

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 À HAUTE RÉSISTANCE PRÉSENTANT D'EXCELLENTE CARACTÉRISTIQUES D'APTITUDE AU FAÇONNAGE ET DE COLLISION ET PRÉSENTANT UNE RÉSISTANCE À LA TRACTION SUPÉRIEURE OU ÉGALE À 980 MPa, ET SON PROCÉDÉ DE PRODUCTION

Publication

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Application

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Priority

- JP 2015071438 A 20150331
- JP 2015225507 A 20151118
- JP 2016056169 W 20160301

Abstract (en)

[origin: EP3279363A1] 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 more than 10% to 65% 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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CPC (source: EP US)

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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
- W.C.LESLIE, THE PHYSICAL METALLURGY OF STEELS, pages 231

Opponent : Kabushiki Kaisha Kobe Seiko Sho

- EP 3128023 A1 20170208 - JFE STEEL CORP [JP]
- US 20120312433 A
- W.C.LESLIE, THE PHYSICAL METALLURGY OF STEELS, pages 231

Cited by

EP4079905A4; EP4079902A4; EP4079892A4; EP4079888A4; EP4079904A4; EP4079898A4; US11078552B2; US11939642B2; US11788163B2; EP3778973A4; US11661642B2; EP3778974A4

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