

## Title (en)

PROCESS FOR PRODUCING THICK HIGH-STRENGTH STEEL PLATE EXCELLENT IN BRITTLE FRACTURE ARRESTABILITY AND TOUGHNESS OF ZONE AFFECTED BY HEAT IN LARGE-HEAT-INPUT WELDING AND THICK HIGH-STRENGTH STEEL PLATE EXCELLENT IN BRITTLE FRACTURE ARRESTABILITY AND TOUGHNESS OF ZONE AFFECTED BY HEAT IN LARGE-HEAT-INPUT WELDING

## Title (de)

VERFAHREN ZUR HERSTELLUNG EINER DICKEN STAHLPLATTE MIT HOHER FESTIGKEIT, HERVORRAGENDER STABILITÄT GEGEN SPRÖDE BRÜCHE UND HERVORRAGENDER RESISTENZ VON DURCH HITZE IN SCHWEISSVORGÄNGEN MIT HOHER HITZUZUFUHR BETROFFENEN BEREICHEN SOWIE DICKE STAHLPLATTE MIT HOHER FESTIGKEIT, HERVORRAGENDER STABILITÄT GEGEN SPRÖDE BRÜCHE UND HERVORRAGENDER RESISTENZ VON DURCH HITZE IN SCHWEISSVORGÄNGEN MIT HOHER HITZUZUFUHR BETROFFENEN BEREICHEN

## Title (fr)

PROCÉDÉ DE PRODUCTION D'UNE PLAQUE ÉPAISSE D'ACIER À HAUTE RÉSISTANCE MÉCANIQUE QUI PRÉSENTE D'EXCELLENTE PROPRIÉTÉS DE BLOCAGE DES FRACTURES FRAGILES ET UNE EXCELLENTE TÉNACITÉ DE LA PARTIE AFFECTÉE PAR LA CHALEUR EN SOUDAGE PAR GRAND APPORT DE CHALEUR, ET PLAQUE ÉPAISSE D'ACIER À HAUTE RÉSISTANCE MÉCANIQUE QUI PRÉSENTE D'EXCELLENTE PROPRIÉTÉS DE BLOCAGE DES FRACTURES FRAGILES ET UNE EXCELLENTE TÉNACITÉ DE LA ZONE AFFECTÉE PAR LA CHALEUR EN SOUDAGE PAR GRAND APPORT DE CHALEUR

## Publication

**EP 2236631 A4 20170329 (EN)**

## Application

**EP 08857772 A 20081204**

## Priority

- JP 2008072051 W 20081204
- JP 2007315840 A 20071206

## Abstract (en)

[origin: EP2236631A1] This method for producing a thicker high-strength steel plate that includes: cooling a continuously cast slab containing, in terms of mass %, C: 0.05 to 0.12%, Si: not more than 0.3%, Mn: 1 to 2%, P: not more than 0.015%, S: not more than 0.005%, B: 0.0003 to 0.003%, V: 0.01 to 0.15%, Al: 0.001 to 0.1%, Ti: 0.005 to 0.02%, N: 0.002 to 0.01%, and O: not more than 0.004%, with the remainder being iron and unavoidable impurities, to a temperature of Ar 3 -200 °C or lower, and subsequently reheating the slab to 950 to 1,100 °C; subjecting the continuously cast slab to rough rolling at 900 °C or higher with a cumulative reduction ratio of at least 30%; subsequently performing finish rolling at 700 °C or higher with a cumulative reduction ratio of at least 50% under conditions that both of the finish rolling start temperature and the finish rolling completion temperature are not higher than the temperature represented by the formula:  $\{-0.5 \times (\text{slab heating temperature (}^{\circ}\text{C)}) + 1.325\}$  (°C), thereby forming a rolled plate; and then cooling the rolled plate to 500 °C or lower by accelerated cooling to obtain a steel plate. In the continuously cast slab, a calculated value of an amount of B {effective B amount: Bef(%)} which is solid-solubilized into an austenite base material prior to transformation is not more than 0%, and a carbon equivalent Ceq satisfies a range from 0.32 to 0.42%.

## IPC 8 full level

**C21D 8/02** (2006.01); **C22C 38/00** (2006.01); **C22C 38/04** (2006.01); **C22C 38/12** (2006.01); **C22C 38/14** (2006.01); **C22C 38/58** (2006.01)

## CPC (source: EP KR)

**C21D 8/0226** (2013.01 - EP KR); **C21D 8/0263** (2013.01 - EP KR); **C21D 9/50** (2013.01 - KR); **C22C 1/11** (2023.01 - EP KR); **C22C 38/001** (2013.01 - EP KR); **C22C 38/002** (2013.01 - KR); **C22C 38/005** (2013.01 - KR); **C22C 38/04** (2013.01 - EP KR); **C22C 38/06** (2013.01 - EP KR); **C22C 38/12** (2013.01 - EP KR); **C22C 38/14** (2013.01 - EP KR); **C21D 9/50** (2013.01 - EP); **C21D 2211/004** (2013.01 - EP)

## Citation (search report)

- [X] JP 2007046096 A 20070222 - NIPPON STEEL CORP
- [A] JP H1088275 A 19980407 - KAWASAKI STEEL CO
- [A] JP H11229078 A 19990824 - KOBE STEEL LTD
- [A] EP 1035222 A1 20000913 - KAWASAKI STEEL CO [JP]
- See references of WO 2009072559A1

## Cited by

RU2653954C2; EP2644735A4; EP2644731A4; US9403242B2

## Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR

## DOCDB simple family (publication)

**EP 2236631 A1 20101006**; **EP 2236631 A4 20170329**; CN 101578380 A 20091111; CN 101578380 B 20110112; JP 4612735 B2 20110112; JP WO2009072559 A1 20110428; KR 101070093 B1 20111004; KR 20090097167 A 20090915; TW 200932925 A 20090801; TW I346706 B 20110811; WO 2009072559 A1 20090611

## DOCDB simple family (application)

**EP 08857772 A 20081204**; CN 200880001547 A 20081204; JP 2008072051 W 20081204; JP 2009507634 A 20081204; KR 20097013330 A 20081204; TW 97147488 A 20081205