

SIC

Oxidation Resistant Stainless Steel Seamless Tube

General Description

SIC series, SIC 9, SIC 10 and SIC 12, exhibit excellent resistance to oxidation and vanadium or sulfur attack due to high contents of silicon, aluminum and chromium. Maximum temperatures for operation are 900°C for SIC 9, 1000 °C for SIC 10, and 1200 °C for SIC 12 in air.

- 1) SIC is suitable for recuperators due to its high oxidation resistance, superior to 18Cr-8Ni austenitic stainless steels.
- 2) Heat exchange efficiency is improved due to relatively high thermal conductivity of the ferritic matrix.
- 3) Cost is highly competitive due to less Ni content.

Applications

Typical applications are various kinds of recuperators for:

- blast furnaces
 - heating furnaces
 - glass melting furnaces
 - lime roasting furnaces
- etc.

Features of Manufacturing Process

- 1) The combination of vacuum degassing and ladle refining processes assures high cleanliness of the materials , as well as improving weldability and oxidation resistance.
- 2) Fine microstructure and high dimensional accuracy can be achieved by using sophisticated hot-extrusion process.
- 3) Appropriate heat treatment improves the ductility and toughness with uniform structure and hardness.
- 4) Strict inspections such as mechanical testing and nondestructive inspection assure the best quality.

Chemical Composition

Designation	Chemical composition range (mass %)						
	C	Si	Mn	P	S	Cr	Al
SIC 9	≤0.12	0.9~1.4	≤1.00	≤0.045	≤0.030	12.0~14.0	0.7~1.2
SIC 10	≤0.12	0.7~1.2	≤1.00	≤0.045	≤0.030	17.0~19.0	0.7~1.2
SIC 12	≤0.12	1.2~1.5	≤1.00	≤0.045	≤0.030	23.0~25.0	1.2~1.7

Production Range

Finish classification	Outer diameter (mm)	Wall thickness (mm)	Length (m)
Hot finished tube	38~40	≥3.5	≤7
	40~58	≥3.0	
	58~69	≥3.5	
	69~90	≥4.0	
	90~140	≥4.5	

Dimensional Tolerance

Finish classification	Outer diameter (mm)	Tolerance in outer diameter (mm)	Tolerance in wall thickness (%)
Hot finished tube	<102	+ 0.4, - 0.8	± 17.5
	≥102	+ 0.4, - 1.2	

Characteristics

1) Oxidation resistance

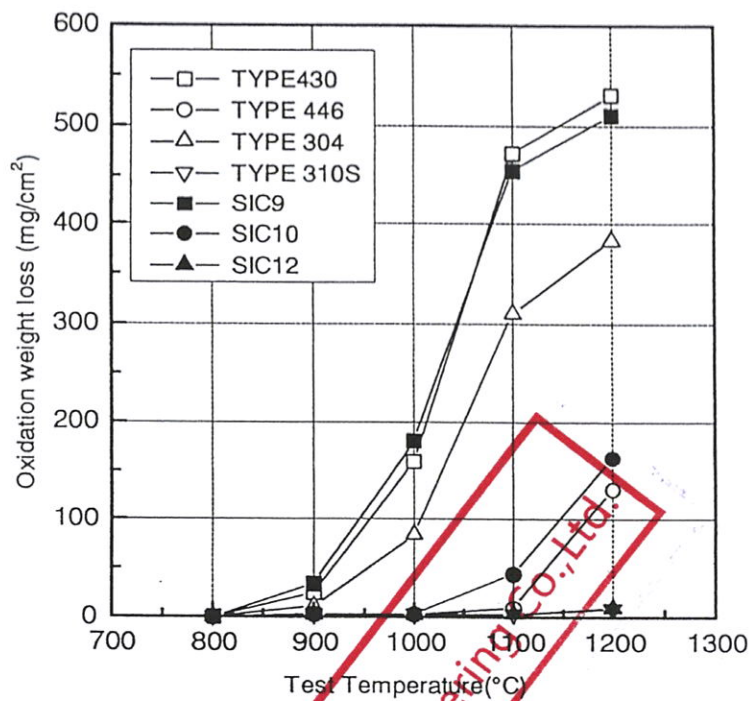


Fig. Oxidation weight loss hold for 50 hours at elevated temperature in air.

2) Corrosion resistance to vanadium (V_2O_5) attack

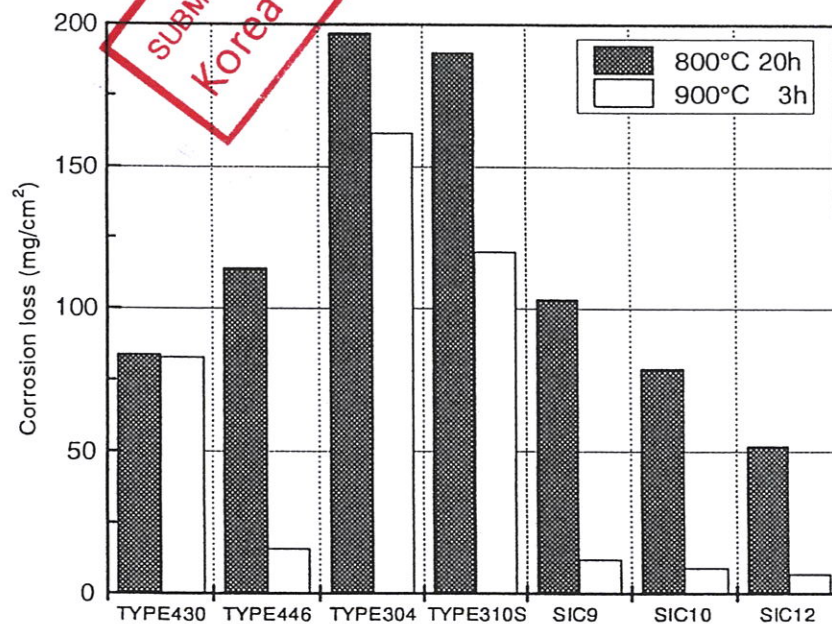


Fig. Corrosion loss of various stainless steels by vanadium attack (in $V_2O_5 + 15\%Na_2SO_4$).

3) Corrosion resistance to heavy oil combustion gas

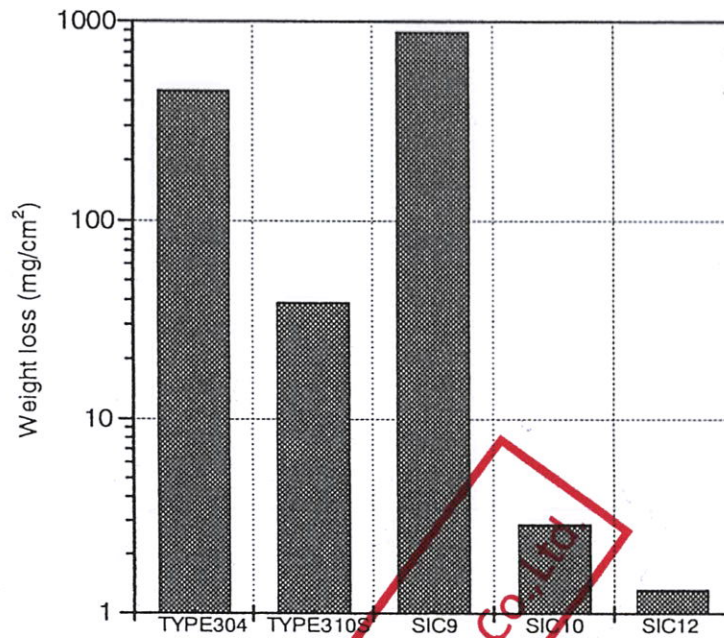


Fig. Oxidation-corrosion loss after 50 hour exposure in heavy oil combustion gas at 950 °C.

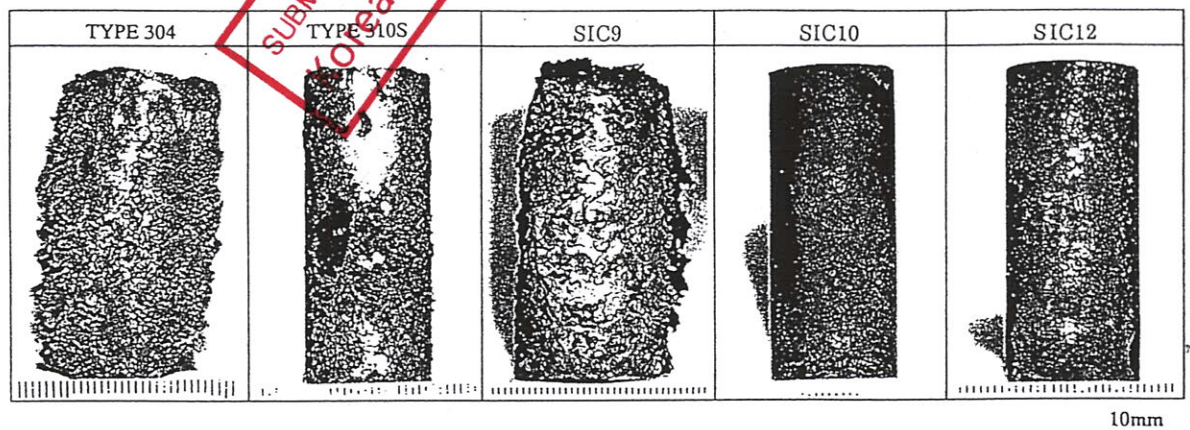


Fig. Photographs after corrosion test in heavy oil combustion gas.