

Title (en)
STEEL MATERIAL FOR FORMING COMPONENTS USING ADDITIVE MANUFACTURING AND USE OF A STEEL MATERIAL OF THIS TYPE

Title (de)
STAHLMATERIAL ZUM FORMEN VON BAUTEILEN DURCH ADDITIVE FERTIGUNG UND VERWENDUNG EINES SOLCHEN STAHLMATERIALS

Title (fr)
MATÉRIAU À BASE D'ACIER CONÇU POUR FORMER DES PIÈCES PAR FABRICATION ADDITIVE ET UTILISATION DE CE MATÉRIAU À BASE D'ACIER

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Application
EP 21729569 A 20210602

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Abstract (en)
[origin: WO2021245158A1] The invention relates to a steel material which allows for components to be formed with low residual stress via additive manufacturing without pre- or post-heating. The steel material consists of a steel with the following composition, in wt.-%: C: 0.28 - 0.65 %, Co: < 10.0, Cr: 3.5 - 12.5 %, optionally Mo: 0.5 - 12.5 %, wherein the sum of the content of Cr and Mo is 4 - 16 %, the Ni equivalent Ni_{eq} calculated according to the formula $Ni_{eq} [\%] = 30 \%C + \%Ni + 0.5 \%Mn$ from the C-content %C, the Ni-content %Ni, the Mn-content %Mn fulfills the condition (1) $10 \% \leq Ni_{eq} \leq 20 \%$, and alongside C, optionally respectively up to 9% Mn and up to 4.5% Ni are provided to fulfill condition (1), wherein the Cr equivalent Cr_{eq} calculated according to the formula $Cr_{eq} [mass] = \%Cr + \%Mo + 1.5 \%S + 0.5 \%Nb + 2 \%XX$ from the Cr-content Cr%, the Mo-content Mo%, the Si-content Si%, the Nb-content %Nb and the sum %XX of the contents of at least one element of the group "Sc, Y, Ti, Zr, Hf, V, Ta" fulfills the condition (2) $4 \% \leq Cr_{eq} \leq 16 \%$, and optionally respectively up to 2% Si, up to 2% Nb or at least one element from the group "Sc, Y, Ti, Zr, Hf, V, Ta" are provided to fulfill condition (2), wherein the total proportion of elements of this group is at most equal to the mass fraction of 2%, which Ti must not exceed if Ti is the only element selected from the group consisting of "Sc, Y, Ti, Zr, Hf, V, Ta", and wherein the rest of the steel consists of Fe and < 0.5 % impurities, including $\leq 0.025 \% P$ and $50.025 \% S$. The steel material is suited, in particular as a powder, for LPBF or LMD methods and as wire for the WAAM method.

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