

Abstract:

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550 610

2. JFE Steel's On-Line Heat Treatment Technology

... () ...
 ... A ... () ...
 ... () ...
 ...⁶⁾ 550 610 ...
 ... P ...
 ... 1980, ...
 ... (A). ...
 ... , Super-A , ...
 ... Super- A ... 1998^{7,8)} .
 ... () ...

... ..

4. Development Concept for 550 and 610 MPa Class High-strength Steel Plates for Tanks and Penstocks

4.1 Applied Specifications and Heat Treatment Process

... .. 610 490 3115 550 A841 2 A Super- A

4.2 Concept of Alloy Design and Microstructure Control by On-Line Heat Treatment

... .. 550 610

(1) (P), A 0.09%, P 0.20%, Super- A 490 A, A537-2 (Fig. 7)

(Fig. 8), (2) Super- A 6,14) A (3)

Table 1 Chemical compositions of the developed steels

Steel	Tempering (°C)	Chemical composition (wt.%)							C	P
		C	Mn	P	S	Si	Al	N		
A841 2	16, 38	0.08	0.19	1.34	0.014	0.002	0.002	0.33	0.16	
610. 2	25	0.08	0.20	1.35	0.014	0.002	0.002	0.33	0.16	
	40	0.09	0.25	1.46	0.008	0.001	0.002	0.39	0.19	
610	12, 22	0.09	0.20	1.36	0.015	0.002	0.002	0.36	0.18	
	32	0.09	0.20	1.22	0.008	0.002	0.002	0.33	0.17	

C: 0.24, 0.16, 0.40, 0.15, 0.14, 0.14, 0.14
 P: 0.30, 0.20, 0.20, 0.60, 0.20, 0.15, 0.10, 5

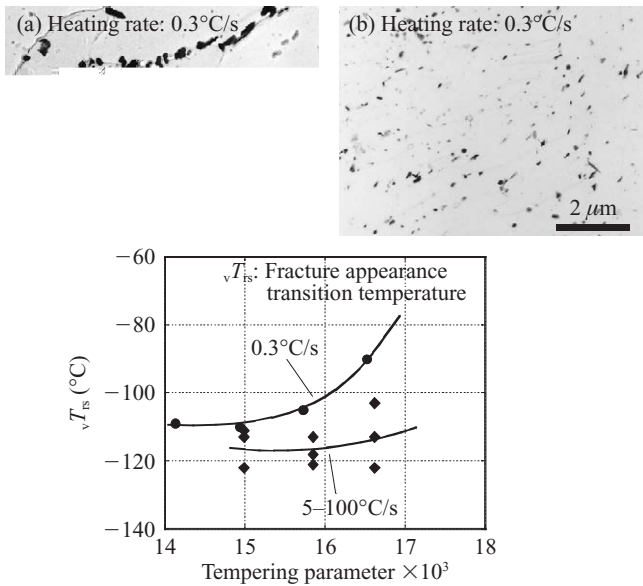


Fig.9 Cementite refinement and toughness improvement by rapid heating and tempering of JFE-HITEN610U2

Table 2 Mechanical properties of ASTM A841 Gr.B Cl.2

Temp. (°C)	Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Reduction of area (%)	Charpy impact energy (J)	
					E ₂₅	E ₄₅
16	583	669	36	1/4t, 1/4t	296 236	278 140
38	522	617	50	1/4t, 1/4t	320 298	263 284

A841 2, 415, 550, 690
 E: 20, 20; E₄₀ 20

Table 3 Mechanical properties of JFE-HITEN610U2

Table 4 Mechanical properties of JFE-HITEN610E

5. Properties of Developed Steels

5.1 Base Metal Performance of Developed Steels

Table 1
 0.09 %
 P
 0.20 %.

Tables 2, 4
 A841 2
 610. 2 610

A841 2 490

5.2 Welded Joint Performance

A, Tables 5 6

610.2

(A), 610

()

6. Conclusion

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1()-11()= 32()-12()-12()-2()-90, 21()-20()- 1()-11()-11()-11()-()-12 1()-20()- 11()-11

