

Title (en)

High thermal diffusivity and high wear resistance tool steel

Title (de)

Stahl mit grosser Verschleißfestigkeit und hohem thermischen Diffusionsvermögen

Title (fr)

Acier avec haute résistance à l'usure et haute diffusion thermique

Publication

EP 2476772 A1 20120718 (EN)

Application

EP 11382004 A 20110113

Priority

EP 11382004 A 20110113

Abstract (en)

A tool steel family with outstanding thermal diffusivity, hardness and wear resistance has been developed, also exhibiting good hardenability. Also its mechanical strength, as well as its yield strength, at ambient and high temperature (superior to 600°C) are high, due to a high alloying level in spite of the high thermal conductivity. Because of its high thermal conductivity and good toughness, steels of this invention have also good resistance to thermal fatigue and thermal shock. These steels are ideal for discontinuous processes where it is interesting to reduce cycle time and that require high hardness and/or wear resistance (plastic injection molding, other plastic forming processes and curing of thermosets, hot forming of sheet...). These tool steels are also appropriate for processes requiring high wear resistance and good resistance to thermal fatigue (forging, hot stamping, light-alloy injection...).

IPC 8 full level

C22C 38/12 (2006.01); **C21D 6/00** (2006.01); **C22C 38/22** (2006.01); **C22C 38/24** (2006.01); **C22C 38/44** (2006.01)

CPC (source: EP KR US)

C21D 1/22 (2013.01 - EP US); **C21D 1/25** (2013.01 - EP US); **C21D 6/00** (2013.01 - KR); **C21D 6/001** (2013.01 - EP US); **C21D 6/002** (2013.01 - EP US); **C21D 6/005** (2013.01 - EP US); **C21D 6/008** (2013.01 - EP US); **C22C 38/02** (2013.01 - US); **C22C 38/04** (2013.01 - US); **C22C 38/06** (2013.01 - US); **C22C 38/08** (2013.01 - US); **C22C 38/12** (2013.01 - EP KR US); **C22C 38/14** (2013.01 - US); **C22C 38/22** (2013.01 - EP KR US); **C22C 38/24** (2013.01 - EP KR US); **C22C 38/26** (2013.01 - US); **C22C 38/28** (2013.01 - US); **C22C 38/44** (2013.01 - KR US); **C22C 38/46** (2013.01 - US); **C21D 9/18** (2013.01 - EP US); **C21D 9/22** (2013.01 - EP US); **C21D 2211/002** (2013.01 - EP US); **C21D 2211/004** (2013.01 - EP US); **C21D 2211/008** (2013.01 - EP US)

Citation (applicant)

- EP 1887096 A1 20080213 - ROVALMA SA [ES]
- EP 2236639 A1 20101006 - ROVALMA SA [ES], et al
- JP 4147706 B2 20080910

Citation (search report)

- [X] EP 1887096 A1 20080213 - ROVALMA SA [ES]
- [X] WO 2004046407 A1 20040603 - LEE IL-KYU [KR]
- [X] JP H11222650 A 19990817 - NIPPON KOSHUHA STEEL CO LTD, et al
- [X] JP H04147706 A 19920521 - KAWASAKI STEEL CO
- [X] EP 2236639 A1 20101006 - ROVALMA SA [ES], et al

Citation (third parties)

Third party :

- EP 1887096 A1 20080213 - ROVALMA SA [ES]
- JP H11222650 A 19990817 - NIPPON KOSHUHA STEEL CO LTD, et al
- WO 2008084108 A1 20080717 - ROVALMA SA [ES], et al
- WO 2008017341 A1 20080214 - ROVALMA SA [ES], et al
- JP S63282241 A 19881118 - KAWASAKI STEEL CO
- WO 2010112319 A1 20101007 - ROVALMA SA [ES], et al

Cited by

EA022421B1; CN102899586A; CN106148651A; CN104745955A; CN102899585A; CN103060683A; EA026543B1; CN113528937A; CN106191689A; CN111647796A; CN105908102A; CN110541108A; CN103741046A; CN104313502A; CN105886933A; CN111647798A; EP4219783A1; WO2017025397A1; WO2014131907A1; WO2015140235A1

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

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

EP 2476772 A1 20120718; CA 2824238 A1 20120719; EP 2663664 A1 20131120; EP 3330401 A1 20180606; JP 2014508218 A 20140403; KR 20140004718 A 20140113; MX 2013008138 A 20131007; US 2014000770 A1 20140102; WO 2012095532 A1 20120719

DOCDB simple family (application)

EP 11382004 A 20110113; CA 2824238 A 20120113; EP 12700396 A 20120113; EP 17166724 A 20120113; EP 2012050531 W 20120113; JP 2013548855 A 20120113; KR 20137021412 A 20120113; MX 2013008138 A 20120113; US 201213978782 A 20120113