L=4D) : 35%

Recommended Amperages:

Size (mm)	2.5	3.15	4	5
Amps	50-80	70-110	90-140	130-180

Length of Electrode: 350mm

XuperFab E309Mo-16 ac / dc+

An Advanced Electrode for highest Quality Welding of Carbon Steels to Molybdenum-Containing Austenitic Stainless Steel of type AISI 316 Mo or Equivalent Grades.

Principal Applications:
For joining Carbon Steels to 18 Cr / 12 Ni / 2 Mo type stainless steels, and to deposit the 'barrier' layer for Molybdenum - containing stainless overlays on carbon steels.

Outstanding Features:
- Excellent operating features and easy slag control in all positions.
- Smooth, well - rippled weld beads with negligible spatter.
- Confirms to ASME Sec II, Part C, SFA 5.4, Class E 309Mo-16.

Characteristics:
Precisely controlled chemistry of the core wire and the flux coating enables consistent achievement of outstanding weld properties. High deposit ductility and optimum ferrite content always assures total freedom from cracking, in spite of dilution.

Procedure:
Clean weld area. Bevel heavy sections 60° to 90° groove. Clamp / tack long seams. Use chill bars and back-up plates to minimise distortion. Deposit stringer beads with shortest arc length. Chip slag between passes. Prevent localized heat build-up by staggered welding.

Technical Characteristics: Typical All-weld Chemistry (Wt %)

C	Mn	Si	Cr	Ni	S	P	Mo	Cu
0.04	0.80	0.3	22.5	13.00	0.02	0.03	2.50	0.20

Typical Mechanical Properties:
Tensile Strength : 580 MPa
Elongation (L=4D) : 35%

Recommended Amperages:

Size (mm)	2.5	3.15	4	5
Amps	50-80	70-110	90-140	130-180

Length of Electrode: 350mm

Other Fabrication Range of Products

- ***XuperFab E310-16***
- ***XuperFab E347-16***
- ***XuperFab E308H-16***
- ***XuperFab E410NiMo-15***
- ***XuperFab E317-16***
- ***XuperFab E317L-16***
- ***XuperFab E2209-17 (Duplex SS)***
- ***XuperFab E2594-17 (Super Duplex SS)***
- ***XuperFab E385-17 (Super Austenitic)***
- ***SS Welding Consumables as per the requirements like Ferrite Number, % of Carbon, IGC etc.***

Ferrite in Weld Deposits:

Formation of Delta Ferrite during solidification depends on chemical composition, conditions of crystallization and cooling rate. Delta ferrite is known to be beneficial in reducing tendency for cracking of fissuring in weld metals. However, excess ferrite may have detrimental effect on corrosion resistance. Hence, controlled ferrite content in the weld deposit is essential. Following methods are adopted for measurement of delta ferrite.

Use of various diagram for finite Messmate : WRC 92.

Finite Messmate Methods:

Ferritoscope, (Fisher Gauge)

Metallographic techniques

Intergranular Corrosion (IGC) in Stainless Steel:

It is a form of relatively rapid and localized corrosion associated with carbide precipitation. This is caused by Chromium carbide formation and precipitation at grain boundaries in the heat affected zone in temperature range of 427°C to 871°C. Chromium Carbide formation removes some Chromium near the grain boundaries thereby reducing corrosion resistance of these local areas.

The common methods of testing austenitic Stainless Steel for susceptibility to intergranular corrosion are described in ASTM A 262 Practice A, B, C, E & F.

Practice A : Oxalic Acid Test.

Practice B : Ferric Sulfate-Sulfuric Acid Test.

Practice C : Nitric Acid Test.

Practice E : Copper-Copper Sulfate-16% Sulfuric Acid Test.

Practice F : Copper-Copper Sulfate-50% Sulfuric Acid Test.

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EWAC Alloys Limited
(A wholly owned subsidiary of Larsen & Toubro Limited)

Marketing Office:
L&T Business Park, Tower - B, TC - II, 5th Floor,
L&T Gate No. 5, Powai Campus, Saki Vihar Road,
Powai, Mumbai - 400 072, INDIA
Tel: + 91 22 6705 9843 | Fax: +91 22 6705 9876 / 9877
E-mail: ewacmarketing@larsentoubro.com
Web: www.ewacalloys.com

Manufacturing Plant
Plot No. 7917, GIDC,
Ankleshwar - 393002,
Gujarat, INDIA

Registered Office
L&T House, Ballard Estate,
Mumbai - 400 001,
INDIA

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