

Title (en)

Cold rolled steel flat product for deep drawing applications and method for its production

Title (de)

Kaltgewalztes Stahlflachprodukt für Tiefziehenanwendungen und Verfahren zu seiner Herstellung

Title (fr)

Produit plat en acier laminé à froid pour applications d'emboutissage profond et son procédé de fabrication

Publication

EP 2767601 A1 20140820 (DE)

Application

EP 13155225 A 20130214

Priority

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Abstract (en)

The cold-rolled flat product made of steel, is claimed. The steel contains iron, unavoidable impurities, carbon, aluminum, niobium, titanium, phosphorus, sulfur, nitrogen, and optionally elements including manganese, rare earth metal, silicon, zirconium, vanadium, tungsten, molybdenum, chromium, cobalt, nickel, boron, copper and calcium. The product has deep drawability (r-value) of 1.3, and contains 0-0.1 vol.% of carbides. A ratio of a grain length in a rolling direction to a width in a transverse direction of a grain of the flat steel product is less than 1.5. The cold-rolled flat product made of steel, is claimed. The steel contains iron, unavoidable impurities, 0.05 wt.% of carbon, 6.8 wt.% of aluminum, 0.1-0.15 wt.% of niobium, 0.15-0.3 wt.% of titanium, less than 0.1 wt.% of phosphorus, less than 0.03 wt.% of sulfur, less than 0.1 wt.% of nitrogen, and optionally elements including 0-0.1 wt.% of manganese, 0-0.2 wt.% of rare earth metal, 0-2 wt.% of silicon, 0-1 wt.% of zirconium, 0-1 wt.% of vanadium, 0-1 wt.% of tungsten, 0-1 wt.% of molybdenum, 0-3 wt.% of chromium, 0-1 wt.% of cobalt, 0-2 wt.% of nickel, 0-0.1 wt.% of boron, 0-3 wt.% of copper and 0-0.015 wt.% of calcium. A ratio of titanium to niobium is 1.5-2.5. The product has deep drawability (r-value) of 1.3, and contains 0-0.1 vol.% of carbides. A ratio of a grain length in a rolling direction to a width in a transverse direction of a grain of the flat steel product is less than 1.5. An independent claim is included for a method of producing a cold-rolled flat product.

Abstract (de)

Die Erfindung betrifft ein kaltgewalztes Stahlflachprodukt für Tiefziehenanwendungen aus einem Stahl, der neben Fe und unvermeidbaren Verunreinigungen (in Gew.-%) C: 0,008 - 0,1 %, Al: 6, 5 - 12 %, Nb: 0,1 - 0,2 %, Ti: 0, 15 - 0,5 %, P: < 0,1 %, S: < 0,03 %, N: < 0,1 % sowie optional eines oder mehrere Elemente aus der Gruppe "Mn, Si, REM, Mo, Cr, Zr, V, W, Co, Ni, B, Cu, Ca, N" mit der Maßgabe enthält, Mn: < 1 %, REM: < 0,2 %, Si: < 2 %, Zr: < 1 %, V: < 1 %, W: < 1 %, Mo: < 1 %, Cr: < 3 %, Co: < 1 %, Ni: < 2 %, B: < 0,1 %, Cu: < 3 %, Ca: < 0,015 %. Dabei gilt für das Verhältnis $2,5 \cdot \frac{\%Ti}{\%Nb} \leq 1,5$, $\%Ti = Ti\text{-Gehalt}$ und $\%Nb = Nb\text{-Gehalt}$. Zur Herstellung eines solchen Stahlflachprodukts wird ein entsprechend zusammengesetzter Stahl zu einem Vorprodukt vergossen, das dann bei einer Warmwalzendtemperatur von 820 - 1000 °C zu Warmband warmgewalzt wird. Dieses wird anschließend bei einer Haspeltemperatur von bis zu 750 °C gehaspelt, nach dem Haspeln bei einer Glühtemperatur von >650 - 1200 °C über 1 - 50 h geglüht, anschließend in ein oder mehr Stufen mit einem Gesamt-Kaltwalzgrad von $\geq 65\%$ zum kaltgewalzten Stahlflachprodukt kaltgewalzt und schließlich bei 650 - 850 °C schlussgeglüht.

IPC 8 full level

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CPC (source: EP US)

C21D 1/26 (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 8/0263** (2013.01 - EP US); **C21D 8/0405** (2013.01 - EP US); **C21D 9/46** (2013.01 - EP US); **C21D 9/48** (2013.01 - EP US); **C22C 38/001** (2013.01 - US); **C22C 38/004** (2013.01 - US); **C22C 38/02** (2013.01 - US); **C22C 38/04** (2013.01 - US); **C22C 38/06** (2013.01 - EP US); **C22C 38/12** (2013.01 - EP US); **C22C 38/14** (2013.01 - EP US); **C22C 38/44** (2013.01 - US); **C22C 38/46** (2013.01 - US); **C22C 38/48** (2013.01 - US); **C22C 38/50** (2013.01 - US); **C21D 8/0226** (2013.01 - EP US); **C21D 8/0236** (2013.01 - EP US); **C21D 2211/004** (2013.01 - EP US); **C21D 2211/005** (2013.01 - EP US)

Citation (applicant)

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BA ME

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DOCDB simple family (application)

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