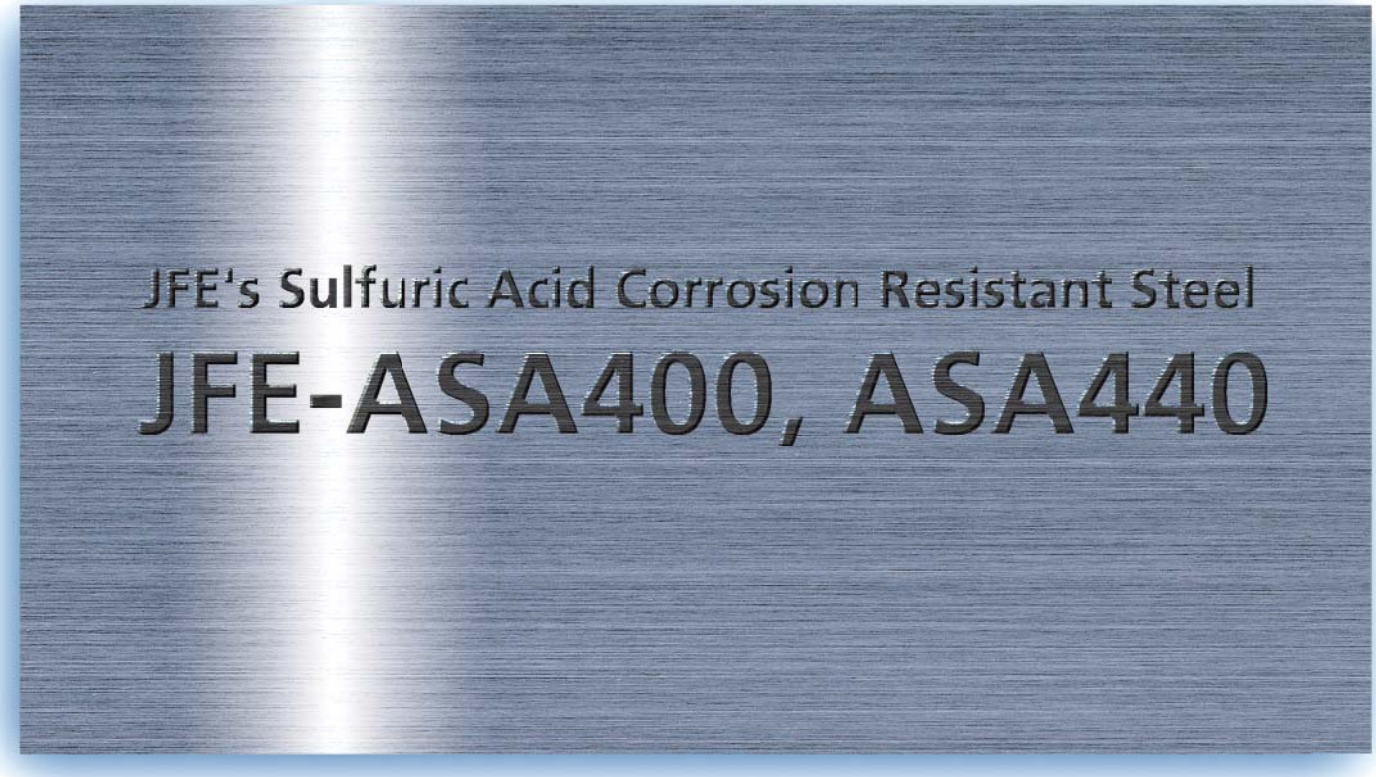
JFE-ASA400, ASA440

JFE's Sulfuric Acid Corrosion Resistant Steel

JFE Steel Corporation



Introduction

Low temperature corrosion due to SO_3 is one of the serious corrosion problems associated with heavy-oil- or coal-fired boilers.
This phenomenon is called "sulfuric acid dew point corrosion", in which a small amount of SO_3 contained in combustion gas condenses as sulfuric acid on steel material at temperatures lower than its dew point, causing serious corrosion of economizers, air preheaters, dust collectors, chimneys, gas flues, and other parts of boilers.
JFE Steel's sulfuric acid resistant steel JFE-ASA400 and JFE-ASA440 have been developed putting emphasis on sulfuric acid dew point corrosion resistance. Having superior corrosion resistance to normal steel, these products are suitable for economizers, air preheaters, dust collectors, chimneys, gas flues, and other parts of boilers.
These products also provide excellent resistance to hydrochloric acid corrosion of refuse incinerators caused by vinyl chloride waste.

JFE's Sulfuric Acid Corrosion Resistant Steel

Excellent in corrosion and acid resistance

This product is resistant to sulfuric acid dew point corrosion, hydrochloric acid corrosion, and other similar atmospheric corrosion.

Diverse line up for design strength and user environment

Standard No.	Grade	Application Environment
JFE-ASA400 JFE-ASA440	D	This is used when the surface temperature is 120 to 130°C or lower and sulfuric acid dew point corrosion should be mainly considered.
	H	Though ASA-D is superior in sulfuric acid dew point corrosion resistance, this is used when high temperature strength is important.
	W	This is used when the conditions are difficult to determine.

Excellent mechanical properties and workability

This product has a tensile strength equivalent to that of SM400 as well as excellent cutting and bending workability.

Excellent weldability

This product can be easily welded by hand welding, automatic welding, and resistance spot welding. Using exclusive welding materials, quality of welded parts are guaranteed as well as base materials.

Typical Applications

- Air preheaters, economizers, gas flues, and chimneys of heavy-oil- or coal-fired boilers
- Heat exchangers, gas flues, and chimneys in plants
- Dust collectors, exhaust pipes, gas flues, and chimneys of dust incinerators and pollution control equipment
- Exhaust systems also requiring weather resistance
- Exhaust systems also requiring high temperature strength

Maximum Product Dimensions

Hot-rolled products

Thickness (mm)	Width (mm)													
	914	1100	1219	1530	1830	3400	3600	3800	4000	4400	4600	5000	5200	5300
1.6														
2.3														
3.2														
4.5 ~ 5.9														
6.0 ~ 6.9														
7.0 ~ 7.9														
8.0 ~ 8.9					Potential manufacturing range									
9.0 ~ 9.9														
10.0 ~ 10.9														
11.0 ~ 50.0														

For dimensions falling under area, please consult with us before making an order.
For other dimensions, please contact us. Also, contact us about coils.

Cold-rolled products

Thickness (mm)	Width (mm)					
	610	762	914	1219	1524	1829
0.8						
0.9						
1.0						
1.2		Potential manufacturing range				
1.6						
2.0						
2.3						
2.6						

Thick plate products

Product length: m

Thickness (mm)	Width (mm)													
	2601 ~ 2800	2801 ~ 3000	3001 ~ 3200	3201 ~ 3400	3401 ~ 3600	3601 ~ 3800	3801 ~ 4000	4001 ~ 4200	4201 ~ 4400	4401 ~ 4600	4601 ~ 4800	4801 ~ 5000	5001 ~ 5200	5201 ~ 5300	5301 ~ 5340
6.0 ~ 6.9										22	22	19	16	13.5	13.5
7.0 ~ 9.0					25						22	20	16	13.5	13.5
9.1 ~ 11.9												20	20	20	16
12.0 ~ 13.9														22	16
14.0 ~ 25.0				27									25		16
25.1 ~ 28.0										25					16
28.1 ~ 32.0							25					24	23	20	16
32.1 ~ 38.0				25				24	23	22	21	20	19	18	16
38.1 ~ 45.0					24	23	23	20	19	19	18	17	16	16	16
45.1 ~ 50.0		25	23	22	21	20	20	18	17	16	16	15	14	14	14

Standards

Chemical compositions

(%)

Standard No.	Grade	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Sb	Sn
JFE-ASA400	D	≦0.14	≦0.55	0.30 ~ 0.70	≦0.030	≦0.020	0.25 ~ 0.50	≦0.50	—	—	0.05 ~ 0.20	≦0.10
	H								0.50 ~ 1.00	≦0.10	—	—
	W										0.05 ~ 0.20	≦0.10
JFE-ASA440	D	≦0.17							—	—	0.05 ~ 0.20	≦0.10
	H								0.50 ~ 1.00	≦0.10	—	—
	W										0.05 ~ 0.20	≦0.10

Mechanical properties

Standard No.	Plate thickness	Yield strength (N/mm²)	Tensile strength (N/mm²)	Elongation (%)		Bending
JFE-ASA400	t ≦ 5	≧ 245	≧ 400	≧ 21	(JIS 5)	1.0t
	5 < t ≦ 16	≧ 245		≧ 18	(JIS 1A)	1.5t
	16 < t ≦ 40	≧ 235		≧ 21		
	40 < t ≦ 50	≧ 215				
JFE-ASA440	t ≦ 5	≧ 265	≧ 440	≧ 21	(JIS 5)	1.0t
	5 < t ≦ 16			≧ 17	(JIS 1A)	1.5t
	16 < t ≦ 25.4			≧ 21		

Quality Property Examples

Chemical compositions

Standard No.	Plate thickness (mm)	Chemical compositions (%)									
		C	Si	Mn	P	S	Cu	Ni	Cr	Sb	Sn
JFE-ASA400D	1.2	0.07	0.20	0.68	0.013	0.006	0.32	0.17	—	0.11	0.05
	25	0.11	0.24	0.76	0.015	0.007	0.38	0.22	—	0.11	0.04
JFE-ASA400H	40	0.08	0.24	0.68	0.014	0.009	0.36	0.15	0.70	—	—
JFE-ASA400W	25	0.08	0.22	0.62	0.013	0.008	0.33	0.17	0.70	0.10	0.05
JFE-ASA440W	3.2, 9.0	0.08	0.32	0.63	0.015	0.008	0.30	0.17	0.62	0.05	—

Mechanical properties

Standard No.	Plate thickness (mm)	Yield strength (N/mm²)	Tensile strength (N/mm²)	Elongation (%)	Bending
JFE-ASA400D	1.2	296	417	39	1.0t Good
	25	273	425	30	1.5t Good
JFE-ASA400H	40	304	422	33	
JFE-ASA400W	25	275	413	31	1.5t Good
JFE-ASA440W	3.2	384	467	39	1.0t Good
	9.0	353	500	28	1.5t Good

Welded joint performance

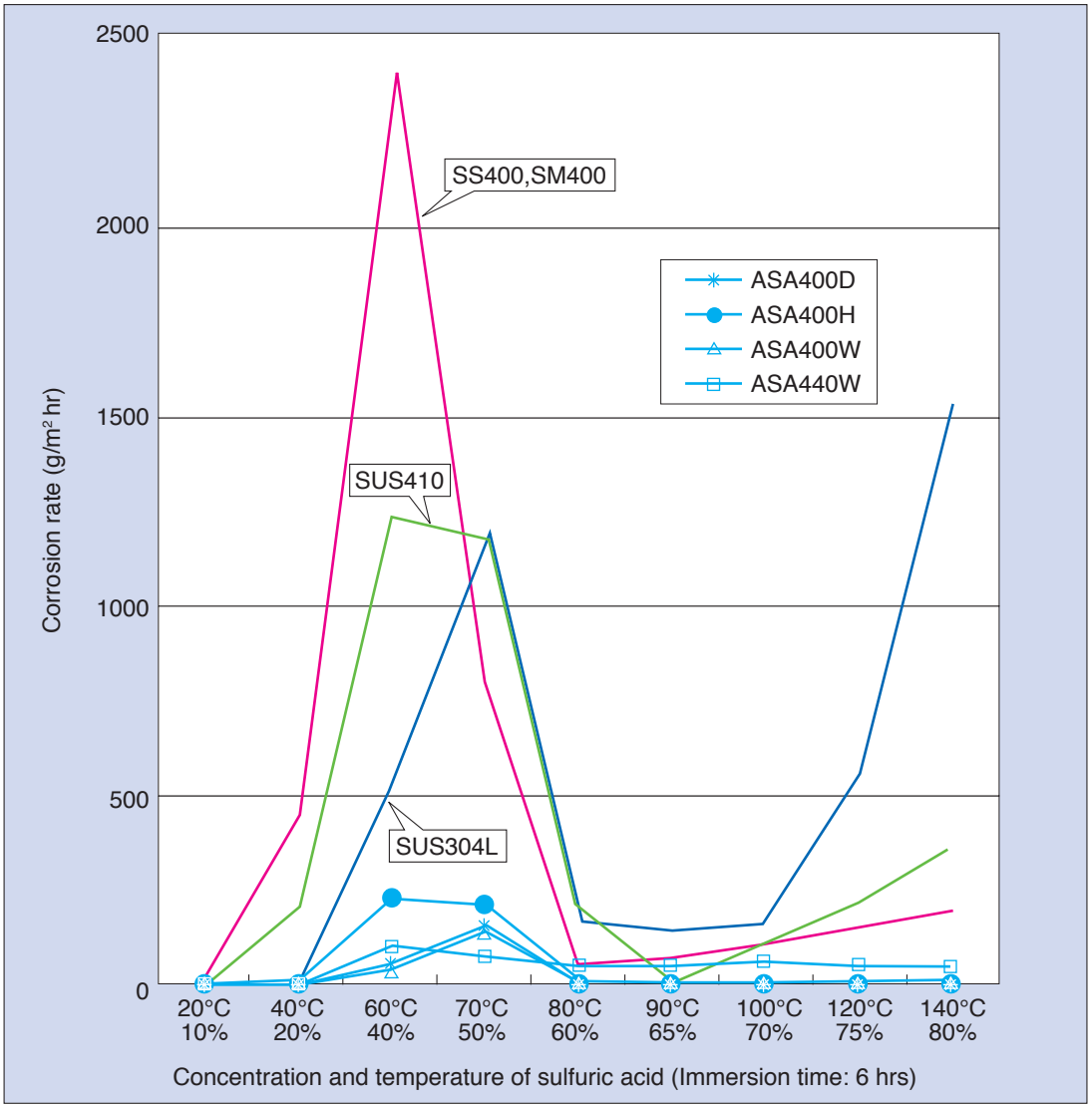
Standard No.	Plate thickness (mm)	Welding method	Welding material	Welding heat input (kJ/cm)	Joint strength (N/mm²)	Bending test at 2.0t
JFE-ASA400D	16	SMAW	BA-47*	20	488	Good
JFE-ASA400H	25	SAW	USW52 × MF38*	44	490	Good
JFE-ASA400W	25	SAW	USW52 × MF38*	45	492	Good
JFE-ASA440W	4.5	SMAW	KS-76K**	0.7	519	Good

* Manufactured by Kobe Steel. ** Manufactured by JFE Steel.

Use welding materials exclusively designed for sulfuric acid corrosion resistant steel.

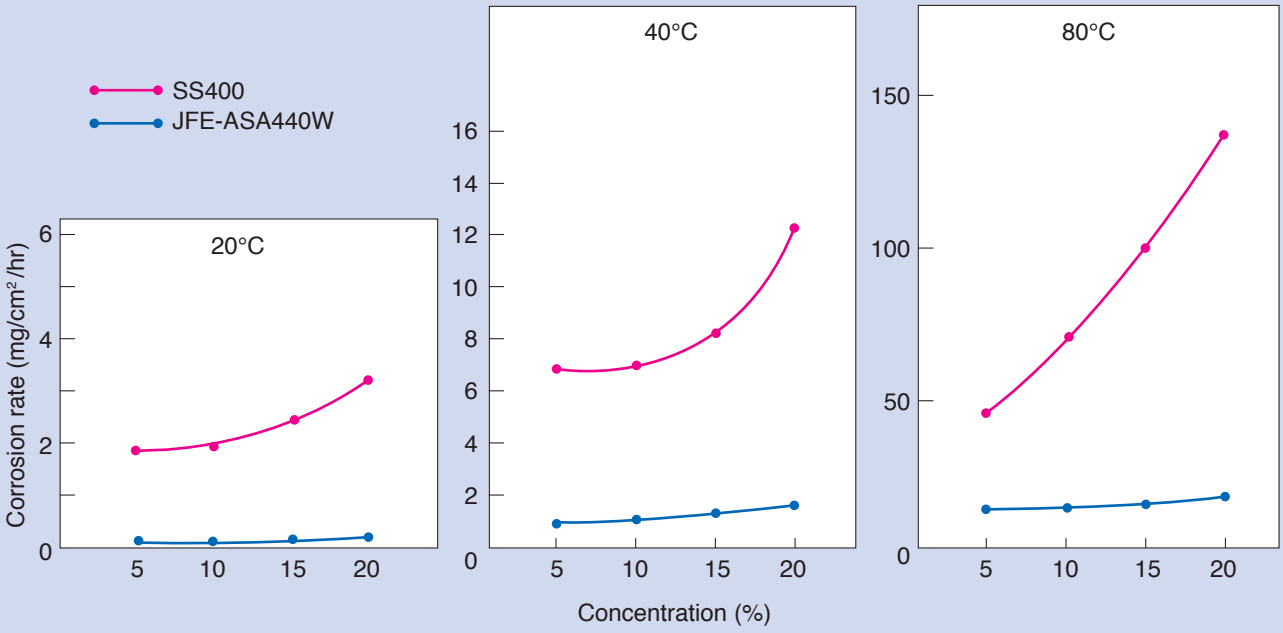
Corrosion Resistance

Sulfuric acid dew point corrosion resistance



Appearance of test specimens after 6 hours of immersion in 50% sulfuric acid solution at 70°C

Hydrochloric acid resistance



Influence of concentration on corrosion rate in hydrochloric acid solution

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