

Title (en)

METHOD FOR PRODUCING AN EASILY DEFORMABLE FLAT STEEL PRODUCT

Title (de)

VERFAHREN ZUM HERSTELLEN EINES GUT UMFORMBAREN STAHLFLACHPRODUKTS

Title (fr)

PROCÉDÉ DE FABRICATION D'UN PRODUIT EN ACIER PLAT FACILEMENT FORMABLE

Publication

EP 2513346 A2 20121024 (DE)

Application

EP 10787425 A 20101203

Priority

- DE 102009044861 A 20091210
- EP 2010068831 W 20101203

Abstract (en)

[origin: WO2011069906A2] The invention relates to a method by means of which an easily deformable flat steel product having a carbon content of 0.1-0.4 wt % can be produced in a cost-effective manner. To this end, according to the invention, an annealing treatment is carried out under an annealing atmosphere comprising 0.1-25 vol % of H₂, H₂O, with the remainder being N₂ and technically unavoidable impurities, and having a dew point of between -20°C and +60°C, wherein the ratio of H₂O/H₂ of the annealing atmosphere is no greater than 0.957. The flat steel product is thereby heated to a holding temperature of 600-1100°C in the course of the annealing treatment, at which it is held for a holding time of 10-360 s, so that the flat steel product obtained after the annealing treatment comprises a 10-200 µm thick ductile edge layer (R) adjacent to the free surface thereof, having a ductility that is greater than the interior core layer (K) of the flat steel product covered by the edge layer. The invention further relates to a correspondingly produced flat steel product particularly suitable for hot or cold forming, and to a method for producing components made of such a flat steel product.

IPC 8 full level

B21D 31/00 (2006.01); **C21D 1/26** (2006.01); **C21D 1/76** (2006.01); **C21D 8/02** (2006.01); **C21D 9/46** (2006.01); **C22C 38/02** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/28** (2006.01); **C22C 38/38** (2006.01)

CPC (source: EP US)

B21D 31/00 (2013.01 - US); **C21D 1/26** (2013.01 - US); **C21D 1/76** (2013.01 - EP US); **C21D 8/0257** (2013.01 - EP US); **C21D 9/46** (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 38/28** (2013.01 - EP US); **C22C 38/38** (2013.01 - EP US)

Citation (search report)

See references of WO 2011069906A2

Cited by

EP3751016A4; EP2513346B1

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)

WO 2011069906 A2 20110616; **WO 2011069906 A3 20110818**; CN 102652177 A 20120829; CN 102652177 B 20150121; DE 102009044861 B3 20110622; EP 2513346 A2 20121024; EP 2513346 B1 20170607; JP 2013513725 A 20130422; JP 2016117948 A 20160630; JP 6298439 B2 20180320; US 2013180305 A1 20130718; US 9234253 B2 20160112

DOCDB simple family (application)

EP 2010068831 W 20101203; CN 201080055825 A 20101203; DE 102009044861 A 20091210; EP 10787425 A 20101203; JP 2012542467 A 20101203; JP 2015235919 A 20151202; US 201013513682 A 20101203