

Title (en)  
THIN STEEL SHEET AND PROCESS FOR PRODUCING SAME

Title (de)  
DÜNNES STAHLBLECH UND VERFAHREN ZU SEINER HERSTELLUNG

Title (fr)  
TÔLE D'ACIER MINCE ET PROCÉDÉ DE PRODUCTION DE CETTE DERNIÈRE

Publication  
**EP 2781615 A4 20150701 (EN)**

Appication  
**EP 12850214 A 20121107**

Priority  
• JP 2011250015 A 20111115  
• JP 2012007147 W 20121107

Abstract (en)  
[origin: EP2781615A1] A thin steel sheet having sheet thickness  $\# \square$  1.6 mm, but tensile strength  $\# \square$  780 MPa and Young's modulus  $\# \square$  240 GPa in transverse direction is provided, where the steel sheet has composition including, in mass%, C: 0.06-0.12 %, Si: 0.5-1.5 %, Mn: 1.0-3.0 %, P: 0.05 % or less, S: 0.01 % or less, Al: 0.5 % or less, N: 0.01 % or less, Ti: 0.02-0.20 %, and the balance being Fe and incidental impurities, where the composition satisfies relations of Formula (1) and (2), and microstructure such that ferrite phase has area ratio  $\# \square$  60 % and martensite phase has area ratio of 15-35 %, ferrite and martensite phases are 95 % or more in total, average grain size of ferrite is  $\# \square$  4.0  $\mu$ m and that of martensite is  $\# \square$  1.5  $\mu$ m, 0.11  $\# \square$  % C - 12 / 47.9  $\times$  % Ti \*  $\# \square$  0.15 , where Ti \* = % Ti - 47.9 / 14  $\times$  % N - 47.9 / 32.1  $\times$  % S

IPC 8 full level  
**C22C 38/00** (2006.01); **B21B 3/00** (2006.01); **C21D 8/02** (2006.01); **C21D 8/04** (2006.01); **C21D 9/46** (2006.01); **C22C 38/02** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/08** (2006.01); **C22C 38/12** (2006.01); **C22C 38/14** (2006.01); **C22C 38/16** (2006.01); **C22C 38/28** (2006.01); **C22C 38/38** (2006.01); **C22C 38/58** (2006.01)

CPC (source: EP US)  
**C21D 8/0263** (2013.01 - US); **C21D 8/0436** (2013.01 - EP US); **C21D 8/0463** (2013.01 - EP US); **C21D 8/0473** (2013.01 - EP US); **C22C 38/00** (2013.01 - EP US); **C22C 38/001** (2013.01 - EP US); **C22C 38/002** (2013.01 - US); **C22C 38/02** (2013.01 - EP US); **C22C 38/04** (2013.01 - EP US); **C22C 38/06** (2013.01 - EP US); **C22C 38/08** (2013.01 - US); **C22C 38/12** (2013.01 - EP US); **C22C 38/14** (2013.01 - EP US); **C22C 38/16** (2013.01 - US); **C22C 38/28** (2013.01 - US); **C22C 38/38** (2013.01 - US); **C21D 9/46** (2013.01 - EP US); **C21D 2211/004** (2013.01 - EP US); **C21D 2211/005** (2013.01 - EP US); **C21D 2211/008** (2013.01 - EP US)

Citation (search report)  
• [X] JP 2008240125 A 20081009 - JFE STEEL KK  
• [X] JP 2006183130 A 20060713 - JFE STEEL KK  
• [X] EP 1659191 A1 20060524 - JFE STEEL CORP [JP]  
• [XA] JP 2008240123 A 20081009 - JFE STEEL KK  
• [A] EP 0969112 A1 20000105 - NIPPON STEEL CORP [JP]  
• See references of WO 2013073136A1

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 2781615 A1 20140924**; **EP 2781615 A4 20150701**; CN 103930585 A 20140716; CN 103930585 B 20150722; JP 5370620 B1 20131218; JP WO2013073136 A1 20150402; KR 20140048348 A 20140423; US 2015027594 A1 20150129; WO 2013073136 A1 20130523

DOCDB simple family (application)  
**EP 12850214 A 20121107**; CN 201280055523 A 20121107; JP 2012007147 W 20121107; JP 2013524300 A 20121107; KR 20147008893 A 20121107; US 201214355756 A 20121107