

Title (en)  
HIGH-STRENGTH COLD-ROLLED STEEL SHEET HAVING EXCELLENT WORKABILITY AND COLLISION CHARACTERISTICS AND HAVING TENSILE STRENGTH OF 980 MPa OR MORE, AND METHOD FOR PRODUCING SAME

Title (de)  
HOCHFESTES KALTGEWALZTES STAHLBLECH MIT HERVORRAGENDEN BEARBEITBARKEITS- UND KOLLISIONSEIGENSCHAFTEN UND EINER ZUGFESTIGKEIT VON 980 MPA ODER MEHR SOWIE VERFAHREN ZUR HERSTELLUNG DAVON

Title (fr)  
TÔLE D'ACIER LAMINÉE À FROID HAUTE RÉSISTANCE, AYANT UNE EXCELLENTE APTITUDE AU FAÇONNAGE, DE TRÈS BONNES CARACTÉRISTIQUES DE COLLISION ET UNE RÉSISTANCE À LA TRACTION DE 980 MPa OU PLUS, ET PROCÉDÉ DE PRODUCTION

Publication  
**EP 3279362 B1 20210421 (EN)**

Application  
**EP 16772043 A 20160301**

Priority  
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Abstract (en)  
[origin: EP3279362A1] Provided are: a high-strength cold-rolled steel sheet having a tensile strength of 980 MPa or more, having good formability as evaluated by ductility and stretch-flangeability, and having excellent crashworthiness; and a method for producing the steel sheet. In this high-strength cold-rolled steel sheet, the metal structure at a position of 1/4 of the sheet thickness satisfies (1) to (4) below. (1) The area ratio of ferrite is 0% or more and 10% or less, with the balance being a hard phase including quenched martensite and retained austenite and including at least one selected from the group consisting of bainitic ferrite, bainite, and tempered martensite. (2) The volume ratio V<sup>3</sup> of retained austenite is 5% or more to 30% or less. (3) The area ratio V MA of an MA structure in which quenched martensite and retained austenite are combined is 3% or more to 25% or less, and the average circle-equivalent diameter of the MA structure is 2.0 μm or less. (4) The ratio V MA / V<sup>3</sup> of the area ratio V MA of the MA structure to the volume ratio V<sup>3</sup> of the retained austenite is 0.50 to 1.50.

IPC 8 full level  
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Citation (opposition)  
Opponent : ArcelorMittal  
• EP 3128023 A1 20170208 - JFE STEEL CORP [JP]  
• US 2012312433 A1 20121213 - MIZUTA SAE [JP], et al

Cited by  
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