

Title (en)
PROCESS FOR PRODUCING A GRAIN-ORIENTATED ELECTRICAL STEEL SHEET

Title (de)
VERFAHREN ZUR HERSTELLUNG VON KORNIORIENTIERTEM ELEKTROBLECH

Title (fr)
PROCEDE POUR PRODUIRE UNE TOLE ELECTRIQUE A GRAINS ORIENTES

Publication
EP 0910676 A1 19990428 (DE)

Application
EP 97930498 A 19970703

Priority
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Abstract (en)
[origin: US6153019A] PCT No. PCT/EP97/03510 Sec. 371 Date Oct. 26, 1998 Sec. 102(e) Date Oct. 26, 1998 PCT Filed Jul. 3, 1997 PCT Pub. No. WO98/02591 PCT Pub. Date Jan. 22, 1998A process for producing a grain-oriented magnetic steel sheet in which a slab, made from a steel containing (in mass %) more than 0.005 to 0.10% C, 2.5 to 4.5% Si, 0.03 to 0.15% Mn, more than 0.01 to 0.05% S, 0.01 to 0.035% Al, 0.0045 to 0.012% N, 0.02 to 0.3% Cu, the remainder being Fe, including unavoidable impurities, is heated through and hot rolled to a final thickness between 1.5 and 7.0 mm. The hot strip is annealed and immediately cooled and cold rolled in one or several cold-rolling steps to the final thickness of the cold strip. The cold strip is subjected to a recrystallizing annealing process in a humid atmosphere containing hydrogen and nitrogen, with synchronous decarburization. A non-stick layer, essentially containing MgO, is applied to the surface of the decarburized cold strip which is then subjected to final annealing. The cold strip is then rolled into coils.

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C21D 8/12; **C22C 38/02**

IPC 8 full level
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CPC (source: EP US)
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Cited by
DE102011107304A1; DE102011119395A1; WO2013004747A1; WO2012168253A1

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