

Title (en)  
GRAIN-ORIENTED MAGNETIC STEEL SHEET

Title (de)  
KORNORIENTIERTES MAGNETSTAHLBLECH

Title (fr)  
TÔLE D'ACIER MAGNÉTIQUE À GRAINS ORIENTÉS

Publication  
**EP 2460902 A4 20130220 (EN)**

Application  
**EP 10804595 A 20100730**

Priority  
• JP 2009179494 A 20090731  
• JP 2010063343 W 20100730

Abstract (en)  
[origin: EP2460902A1] An electrical steel sheet is provided that contains, as components, by mass%, 0.005% or less of C, 1.0% to 8.0% of Si, and 0.005% to 1.0% of Mn; one or more selected from Nb, Ta, V, and Zr such that a total content thereof is 10 to 50 ppm; and the balance being Fe and unavoidable impurities, wherein at least 10% of the content of Nb, Ta, V, and Zr is in the form of precipitates; the precipitates have an average diameter (equivalent circle diameter) of 0.02 to 3  $\mu\text{m}$ ; and secondary recrystallized grains of the steel sheet have an average grain size of 5 mm or more. Thus, an electrical steel sheet is provided in which degradation of magnetic characteristics can be reduced in the case of the sheet being sheared, even when the sheet is used for a large transformer having a size of several meters.

IPC 8 full level  
**C22C 38/00** (2006.01); **B21B 3/02** (2006.01); **C21D 8/12** (2006.01); **C21D 9/46** (2006.01); **C22C 38/14** (2006.01); **C22C 38/60** (2006.01); **H01F 1/16** (2006.01)

CPC (source: EP KR US)  
**C21D 8/12** (2013.01 - EP KR US); **C21D 8/1272** (2013.01 - EP KR US); **C21D 8/1283** (2013.01 - EP KR US); **C21D 9/46** (2013.01 - EP KR US); **C22C 38/001** (2013.01 - EP KR US); **C22C 38/002** (2013.01 - EP KR US); **C22C 38/008** (2013.01 - EP KR US); **C22C 38/02** (2013.01 - EP KR US); **C22C 38/04** (2013.01 - EP KR US); **C22C 38/06** (2013.01 - EP KR US); **C22C 38/12** (2013.01 - EP KR US); **C22C 38/20** (2013.01 - EP KR US); **C22C 38/34** (2013.01 - EP KR US); **H01F 1/16** (2013.01 - EP KR US); **C21D 2201/05** (2013.01 - EP US)

Citation (search report)  
• [Y] JP H10110218 A 19980428 - KAWASAKI STEEL CO  
• [Y] JP 2003049250 A 20030221 - KAWASAKI STEEL CO  
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