

Title (en)

STEEL MATERIAL HAVING EXCELLENT ROLLING FATIGUE CHARACTERISTICS

Title (de)

STAHLMATERIAL MIT HERVORRAGENDEN WALZERMÜDUNGSEIGENSCHAFTEN

Title (fr)

MATÉRIAU EN ACIER DOTÉ D'EXCELLENTE CARACTÉRISTIQUES DE FATIGUE DE ROULEMENT

Publication

**EP 3647451 A1 20200506 (EN)**

Application

**EP 18857159 A 20180913**

Priority

- JP 2017176163 A 20170913
- JP 2017176165 A 20170913
- JP 2017176161 A 20170913
- JP 2018034008 W 20180913

Abstract (en)

A steel material excellent in rolling fatigue property, the steel material including, in mass%: C: 0.10% to 1.50%, Si: 0.01% to 0.80%, Mn: 0.10% to 1.50%, Cr: 0.02% to 2.50%, Al: 0.002% to less than 0.010%, Ce + La + Nd: 0.0001% to 0.0025%, Mg: 0.0005% to 0.0050%, O: 0.0001% to 0.0020%, Ti: 0.000% to less than 0.005%, N: 0.0180% or less, P: 0.030% or less, S: 0.005% or less, Ca: 0.0000% to 0.0010%, V: 0.00 to 0.40%, Mo: 0.00 to 0.60%, Cu: 0.00 to 0.50%, Nb: 0.000 to less than 0.050%, Ni: 0.00 to 2.50%, Pb: 0.00 to 0.10%, Bi: 0.00 to 0.10%, B: 0.0000 to 0.0050%, and the balance being Fe and an impurity, wherein a fatigue-initiating inclusion detected by an ultrasonic fatigue test contains one or more of Ce, La, and Nd, and Mg, Al, and O, and a composition ratio in the fatigue-initiating inclusion satisfies Formula (1).

IPC 8 full level

**C22C 38/00** (2006.01); **C21C 7/06** (2006.01); **C22C 38/28** (2006.01); **C22C 38/60** (2006.01)

CPC (source: EP KR US)

**C21C 7/06** (2013.01 - KR); **C22C 38/001** (2013.01 - EP KR US); **C22C 38/002** (2013.01 - EP US); **C22C 38/005** (2013.01 - EP US); **C22C 38/02** (2013.01 - EP US); **C22C 38/04** (2013.01 - EP US); **C22C 38/06** (2013.01 - EP US); **C22C 38/08** (2013.01 - US); **C22C 38/18** (2013.01 - EP); **C22C 38/20** (2013.01 - EP US); **C22C 38/22** (2013.01 - EP US); **C22C 38/24** (2013.01 - EP US); **C22C 38/26** (2013.01 - EP US); **C22C 38/28** (2013.01 - EP US); **C22C 38/32** (2013.01 - EP US); **C22C 38/40** (2013.01 - EP); **C22C 38/42** (2013.01 - KR); **C22C 38/44** (2013.01 - KR); **C22C 38/50** (2013.01 - KR); **C22C 38/60** (2013.01 - EP KR US); **C21C 7/06** (2013.01 - EP US); **C21D 1/42** (2013.01 - US); **C21D 6/002** (2013.01 - US); **C21D 6/005** (2013.01 - US); **C21D 6/008** (2013.01 - US); **C21D 9/40** (2013.01 - EP)

Designated contracting state (EPC)

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**EP 3647451 A1 20200506**; **EP 3647451 A4 20201104**; CN 111065755 A 20200424; JP 6652226 B2 20200219; JP WO2019054448 A1 20200326; KR 20200044866 A 20200429; US 2020216937 A1 20200709; WO 2019054448 A1 20190321

DOCDB simple family (application)

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