

Title (en)  
HIGH CHROMIUM MARTENSITIC HEAT-RESISTANT SEAMLESS STEEL TUBE WITH COMBINED HIGH CREEP RUPTURE STRENGTH AND OXIDATION RESISTANCE

Title (de)  
HOCHCHROMHALTIGES MARTENSITISCHES, HITZEBESTÄNDIGES NAHTLOSES STAHLROHR MIT KOMBINierter HOHER ZEITSTANDFESTIGKEIT UND OXIDATIONSBESTÄNDIGKEIT

Title (fr)  
TUBE D'ACIER SANS SOUDURE THERMO-RÉSISTANT MARTENSITIQUE À HAUTE TENEUR EN CHROME À RÉsISTANCE À LA RUPTURE EN FLUAGE ÉLEVÉE ET RÉsISTANCE À L'OXYDATION COMBINÉES

Publication  
**EP 3269831 A1 20180117 (EN)**

Application  
**EP 16179114 A 20160712**

Priority  
EP 16179114 A 20160712

Abstract (en)  
Martensitic heat-resistant steel for boiler applications with a unique combination of enhanced creep strength and excellent oxidation resistance upon high temperature exposure in steam containing environments., having the following melt analysis (in wt.-%): C: 0.10 to 0.16%, Si: 0.20 to 0.60%, Mn: 0.30 to 0.80%, P #=0.020%, S #=0.010%, Al #=0.020%, Cr: 10.5 to 12.00%, Mo: 0.10 to 0.60%, V: 0.15 to 0.30%, Ni: 0.10 to 0.40%, B: 0.008 to 0.015%, N:0.002 to 0.020%, Co: 1.50 to 3.00%, W: 1.50 to 2.50%, Nb: 0.02 to 0.07%, Ti: 0.001-0.020%. The balance of the steel consists of iron and unavoidable impurities. The steel is normalized for a period of about 10 to about 120 minutes in the temperature range between 1050 °C and 1170°C and cooled down in air or water to room temperature, and then tempered for at least one hour in the temperature range between 750°C and 820°C. It exhibits martensitic microstructure with average  $\bar{\epsilon}$ -ferrite content of less than 5 vol.-%.

IPC 8 full level  
**C21D 8/02** (2006.01); **C21D 6/00** (2006.01); **C21D 8/10** (2006.01); **C21D 9/08** (2006.01); **C21D 9/46** (2006.01); **C22C 38/00** (2006.01); **C22C 38/02** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/10** (2006.01); **C22C 38/12** (2006.01); **C22C 38/14** (2006.01); **C22C 38/18** (2006.01); **C22C 38/44** (2006.01); **C22C 38/46** (2006.01); **C22C 38/48** (2006.01); **C22C 38/50** (2006.01); **C22C 38/52** (2006.01); **C22C 38/54** (2006.01)

CPC (source: EA EP KR US)  
**C21D 6/002** (2013.01 - EA EP KR US); **C21D 6/004** (2013.01 - EP US); **C21D 6/005** (2013.01 - EP US); **C21D 6/007** (2013.01 - EP US); **C21D 6/008** (2013.01 - EP US); **C21D 8/0226** (2013.01 - KR); **C21D 8/0263** (2013.01 - KR); **C21D 8/105** (2013.01 - EA EP KR US); **C21D 9/08** (2013.01 - EA EP US); **C21D 9/085** (2013.01 - EA EP KR US); **C22C 38/001** (2013.01 - EA EP KR US); **C22C 38/02** (2013.01 - EA EP KR US); **C22C 38/04** (2013.01 - EA EP KR US); **C22C 38/06** (2013.01 - EP US); **C22C 38/105** (2013.01 - EA EP KR US); **C22C 38/12** (2013.01 - EA EP KR US); **C22C 38/14** (2013.01 - EA EP US); **C22C 38/18** (2013.01 - EA EP US); **C22C 38/44** (2013.01 - EA EP US); **C22C 38/46** (2013.01 - EA EP KR US); **C22C 38/48** (2013.01 - EA EP KR US); **C22C 38/50** (2013.01 - EA EP KR US); **C22C 38/52** (2013.01 - EA EP KR US); **C22C 38/54** (2013.01 - EA EP KR US); **C21D 8/0226** (2013.01 - EA EP US); **C21D 8/0263** (2013.01 - EA EP US); **C21D 2211/005** (2013.01 - EP US); **C21D 2211/008** (2013.01 - EA EP KR US)

Citation (applicant)  
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- [A] EP 1621643 A1 20060201 - NAT INST FOR MATERIALS SCIENCE [JP], et al
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DOCDB simple family (application)  
**EP 16179114 A 20160712**; AU 2017297766 A 20170712; BR 112019000376 A 20170712; CA 3025133 A 20170712; CN 201780039089 A 20170712; EA 201990013 A 20170712; EP 17743278 A 20170712; EP 2017067613 W 20170712; ES 16179114 T 20160712; JP 2019500645 A 20170712; KR 20197004185 A 20170712; MX 2019000517 A 20170712; PL 16179114 T 20160712; UA A201900275 A 20170712; US 201716314205 A 20170712