

Title (en)
Steel and process for manufacturing of workpieces with high abrasion resistance

Title (de)
Stahl und Verfahren zur Herstellung von Bauteile mit hohe Abriebfestigkeit

Title (fr)
Acier et procédé pour la fabrication de pièces à haute résistance à l'abrasion

Publication
EP 0739993 A1 19961030 (FR)

Application
EP 96400737 A 19960405

Priority
FR 9505016 A 19950427

Abstract (en)
An abrasion-resistant steel contains (by wt.%) 0.24-0.3 (pref. 0.24-0.27) C, 0-2 (pref. 0-1 Si) 0-2 (pref. 0-1) Al, 0-2 (pref. 0.3-1.6) Mn, 0-4 (pref. 0-2) Ni, 0-3 (pref. 0.5-1.8) Cr, 0-0.6 Mo and 0-1.2 W. The steel may also contain 0.005-0.005% B, at least one of Nb, V, Zr and Ti in amt. less than 0.3% and at least one of Se, Te, Ca, Bi and Pb in amt. below 0.1%, the rest being Fe. The following relationships also apply, $4.6C + 1.05Mn + 0.54Ni + 0.66(Mo + W/2) + 0.5Cr + k \geq 1.6$, where $k = 0$ if the steel contains less than 0.0005% B and $k = 0.5$ if the steel contains more than 0.0005% B and $0.6\% \leq (Al+Si) \leq 2\%$. To improve their abrasion resistance sheets of the steel are heated to above austenisation temp. (e.g. 900 degrees C) then cooled to 450 degrees C at more than 1 degrees C/s, further cooled to 200 degrees C over 50 s to 60 minutes (pref. 100 s to 30 minutes) and finally returned to ambient (below 250 degrees C) in less than 3 h. This gives the steel a martensitic or martensitic-bainitic structure contg. 5-15% austenite and a hardness of 400-500 HB.

Abstract (fr)
Acier pour la fabrication de pièces à haute résistance à l'abrasion dont la composition chimique comprend, en poids: $0,24\% \leq C \leq 0,3\%$, $0\% \leq Si \leq 2\%$, $0\% \leq Al \leq 2\%$, $0\% \leq Mn \leq 2\%$, $0\% \leq Ni \leq 4\%$, $0\% \leq Cr \leq 3\%$, $0\% \leq Mo \leq 0,6\%$, $0\% \leq W \leq 1,2\%$, éventuellement de 0,0005% à 0,005% de bore, éventuellement au moins un élément pris parmi Nb, V, Zr et Ti, en des teneurs inférieures à 0,3%, éventuellement au moins un élément pris parmi Se, Te, Ca, Bi et Pb en des teneurs inférieures à 0,1%, le reste étant du fer et des impuretés résultant de l'élaboration; la composition chimique satisfaisant en outre les relations suivantes: $0,6\% \leq Al+Si \leq 2\%$ et $4,6xC + 1,05xMn + 0,54xNi + 0,66x(Mo+W/2) + 0,5xCr+K \geq 1,6$, avec $K = 0$ si l'acier contient moins de 0,0005% de bore et $K = 0,5$ si l'acier contient plus de 0,0005% de bore. Procédé de fabrication d'une pièce et utilisation.

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