

## Title (en)

High-tensile strength hot-rolled steel sheet excellent in elongation properties and stretch flangeability, and producing method thereof

## Title (de)

Zugfestes warmgewalztes Stahlblech mit ausgezeichneter Bruchdehnung und Streckbördelverformfähigkeit und dessen Herstellungsverfahren

## Title (fr)

Tôle d'acier laminée à chaud résistant à la traction, ayant une allongement et une déformabilité de bordage par étirage excellente et son procédé de fabrication

## Publication

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## Application

**EP 03006195 A 20030319**

## Priority

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## Abstract (en)

A high-tensile strength hot-rolled steel sheet that satisfies, in addition to TS of 780 MPa or more or furthermore 980 MPa or more,  $TS \times EL \geq 20000$  MPa% and  $TS \times \lambda \geq 82000$  MPa%, and a method of producing the same are provided. Specific resolution means are as follows. That is, a high-tensile strength hot-rolled steel sheet including a composition that includes C of 0.04% by mass or more and 0.25% by mass or less; Si of 0.4% by mass or more and 2.0% by mass or less; Mn of 3.0% by mass or less; Al of 0.2% by mass or less; S of 0.007% by mass or less; Ti of 0.08% by mass or more and 0.3% by mass or less; and the balance of Fe and inevitable impurities, in the above, the contents of the C, the Si and the Ti satisfying  $(\%C \times 12 - \%Ti \times 48) / (\%Si \times 28) \leq 0.4$ ; and a microstructure that includes ferrite; bainite; and retained austenite; in the above a fraction of the ferrite in an entire microstructure is 40% or more and an average grain size of the ferrite is 5  $\mu m$  or less; a fraction of the bainite is in the range of 20% to 48% with respect to an entire microstructure; and a fraction of the retained austenite is in the range of 2% to 7% with respect to an entire microstructure is produced.

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## Citation (search report)

- [A] EP 0586704 A1 19940316 - NIPPON STEEL CORP [JP]
- [A] EP 1001041 A1 20000517 - KAWASAKI STEEL CO [JP]
- [A] EP 0945522 A1 19990929 - KAWASAKI STEEL CO [JP]
- [A] PATENT ABSTRACTS OF JAPAN vol. 1997, no. 10 31 October 1997 (1997-10-31)
- [A] PATENT ABSTRACTS OF JAPAN vol. 2000, no. 25 12 April 2001 (2001-04-12)
- [A] PATENT ABSTRACTS OF JAPAN vol. 1999, no. 11 30 September 1999 (1999-09-30)
- [A] DATABASE COMPENDEX [online] ENGINEERING INFORMATION, INC., NEW YORK, NY, US; EVANS P J ET AL: "High strength C-Mn steels for automotive applications", XP002246411, Database accession no. EIX98214145887 & IRONMAKING STEELMAKING; IRONMAKING AND STEELMAKING 1997 INST OF MATERIALS, LONDON, ENGL, vol. 24, no. 5, 1997, pages 361 - 367, XP002246410

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