

Title (en)
HIGH-STRENGTH STEEL MATERIAL HAVING EXCELLENT LOW-TEMPERATURE STRAIN AGING IMPACT PROPERTIES AND METHOD FOR MANUFACTURING SAME

Title (de)
HOCHFESTES STAHLMATERIAL MIT HERVORRAGENDEN TIEFTEMPÉRATURZÄHIGKEITSBEANSPRUCHUNGSEIGENSCHAFTEN SOWIE VERFAHREN ZUR HERSTELLUNG DAVON

Title (fr)
MATÉRIAU EN ACIER À HAUTE RÉSISTANCE AYANT D'EXCELLENTE PROPRIÉTÉS AU CHOC PAR VIEILLISSEMENT PAR CONTRAINTE À BASSE TEMPÉRATURE ET SON PROCÉDÉ DE FABRICATION

Publication
EP 3392367 B1 20211027 (EN)

Application
EP 16876051 A 20161215

Priority
• KR 20150178977 A 20151215
• KR 2016014734 W 20161215

Abstract (en)
[origin: EP3392367A1] The present invention relates to a steel material for pressure vessels, offshore structures and the like and, more specifically, to a high-strength steel material having excellent low-temperature strain aging impact properties and a method for manufacturing same, the high-strength steel material comprising 0.04-0.14 wt% of carbon (C), 0.05-0.60 wt% of silicon (Si), 0.6-1.8 wt% of manganese (Mn), 0.005-0.06 wt% of soluble aluminum (sol. Al), 0.005-0.05 wt% of niobium (Nb), 0.01 wt% or less (not including 0 wt%) of vanadium (V), 0.001-0.015 wt% of titanium (Ti), 0.01-0.4 wt% of copper (Cu), 0.01-0.6 wt% of nickel (Ni), 0.01-0.2 wt% of chromium (Cr), 0.001-0.3 wt% of molybdenum (Mo), 0.0002-0.0040 wt% of calcium (Ca), 0.001-0.006 wt% of nitrogen (N), 0.02 wt% or less (not including 0 wt%) of phosphorus (P), and 0.003 wt% or less (not including 0 wt%) of sulfur (S), with a balance of Fe and other inevitable impurities, and comprising a mixed structure of ferrite, pearlite, bainite and a martensite-austenite (MA) composite phase as a microstructure, wherein the fraction of the MA phase is 3.5% or less (not including 0%).

IPC 8 full level
C22C 38/02 (2006.01); **C21D 6/00** (2006.01); **C21D 8/02** (2006.01); **C21D 9/46** (2006.01); **C22C 38/00** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/42** (2006.01); **C22C 38/44** (2006.01); **C22C 38/46** (2006.01); **C22C 38/48** (2006.01); **C22C 38/50** (2006.01); **C22C 38/58** (2006.01)

CPC (source: EP US)
C21D 6/004 (2013.01 - EP US); **C21D 6/005** (2013.01 - EP US); **C21D 6/008** (2013.01 - EP US); **C21D 8/02** (2013.01 - EP US); **C21D 8/0205** (2013.01 - EP US); **C21D 8/0226** (2013.01 - EP US); **C21D 8/0263** (2013.01 - EP US); **C21D 9/46** (2013.01 - EP US); **C22C 38/00** (2013.01 - EP US); **C22C 38/001** (2013.01 - EP US); **C22C 38/002** (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 38/42** (2013.01 - EP US); **C22C 38/44** (2013.01 - EP US); **C22C 38/46** (2013.01 - EP US); **C22C 38/48** (2013.01 - EP US); **C22C 38/50** (2013.01 - EP US); **C22C 38/58** (2013.01 - EP US); **C21D 2211/002** (2013.01 - EP US); **C21D 2211/005** (2013.01 - EP US); **C21D 2211/009** (2013.01 - EP US)

Designated contracting state (EPC)
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)
EP 3392367 A1 20181024; **EP 3392367 A4 20190227**; **EP 3392367 B1 20211027**; CN 108368593 A 20180803; CN 108368593 B 20201002; JP 2019504187 A 20190214; JP 6616002 B2 20191204; KR 101758483 B1 20170717; KR 20170071639 A 20170626; US 2018363111 A1 20181220; US 2024110267 A1 20240404; WO 2017105109 A1 20170622

DOCDB simple family (application)
EP 16876051 A 20161215; CN 201680073003 A 20161215; JP 2018528629 A 20161215; KR 20150178977 A 20151215; KR 2016014734 W 20161215; US 201616061160 A 20161215; US 202318537245 A 20231212