

Title (en)
Process for manufacturing grain-oriented magnetic steel spring

Title (de)
Verfahren zur Herstellung von kornorientiertem Elektroband

Title (fr)
Procédé de fabrication de bande d'acier magnétique à grains orientés

Publication
EP 1752549 B1 20160120 (DE)

Application
EP 05016835 A 20050803

Priority
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Abstract (en)
[origin: EP1752549A1] A method for the production of grain-oriented electric steel strip by continuous thin-slab casting, involves a continuous hot-rolling stage on a line-mounted multiple-stand milling train at 900-1200[deg]C, with reductions of more than 40% in the first pass and not more than 30% in the last pass and with rolling in the two-phase mixture range in at least the second and third passes.. A method for the production of grain-oriented electric steel strip based on a continuous thin-slab casting process, involves (a) melting steel containing (apart from iron and unavoidable impurities) 2.5-4.0 wt% silicon, 0.02-0.10 wt% carbon, 0.01-0.065 wt% aluminum, 0.003-0.015 wt% nitrogen, and optionally up to 0.30 wt% manganese, up to 0.05 wt% titanium, up to 0.3 wt% phosphorus, not more than 0.04 wt% sulfur and/or selenium (total), up to 0.2 wt% (each) of one or more of the elements arsenic, tin, antimony, tellurium or bismuth, up to 0.5 wt% (each) of one or more of the elements copper, nickel, chromium, cobalt or molybdenum and up to 0.012 wt% (each) of one or more of the elements boron, vanadium or niobium, (b) secondary metallurgical processing of the melt in a vacuum unit and/or a pan furnace, (c) continuous casting to form a strip, (d) cutting the strip into thin slabs, (e) heating to 1050-1300[deg]C for not more than 60 minutes in an in-line furnace, (f) continuous hot-rolling in a line-mounted multiple stand mill train to give rolled strip with a thickness of 0.5-4.0 mm, using a temperature of 900-1200[deg]C for the first pass with a reduction of more than 40%, rolling in the two-phase mixture range (alpha - gamma) in at least the next two passes and with a reduction of not more than 30% in the last pass, (g) cooling the strip, (h) rolling the strip into a coil, (i) optionally annealing the strip after coiling or before cold-rolling, (j) cold-rolling to cold-rolled strip with a final thickness of 0.15-0.50 mm, (k) annealing with recrystallisation and decarbonisation, (l) treating the strip surface with a scale separator, (m) final annealing to develop a Goss structure, (n) optional coating with electrical insulation followed by stress-relieving annealing and (o) optional domain refinement.

IPC 8 full level
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CPC (source: EP KR US)
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Citation (examination)
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• "Grain-oriented Silicon Electrical Steel From Italy and Japan", US INTERNATIONAL TRADE COMMISSION, 1 May 1994 (1994-05-01), us, pages ii-3 - ii-8

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