

Heat-Proof Domain -Refined Grain -Oriented Electrical Steel

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Synopsis :

A heat-proof domain -refined grain -oriented electrical steel (RGHPD) has recently been developed, which is characterized by an introduction of linear grooves on the surface of the steel sheet after final cold rolling. The iron loss of the new materials is reduced by about 10% as compared with non-grooved materials. Using this material, the iron loss of wound core transformers is reduced by about 10%. This material can also be used for stacked core transformers and is expected to make a major contribution to energy conservation.

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1000 S. EAST ASIAN BLDG. CHICAGO, IL 60607

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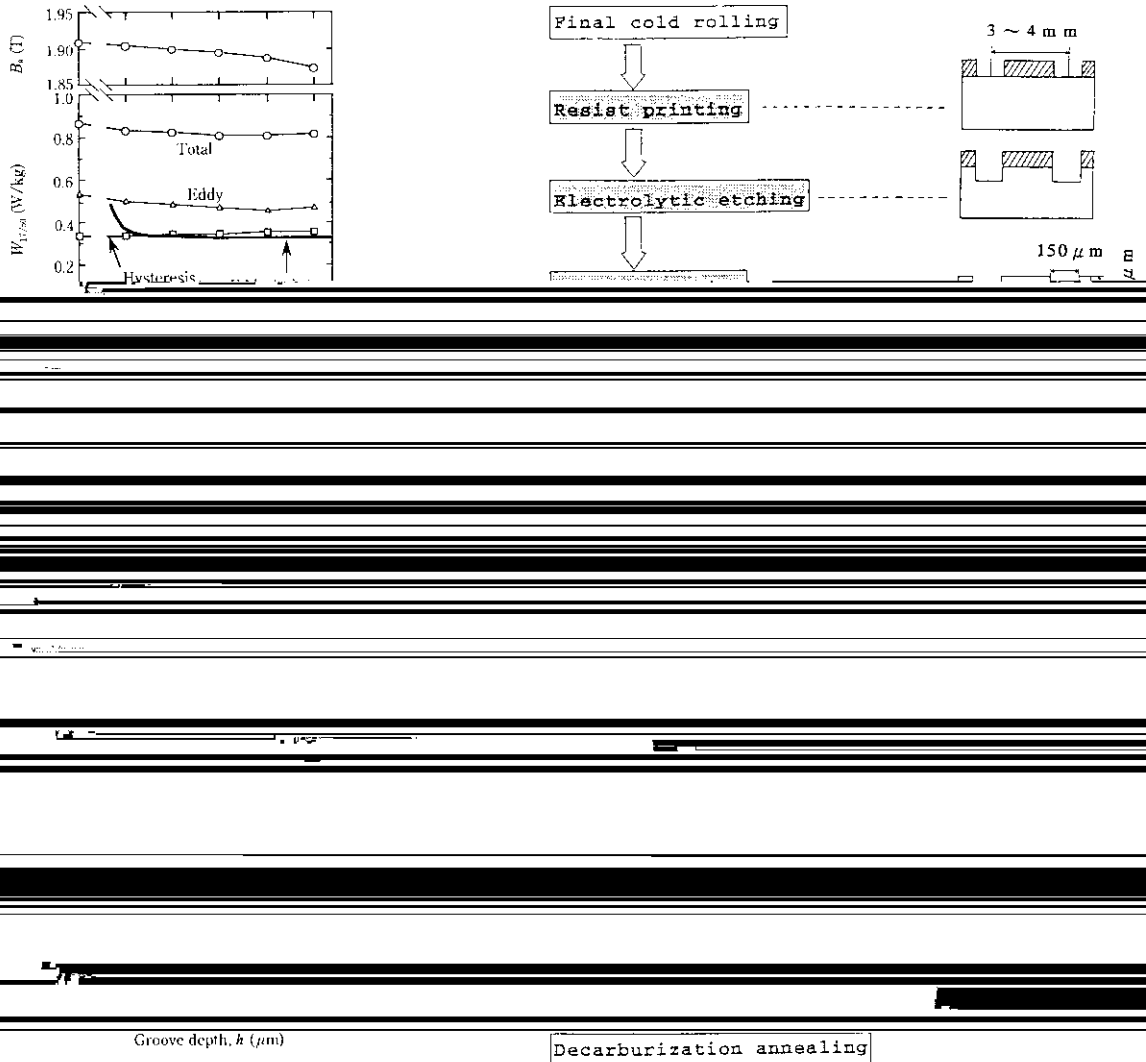
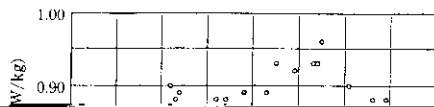


Fig. 4 Dependence of magnetic flux density B_8 and iron loss W_{150} on the groove depth h (The solid line calculated; the



Photo 1 Cross-sectional view of the grooved region of a steel surface after final annealing



Before domain
retained



化が速く進行するため、全体で見れば磁化の遅れはなく、1.7T あたりまでは励磁特性は非処理材と変わらないものと考えられる。1.7T 程度で非処理面側の磁束密度は飽和に達し、それ以上では磁

Table 1 Magnetic properties of wound-core transformers (0.23 mm in thickness)

No.	Core type	Magnetic flux density (T) at H=5000 A/m	Magnetic flux density (T) at H=10000 A/m	Core loss (W/kg) at H=5000 A/m, 50 Hz	Core loss (W/kg) at H=10000 A/m, 50 Hz
1	Wound core	1.95	2.25	1.2	2.8
2	Wound core	1.95	2.25	1.2	2.8
3	Wound core	1.95	2.25	1.2	2.8
4	Wound core	1.95	2.25	1.2	2.8
5	Wound core	1.95	2.25	1.2	2.8
6	Wound core	1.95	2.25	1.2	2.8
7	Wound core	1.95	2.25	1.2	2.8
8	Wound core	1.95	2.25	1.2	2.8
9	Wound core	1.95	2.25	1.2	2.8
10	Wound core	1.95	2.25	1.2	2.8
11	Wound core	1.95	2.25	1.2	2.8
12	Wound core	1.95	2.25	1.2	2.8
13	Wound core	1.95	2.25	1.2	2.8
14	Wound core	1.95	2.25	1.2	2.8
15	Wound core	1.95	2.25	1.2	2.8
16	Wound core	1.95	2.25	1.2	2.8
17	Wound core	1.95	2.25	1.2	2.8
18	Wound core	1.95	2.25	1.2	2.8
19	Wound core	1.95	2.25	1.2	2.8
20	Wound core	1.95	2.25	1.2	2.8