Title (en)

A PROCESS FOR MANUFACTURING A MARTENSITIC STAINLESS STEEL PART FROM A SHEET

Title (de)

VERFAHREN ZUR HERSTELLUNG EINES MARTENSITISCHEN ROSTFREIEN STAHLTEILS AUS EINEM BLECH

Title (fr)

PROCÉDÉ DE FABRICATION D'UNE PIÈCE EN ACIER INOXYDABLE MARTENSITIQUE À PARTIR D'UNE TÔLE

Publication

EP 3445878 A1 20190227 (FR)

Application

EP 17713465 A 20170321

Priority

- IB 2016052302 W 20160422
- IB 2017051636 W 20170321

Abstract (en)

[origin: WO2017182896A1] Process for manufacturing a martensitic stainless steel part, according to which a stainless steel sheet is prepared having the composition: 0.005% ≤ C ≤ 0.3%; 0.2% ≤ Mn ≤ 2.0%; traces ≤ Si ≤ 1.0%; traces ≤ S ≤ 0.01%; traces ≤ P ≤ 0.04%; 10.5% ≤Cr ≤ 7.0%; traces ≤ Ni ≤ 4.0%; traces ≤ Mo ≤ 2.0%; Mo + 2 x W ≤ 2.0%; traces ≤ Cu ≤ 3%; traces ≤ Ti ≤ 0.5%; traces ≤ Al ≤ 0.2%; traces ≤ O ≤ 0.04%; 0.05% ≤ Nb ≤ 1.0%; 0.05% ≤ Nb + Ta ≤ 1.0%; 0.25% ≤ (Nb + Ta)/(C + N) ≤ 8; traces ≤ V ≤ 0.3%; traces ≤ Co ≤ 0.5%; traces ≤ Cu +Ni + Co ≤ 5.0%; traces ≤ Sn ≤ 0.05%; traces ≤ B ≤ 0.1%; traces ≤ Zr ≤ 0.5%; Ti + V + Zr ≤ 0.5%; traces ≤ H ≤ 5 ppm; traces ≤ N ≤ 0.2%; (Mn + Ni) ≥ (Cr - 0.3 – 80 x [(C + N)^2]); traces ≤ Ca ≤ 0.002%; traces ≤ rare earth elements and/or Y ≤ 0.06%; the remainder being iron and impurities; the temperature Ms being ≥ 200°C; the temperature Mf being ≥ -50°C; the microstructure being composed of ferrite and/or tempered martensite and from 0.5% to 5% by volume of carbides; the size of the ferritic grains being from 1 to 80 µm; an austenization is carried out, in order to obtain a microstructure containing at most 0.5% of carbides and at most 20% of residual ferrite; the sheet is transferred to a first shaping tool, the sheet remaining at a temperature above Ms and retaining at most 0.5% of carbides and at most 20% of residual ferrite; a first shaping or cutting step is carried out, the sheet remaining at a temperature above Ms and retaining at most 0.5% of carbides and at most 20% of residual ferrite; the sheet is transferred to a second shaping tool; a second shaping step is carried out during which the sheet remains at a temperature above Ms and retains at most 0.5% of carbides and at most 20% of residual ferrite; - if TPn is the temperature reached by the sheet at the end of the last shaping step and Σti is the sum of the durations of the transfer and shaping steps, (TP0-TPn)/Σti is at least 0.5°C/s; - and the sheet is left to cool into a final part having a microstructure containing at most 0.5% of carbides and at most 20% of residual ferrite.

IPC 8 full level

C21D 6/00 (2006.01); **C21D 1/673** (2006.01); **C21D 7/13** (2006.01); **C22C 38/00** (2006.01); **C22C 38/20** (2006.01); **C22C 38/22** (2006.01); **C22C 38/24** (2006.01); **C22C 38/26** (2006.01); **C22C 38/28** (2006.01); **C22C 38/30** (2006.01); **C22C 38/32** (2006.01); **C22C 38/38** (2006.01)

CPC (source: EP KR RU US)

C21D 1/673 (2013.01 - EP KR US); **C21D 6/00** (2013.01 - RU); **C21D 6/002** (2013.01 - EP KR US); **C21D 6/004** (2013.01 - EP KR US); **C21D 6/005** (2013.01 - EP KR US); **C21D 6/007** (2013.01 - EP US); **C21D 6/008** (2013.01 - EP US); **C21D 7/13** (2013.01 - EP KR US); **C21D 8/00** (2013.01 - RU); **C22C 38/001** (2013.01 - EP US); **C22C 38/002** (2013.01 - EP US); **C22C 38/004** (2013.01 - US); **C22C 38/005** (2013.01 - EP US); **C22C 38/008** (2013.01 - EP US); **C22C 38/02** (2013.01 - EP KR US); **C22C 38/04** (2013.01 - EP US); **C22C 38/06** (2013.01 - EP US); **C22C 38/26** (2013.01 - RU); **C22C 38/28** (2013.01 - RU); **C22C 38/30** (2013.01 - RU); **C22C 38/32** (2013.01 - RU); **C22C 38/38** (2013.01 - RU); **C22C 38/40** (2013.01 - RU); **C22C 38/42** (2013.01 - EP KR US); **C22C 38/44** (2013.01 - EP KR US); **C22C 38/46** (2013.01 - EP US); **C22C 38/48** (2013.01 - EP KR US); **C22C 38/50** (2013.01 - EP KR US); **C22C 38/52** (2013.01 - EP US); **C22C 38/54** (2013.01 - EP US); **C22C 38/58** (2013.01 - KR); C21D 2211/004 (2013.01 - EP KR US); C21D 2211/005 (2013.01 - EP KR US); C21D 2211/008 (2013.01 - EP KR US)

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See references of WO 2017182896A1

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