

*Abstract:*

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— — — — —  
— — — — —

550 610

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

... ( ) ...  
 ... A ... ( ) ...  
 ... ( ) ...  
 ...<sup>6)</sup> 550 610 ...  
 ... P ...  
 ... 1980, ...  
 ... ( A ). ...  
 ... , Super-A , ...  
 ... Super- A ... 1998<sup>7,8)</sup> .  
 ... ( ) ...



... ..

#### 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

								C (%)	P (%)
A841 2	16, 38	0.08	0.19	1.34	0.014	0.002		0.33	0.16
610. 2	25	0.08	0.20	1.35	0.014	0.002		0.33	0.16
	40	0.09	0.25	1.46	0.008	0.001		0.39	0.19
610	12, 22	0.09	0.20	1.36	0.015	0.002		0.36	0.18
	32	0.09	0.20	1.22	0.008	0.002		0.33	0.17

C: 0.24, 0.16, 0.40, 0.15, 0.14, 0.14  
 P: 0.30, 0.20, 0.20, 0.60, 0.20, 0.15, 0.10, 0.5

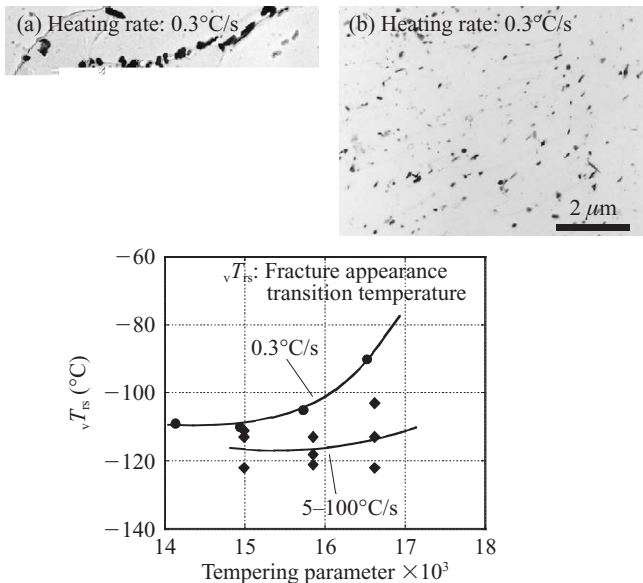


Fig.9 Cementite refinement and toughness improvement by rapid heating and tempering of JFE-HITEN610U2

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

		Yield strength (MPa)	Tensile strength (MPa)	Elongation (%)	Reduction of area (%)	$E_{25}$ (J)	$E_{45}$ (J)
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, 40, 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

550 610

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

