

Title (en)  
HOT-ROLLED STEEL SHEET HAVING HIGH YIELD RATIO AND EXCELLENT LOW-TEMPERATURE IMPACT ENERGY ABSORPTION AND HAZ SOFTENING RESISTANCE AND METHOD FOR PRODUCING SAME

Title (de)  
HEISSGEWALZTES STAHLBLECH MIT HOHER STRECKGRENZE UND HERVORRAGENDER NIEDRIGTEMPERATUR-SCHLAGENERGIEABSORPTION UND WEZ-ERWEICHUNGSBESTÄNDIGKEIT SOWIE VERFAHREN ZU SEINER HERSTELLUNG

Title (fr)  
FEUILLE D'ACIER LAMINÉE À CHAUD AYANT UN RAPPORT DE LIMITE D'ÉLASTICITÉ ÉLEVÉ ET UNE EXCELLENTE ABSORPTION D'ÉNERGIE D'IMPACT À BASSE TEMPÉRATURE ET UNE RÉSISTANCE AU RAMOLLISSEMENT HAZ ET SON PROCÉDÉ DE FABRICATION

Publication  
**EP 2743364 A4 20151104 (EN)**

Application  
**EP 12822363 A 20120808**

Priority  
• JP 2011173760 A 20110809  
• JP 2012070259 W 20120808

Abstract (en)  
[origin: EP2743364A1] Hot rolled steel sheet which has a maximum tensile strength of 600 MPa or more and has an excellent low temperature impact energy absorption and HAZ softening resistance and a method of production of the same are provided, that is, sheet which contains, by mass %, C: 0.04 to 0.09%, Si: 0.4% or less, Mn: 1.2 to 2.0%, P: 0.1% or less, S: 0.02% or less, Al: 1.0% or less, Nb: 0.02 to 0.09%, Ti: 0.02 to 0.07%, and N: 0.005% or less, where  $2.0 \leq \text{Mn} + 8[\% \text{Ti}] + 12[\% \text{Nb}] \leq 2.6$ , has a balance of Fe and unavoidable impurities, has an area percentage of pearlite of 5% or less, has a total area percentage of martensite and retained austenite of 0.5% or less, has a balance of a metal structure of ferrite and/or bainite, has an average grain size of ferrite and bainite of 10  $\mu\text{m}$  or less, has an average particle size of alloy carbonitrides with incoherent interfaces which contain Ti and Nb of 20 nm or less, and has a yield ratio of 0.85 or more.

IPC 8 full level  
**C22C 38/00** (2006.01); **B21B 3/00** (2006.01); **C21D 9/46** (2006.01); **C22C 38/14** (2006.01); **C22C 38/58** (2006.01); **C23C 2/02** (2006.01); **C23C 2/28** (2006.01)

CPC (source: CN EP KR US)  
**B21B 3/00** (2013.01 - KR); **C21D 8/0226** (2013.01 - CN KR); **C21D 8/0263** (2013.01 - CN EP KR US); **C21D 8/0426** (2013.01 - EP US); **C21D 8/0473** (2013.01 - EP US); **C21D 8/0484** (2013.01 - EP US); **C21D 9/46** (2013.01 - KR); **C22C 38/001** (2013.01 - EP KR US); **C22C 38/002** (2013.01 - CN EP US); **C22C 38/005** (2013.01 - CN EP US); **C22C 38/02** (2013.01 - CN EP KR US); **C22C 38/04** (2013.01 - CN EP KR US); **C22C 38/06** (2013.01 - CN EP KR US); **C22C 38/08** (2013.01 - CN); **C22C 38/12** (2013.01 - CN EP KR US); **C22C 38/14** (2013.01 - CN EP KR US); **C22C 38/16** (2013.01 - CN EP US); **C22C 38/18** (2013.01 - CN); **C22C 38/32** (2013.01 - CN); **C22C 38/42** (2013.01 - EP US); **C22C 38/48** (2013.01 - EP US); **C22C 38/50** (2013.01 - EP US); **C22C 38/58** (2013.01 - KR); **C23C 2/02** (2013.01 - CN EP US); **C23C 2/0224** (2022.08 - CN EP KR US); **C23C 2/024** (2022.08 - CN EP KR US); **C23C 2/28** (2013.01 - CN EP KR US); **C21D 9/56** (2013.01 - EP US); **C21D 2211/001** (2013.01 - CN KR); **C21D 2211/002** (2013.01 - CN EP KR US); **C21D 2211/005** (2013.01 - CN EP KR US); **C21D 2211/008** (2013.01 - CN KR); **C21D 2211/009** (2013.01 - CN KR); **Y10T 428/12972** (2015.01 - EP US)

Citation (search report)  
• [A] US 5653826 A 19970805 - KOO JAYOUNG [US], et al  
• [A] US 2010221572 A1 20100902 - LAURENT JEAN-PIERRE [FR], et al  
• [A] EP 2130938 A1 20091209 - NIPPON STEEL CORP [JP]  
• [AD] JP 2007009322 A 20070118 - JFE STEEL KK  
• [A] US 2003094221 A1 20030522 - KONDO MASAYUKI [JP], et al  
• See also references of WO 2013022043A1

Cited by  
CN109415791A; EP3476969A4; JP2020509189A; US11649515B2

Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)  
**EP 2743364 A1 20140618; EP 2743364 A4 20151104; EP 2743364 B1 20160727**; BR 112014002875 A2 20170221; BR 112014002875 B1 20181023; CA 2843588 A1 20130214; CA 2843588 C 20180220; CN 103732776 A 20140416; CN 103732776 B 20160608; CN 105648311 A 20160608; CN 105648311 B 20180330; ES 2589640 T3 20161115; JP 5354130 B2 20131127; JP WO2013022043 A1 20150305; KR 101575832 B1 20151208; KR 20140026574 A 20140305; MX 2014001501 A 20140512; MX 349893 B 20170818; PL 2743364 T3 20170131; RU 2562582 C1 20150910; TW 201313920 A 20130401; TW I453287 B 20140921; US 2014178712 A1 20140626; WO 2013022043 A1 20130214; ZA 201400954 B 20160727

DOCDB simple family (application)  
**EP 12822363 A 20120808**; BR 112014002875 A 20120808; CA 2843588 A 20120808; CN 201280038678 A 20120808; CN 201610008939 A 20120808; ES 12822363 T 20120808; JP 2012070259 W 20120808; JP 2013502930 A 20120808; KR 20137034781 A 20120808; MX 2014001501 A 20120808; PL 12822363 T 20120808; RU 2014108831 A 20120808; TW 101128765 A 20120809; US 201214236371 A 20120808; ZA 201400954 A 20140207