

Title (en)

Method for manufacturing a steel part by hot forming and steel part manufactured by hot forming

Title (de)

Verfahren zum Herstellen eines Stahlbauteils durch Warmformen und durch Warmformen hergestelltes Stahlbauteil

Title (fr)

Procédé de fabrication d'un composant en acier par façonnage à chaud et composant en acier fabriqué par façonnage à chaud

Publication

EP 2045360 B1 20111130 (DE)

Application

EP 07117719 A 20071002

Priority

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Abstract (en)

[origin: EP2045360A1] A low-alloy, sheet steel which can be hardened, is coated with metal containing at least 85 wt% aluminum and up to 15 wt % Si. A zinc coating is then added, containing at least 90 wt% Zn. The material is heated to at least 750[deg] C prior to thermal deformation. The flat product is then thermo-formed to make the steel component. To produce the hardened structure, it is cooled at a sufficiently rapid rate. The hot deformation temperature is preferably 850-900[deg] C. The aluminum coating is added by hot dip aluminization. It contains 5-12 wt% silicon. The zinc is coated onto the aluminum layer electrolytically. It contains at least 99 wt% Zn. It is alternatively coated by physical vapor deposition. In the zinc coating, one or more of Al, Mg and Si are contained. Before zinc coating, the aluminum-coated steel is given a rolled finish. It is pickled before zinc coating. Both coatings take place continuously, in successive processes. Alternatively, successive batch processes are used. Hot deformation takes place in one or more stages. This is optionally preceded by cold deformation. Before heating, the aluminum coating has a thickness of 5-25 mu m. Before heating, a 2-5 mu m thick alloying boundary layer containing Al, Si and Fe is provided between the steel and the aluminum. The total thickness of the coating on the steel before heating, is 7-35 mu m. The base layer coating on the steel is predominantly aluminum, containing Fe, Zn and Si. This is coated with a layer of metal predominantly comprising zinc, which contains Al, Si and Fe. The base layer contains at least: 30 wt% Al, 20 wt% Fe and 3 wt% Si. The outer covering layer contains at least: 60 wt% Zn, 5 wt% Al. It also includes up to: 10 wt% Fe and 10 wt% Si. The base layer thickness is 15-25 mu m. The covering layer thickness is 3-10 mu m. The sheet steel product is produced from manganese-boron steel. An independent claim IS INCLUDED FOR the corresponding steel component.

IPC 8 full level

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CPC (source: EP US)

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Cited by

WO2023202765A1; WO2018153755A1; CN111334775A; DE102012214274B4; RU2729674C1; CN106795613A; EP4071273A4; CN107250414A; RU2686164C2; US9677145B2; WO2011054571A1; WO2013000458A3; US10669603B2; US11692234B2; US10287647B2; US11613791B2; WO2016132165A1; WO2016132194A1; WO2015036151A1; EP2233598B1

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