

Title (en)
METHOD FOR MANUFACTURING VERY HIGH STRENGTH, COLD-ROLLED, DUAL PHASE STEEL SHEETS, AND SHEETS THUS PRODUCED

Title (de)
VERFAHREN ZUR HERSTELLUNG VON KALTGEWALZTEN DUALPHASENSTAHLEBLECHEN MIT SEHR HOHER FESTIGKEIT UND SO HERGESTELLTE BLECHE

Title (fr)
PROCEDE DE FABRICATION DE TOLES D'ACIERS DUAL PHASE LAMINEES A FROID A TRES HAUTE RESISTANCE ET TOLES AINSI PRODUITES

Publication
EP 2291547 B1 20120425 (FR)

Application
EP 09761870 A 20090515

Priority
• FR 2009000574 W 20090515
• EP 08290474 A 20080521
• EP 09761870 A 20090515

Abstract (en)
[origin: EP2123786A1] Cold-rolled and annealed steel sheet comprises (in wt.%): carbon (0.055-0.095); manganese (2-2.6); silicon (0.005-0.35); sulfur (= 0.005); phosphorus (= 0.05); aluminum (0.1-0.3); molybdenum (0.05-0.25); chromium (0.2-0.5); nickel (= 0.1); niobium (0.01-0.04); titanium (0.01-0.05); boron (0.0005-0.0025); and nitrogen (0.002-0.007), where the rest of the composition is iron and impurities. An independent claim is included for a process for preparation of the steel sheet comprising pouring the steel in the form of semi-product, carrying the semi-product at a temperature of 1150-1250[deg] C, hot rolling of the semi-finished product with a temperature of end-rolling of greater than argon (Ar3) to obtain a hot rolled product, coiling the hot-rolled at a temperature of 500-570[deg] C, cleaning the hot rolled product, making cold rolling with a reduction rate of 30-80% to obtain cold rolled product, heating the cold rolled product having a speed of 1-5[deg] C/s and annealing temperature including Ac1+40[deg] C-Ac3-30[deg] C, (where Ac1 is initial temperature of allotropic transformation, and Ac3 is final temperature of allotropic transformation) for 30-300 seconds to obtain a heated and annealed product with a structure comprising austenite and cooling the product to a temperature below the initial temperature of formation of martensite (M s) temperature with sufficient speed so that austenite is completely transformed to martensite.

IPC 8 full level
C22C 38/04 (2006.01); **C21D 8/02** (2006.01); **C23C 2/02** (2006.01); **C23C 2/06** (2006.01)

CPC (source: EP KR US)
B22D 7/00 (2013.01 - EP US); **B22D 11/001** (2013.01 - EP US); **C21D 1/84** (2013.01 - EP US); **C21D 6/004** (2013.01 - EP US); **C21D 6/005** (2013.01 - EP US); **C21D 6/008** (2013.01 - EP US); **C21D 8/0205** (2013.01 - EP US); **C21D 8/021** (2013.01 - EP US); **C21D 8/0226** (2013.01 - EP KR US); **C21D 8/0236** (2013.01 - EP KR US); **C21D 8/0263** (2013.01 - EP US); **C21D 8/0273** (2013.01 - EP KR US); **C21D 8/0278** (2013.01 - EP US); **C21D 9/46** (2013.01 - EP US); **C22C 38/001** (2013.01 - EP KR US); **C22C 38/002** (2013.01 - EP US); **C22C 38/02** (2013.01 - EP US); **C22C 38/04** (2013.01 - EP US); **C22C 38/06** (2013.01 - EP US); **C22C 38/44** (2013.01 - EP KR US); **C22C 38/48** (2013.01 - EP KR US); **C22C 38/50** (2013.01 - EP KR US); **C22C 38/54** (2013.01 - EP KR US); **C22C 38/58** (2013.01 - EP KR US); **C23C 2/02** (2013.01 - EP US); **C23C 2/0224** (2022.08 - EP KR US); **C23C 2/024** (2022.08 - EP KR US); **C23C 2/06** (2013.01 - KR US); **C23C 2/28** (2013.01 - EP KR US); **C23C 2/29** (2022.08 - EP US); **C23C 2/36** (2013.01 - US); **C23C 2/40** (2013.01 - KR); **C21D 2211/005** (2013.01 - KR); **C21D 2211/008** (2013.01 - KR)

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 MK MT NL NO PL PT RO SE SI SK TR

Designated extension state (EPC)
BA

DOCDB simple family (publication)
EP 2123786 A1 20091125; AT E555225 T1 20120515; BR PI0912879 A2 20170516; BR PI0912879 B1 20180626; CA 2725290 A1 20091217; CA 2725290 C 20151013; CN 102046827 A 20110504; CN 102046827 B 20130306; EP 2291547 A1 20110309; EP 2291547 B1 20120425; ES 2386701 T3 20120827; JP 2011523440 A 20110811; JP 5425896 B2 20140226; KR 101328768 B1 20131113; KR 20110013490 A 20110209; MA 32294 B1 20110502; MX 2010012584 A 20110405; PL 2291547 T3 20120928; RU 2010152214 A 20120627; RU 2470087 C2 20121220; UA 100056 C2 20121112; US 10190187 B2 20190129; US 2011168300 A1 20110714; US 2016222486 A1 20160804; US 2019106765 A1 20190411; WO 2009150319 A1 20091217; ZA 201007964 B 20110727

DOCDB simple family (application)
EP 08290474 A 20080521; AT 09761870 T 20090515; BR PI0912879 A 20090515; CA 2725290 A 20090515; CN 200980118384 A 20090515; EP 09761870 A 20090515; ES 09761870 T 20090515; FR 2009000574 W 20090515; JP 2011510017 A 20090515; KR 20107028478 A 20090515; MA 33333 A 20101111; MX 2010012584 A 20090515; PL 09761870 T 20090515; RU 2010152214 A 20090515; UA A201015426 A 20090515; US 201615097039 A 20160412; US 201816213455 A 20181207; US 99349809 A 20090515; ZA 201007964 A 20101108