

Title (en)  
HIGH-STRENGTH COLD-ROLLED STEEL SHEET AND METHOD FOR MANUFACTURING SAME

Title (de)  
HOCHFESTES KALTGEWALZTES STAHLBLECH UND VERFAHREN ZUR HERSTELLUNG DAVON

Title (fr)  
TÔLE D'ACIER LAMINÉE À FROID À HAUTE RÉSISTANCE ET SON PROCÉDÉ DE FABRICATION

Publication  
**EP 3272892 A1 20180124 (EN)**

Application  
**EP 16764383 A 20160216**

Priority  
• JP 2015054283 A 20150318  
• JP 2016000778 W 20160216

Abstract (en)  
Provided are a high-strength cold-rolled steel sheet having a tensile strength (TS) of 1,300 MPa or higher, a good chemical conversion property, and good formability, and a method for producing the high-strength cold-rolled steel sheet. The high-strength cold-rolled steel sheet contains C: 0.15% or more and 0.22% or less, Si: 1.0% or more and 2.0% or less, Mn: 1.7% or more and 2.5% or less, P: 0.05% or less, S: 0.02% or less, Al: 0.01% or more and 0.05% or less, N: 0.005% or less, O: 0.01% or less, and the balance being iron and unavoidable impurities. The composition satisfies  $[\text{Si}]/[\text{Mn}] \geq 0.5$  ( $[\text{Si}]$  represents the Si content, and  $[\text{Mn}]$  represents the Mn content (% by mass)). The steel sheet has a structure including, in terms of area fraction, 60% or more and less than 100% of tempered martensite, 5% or less (inclusive of 0%) of untransformed austenite, and the balance being ferrite. The ferrite has an average crystal grain size of less than 3.5  $\mu\text{m}$ . Less than 10 particles/100  $\mu\text{m}^2$  of Si-Mn compound oxide particles having a circle equivalent diameter of 5  $\mu\text{m}$  or less are present on the surface of the steel sheet. The surface of the steel sheet is covered with Si-based oxide at a coverage of 1% or less.

IPC 8 full level  
**C22C 38/00** (2006.01); **C21D 8/02** (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 38/10** (2006.01); **C22C 38/12** (2006.01); **C22C 38/14** (2006.01); **C22C 38/16** (2006.01); **C22C 38/18** (2006.01); **C22C 38/60** (2006.01); **C23G 1/08** (2006.01)

CPC (source: EP KR US)  
**C21D 6/001** (2013.01 - EP US); **C21D 6/002** (2013.01 - EP US); **C21D 6/005** (2013.01 - EP US); **C21D 6/008** (2013.01 - EP US); **C21D 8/0205** (2013.01 - EP US); **C21D 8/0226** (2013.01 - KR); **C21D 8/0236** (2013.01 - KR); **C21D 8/0247** (2013.01 - EP KR US); **C21D 9/46** (2013.01 - EP KR US); **C22C 38/00** (2013.01 - EP US); **C22C 38/001** (2013.01 - EP US); **C22C 38/002** (2013.01 - EP US); **C22C 38/005** (2013.01 - EP US); **C22C 38/008** (2013.01 - EP 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 38/08** (2013.01 - EP US); **C22C 38/10** (2013.01 - EP US); **C22C 38/12** (2013.01 - EP US); **C22C 38/14** (2013.01 - EP US); **C22C 38/16** (2013.01 - EP US); **C22C 38/18** (2013.01 - EP US); **C22C 38/38** (2013.01 - EP US); **C22C 38/60** (2013.01 - EP KR US); **C23G 1/00** (2013.01 - EP US); **C23G 1/08** (2013.01 - EP KR US); **C23G 1/081** (2013.01 - EP US); **C21D 8/0226** (2013.01 - EP US); **C21D 8/0236** (2013.01 - EP US); **C21D 8/0273** (2013.01 - EP US); **C21D 2211/001** (2013.01 - EP US); **C21D 2211/005** (2013.01 - EP US); **C21D 2211/008** (2013.01 - EP KR US)

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