



YAWATA
WELDING ELECTRODE

ステンレス鋼用 被覆アーク溶接棒

STAINLESS STEEL

ARC WELDING ELECTRODE
for STAINLESS STEEL



Approved by:
AMERICAN BUREAU OF SHIPPING



308L-16 / 308R

For 18%Cr-8%Ni STAINLESS STEEL



Uon.730-2530
E19.9LR26



CLASSIFICATION
AWS A5.4 : E308L-16
JIS Z 3221 : ES308L-16
DIN 8556 : E 199 LR 26

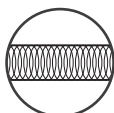
YAWATA 308L-16 / 308R is a rutile high-alloy electrode for stainless steel with Cr-Ni content. Resistant to atmospheric corrosion, rust and crack. Beautiful beads and finely rippled joint making it suitable for work that requires details or appearance.

Applications

Welding of 18%Cr-8%Ni austenitic stainless steels for chemical apparatus, containers and plants



NO CRACK



BEAUTIFUL BEADS



STABLE ARC FORCE



FOR AISI 302,
304 & 304L



CLASSIFICATION
AWS A5.4 : E308-16
JIS Z 3221 : ES308-16
DIN 8556 : E 199 nCR 26

SIZES & RECOMMENDED CURRENT RANGE (AC OR DC +)

DIAMETER/ LENGTH (mm)	2.0/250	2.6/300	3.2/350	4.0/350	5.0/350
PACKING SIZE (kg)	5/20	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20	5/20
HERMETICAL PACK (pieces)	-	4	4	-	-
WELDING POSITION	CURRENT (A)				
F	40-50	55-70	80-100	110-140	140-170
V, OH	35-45	45-65	70-90	100-130	-

TYPICAL CHEMICAL COMPOSITION OF DEPOSITED METAL (%)

	C	Si	Mn	P	S	Cr	Ni
308L-16	0.03	0.70	1.10	0.025	0.011	18.90	9.90
308R	0.05	0.70	1.10	0.020	0.011	19.20	9.30

TYPICAL MECHANICAL PROPERTIES OF DEPOSITED METAL

	TENSILE STRENGTH N/mm ² (kgf/mm ²)	ELONGATION %	CREEP-RUPTURE STRENGTH (as welded, 650 °C x 1000h) N/mm ² (kgf/mm ²)
308L-16	560 (57)	51	120 (12)
308R	610 (62)	47	130 (13)



WELDING POSITION
All Positions
Except Vertical Down

309L-16 / 309R

For 22%Cr-12%Ni STAINLESS STEEL AND DISSIMILAR METALS



CLASSIFICATION
AWS A5.4 : E 309L-16
JIS Z 3221 : ES309L-16
DIN 8556 : E 23 12 L 26

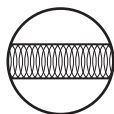
YAWATA 309L-16 / 309R is a rutile stainless steel electrode. 25%Cr-12%Ni deposited metal shows extremely high crack resistance due to its high ferrite content.

Applications

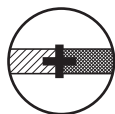
Welding of 22%Cr-12%Ni stainless steels, dissimilar metals such as 18%Cr-8%Ni stainless steels to mild steels or low alloy steels, 18%Cr-8%Ni stainless clad steels, and the parts of hardenable steel for which postheat treatment is impossible, for petroleum, chemical and textile industries.



EXTREMELY
HIGH CRACK
RESISTANCE



BEAUTIFUL BEADS



JOIN MILD STEEL &
STAINLESS STEEL



FOR AISI 304,
309 & 309L



CLASSIFICATION
AWS A5.4 : E 309-16
JIS Z 3221 : ES309-16
DIN 8556 : E 23 12 R 26

SIZES & RECOMMENDED CURRENT RANGE (AC OR DC +)

DIAMETER/ LENGTH (mm)	2.0/250	2.6/300	3.2/350	4.0/350	5.0/350
PACKING SIZE (kg)	5/20	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20	5/20
HERMETICAL PACK (pieces)	-	4	4	-	-
WELDING POSITION	CURRENT (A)				
F	40-50	55-70	80-100	110-140	140-170
V, OH	35-45	45-65	70-90	100-130	-

TYPICAL CHEMICAL COMPOSITION OF DEPOSITED METAL (%)

	C	Si	Mn	P	S	Cr	Ni
309L-16	0.03	0.65	1.10	0.020	0.013	23.20	13.20
309R	0.06	0.70	1.20	0.020	0.012	24.20	13.20

TYPICAL MECHANICAL PROPERTIES OF DEPOSITED METAL

	TENSILE STRENGTH N/mm ² (kgf/mm ²)	ELONGATION %	CREEP-RUPTURE STRENGTH (as welded, 650 °C x 1000h) N/mm ² (kgf/mm ²)
309L-16	560 (57)	40	120 (12)
309R	590 (60)	42	120 (12)

WELDING
POSITION



All Positions
Except Vertical Down



316L-16 / 316R

For 18%Cr-12%Ni-2% Mo STAINLESS STEEL



CLASSIFICATION
AWS A5.4 : E316L-16
DIN 8556 : E1912.2LR26

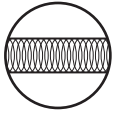
YAWATA 316L-16 / 316R is a rutile high-alloy electrode for non-stabilized and stabilized chromium-nickel steels resistant to atmospheric corrosion. Smooth running, good striking and restriking. Regular appearance. Finely rippled, smooth junction, easy slag removal.

Applications

Welding of all chromium-nickel steel with low or medium C content, as well as titanium and niobium stabilized chromium-nickel steel of 18%Cr-12%Ni-2%Mo type. Welding of stainless steels for food-grade and pharmaceutical-grade equipment, and for chemical engineering plants.



HIGH CORROSION
RESISTANCE



BEAUTIFUL BEADS



STABLE ARC FORCE



FOR AISI 316,
316L & 318



CLASSIFICATION
AWS A5.4 : E316-16
JIS Z 3221 : ES316-16

SIZES & RECOMMENDED CURRENT RANGE (AC OR DC +)

DIAMETER/ LENGTH (mm)	2.0/250	2.6/300	3.2/350	4.0/350	5.0/350
PACKING SIZE (kg)	5/20	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20	5/20
HERMETICAL PACK (pieces)	-	4	4	-	-
WELDING POSITION	CURRENT (A)				
F	40-50	55-70	80-100	110-140	140-170
V, OH	35-45	45-65	70-90	100-130	-

TYPICAL CHEMICAL COMPOSITION OF DEPOSITED METAL (%)

	C	Si	Mn	P	S	Cr	Ni	Mo
316L-16	0.03	0.70	1.25	0.024	0.011	18.70	12.40	2.65
316R	0.05	0.33	1.48	0.021	0.011	18.30	12.90	2.35

TYPICAL MECHANICAL PROPERTIES OF DEPOSITED METAL

	TENSILE STRENGTH N/mm ² (kgf/mm ²)	ELONGATION %	CREEP-RUPTURE STRENGTH (as welded, 650 °C x 1000h) N/mm ² (kgf/mm ²)
316L-16	560 (57)	46	650°C 140 (14) 732°C 57 (5.8)
316R	590 (60)	42	650°C 140 (14) 732°C 61 (6.2)

TYPICAL CORROSION RESISTANCE OF DEPOSITED METAL

316L-16	Boiling 5% (weight) H ₂ SO ₄	6.0 max (g/m ² .h)
316R	Boiling 5% (weight) H ₂ SO ₄	7.0 max (g/m ² .h)



WELDING
POSITION
All Positions
Except Vertical Down

HOTLINE TECHNICAL SUPPORT
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DISCLAIMER 1. Various data of distinctive features such as welding materials, deposited metal, weld metal etc. shown in this catalogue are meant to explain the representative properties and performance of the products and are not to be taken as a guarantee except those which are specified clearly as "Specification". 2. In regards to the properties of welded structures, note that the results may be affected by the design of structures, chemical compositions of steel plates, construction methods, welding conditions, ability of constructor etc. 3. The company shall not take responsibility for damages caused by the misuse of the technical information written in this catalogue.

307-16

For STAINLESS STEEL

CLASSIFICATION
AWS A5.4 : E 307-16
DIN 8556 : E 188 Mo 6 R 26



YAWATA 307-16 is a basic coated, austenitic high-yielded electrode. The weld metal is tough with high tensile and elongation values, self-lifting slag, rust proof, wear resisting and crack-free.

Applications

For welding dissimilar metals and other steels that are difficult to weld, containing 18% Cr, 8% Ni and 6% Mn, such as high manganese alloy steel, armour steel and hardenable steels.



HIGH IMPACT
RESISTANCE



EASY TO WELD



CORROSION
RESISTANCE



FOR MILD STEEL
& AISI 210

309Mo-16

For STAINLESS CLAD STEEL CONTAINING MO

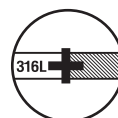
CLASSIFICATION
AWS A5.4 : E 309Mo-16
JIS Z 3221 : ES309Mo-16
DIN 3581 : E 23 12 R 26



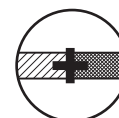
YAWATA 309Mo-16 is a lime-titania type stainless steel electrode. 22%Cr -12%Ni-2%Mo deposited metal shows excellent crack resistance especially in the welding of dissimilar metals such as stainless steel to mild steel, metals containing molybdenum and 316L to mild steel.

Applications

Welding of 22%Cr-2%Mo stainless steels, dissimilar metals containing molybdenum, 316 stainless clad steels, and self-hardening type steels which contain molybdenum and for which postheat treatment is impossible.



JOIN 316L &
OTHER STEELS



JOIN MILD STEEL &
STAINLESS STEEL



EXTREMELY
HIGH CRACK
RESISTANCE



EASY TO WELD

310-16

For 25%Cr-20%Ni STAINLESS STEEL

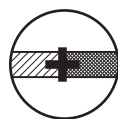
CLASSIFICATION
AWS A5.4 : E 310-16
DIN 8556 : E 25 20 R 26



YAWATA 310-16 is a rutile coated electrode deposits nominally 25%Cr-20%Ni fully austenitic stainless steel weld metal. The weld metal is resistant to oxidation and scaling at temperature up to 1050°C.

Applications

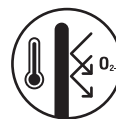
Welding of 25%Cr-20%Ni steels, and for dissimilar welds which require post weld heat treatment.



JOIN MILD STEEL &
STAINLESS STEEL



EASY TO WELD



RESISTANCE TO OXIDATION
AT HIGH TEMPERATURE



FOR AISI 309,
310 & 314

312-16

For STAINLESS STEEL AND DISSIMILAR METALS

CLASSIFICATION
AWS A5.4 : E 312-16
DIN 8556 : E 29 9 R 26



YAWATA 312-16 is a rutile austenitic-ferritic coated electrode with a 25-30% ferrite content. The weld metal is extremely crack resistant and lends itself admirably to the welding of dissimilar and difficult to weld steels. It can be used for the welding of high nickel alloys without becoming fully austenitic due to nickel pick-up.

Applications

Welding of austenitic-manganese steel, welding spring steel, tool steel and armour steel. Joining non-alloy and high alloy steels. Also suitable as a buffer layers in hardenable steel.



JOIN DISSIMILAR
STEELS



EASY TO WELD



HIGH TENSILE
STRENGTH



EXTREMELY
HIGH CRACK
RESISTANCE

SIZES & RECOMMENDED CURRENT RANGE (AC OR DC +)				
DIAMETER/ LENGTH (mm)	2.6/300	3.2/350	4.0/350	5.0/350
PACKING SIZE (kg)	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20
WELDING POSITION	CURRENT (A)			
ALL	50-80	70-100	100-140	150-210

TYPICAL CHEMICAL COMPOSITION OF DEPOSITED METAL (%)						
C	Si	Mn	P	S	Cr	Ni
0.07-0.15	≤1.0	5.0-7.0	≤0.035	≤0.025	17.5-19.5	7.5-9.5

TYPICAL MECHANICAL PROPERTIES OF DEPOSITED METAL			
TENSILE STRENGTH N/mm² (kgf/mm²)	YIELD STRENGTH N/mm² (kgf/mm²)	ELONGATION %	CHARPY 2V-NOTCH at 20°C, J (kgf.m)
≥560 (≥57)	≥350 (≥36)	≥30	≥47 (≥4.8)

SIZES & RECOMMENDED CURRENT RANGE (AC OR DC +)				
DIAMETER/ LENGTH (mm)	2.6/300	3.2/350	4.0/350	5.0/350
PACKING SIZE (kg)	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20
WELDING POSITION	CURRENT (A)			
F	55-70	80-100	110-140	140-170
V, OH	45-60	70-90	100-130	-

TYPICAL CHEMICAL COMPOSITION OF DEPOSITED METAL (%)							
C	Si	Mn	P	S	Cr	Ni	Mo
0.05	0.68	1.14	0.018	0.013	23.50	12.80	2.65

TENSILE STRENGTH N/mm² (kgf/mm²)		ELONGATION %
640 (65)		39

SIZES & RECOMMENDED CURRENT RANGE (AC OR DC +)				
DIAMETER/ LENGTH (mm)	2.6/300	3.2/350	4.0/350	5.0/350
PACKING SIZE (kg)	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20
WELDING POSITION	CURRENT (A)			
F	40-70	70-100	110-140	140-170
V, OH	40-70	70-90	90-130	-

TYPICAL CHEMICAL COMPOSITION OF DEPOSITED METAL (%)						
C	Si	Mn	P	S	Cr	Ni
0.10	0.65	1.90	0.020	0.012	25.00	20.00

TYPICAL MECHANICAL PROPERTIES OF DEPOSITED METAL			
TENSILE STRENGTH N/mm² (kgf/mm²)	YIELD STRENGTH N/mm² (kgf/mm²)	ELONGATION %	CHARPY 2V-NOTCH at 20°C, J (kgf.m)
550 (56)	400 (41)	30	70 (7.1)

SIZES & RECOMMENDED CURRENT RANGE (AC OR DC +)				
DIAMETER/ LENGTH (mm)	2.6/300	3.2/350	4.0/350	5.0/350
PACKING SIZE (kg)	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20	1/20 & 5/20
HERMETICAL PACK (pieces)	4	4	-	-
WELDING POSITION	CURRENT (A)			
F	50-75	75-110	110-150	140-190
V, OH	50-70	70-100	100-140	-

TYPICAL CHEMICAL COMPOSITION OF DEPOSITED METAL (%)				
C	Si	Mn	Cr	Ni
0.12	0.90	1.00	29.00	9.00

TYPICAL MECHANICAL PROPERTIES OF DEPOSITED METAL			
TENSILE STRENGTH N/mm² (kgf/mm²)	YIELD STRENGTH N/mm² (kgf/mm²)	ELONGATION %	CHARPY 2V-NOTCH at 20°C, J (kgf.m)
750 (76)	550 (56)	23	60 (6.1)

