Improvement of Motor Performance by Use of High-Efficiency Electrical Steels*



[illegible]

S[illegible]:

The influence of the properties of core materials on the performance of a brushless DC motor and an induction motor, which are representative types often used as drive motors for electric and hybrid vehicles. The efficiency of the brushless DC motor of concentrated winding type can be estimated by the core material iron loss at 400 Hz. By using low-core-loss high-flux-density electrical steels RMHE for this brushless DC motor, efficiencies higher than conventional materials by 0.5–1.0% were obtained with equivalent torque constants. In the three-phase induction motor, high efficiencies were obtained by using RMA having higher magnetic flux densities. The difference between materials in the distribution of local magnetic field strength, magnetic flux density and core loss in motor cores were clarified by local magnetic properties measurement using a contact probe method.

E ... 0.5%

1 300 ... 1 500 ... 100 ... 400 ...[19]

Fig. 2 ... B_{50} ... B_{50} ... B_{50}

$$K = 0.144\,B - 0.011\,5 \tag{2}$$

K ... (/A) ... B ... B_{50} ( ).

Fig. 3.

A a a , **Fig. 5** a f a f a DC g 50 400 (

Figure 6

A g. 5 a 6

20)

Fig. 7 g 35 E300 (0.35) a 50 E300 (0.50),

a t a A, t B_{50}. C

t , a g g B_{50}

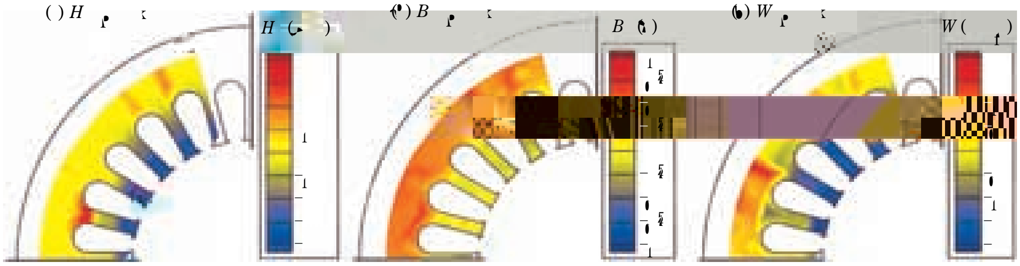

Fig. 14 Diff ... (a), ... ( ) ... ( ) ... 50 A ... 50 400 (... A350 – ... 400)

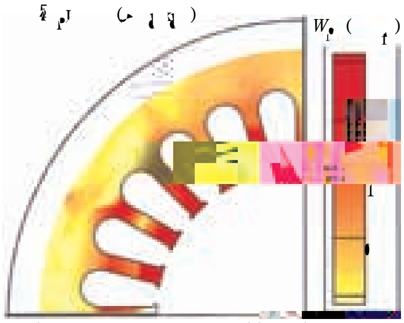

Fig. 13 D ... 50 400 ...

... 50 400 ... 50 A350 ... 50 400 ... 50 A350 ... B ... 50 A350 ... B ... 50 A350 ... B_{50} ... 50 400.

B ; 50 400 ... 50 A350 ... 50 A350 ... 50 ... 400 ... B_{50} ...

6 Conclusions

... DC ...

(1) ...

... DC ... 400 ...

(2) ... DC ... 0.5 ... 1.0% ...

(3) ... B_{50}.

(4) Diff ...

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