Title (en)

Process for manufacturing steel flat products from boron microalloyed multi phase steel

Title (de)

Verfahren zum Herstellen von Stahl-Flachprodukten aus einem mit Bor mikrolegierten Mehrphasenstahl

Title (fr)

Procédé pour la fabrication de produits plats à partir d'un acier à plusieurs phases micro-allié en bore

Publication

EP 1918406 A1 20080507 (DE)

Application

EP 06123139 A 20061030

Priority

EP 06123139 A 20061030

Abstract (en)

The method for the production of flat steel products useful for automotive industry, comprises casting a steel into a cast strip having a thickness of 1-4 mm, hot-rolling the cast strip in-line into a hot-rolled strip having a thickness of higher than 1.5 mm in a continuous process at a final hot-rolling temperature at 800-1100[deg] C and coiling the hot-rolled strip at a coiling temperature of 250-570[deg] C to obtain a hot-rolled strip, which has a minimum tensile strength R m of 800 MPa and a minimum breaking elongation A 8 0 of 5%. The method for the production of flat steel products useful for automotive industry, comprises casting a steel into a cast strip having a thickness of 1-4 mm, hot-rolling the cast strip in-line into a hot-rolled strip having a thickness of higher than 1.5 mm in a continuous process at a final hot-rolling temperature of 800-1100[deg] C and coiling the hot-rolled strip at a coiling temperature of 250-570[deg] C to obtain a hot-rolled strip, which has a minimum tensile strength R m of 800 MPa and a minimum breaking elongation A 8 0 of 5%. The steel forms a complex phase structure. The shaping degree is greater than 20%. The width of the hot-rolled strip is more than 1.600 mm. The hot-rolled strip is cold-rolled with a thickness of 0.5-1.4 mm at 750-850[deg] C to obtain a cold-rolled strip, which has a minimum tensile strength of 800 MPa and a minimum breaking elongation A 5 0 of 10%. The cold or hot-rolled strip is provided with a metallic coating, which is galvanizing. The hot-rolled temperature is 900-1020[deg] C and the coiling temperature is 420-490[deg] C, when the minimum breaking elongation A 8 0 of the obtained hot-rolled strip is 10%. The hot-rolled temperature is 900-1100[deg] C and the coiling temperature is 450-570[deg] C, when the minimum tensile strength of the obtained hot-rolled strip is 1000 MPa.

Abstract (de)

Die Erfindung betrifft ein Verfahren, mit dem sich hochfeste Stahl-Flachprodukte über eine große Bandbreite von geometrischen Abmessungen bei vermindertem Herstellaufwand erzeugen lassen. Dazu wird erfindungsgemäß ein ein Mehrphasengefüge bildender Stahl, der (in Gew.-%) 0,08 - 0,12 % C, 1,70 - 2,00 % Mn, bis zu 0,030 % P, bis zu 0,004 % S, bis zu 0,20 % Si, 0,01 - 0,06 % Al, bis zu 0,0060 % N, 0,20 - 0,50 % Cr, 0,010 - 0,050 % Ti, 0,0010 - 0,0045 % B und als Rest Eisen und unvermeidbare Verunreinigungen enthält, zu einem gegossenen Band mit einer Dicke von 1 - 4 mm vergossen, das gegossene Band in einem kontinuierlichen Arbeitsablauf mit einem Umformgrad von mehr als 20 % in-Line bei einer im Bereich von 800 - 1100 °C liegenden Warmwalzendtemperatur zu einem Warmband mit einer Dicke von 0,5 - 3,2 mm warmgewalzt und das Warmband bei einer 250 - 570 °C betragenden Haspeltemperatur gehaspelt, so dass ein Warmband erhalten wird, dessen Zugfestigkeit R m mindestens 800 MPa bei einer Bruchdehnung A 80 von mindestens 5 % beträgt.

IPC 8 full level

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CPC (source: EP KR US)

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Citation (search report)

- [A] EP 1396550 A1 20040310 - THYSSENKRUPP STAHL AG [DE]
- [A] WO 0248410 A1 20020620 - THYSSENKRUPP STAHL AG [DE], et al
- [A] DE 19710125 A1 19980917 - KRUPP AG HOESCH KRUPP [DE]
- [DA] EP 1319725 A2 20030618 - THYSSENKRUPP STAHL AG [DE]
- [DA] EP 1072689 A1 20010131 - USINOR [FR]
- [A] EP 1493832 A1 20050105 - JFE STEEL CORP [JP]
- [A] SENK D ET AL: "UMFORMEN UND KUEHLEN VON DIREKTGEGOSSENEM STAHLBAND IN-LINE ROLLING AND COOLING OF DIRECT CAST STEEL STRIP", STAHL UND EISEN, VERLAG STAHLEISEN, DUSSELDORF, DE, vol. 120, no. 6, 16 June 2000 (2000-06-16), pages 65 - 69, XP001118293, ISSN: 0340-4803
- [A] LINDENBERG H-U ET AL: "EUROSTRIP - STATE OF THE ART OF STRIP CASTING EUROSTRIP - STAND DER TECHNIK BEIM BANDGIESSEN", STAHL UND EISEN, VERLAG STAHLEISEN, DUSSELDORF, DE, vol. 121, no. 12, 14 December 2001 (2001-12-14), pages 97 - 104, XP001103986, ISSN: 0340-4803

Cited by

CN105950984A; AT512399A4; AT512399B1; EP3415646A1; EP2489748A1; US9144839B2; US9976205B2; WO2012100762A1; WO2013182622A1; WO2012110165A1; US10612113B2; WO2015014333A3

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EP 2007061390 W 20071024; ES 06123139 T 20061030; JP 2009533822 A 20071024; KR 20097007485 A 20071024; PL 06123139 T 20061030;
US 44762107 A 20071024