

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

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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^3 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^3 of the area ratio V_{MA} of the MA structure to the volume ratio V^3 of the retained austenite is 0.50 to 1.50.

IPC 8 full level

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Citation (search report)

- [E] EP 3128023 A1 20170208 - JFE STEEL CORP [JP]
- [XI] US 2012312433 A1 20121213 - MIZUTA SAE [JP], et al
- [X] JP 2011202207 A 20111013 - KOBE STEEL LTD
- [XI] EP 2757171 A1 20140723 - JFE STEEL CORP [JP]
- [XI] WO 2014092025 A1 20140619 - KOBE STEEL LTD [JP]
- See references of WO 2016158159A1

Cited by

EP4141132A4; EP4198149A4; EP3954792A4; WO2020109850A1; WO2023233036A1

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