

Title (en)  
STEEL PLATE HAVING EXCELLENT TOUGHNESS AND RESISTANCE TO HYDROGEN-INDUCED CRACKING, AND STEEL PIPE FOR LINE PIPE

Title (de)  
STAHLPLATTE MIT HERVORRAGENDER ZÄHIGKEIT UND RESISTENZ GEGEN WASSERSTOFFINDUZIERTER RISSBILDUNG UND STAHLROHR FÜR EIN LEITUNGSROHR

Title (fr)  
PLAQUE D'ACIER AYANT D'EXCELLENTE PROPRIÉTÉS EN TERMES DE TÉNACITÉ ET DE RÉSISTANCE À LA FISSURATION SOUS HYDROGÈNE ET TUBE EN ACIER POUR TUBE DE CANALISATION

Publication  
**EP 3239333 A4 20180627 (EN)**

Application  
**EP 15873096 A 20151222**

Priority  
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Abstract (en)  
[origin: EP3239333A1] A steel plate and a steel pipe having excellent hydrogen-induced cracking resistance and toughness are achieved. Further, the steel plate and steel pipe are achieved that can evaluate the hydrogen-induced cracking resistance based on the internal quality of a cast strip without performing a hydrogen-induced cracking test after rolling. The steel plate having the excellent hydrogen-induced cracking resistance and toughness satisfies the specified contents of C, Si, Mn, P, S, Al, Ca, N, and O, and further contains the specified content of one or more elements selected from the group consisting of REM and Zr, with the balance being iron and inevitable impurities. The steel plate is further characterized by that the ratio (Ca/S) of the Ca to the S is 2.0 or more; the Ca, the S, and the O satisfy the relationship of  $(Ca - 1.25S)/O \neq 1.80$ ; an Ar gas content in a steel is 0.50  $\mu\text{L}/\text{cm}^3$  or less; and a decrease in the amount of Ca obtained by subtracting a Ca concentration in a slab from a Ca concentration in a molten steel in a tundish is a threshold value Ca drop, or less, the threshold value Ca drop, being a maximum decrease in the amount of Ca that avoids the occurrence of hydrogen-induced cracking in the steel plate obtained by rolling the slab.

IPC 8 full level  
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CPC (source: EP KR)  
**C21D 8/0221** (2013.01 - KR); **C21D 8/0226** (2013.01 - EP); **C21D 8/0263** (2013.01 - EP); **C22C 38/001** (2013.01 - EP); **C22C 38/002** (2013.01 - EP KR); **C22C 38/005** (2013.01 - EP KR); **C22C 38/02** (2013.01 - EP KR); **C22C 38/04** (2013.01 - EP KR); **C22C 38/06** (2013.01 - EP KR); **C22C 38/08** (2013.01 - EP); **C22C 38/12** (2013.01 - EP); **C22C 38/14** (2013.01 - EP KR); **C22C 38/16** (2013.01 - EP); **C22C 38/58** (2013.01 - EP KR); **C21C 7/04** (2013.01 - EP); **C21D 9/08** (2013.01 - EP); **C21D 2211/004** (2013.01 - EP)

Citation (search report)  
• [E] EP 3018231 A1 20160511 - KOBE STEEL LTD [JP]  
• [X] JP 2014208892 A 20141106 - KOBE STEEL LTD  
• [A] JP 2014173892 A 20140922 - KOBE STEEL LTD  
• [A] JP 2014173893 A 20140922 - KOBE STEEL LTD  
• See references of WO 2016104528A1

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