

Title (en)

HOT DIP COATING PROCESS FOR A STEEL PLATE PRODUCT MADE OF HIGH STRENGTHHEAVY-DUTY STEEL

Title (de)

VERFAHREN ZUM SCHMELZTAUCHBESCHICHTEN EINES STAHLFLACHPRODUKTES AUS HÖHERFESTEM STAHL

Title (fr)

PROCÉDÉ DE REVÊTEMENT PAR IMMERSION EN FUSION D'UN PRODUIT PLAT EN ACIER HYPERRÉSISTANT

Publication

EP 2010690 B1 20100224 (DE)

Application

EP 06754869 A 20060426

Priority

EP 2006061858 W 20060426

Abstract (en)

[origin: WO2007124781A1] The invention relates to a process for coating manufactured highheavy-strength duty steel plate products containing steel made of various alloying constituentscomponents, especially Mn, Al, Si and/or Cr, with a protective metal layer, whereby the steel plate product is first treated with heat and then coated in a smelting bath of at least 85% zinc and/or aluminum with the protective metal layer while in at its warmed elevated up statetemperature. As per the invention, the heat treatment includes the following processing steps: a) the steel plate product is heated to a temperature of > 750 °C to 850 °C up in a reduced atmosphere with an H₂ content of at least 2% to 8% to a temperature of > 750 °C to 850 °C. b) The steel plate product is treated with heat for 1 to 10 seconds, whereby the surface, primarily made of pure iron, is converted into an iron oxide coating at a temperature of > 750 °C to 850 °C in a reaction chamber integrated into a continuous furnace with an oxidizing atmosphere that has an O₂-content of 0.01 % to 1 %. Cc) The steel plate product is then annealed in a reduced atmosphere with an H₂-content of 2 % to 8 % by heating it up to a maximum of 900 °C over a period of time that is longer than the duration of the thermal treatment needed to generate the iron oxide coating (process step b) thus reducing the pure iron in the surface of the previously generated iron oxide layer. Dd) The steel plate product is then cooled to smelting bath temperature.

IPC 8 full level

C23C 2/02 (2006.01); **C23C 2/06** (2006.01); **C23C 2/12** (2006.01)

CPC (source: EP KR US)

C23C 2/0038 (2022.08 - EP US); **C23C 2/004** (2022.08 - EP KR US); **C23C 2/02** (2013.01 - EP); **C23C 2/0222** (2022.08 - EP KR US); **C23C 2/0224** (2022.08 - EP KR US); **C23C 2/024** (2022.08 - EP KR US); **C23C 2/06** (2013.01 - EP KR US); **C23C 2/12** (2013.01 - EP KR US)

Cited by

DE102011056823A1; DE102011051731A1; EP3686534A1; BE1026986A1; DE102011051731B4; US2019275766A1; US10821706B2; EP3173495A1; EP3135778A1; WO2020201133A1; WO2013092479A1; WO2016177590A1; US10801086B2; WO2013007578A3; WO2020201136A1; EP2824216A1; DE102010037254A1; WO2012028465A1; WO2013007578A2; US9096919B2; US9279175B2

Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

DOCDB simple family (publication)

WO 2007124781 A1 20071108; AT E458838 T1 20100315; BR PI0621610 A2 20111213; CA 2647687 A1 20071108; CA 2647687 C 20121002; CN 101501235 A 20090805; CN 101501235 B 20120704; DE 502006006289 D1 20100408; EP 2010690 A1 20090107; EP 2010690 B1 20100224; ES 2339804 T3 20100525; JP 2009534537 A 20090924; JP 5189587 B2 20130424; KR 101275839 B1 20130618; KR 20080111492 A 20081223; PL 2010690 T3 20100730; US 2009199931 A1 20090813; US 8636854 B2 20140128

DOCDB simple family (application)

EP 2006061858 W 20060426; AT 06754869 T 20060426; BR PI0621610 A 20060426; CA 2647687 A 20060426; CN 200680054367 A 20060426; DE 502006006289 T 20060426; EP 06754869 A 20060426; ES 06754869 T 20060426; JP 2009506924 A 20060426; KR 20087025650 A 20060426; PL 06754869 T 20060426; US 29711206 A 20060426