Submerged Arc Welding Consumables For Mild Steel and 490N/mm² Class Carbon steel and Low alloy steel



CA-502×UC-36

For single and multi-layer welding of mild and 490N/mm² class high tensile strength steel

Applications

CA-502×UC-36 is well suited for super-high speed welding in plate of thin and medium thickness, as an example, miniature LPG tank and spiral pipe.

It is also applicable to fillet welding and butt welding in flat position of ships, machine, vehicles, pressure vessels, bridges and general steel structures.

Characteristics

- (1) It is comparatively insensitive to rust, scales, oil and primers on the surface to be welded.
- (2) As the consumption of flux is small, it is very economical.
- (3) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the plate of moisture free and dry the flux at 250 \sim 350 $^{\rm C}$ for about one hour before use.
- (2) Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove in order to get sound welds.
- (3) When the flux height is excessive, poor bead appearance may occur.

Typical chemical composition of weld metal (%)

	C Mn Si	0	D	0	Remarks		
C		Р	5	Base metal	PT(mm)		
0.08	1.17	0.83	0.021	0.012	SM490A	25	
0.08	1.32	0.71	0.019	0.010	SM490A	20	

Typical mechanical properties of weld metal

YP	TS	EI	IV	Remarks			
N/mm² (MPa)	N/mm² (MPa)	EL (%)	J0	-18℃	Base metal	PT (mm)	PWHT
470	559	30	55	37	SM490A	25	As weld
-	565	-	60	-	SM490A	20	As weld

· Approval : ABS, BV, DNV GL, KR, LR, NK

CA-502H×**UC-36**

For single and multi-layer welding of mild and 490N/mm² class high tensile strength steel

Applications

CA-502H×UC-36 is well suited for super-high speed welding in plate of thin and medium thickness, as an example, miniature LPG tank of spiral pipe.

It is also applicable to fillet welding and butt welding in flat position of ships, machine, vehicles, pressure vessels, bridges and general steel structures.

Characteristics

- (1) It is comparatively insensitive to rust, scales, oil and primers on the surface to be welded.
- (2) As the consumption of flux is small, it is very economical.
- (3) Low temperature impact value is superior than CA-502.
- (4) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the plate of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove in order to get sound welds.
- (3) When the flux height is excessive, poor bead appearance may occur.

0	C Mn Si	0.	_	0	Remarks		
C		Р	5	Base metal	PT(mm)		
0.06	1.47	0.61	0.028	0.005	SM490A	25	
0.08	1.32	0.45	0.015	0.010	EH36	20	

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

YP	TS	EI	IV	Remarks			
N/mm² (MPa)	N/mm² (MPa)	(%)	-29℃	-40°C	Base metal	PT (mm)	PWHT
470	579	30	60	49	SM490A	25	As weld
-	580	31	50	-	EH36	20	As weld

· Approval : ABS, BV, DNV GL, KR, LR, NK

CA-506S×UC-36

For single and multi-layer welding of medium or thick mild steel and 490N/mm² class high tensile strength steel

Applications

Butt and flat fillet welding of ships, vessels, bridges, machines, buildings, heavy duty steel structure and general fabrications. Butt welding of aluminum-killed steel for low temperature service used in LPG storage tanks, LPG tankers, low temperature service equipment, and other structures for cold regions.

Characteristics

- (1) Excellent notch toughness at low temperature down to -50℃.
- (2) It deposits weld metal of good appearance even in low speed welding with metal with high currents.
- (3) Good mechanical properties can be obtained with single-layer welding using high heat input.
- (4) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) When the flux height is excessive, poor bead appearance may occur.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

	C Mn Si	0	_	0	Remarks		
C		Р	5	Base metal	PT(mm)		
0.07	1.35	0.37	0.021	0.014	SM490A	25	
0.06	1.28	0.31	0.016	0.010	EH36	20	

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

ΥP	YP TS F		IV	Remarks			
N/mm² (MPa)	N/mm² (MPa)	EL (%)	-20°C	-50°C	Base metal	PT (mm)	PWHT
470	578	30	90	70	SM490A	25	As weld
-	565	-	60	-	EH36	20	As weld

· Approval : ABS, BV, DNV GL, LR

CA-512×UC-43(UC-48)

For single and multi-layer welding of mild and 490N/mm² class high tensile strength steel

AWS A5.17

F7A(P)2-EL8 F7A(P)2-EL12

Applications

CA-512×UC-43 are well suited for fillet and butt welding of ships, machine, H-beams, boilers, bridges, agricultural, steel structure and general steel fabrications.

Characteristics

- (1) It is comparatively insensitive to rust, scales, oil and dirt and primers on the surface to be welded.
- (2) Slag detachability and bead appearance is very good.
- (3) Suitable for welding of thin and medium plate in high speed welding.
- (4) As the consumption of flux is small, it is very economical.
- (5) Applicable to horizontal and flat fillet welding.
- (6) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove in order to get sound welds.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

	C Mn Si	0.	D	0	Remarks		
C		Р	5	Base metal	PT(mm)		
0.06	1.48	0.41	0.021	0.014	SM490A	25	
0.07	1.39	0.38	0.018	0.011	SM490A	20	

Typical chemical composition of weld metal (%)

YP	YP TS L		IV	IV (J)			Remarks		
N/mm² (MPa)	N/mm² (MPa)	(%)	3 0	-29°C	Base metal	PT (mm)	PWHT		
460	566	31	90	70	SM490A	25	As weld		
-	578	-	60	-	SM490A	20	As weld		

CA-514×UC-43(UC-48)

For single and multi-layer welding of mild and 490N/mm² class high tensile strength steel, For one-side welding

AWS A5.17

F7A(P)4-EL8 F7A(P)4-EL12

Applications

CA-514 \times UC-43 are well suited for fillet and butt welding of ships, structural steel, and heavy duty structures.

Characteristics

- (1) Impact properties of weld metal and crack resistibility are excellent.
- (2) Particulary well suited for both side single layer welding in plates thicker than 15mm with single or multi-wire systems within the ship building industry.
- (3) Slag detachability and bead appearance are very good.
- (4) As the consumption of flux is small, it is very economical.
- (5) Applicable to tandem and one-side welding.
- (6) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.
- (3) Pay attention to welding voltage. Excessive welding voltage caused deterioration of joint properties.

	C Mn Si	0.	_	0	Remarks		
C		Р	5	Base metal	PT(mm)		
0.08	1.55	0.38	0.021	0.015	SM490A	25	
0.07	1.35	0.42	0.016	0.010	DH36	25	

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

YP	TS		IV	F	Remark	(S	
N/mm² (MPa)	N/mm² (MPa)	EL (%)	3°0	-40°C	Base metal	PT (mm)	PWHT
462	546	31	70	52	SM490A	25	As weld
-	586	-	65	-	DH36	25	As weld

· Approval : ABS, BV, DNV GL, KR, LR, NK

CA-522×UC-12K

For single and multi-layer welding of mild and 490N/mm² class high tensile strength steel

Applications

CA-522×UC-12K are well suited for fillet and butt welding of LPG tank, spiral pipe, ships, machine, boilers, bridges and steel structures.

Characteristics

- (1) CA-522×UC-12K are well suited for high speed welding in thin plate.
- (2) It is comparatively insensitive to rust, scales, oil and dirt and primers on the surface to be welded.
- (3) Slag detachability and bead appearance are very good.
- (4) Suitable for welding of thin and medium plate in high speed welding.
- (5) As the consumption of flux is small, it is very economical.
- (6) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at 250 \sim 350 $^{\circ}{\rm C}$ for about one hour before use.
- (2) Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove in order to get sound welds.
- (3) When the flux height is excessive, poor bead appearance may occur.
- (4) The use of the flux which has been re-used for welding in many times may causes deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

0	Mn Si	0.	_	0	Remarks		
C		Р	S	Base metal	PT(mm)		
0.08	1.67	0.50	0.020	0.016	SM490A	25	
0.07	1.52	0.44	0.019	0.013	SM490A	20	

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

YP	YP TS EI		IV	IV (J)			Remarks		
N/mm² (MPa)	N/mm² (MPa)	(%)	ວິດ	-29℃	Base metal	PT (mm)	PWHT		
468	560	28	70	40	SM490A	25	As weld		
-	576	-	50	-	SM490A	20	As weld		

Approval : ABS

CA-526×**UC-12K**

For single and multi-layer welding of mild and 490N/mm² class high tensile strength steel

Applications

Fillet and butt welding of steel structures, spiral pipe, ships, structures for ocean areas and thick pressure vessels.

Characteristics

- (1) Crack resistibility, pockmark and porosity resistibility are excellent.
- (2) Applicable to high current and good weldability for all range of thickness of plate.
- (3) Slag detachability and bead appearance are very good.
- (4) Suitable for multi-layer welding of thick plate.
- (5) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) In case of multi-layer welding, use welding current and speed as low as possible at the first layer of groove to avoid cracking.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

0	h far	0.	D	0	Remarks		
C	IVIN	51	Р	5	Base metal	PT(mm)	
0.07	1.36	0.35	0.021	0.010	SM490A	25	
0.08	1.40	0.32	0.019	0.011	EH36	34	

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

ΥP	TS		IV	Remarks			
N/mm² (MPa)	N/mm² (MPa)	(%)	J ()	-50°C	Base metal	PT (mm)	PWHT
472	561	31	90	47	SM490A	25	As weld
-	580	-	60	-	EH36	34	As weld

· Approval : ABS, BV, DNV, LR

CA-50HR×UC-36

For one side welding of mild steel and 490N/mm² class high tensile strength steel

JIS Z3183 S502-H

Applications

 $\mathsf{CA}\xspace{-50}\mathsf{HR}\xspace{-50}\xspac$

Characteristics

- (1) The deposition rate is high. It is very efficient.
- (2) Suitable of one side butt welding with iron powder.
- (3) Good mechanical properties with high heat input.
- (4) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the plate of moisture free and dry the flux 250 \sim 350 °C for about one hour before use.
- (2) Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove in order to get sound welds.
- (3) The use of flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

С	Mn	Si	Р	S	Ni	В	Base Metal
0.09	1.47	0.27	0.015	0.006	0.28	0.002	EH36(20t)
0.10	1.45	0.31	0.017	0.009	0.27	0.002	EH36(25t)

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

YP	TS	FI	IV	(J)	
N/mm² (MPa)	N/mm² (MPa)	(%)	J ()	-20°C	Base Metal
515	602	27	115	100	EH36(20t)
510	610	25	-	85	EH36(25t)

· Approval : ABS, BV, DNV GL, KR, LR

CA-508xUC-12HK

For multi-pass welding of Aluminum-killed low temperature service steel

Applications

Butt joint welding of Aluminum-killed low temperature service steel used in offshore structures, pressure vessels, steel pipes, low temperature service equipment and other structures for cold regions.

Characteristics

- (1) Excellent notch toughness at low temperature down to -60 $^\circ\!\!\!C$
- (2) Crack resistibility, pockmark and porosity resistibility are excellent.
- (3) Slag detachability and bead appearance are very good.
- (4) Suitable for multi-pass welding of low temperature service steel.
- (5) Applicable to both AC and DC(+)

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales oil, paint, water dire and slag of tack welds from the groove in order to get sound welds.
- (3) In case of multi-pass welding, use welding current and speed as low as possible at the first layer of groove to avoid cracking.
- (4) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

	N.4	0.	D	0	Remarks		
C	IVIN	Si	Р	5	Base metal	PT(mm)	
0.06	1.49	0.34	0.016	0.004	A516-70	25	

Typical chemical composition of all weld metal (%)

YP	TΩ	EI	IV(J)	Remarks			
N/mm ²	N/mm ²	(%)	-60°C	Base metal	PT (mm)	PWHT	
517	571	33.8	139	A516-70	25	As welded	
418	519	37.6	135	A516-70	25	620℃*24Hr	

CA-508×UC-36

For multi-layer welding of aluminum-killed steel for low temperature service

Applications

Butt welding of aluminum-killed steel for low temperature service used in offshore structures, steel pipes, chemical vessels, low temperature service equipment, and other structures for cold regions.

Characteristics

- (1) Excellent notch toughness at low temperature down to -60°C.
- (2) Crack resistibility, pockmark and porosity resistibility are excellent.
- (3) Slag detachability and bead appearance are very good.
- (4) Suitable for multi-layer welding of TMCP steel.
- (5) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove in order to get sound welds.
- (3) In case of multi-layer welding, use welding current and speed as low as possible at the first layer of groove to avoid cracking.
- (4) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

	N.4	0;	D	0	Remarks		
C	IVIN	51	Р	5	Base metal	PT(mm)	
0.07	1.42	0.16	0.016	0.008	SM490A	25	
0.11	1.51	0.21	0.013	0.007	API-2H Gr50	80	

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

YP TS F			IV	(J)	Remarks		
N/mm² (MPa)	N/mm² (MPa)	(%)	-46℃	-60℃	Base metal	PT (mm)	PWHT
510	555	34	-	178	SM490A	25	As weld
506	596	31	134	98	API-2H Gr50	80	As weld

· Approval : ABS, BV, DNV GL, KR, LR, NK

CA-502H×UC-A3

For single and multi-layer welding of 550N/mm² class high tensile strength steel AWS A5.17 F8A(P)0-EA3-G

Applications

Butt and fillet welding of ships, pipes, miniature of LPG tanks and general structures.

Characteristics

- (1) It is comparatively insensitive to rust, scales, oil and primers on the surface to be welded.
- (2) As the consumption of flux is small, it is very economical.
- (3) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the plate of moisture free and dry the flux 250 \sim 350°C for about one hour before use.
- (2) Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove in order to get sound welds.
- (3) When the flux height is excessive, poor bead appearance may occur.

Typical chemical composition of weld metal (%)

0	N.4		N.4 -	Remarks			
C	IVIN	SI	Р	S	Mo	Base metal	PT(mm)
0.05	1.43	0.65	0.021	0.018	0.52	SM570	25

YP	TS	EI	IV (J)	Remarks			
N/mm² (MPa)	N/mm² (MPa)	(%)	-18°C	Base metal	PT (mm)	PWHT	
578	641	27	66	SM570	25	As Weld	
-	570	-	43	SM520	20	As Weld	

CA-602P x UC-12K(UC-A2)

For single and Multi-layer welding of high tensile Strength steel

AWS A5.17 F7A4-EM12K AWS A5.23 F8A2-EA2-G

Applications

Single and multi-layer butt welding of spiral pipe, steel pipe for gas transport and general structures.

Characteristics

- (1) It provides good bead appearance, better slag removal.
- (2) It provides good notch toughness of the weld metal.
- (3) Applicable to AC, DC(+) and two-run technique.

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at 300 \sim 350 $^\circ \! C$ for 60 minutes before use.
- (2) Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove in order to get sound welds.
- (3) When the flux height is excessive, poor bead appearance may occur.
- (4) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, unused flux should be mixed properly with such used flux.

Typical chemical composition of weld metal (%)

Miro	C	Mn	Si	D	9	Mo	Remarks	
VVIIE	U	IVIII	0	F	3	1010	Base Metal	PT(mm)
UC-12K	0.04	1.44	0.28	0.019	0.009	-	SM490	25
UC-A2	0.06	1.25	0.31	0.017	0.011	0.42	SM570	25

Typical mechanical properties of weld metal

	YP TS		FI	IV (J)		Remarks		
Wire	N/mm² (MPa)	N/mm ² N/mm ² % (MPa) (MPa)	%	-20℃	-40℃	Base Metal	PT (mm)	PWHT
UC-12K	463	560	32.4	162	103	SM490	25	AW
UC-A2	546	622	30.8	93	49	SM570	25	AW

Fracture at the base metal

CA-508TP x UC-36

For single and multi-layer welding of high tensile Strength steel

AWS A5.17 F7A(P)8-EH14

Applications

CA-508TP x UC-36 is suitable for welding of low temperature pipe with sealing wire MC-60

Characteristics

- (1) Excellent notch toughness at low temperature down to -60 $^\circ\!\!\!C$
- (2) Crack resistibility, pockmark and porosity resistibility are excellent.
- (3) Slag detachability and bead appearance are very good.
- (4) Applicable to both AC and DC(+)

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales oil, paint, water dire and slag of tack welds from the groove in order to get sound welds.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux..

Typical chemical composition of weld metal (%)

	C Mn Si P	0.	_	0	Remarks		
C		5	Base metal	PT(mm)			
0.06	1.50	0.20	0.017	0.010	SM490A	25	
0.07	1.36	0.23	0.014	0.005	S355J2	26	

ΥP	YP TS EL	EL	IV	(J)	Remarks		
N/mm ²		-50℃	-60℃	Base metal	PT(mm)		
493	590	30.0	-	130	SM490A	25	
-	-	-	79(AW) 86(PWHT)	-	A516-60	12.7	

CA-525 x UC-12K

For single and multi-layer welding of high tensile Strength steel

AWS A5.17 F7A(P)5-EM12K

Applications

Butt, fillet welding of 490N/mm2 tensile strength and low temperature steels of structure such as ships, bridges, buildings and storage tanks etc.

Characteristics

- (1) Crack resistibility, pock mark and porosity resistibility are excellent..
- (2) Slag detachability and bead appearance arc very good.
- (2) Suitable for multi-layer welding of thick plate.
- (3) Applicable to both AC and DC(+).

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales oil, paint, water dire and slag of tack welds from the groove in order to get sound welds.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux..

Typical chemica	l composition	of weld	metal	(%)

С	Mn	Si	Р	0	Remarks		
				5	Base metal	PT(mm)	
0.06	1.45	0.22	0.020	0.010	SM490A	25	
0.07	1.54	0.30	0.019	0.008	A516-70	9.53	

ΥP	YP TS EL	EL	IV	(J)	Remarks		
N/mm ²		-30°C	-46℃	Base metal	PT(mm)		
482	532	32.6	-	120	SM490A	25	
-	-	-	65 (AW) 86 (PWHT)	-	A516-70	9.53	

CA-652 X UC-12K(UC-A2)

For single and Multi-layer welding of high tensile Strength steel

AWS A5.17 F7A(P)4-EM12K AWS A5.23 F9A2-EA2-G

Applications

Filler and butt welding of buildings, bridges and API line-pipe.

Characteristics

- (1) It provides good bead appearance, better slag removal.
- (2) It provides good notch toughness of the weld metal.
- (3) Applicable to AC, DC(+) and two-run technique.

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at 300 \sim 350 $^\circ C$ for 60 minutes before use.
- (2) Remove rust, scales, oil, paint, water, dirt and slag of tack welds from the groove in order to get sound welds.
- (3) When the flux height is excessive, poor bead appearance may occur.
- (4) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, unused flux should be mixed properly with such used flux.

10/1	Miro C		_	c	N 4 -	Remarks		
vvire	C	IVIN	51	Р	5	IVIO	Base Metal	PT(mm)
UC-12K	0.05	1.45	0.31	0.021	0.007	-	SM490	25
UC-A2	0.07	1.50	0.23	0.020	0.007	0.40	SM570	25
UC-A2	0.06	1.52	0.20	0.016	0.006	0.18	API 5L X70	19

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

WIRE	YP TS			IV (J)			Remarks		
	N/mm ² (MPa)	N/mm ² (MPa)	%	-20℃	-30℃	-46℃	Base Metal	PT (mm)	PWHT
UC-12K	493	568	28.6	-	-	71	SM490	25	AW
UC-A2	611	676	25.5	96	84	-	SM570	25	AW
UC-A2	523	621*	35.8	124	74	54	API 5L X70	16	AW

· Fracture at the base metal

CA-800T x UC-12K

For 490N/mm2 class high strength steel and low temperature steel

Applications

Butt welding of aluminium-killed steel for low temperature service used in offshore structures, steel pipes, chemical vessels, low temperature service equipment and other structures for cold regions.

Characteristics

- (1) Excellent notch toughness at low temperature down to -60 °C
- (2) Crack resistibility, pockmark and porosity resistibility are excellent.
- (3) Slag detachability and bead appearance are very good.
- (4) Applicable to both AC and DC(+)

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales oil, paint, water dire and slag of tack welds from the groove in order to get sound welds.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux..
- (4) Need preheating and interpass temperature control for cold cracking prevention

0	C Mn Si P	0.	-	0	Remarks		
C		5	Base metal	PT(mm)			
0.08	1.58	0.17	0.019	0.008	SM490A	25	
0.09	1.62	0.21	0.020	0.007	S355J2	26	

Typical chemical composition of weld metal (%)

ΥP	YP TS EL (%)	EL	IV	(J)	Remarks		
N/mm ²		-50℃	-60 ℃	Base metal	PT(mm)		
496	591	29.4	157	120	SM490A	25	
-	-	-	98	-	S355J2	26	

CA-600CM x UC-B2

For 1.25%Cr-1.0%Mo Heat resistant steel.

Applications

Welding of 1.25%Cr-1.0%Mo Steel used for fire power plant and high pressure boiler, pressure vessel, chemical and oil refining industries etc.

Characteristics

- (1) Crack resistibility, pockmark and porosity resistibility are excellent.
- (2) Slag detachability and bead appearance are very good.
- (3) Applicable to both AC and DC(+)

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales oil, paint, water dire and slag of tack welds from the groove in order to get sound welds.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.
- (4) Need preheating and interpass temperature control for cold cracking prevention

Typical chemical composition of weld metal (%)

С	Mn	Si	Cr	Мо	Cu	Р	S
0.07	0.89	0.33	1.23	0.50	0.06	0.017	0.004

YP N/mm²	TS	EL	IV	(J)	Heat	
	N/mm ²	(%)	-30℃	-40℃	Treatment	
534	627	29	144	92	690℃*1hr	

Submerged Arc Welding Consumables For stainless and Ni alloy



03

CA-101S×UC-308/308L

For welding of 18%Cr-8%Ni stainless steel.

UC-308 : AWS ER308 UC-308L : AWS ER308L

Applications

Welding of 18%Cr-8%Ni Stainless steel and hardfacing welding of 19%Cr-9%Ni stainless steel.

Characteristics

CA-101S×UC-308/308L is a bonded type flux which contains appropriate quantity of alloy element. Good crack resistibility, good mechanical properties and good corrosion resistibility of weld metal having appropriate ferrite content.

Notes on usage

- (1) Refer to "General notes on usage for submerged arc welding."
- (2) Avoid using of excessive welding current to prevent deterioration of corrosion resistibility in the heat affected zone.

Flux X Wire		Mn	Si	Ni	Cr	Remarks		
	С					Welding method	Base metal	PT (mm)
CA-101S× UC-308	0.05	1.27	0.85	9.42	19.41	Both side	SUS 308	15
CA-101S× UC-308L	0.02	1.25	0.86	9.48	19.38	single-layer		15

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

Elux X Wire	TS	EL	IV (J)
	N/mm²(MPa)	%	℃ 0
CA-101S×UC-308	602	41	69
CA-101S×UC-308L	589	42	72

Typical welding conditions

PT Dia					Sneed	Groove dimension						
(mm)	(mT.)	Pass	Amp.	Volt.	(cm/min)		A (mm)	B (mm)	N (mm)	°)	(°)	
44	10	1	450	33	55	ŢŶŢ,	2	2	F	00	00	
11	4.0	2	500	33	60	60		3	3	Э	90	90
10	10	1	650	35	30	- D - T 2	0	0	7	00	00	
19	4.8	2	800	35	35		Ö	Ö	/	90	90	

Approval : ABS, DNV(UC-308L)

CA-101S×UC-309/309L

For welding of 22%Cr-12%Ni stainless Steel and mild steel to stainless steel

UC-309 : AWS ER309 UC-309L : AWS ER309L

Applications

Welding of 22%Cr-12%Ni stainless steel and dissimilar joints such as stainless steel to mild steel or low alloy steel. 19%Cr-9%Ni type hardsurfacing of mild steel or low alloy steel. Welding of 18%Cr-8%Ni stainless clad steel.

Characteristics

CA-101S \times UC-309/309L is a bonded type flux which contains appropriate quantity of alloy elements. UC-309 is suitable for welding dissimilar metals such as mild steel because of large quantity of alloy elements. It provides better crack resistibility due to properly controlled ferrite content in austenitic structure.

Notes on usage

In the case welding dissimilar metals such as clad steel or mild steel to stainless steel. If the penetration is excessive, it may result in crack formation. Therefore, select appropriate groove design, welding conditions and wire position.

El						Remarks			
Wire	С	Mn	Si	Ni	Cr	Welding method	Base metal	PT (mm)	
CA-101S× UC-309	0.06	1.17	0.87	12.13	23.91	Both side	SUS	15	
CA-101S× UC-309L	0.03	1.22	0.85	12.22	24.09	single-layer	309	15	

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

	TS	EL	IV (J)
Flux x Wile	N/mm²(MPa)	%	0°C
CA-101S×UC-309	608	39	74
CA-101S×UC-309L	594	40	79

Typical welding conditions

PT	Dia				Speed	Groove dimension						
(mm)	(mT.)	Pass	Amp.	Volt.	(cm/min)	×° ×	A (mm)	B (mm)	N (mm)	°)	(°)	
44	10	1	450	33	55	TY-	0	0	F	00	00	
11	4.0	2	500	33	60	N N	3	3	Э	90	90	
10	10	1	650	35	30	ᡃᢅᠼᡵ	~	0	7	00	00	
19	4.0	2	800	35	35		0	0	1	90	90	

CA-101S×UC-316/316L

For welding of 18%Cr-12%Ni-2%Mo stainless steel.

UC-316 : AWS ER316 UC-316L : AWS ER316L

Applications

Welding of 18%Cr-12%Ni-2%Mo stainless steel. 18%Cr-12%Ni-2%Mo type hardsurfacing of mild steel or low allow steel.

Characteristics

CA-101S×UC-316/316L is bonded type flux which contains appropriate quantity of alloy elements in consideration of crack resistibility. Therefore, by using this flux property, sufficient ferrite content, good crack resistibility, good mechanical properties and good corrosion resistibility weld metal can be obtained.

Notes on usage

- (1) Refer to "General notes on usage for submerged arc welding."
- (2) CBS-1M is used for the single-pass-on-both-side welding and for frist pass in multipass welding.

							Remarks			
Wire	С	Mn	Si	Ni	Cr	Мо	Welding method	Base metal	PT (mm)	
CA-101S× UC-316	0.06	1.12	0.87	11.47	18.81	2.07	Both side	SUS	15	
CA-101S× UC-316L	0.03	1.16	0.84	11.76	18.74	2.06	single-layer	316	15	

Typical chemical composition of weld metal (%)

Typical mechanical properties of weld metal

Flux X Wire	TS N/mm²(MPa)	EL %	IV (J) 0°C
CA-101S×UC-316	584	38	72
CA-101S×UC-316L	559	43	69

Typical welding conditions

PT	Dia				Sneed	(Groove	e dime	ension		
(mm)	(mT.)	Pass	Amp.	Volt.	(cm/min)		A (mm)	B (mm)	N (mm)	°)	(°)
11	4.0	1	450	33	55		0	0	F	00	00
	4.0	2	500	33	60		3	3	Э	90	90
10	10	1	650	35	30		~	0	7	00	00
19 4	4.0	2	800	35	35		0	0	1	90	90

CA-101SXUC-347

For welding of 18%Cr-8%Nb-Ti stainless steel

UC-347 : AWS ER347

Applications

Welding of 18%Cr-8%Nb-Ti stainless steel and 18%Cr-8%Nb-Ti type hardsurfacing of mild steel or low alloy steel.

Characteristics

CA-101S \times UC-347 bonded type flux, containing appropriate quantity of alloy element, appropriate ferrite content of weld metal, good crack resistibility, good mechanical properties, good corrosion resistibility of weld metal and stable arc.

Notes on usage

- (1) Refer to "General notes on usage for submerged arc welding."
- (2) Avoid excessive current to prevent deterioration of corrosion resistibility in heat affect zone.
- (3) Weld with two passes per one layer in the groove.
- (4) Pay attention to crater treatment because crater crack is apt to appear.

Typical chemical composition of weld metal (%)

								Remarks	
Wire	С	Mn	Si	Ni	Cr	Nb+Ti	Welding method	Base metal	PT (mm)
CA-101S× UC-347	0.05	1.18	0.88	9.27	19.02	0.62	Both side single-layer	SUS 347	16

Typical mechanical properties of weld metal

Flux X Wire	TS	EL	IV (J)
	N/mm ² (MPa)	%	C0℃
CA-101S×UC-347	580	39	68

Typical welding conditions

PT Dia					Sneed	(Groove	e dime	ension		
(mm)	(mT.)	Pass	Amp.	Volt.	(cm/min)		A (mm)	B (mm)	N (mm)	°)	(°)
17	10	1	500	33	45		~	F	0	00	00
17	4.0	2	700	34	50		0	Э	0	90	90
04	10	1	720	33	20		0	0	0	00	00
24	4.0	2	750	36	27		8	8	8	90	90

CA-201SxUC-308L

For welding of 18%Cr-8%Ni stainless steel

Applications

Welding of 18%Cr-8%Ni Stainless steel and hardfacing welding of 19%Cr-9%Ni stainless steel.

Characteristics

CA-201 Flux is suitable for welding of Duplex, austenitic stainless steel and nickel alloys. The flux is Aluminate Fluoride basic type and bonded flux. therefore features Good crack resistibility, good mechanical properties and good corrosion resistibility of weld metal having appropriate ferrite content.

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales oil, paint, water dire and slag of tack welds from the groove in order to get sound welds.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

Typical	chemical	composition	of weld	metal (%)
Typical	chemical	composition	or werd	metar (%)

С	Mn	Si	Ni	Cr	Мо
0.03	1.5	0.5	10.3	19.3	0.08

YP	TS	EL	IV (J)		
N/mm ²	N/mm ²	(%)	0°C	-196℃	
413	580	44	106	52	

CA-201SxUC-309L

For welding of 22%Cr-12%Ni stainless Steel and mild steel to stainless steel.

AWS A5.9 ER309L

Applications

Wedling of 22%Cr-12%Ni stainless steel and dissimilar joints such as stainless steel to mild steel or low steel. 19%-9%Ni type hardfacing of mild steel or low alloy steel.

Characteristics

CA-201 Flux is suitable for welding of Duplex, austenitic stainless steel and nickel alloys. The flux is Aluminate Fluoride basic type and bonded flux. UC-309L is suitable for welding dissimilar metals such as mild steel because of large quantity of alloy alloy elements. It provides better crack resistibility due to properly controlled ferrite content in austenitic structure.

Notes on usage

In the case welding dissimilar metals such as clad steel or mild steel to stainless steel. If the penetration is excessive, it may result in crack formation. Therefore, select appropriate groove design, welding conditions and wire position.

Typical chemical composition of weld metal (%)

С	Mn	Si	Ni	Cr	Мо
0.02	1.6	0.5	13.3	22.6	0.09

YP	TS	EL	IV (J)		
N/mm ²	N/mm ²	(%)	0°C	-196℃	
386	573	34	99	76	

CA-201SxUC-316L

For welding of 18%Cr-12%Ni-2%Mo stainless steel.

Applications

Welding of 18%Cr-12%Ni-2%Mo stainless steel. 18%Cr-12%Ni-2%Mo type of hardfacing of mild steel or low allow steel.

Characteristics

CA-201 Flux is suitable for welding of Duplex, austenitic stainless steel and nickel alloys. The flux is Aluminate Fluoride basic type and bonded flux. Therefore, by using this flux property, sufficient ferrite content, good crack resistibility, good mechanical properties and good corrosion resistibility weld metal can be obtained.

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales oil, paint, water dire and slag of tack welds from the groove in order to get sound welds.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

Typical	chemical	composition	of weld	metal (%)
Typical	chemical	composition	or werd	metar (%)

С	Mn	Si	Ni	Cr	Мо
0.03	1.5	0.6	11.6	17.9	2.17

YP	TS	EL	IV (J)		
N/mm ²	N/mm ²	(%)	0°C	-196℃	
420	581	40	129	74	

CA-201SxUC-2209

For welding of Duplex stainless steel

Applications

For welding of 22%%-5%Ni-2%Mo-0.15%N duplex stainless steel.

Characteristics

CA-201 Flux is suitable for welding of Duplex, austenitic stainless steel and nickel alloys. The flux is Aluminate Fluoride basic type and bonded flux. Therefore, by using this flux property good crack resistibility, good mechanical properties and good corrosion resistibility weld metal can be obtained.

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales oil, paint, water dire and slag of tack welds from the groove in order to get sound welds.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

Typical chemical composition of weld metal (%)

С	Mn	Si	Ni	Cr	Мо	FN (WRC1992)	PREN
0.02	1.4	0.6	8.1	22.2	3.3	48.3	35.7

YP	TS	EL	IV (J)		
N/mm ²	N/mm ²	(%)	-40 ℃	-60 °C	
631	801	31	95	72	

CA-201SxUC-625

For Nickel and Nickel alloy steel

Applications

For high temperature and creep resisting steel, heat resisting and dissimilar joint

Characteristics

CA-201SxUC-625 designed to match INCONEL 625, INCOLOY 825, INCOLOY 25-6Mo and stainless steel. The flux is Aluminate Fluoride basic type and bonded flux.

The weld metal has high strength at room and elevated temperature and has exceptional corrosion resistance, including resistance to pitting crevice corrosion and polythionic acid stress-corrosion cracking. CA-201SxUC-625 is useful for many dissimilar joints involving INCONEL alloy, INCOLOY alloys, stainless steel, low-alloy steel, and carbon steel.

Notes on usage

- (1) Store the flux at the place of moisture free and dry the flux at $250 \sim 350$ °C for about one hour before use.
- (2) Remove rust, scales oil, paint, water dire and slag of tack welds from the groove in order to get sound welds.
- (3) The use of the flux which has been re-used for welding in many times may cause deterioration of its usability. Therefore, the unused flux should be mixed properly with such used flux.

Typical	chemical	composition	of weld	metal (%)
i y pioui	ononioui	composition	01 11010	1110101 (70)

С	Mn	Si	Ni	Cr	Мо	Nb
0.02	0.1	0.2	62.8	20.9	9.4	3.4

YP	TS	EL	IV (J)	Bending Test
N/mm²	N/mm²	(%)	-196℃	
497	723	43	105	Good