

Title (en)  
HOT-ROLLED FLAT STEEL PRODUCT AND METHOD FOR THE PRODUCTION THEREOF

Title (de)  
WARMGEWALZTES STAHLFLACHPRODUKT UND VERFAHREN ZU SEINER HERSTELLUNG

Title (fr)  
PRODUIT PLAT LAMINÉ À CHAUD EN ACIER ET PROCÉDÉ DE FABRICATION

Publication  
**EP 3847284 B1 20230816 (DE)**

Application  
**EP 18773945 A 20180906**

Priority  
EP 2018074005 W 20180906

Abstract (en)  
[origin: WO2020048599A1] The invention relates to a hot-rolled flat steel product having a tensile strength  $R_m$  of  $\leq 550$  MPa, a hole expansion ratio  $\lambda$  of  $\leq 30\%$ , and a microstructure consisting of  $\leq 90$  area % ferrite and, as the remainder,  $\leq 10$  area % perlite or cementite, with embedded carbonitride precipitates having an average diameter of  $\leq 10$  nm. The flat steel product consists of a steel containing (in wt%) 0.02-0.3% C,  $\leq 0.7\%$  Si,  $\leq 1.0\%$  Al, 0.2-2.5% Mn, 0.05-0.5% Cr,  $\leq 0.02\%$  P,  $\leq 0.005\%$  S,  $\leq 0.01\%$  N,  $\leq 0.1\%$  Cu and at least one element forming carbonitride precipitates from the group "Ti, Nb, V" and, as the remainder, Fe and unavoidable impurities, with the following provisos:- If V is present, the sum of the TiGEW and NbGEW contents is  $\leq 0.01$  wt%; - if Ti or Nb are present, VGEW is  $\leq 0.01$  wt%; - for  $XGEW [wt\%] = TiGEW + (VGEW/1.06) + (NbGEW/1.94)$ , the following applies:  $0.02\% \leq XGEW \leq 0.5\%$ ; - for ratio =  $(XAT + CrAT) / (CAT + NAT)$ , the following applies:  $0.5 \leq \text{ratio} \leq 2.0$ , where  $XAT = TiAT + VAT + NbAT$ ; wherein TiAT, VAT, NbAT, CrAT, CAT and NAT correspond to the Ti content TiGEW, the V content VGEW, the Nb content NbGEW, the Cr content CrGEW, the C content CGEW and NAT the N content NGEW respectively, each converted into atomic %, and the TiGEW, VGEW, NbGEW, CrGEW, CGEW and NGEW contents are given in wt%. The invention also relates to a method for producing such a flat steel product.

IPC 8 full level  
**C21D 8/02** (2006.01); **C22C 38/00** (2006.01); **C22C 38/02** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/24** (2006.01); **C22C 38/26** (2006.01); **C22C 38/28** (2006.01)

CPC (source: EP)  
**C21D 8/0226** (2013.01); **C22C 38/001** (2013.01); **C22C 38/02** (2013.01); **C22C 38/04** (2013.01); **C22C 38/06** (2013.01); **C22C 38/24** (2013.01); **C22C 38/26** (2013.01); **C22C 38/28** (2013.01); **C21D 2211/004** (2013.01); **C21D 2211/005** (2013.01); **C21D 2211/009** (2013.01)

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 2020048599 A1 20200312**; EP 3847284 A1 20210714; EP 3847284 B1 20230816; EP 3847284 C0 20230816

DOCDB simple family (application)  
**EP 2018074005 W 20180906**; EP 18773945 A 20180906