Non-oriented Silicon Steel Sheet "RM7" Newly Developed with Extremely Low Core Loss

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Synopsis :

In recent years, techniques of producing clean steel have progressed markedly. As a result, development of non-oriented silicon steel sheet with low core loss has been achieved in Kawasaki Steel Corporation, and the manufacture of RM7 (maximum core loss W15/50; 2.50 W/kg at thickness 0.50 mm) has become possible. RM7 is suitable to core materials for large rotating machines, such as generators, and for various static induction apparatus, and meets the needs of

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## 1 Introduction

The manufacturing techniques of silicon steel

## 2 Factors Which Affect Core Loss

Core loss

Core loss $= W_e + W_h$
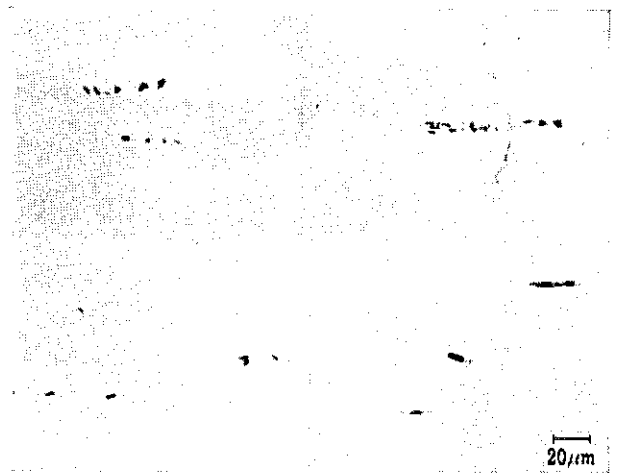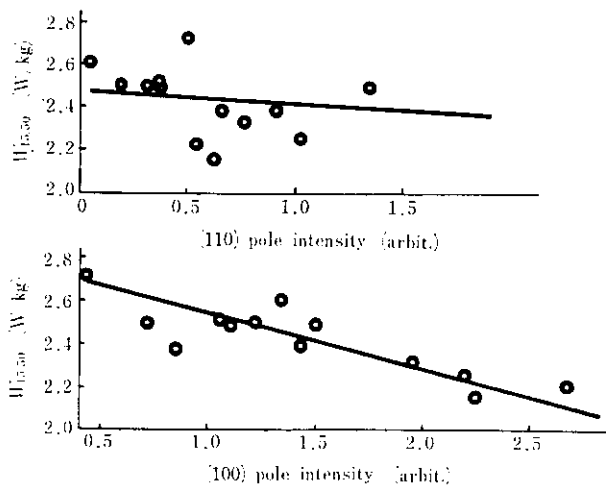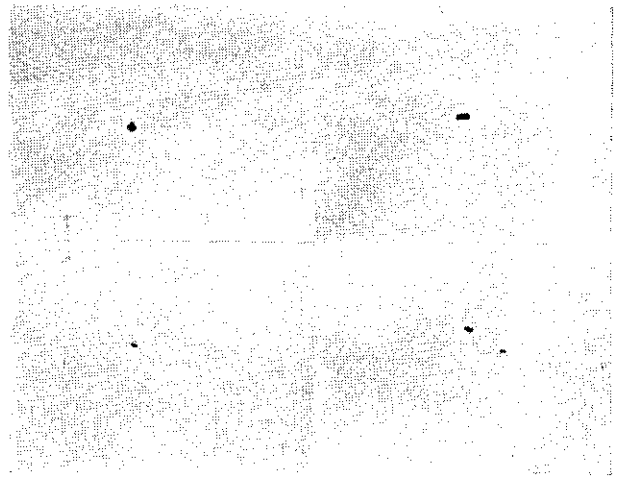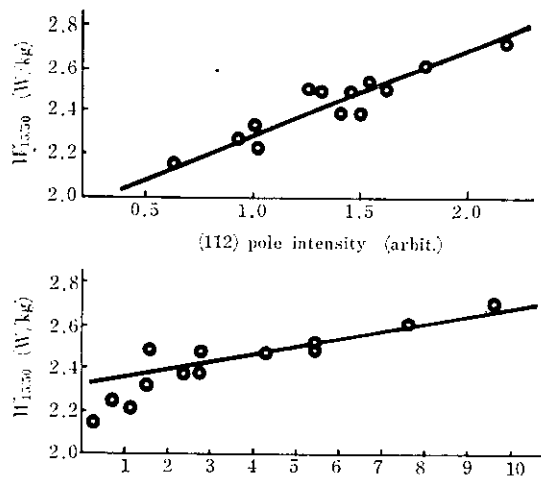
$W_h$

$W_e$

dia.$(\mu m)$

200

150
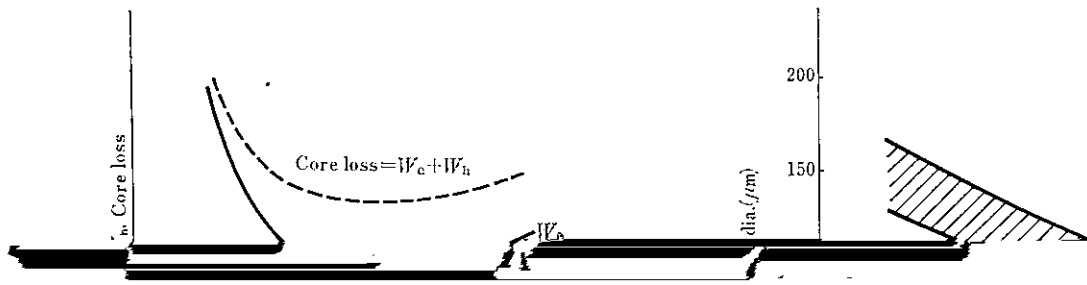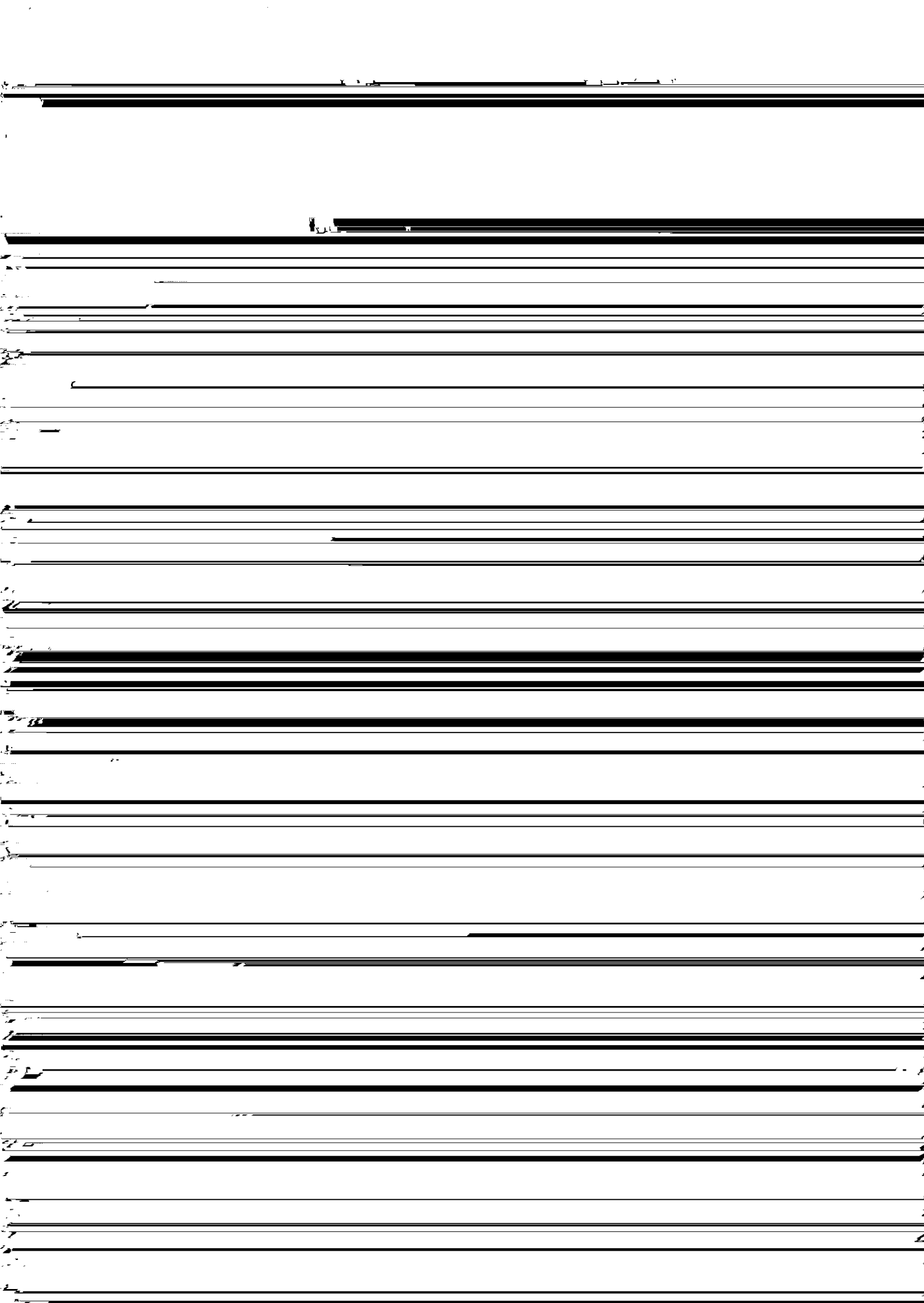
**Fig. 4** Relationship between pole intensity and core loss ($W_{15/50}$, 0.50 mm)

Sample B

**Photo 4** Inclusions in the specimen observed with an optical microscope

magnetic properties of silicon steel is greatly dependent

Table 1 An example of chemical composition

structure and becomes "1" for a random texture. It

is found in the figure that the core loss is affected by the pole intensity of (100), (112) and (111) planes. When the pole intensity of (100) plane is stronger, core loss becomes lower, whereas when that of the (112) and (111) planes are stronger, core loss becomes higher.

The texture is greatly affected by the reduction in cold rolling and also by the quantity of inclusions in steel. For example, sample A includes a small quantity of inclusions and sample B includes a large quantity of them, as shown in Photo 4. Photo 5 shows these

| C | Si | Mn | S | Al | O | N |
|---|---|---|---|---|---|---|
| 0.002 | 3.28 | 0.23 | 0.0003 | 0.608 | 0.0007 | 0.0014 |

is particularly important from the compositional point of view.

In regard to the converter operation, new converters such as Q-BOP, LD-KG and K-BOP are utilized to produce molten steel which is extremely low in C, O and N. In Q-BOP, the oxgen is directly blown into the molten steel from the bottom of the converter, and

The refining technique of high-purity steel was put

in the number of inclusions.
(3) The (111) pole intensity, which is unfavorable for