

Title (en)
THICK STEEL PLATE

Title (de)
DICKE STAHLPLATTE

Title (fr)
PLAQUE D'ACIER ÉPAISSE

Publication
EP 3940103 A4 20221130 (EN)

Application
EP 20794425 A 20200330

Priority
• JP 2019081271 A 20190422
• JP 2020007626 A 20200121
• JP 2020014612 W 20200330

Abstract (en)
[origin: EP3940103A1] Disclosed is a thick steel plate with the composition satisfying predetermined C, Si, Mn, P, S, Al, Nb, Ti, N and Ca, with the balance consisting of Fe and inevitable impurities, the composition satisfying $D_i + 10Nb: 1.20 \text{ to } 2.50$ determined from the equation (1) below, wherein a total area fraction SA of crystal grains having an equivalent circle diameter of 7.5 μm or less, among crystal grains surrounded by high-angle grain boundaries having a crystal misorientation of 15° or more, is 34% or more at the 1/4 position of the plate thickness, and 27% or more at the 1/2 position of the plate thickness: $D_i = 1.16 \times C / 100.5 \times 0.7 \times Si + 1 \times 5.1 \times Mn - 1.2 + 5 \times 0.35 \times Cu + 1 \times 0.36 \times Ni + 1 \times 2.16 \times Cr + 1 \times 3 \times Mo + 1 \times 1.75 \times V + 1 \times 200 \times B + 1$ where, in the equation (1), [element] indicates the content of each element expressed in % by mass, and the content of an element not included is zero.

IPC 8 full level
C22C 38/00 (2006.01); **C21D 1/02** (2006.01); **C21D 8/02** (2006.01); **C21D 9/46** (2006.01); **C22C 38/02** (2006.01); **C22C 38/04** (2006.01); **C22C 38/08** (2006.01); **C22C 38/12** (2006.01); **C22C 38/14** (2006.01); **C22C 38/16** (2006.01); **C22C 38/18** (2006.01); **C22C 38/38** (2006.01); **C22C 38/58** (2006.01)

CPC (source: EP KR)
C21D 1/02 (2013.01 - EP); **C21D 8/0226** (2013.01 - EP KR); **C21D 8/0231** (2013.01 - EP); **C21D 8/0263** (2013.01 - EP); **C21D 9/46** (2013.01 - EP KR); **C22C 38/001** (2013.01 - KR); **C22C 38/002** (2013.01 - EP); **C22C 38/005** (2013.01 - EP); **C22C 38/02** (2013.01 - EP KR); **C22C 38/04** (2013.01 - EP KR); **C22C 38/06** (2013.01 - KR); **C22C 38/08** (2013.01 - EP KR); **C22C 38/12** (2013.01 - EP KR); **C22C 38/14** (2013.01 - EP KR); **C22C 38/16** (2013.01 - EP KR); **C22C 38/18** (2013.01 - EP); **C22C 38/38** (2013.01 - EP KR); **C21D 2201/05** (2013.01 - EP); **C21D 2211/005** (2013.01 - EP)

Citation (search report)
• [I] JP 5679091 B1 20150304
• [I] JP 5812193 B2 20151111
• [A] JP 2016148105 A 20160818 - NIPPON STEEL & SUMITOMO METAL CORP
• See also references of WO 2020217873A1

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

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EP 3940103 A1 20220119; **EP 3940103 A4 20221130**; CN 113840933 A 20211224; CN 113840933 B 20220916; JP 2020176329 A 20201029; JP 7398970 B2 20231215; KR 102684370 B1 20240711; KR 20210142184 A 20211124; WO 2020217873 A1 20201029

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