

Title (en)

Method for the heat treatment of a manganese steel product

Title (de)

Verfahren zum Wärmebehandeln eines Mangan-Stahlprodukts

Title (fr)

Procédé de traitement à chaud d'un produit en manganèse-acier

Publication

EP 3029162 B1 20180425 (DE)

Application

EP 14195644 A 20141201

Priority

EP 14195644 A 20141201

Abstract (en)

[origin: WO2016087392A1] The invention relates to an en-bloc heat treatment of a manganese steel product, the alloy of which comprises: a carbon content (C) in the following range: $0.02 < C < 0.35$ wt%, and a manganese content (Mn) in the following range: $3.5 \text{ wt\%} < \text{Mn} < 6 \text{ wt\%}$. The en-bloc annealing method comprises the following sub-steps: heating (E1) of the steel product at a first holding temperature (T1) in the range of $820 \text{ }^{\circ}\text{C} \pm 20 \text{ }^{\circ}\text{C}$; a first holding (H1) of the steel product during a first holding period ($\delta 1$) at the first holding temperature (T1); faster first cooling (A1) of the steel product to a second holding temperature (T2) in the range between $350 \text{ }^{\circ}\text{C}$ and $450 \text{ }^{\circ}\text{C}$; a second holding (H2) of the steel product during a second holding period ($\delta 2$) in the range of the second holding period (T2); carrying out a slower second cooling (A2).

IPC 8 full level

C22C 38/00 (2006.01); **C21D 1/18** (2006.01); **C21D 1/26** (2006.01); **C21D 6/00** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/16** (2006.01)

CPC (source: CN EP KR US)

C21D 1/185 (2013.01 - EP KR US); **C21D 1/26** (2013.01 - CN EP KR US); **C21D 6/005** (2013.01 - CN EP KR US); **C22C 38/002** (2013.01 - EP US); **C22C 38/04** (2013.01 - EP KR US); **C22C 38/06** (2013.01 - EP US); **C22C 38/16** (2013.01 - EP US); **C21D 2211/001** (2013.01 - CN); **C21D 2211/002** (2013.01 - CN EP US)

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)

EP 3029162 A1 20160608; **EP 3029162 B1 20180425**; CN 107109506 A 20170829; CN 107109506 B 20190312; EP 3227465 A1 20171011; ES 2674133 T3 20180627; JP 2018502986 A 20180201; KR 102029561 B1 20191108; KR 20170090446 A 20170807; US 11124850 B2 20210921; US 2017306429 A1 20171026; WO 2016087392 A1 20160609

DOCDB simple family (application)

EP 14195644 A 20141201; CN 201580065026 A 20151130; EP 15802096 A 20151130; EP 2015078105 W 20151130; ES 14195644 T 20141201; JP 2017528998 A 20151130; KR 20177017190 A 20151130; US 201515528928 A 20151130