Title (en)

Powder metallurgy tool steel.

Title (de)

Pulvermetallurgische Werkzeugstähle.

Title (fr)

Acier à outils obtenu par métallurgie des poudres.

Publication

EP 0467857 A1 19920122 (EN)

Application

EP 91830235 A 19910530

Priority

IT 4815090 A 19900717

Abstract (en)

A new composition for powder-metallurgy (PM) tool steel, characterized by the absence of Co, reduction of W content and increase in Mo and V contents id disclosed. The steel contains (wt%) , C from 1,50 to 1.85, Mn from 0,20 to 0.55, Si from 0.35 to 0.70, W from 1.50 to 3.00, Mo from 8.00 to 9.50, V from 5.50 to 6.50, and Cr from 3-00 to 5.00, the remainder being iron and minor impurities. The powder used in the manufacturing process is obtained by atomization in a gas which may be nitrogen or argon, the ensuing particles being spherical in shape, 80% of them being smaller than 500 mu m. The manufacturing process comprises the following steps: cooling during powder solidification at a rate between 1000 and 10000 DEG C/s hot isostatic pressing to obtain a semifinished piece transformation of the semi into the desired product heating of the product in a salt-bath at a temperature between 1160 and 1200 DEG C for between 3 and 10 minutes hardening in a salt-bath at a temperature between 450 and 600 DEG C followed by cooling to room temperature series of three successive temperings at temperatures between 530 and 560 DEG C, between 540 and 570 DEG C, and again between 530 and 560 DEG C, each for between one and two hours. The tool steel, obtained in this way, contains precipited carbides of the M2C-MC type measuring less than 3.5 mu m and a volume fraction between 13 and 18%.

IPC 1-7

C22C 33/02

IPC 8 full level

C22C 33/02 (2006.01)

CPC (source: EP)

C22C 33/0278 (2013.01); **C22C 33/0292** (2013.01)

Citation (search report)

- [A] EP 0076326 A1 19830413 - FURUKAWA ELECTRIC CO LTD [JP], et al
- [A] US 4880461 A 19891114 - UCHIDA NORIMASA [JP]
- [A] US 4276087 A 19810630 - HASWELL WALTER T, et al
- [A] US 4249945 A 19810210 - HASWELL WALTER T [US], et al
- [A] US 3117863 A 19640114 - ROBERTS GEORGE A, et al
- [A] STAHL UND EISEN, vol. 110, no. 1, 15th January 1990, pages 93-103; S. WILMES: "Pulvermetallurgische Werkzeugstähle - Herstellung, Eigenschaften und Anwendung"

Cited by

US5578773A; AT411580B; CN103814145A; EP0814172A1; US6015446A; WO9748829A1; WO9302819A1; WO9302821A1; US10472704B2; KR100270453B1; WO9302820A1; WO2015160302A1

Designated contracting state (EPC)

AT BE CH DE DK ES FR GB GR LI LU NL SE

DOCDB simple family (publication)

EP 0467857 A1 19920122; **EP 0467857 B1 19960306**; AT E135056 T1 19960315; DE 69117605 D1 19960411; DE 69117605 T2 19960926; DK 0467857 T3 19960520; ES 2085457 T3 19960601; GR 3019999 T3 19960831; IT 1241490 B 19940117; IT 9048150 A0 19900717; IT 9048150 A1 19920117

DOCDB simple family (application)

EP 91830235 A 19910530; AT 91830235 T 19910530; DE 69117605 T 19910530; DK 91830235 T 19910530; ES 91830235 T 19910530; GR 960401374 T 19960521; IT 4815090 A 19900717