Bi-Free Type Stainless Steel Flux cored Wire

Stainless steel flux cored wire is widely adopted at many fields such as petrochemical, pressure vessel, ship building, and machinery industries. This is mainly because of its superior weldability, stable mechanical performance, and high productivities.

There are cracks discovered after weld at the high working temp. 700℃ or higher on conventional austenite stainless steel joints.

It is because of conventional stainless steel flux cored wire contains a minute of Bismuth oxide, so Sorex develops Bi-free type wire to improve it.

Bi effect on crack sensitivity

Bi is are surface active element and conventional FCW generally contains Bi2O3 in the flux to improve slag removal in welding when it exposes over the temperature 600 ℃ in the long time. The ductility of the weld metal is reduced because of the segregation of Bi at the grain boundaries, and cracks can occur.

Main reasons of Bi effect on crack sensitivity

1.	Bi segregates from columnar grain boundaries and cause embrittlement.
2.	Bi is added in the form of an oxide, Bismuth oxide (Bi2O3) induce trans granular solidification, resulting in concentrated plastic deformation at the grain boundary.
3.	Bi promotes the precipitation of substances that cause grain boundary embrittlement.

Bi-free fcw applications

Conventional wire contains bismuth oxide is not recommended to apply to high working temp. environments or post weld heat treatment over 500° such as catalytic, cracking unit, nuclear power steam generator take over stainless steel surfacing welding. Bi-free type wire can do.

Bi content specification

STANDARDS	Bi CONTENT
GB/T 17853-2018	N.A.
AWS A5.22/A5.22M-2012	≦20ppm
ISO 17633-2018	≦20ppm
JIS Z3323-2007	≦10ppm

SOREX BI-FREE STAINLESS STEEL FCW

SFC-308LB	AWS A5.22 E308LT1-1

C	Mn	Si	P	S	Ni	Cr	Bi
0.024	1.13	0.43	0.024	<0.000	10.23	19.39	≤10 ppm

TENSILE STRENGTH	EL(%)
590(60.2)	43

WELDING PARAMETERS

PARAMETERS \ DIA.(mm)	1.2	1.6
VOLT	20-36	24-38
CURRENT	120-260	200-300
E.S.O.	15-25	18-25
GAS GLOW	15-25	15-25

SOREX BI-FREE STAINLESS STEEL FCW

SFC-309LB	AWS A5.22 E309LT1-1

C	Mn	Si	P	S	Ni	Cr	Bi
0.023	1.18	0.51	0.025	0.003	12.73	23.08	≤10 ppm

TENSILE STRENGTH	EL(%)
570(58.2)	42

WELDING PARAMETERS

PARAMETERS \ DIA.(mm)	1.2	1.6
VOLT	20-36	24-38
CURRENT	120-260	200-300
E.S.O.	15-25	18-25
GAS GLOW	15-25	15-25

SOREX BI-FREE STAINLESS STEEL FCW

SFC-316LB	AWS A5.22 E316LT1-1

C	Mn	Si	P	S	Ni	Cr	Mo	Bi
0.023	1.10	0.60	0.022	<0.000	12.15	18.77	2.35	≤10 ppm

TENSILE STRENGTH	EL(%)
583(59.5)	37

WELDING PARAMETERS

PARAMETERS \ DIA.(mm)	1.2	1.6
VOLT	20-36	24-38
CURRENT	120-260	200-300
E.S.O.	15-25	18-25
GAS GLOW	15-25	15-25

SOREX BI-FREE STAINLESS STEEL FCW

SFC-347LB	AWS A5.22 E347LT1-1

C	Mn	Si	P	S	Ni	Cr	Nb	Bi
0.026	1.10	0.64	0.023	0.003	10.13	19.54	0.45	≤10 ppm

TENSILE STRENGTH	EL(%)
620(63.3)	43

WELDING PARAMETERS

PARAMETERS \ DIA.(mm)	1.2	1.6
VOLT	20-36	24-38
CURRENT	120-260	200-300
E.S.O.	15-25	18-25
GAS GLOW	15-25	15-25