Title (en)

Steel and process for forming a steel article by cold plastic working

Title (de)

Stahl und Verfahren zur Formung eines Stahlwerkstückes durch kalte plastische Verarbeitung

Title (fr)

Acier et procédé pour la fabrication d'une piéce en acier mise en forme par déformation plastique à froid

Publication

EP 0851038 A1 19980701 (FR)

Application

EP 97402978 A 19971210

Priority

FR 9616254 A 19961231

Abstract (en)

Steel contains by weight 0.03-0.16% carbon, 0.5-2% manganese, 0.05-0.5% silicon, 0-1.8% chromium, 0-0.25% molybdenum, 0.001-0.05% aluminium, 0.001-0.05% titanium, 0-0.15% vanadium, 0.0005-0.005% boron, 0.004-0.012% nitrogen and 0.001-0.09% sulphur, optionally also up to 0.005% calcium, 0.01% tellurium, 0.04% selenium and 0.3% lead and the rest iron and impurities. Proportions are governed by the following: Mn +0.9 Cr+1.3 Mo+1.6 V=at least 2.2%, and Al+Ti=at least 3.5 N. Also claimed are a hot-rolled semi-product of the steel with a bainitic structure and processes wherein pieces of the steel are hot-rolled, cut to size and then cold-formed, a bainitic structure being conferred by heating above 940 deg. C and quenching, either during and after hot-rolling or after cold-forming, also pieces of steel so formed.

Abstract (fr)

Acier pour la fabrication d'une pièce en acier mise en forme par déformation plastique à froid, dont la composition chimique comprend, en poids: 0,03 % <= C <= 0,16 % ; 0,5 % <= Mn <= 2 % ; 0,05 % <= Si <= 0,5 % ; 0 % <= Cr <= 1,8 % ; 0 % <= Mo <= 0,25 % ; 0,001 % <= Al <= 0,05 % ; 0,001 % <= Ti <= 0,05 % ; 0 % <= V <=0,15 % ; 0,0005 %<= B <= 0,005 % ; 0,004 % <= N <= 0,012 % ; 0,001 % <= S <= 0,09 % ; éventuellement jusqu'à 0,005 % de calcium, jusqu'à 0,01 % de tellure, jusqu'à 0,04 % de sélénium, jusqu'à 0,3 % de plomb ; le reste étant du fer et des impuretés résultant de l'élaboration, la composition chimique de l'acier satisfaisant, en outre les relations : Mn + 0,9 x Cr +1,3 x Mo + 1,6 x V >= 2,2 % et Al + Ti >= 3,5 x N. Procédé pour la fabrication d'une pièce en acier mise en forme par déformation plastique à froid et pièce obtenue.

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IPC 8 full level

C21D 7/02 (2006.01); **C21D 8/00** (2006.01); **C21D 8/02** (2006.01); **C22C 38/00** (2006.01); **C22C 38/14** (2006.01); **C22C 38/32** (2006.01); **C22C 38/38** (2006.01); **C22C 38/60** (2006.01); C21D 8/06 (2006.01)

IPC 8 main group level

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CPC (source: EP US)

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