

Hitachi Metals Creates New Soft Ferrite Core Material Offers Outstanding High-Temperature Properties for Automobile Components

Hitachi Metals, Ltd. (head office: Minato-ku, Tokyo; chairman and chief executive officer, Kazuyuki Konishi; hereafter Hitachi Metals) is pleased to announce its development of MB20D, an innovative soft ferrite core material with outstanding properties for high-temperature environments. MB20D shows greater efficiency, reliability, downsizing and weight reduction in transformers, inductors and other electronic components used in automotive applications. A mass production system for this material is already in place.

1. Background

Soft ferrite, one of our several soft magnetic materials Hitachi Metals produces and sells, is used to make the electrical circuits for automotive applications and other products. The company has earned stellar evaluations for the stable quality of its core materials, which many customers continue to adopt.

In recent years, the move toward using electronic technology in automobiles has been accompanied by growing demands for higher efficiency and reliability in their onboard electronic components. In addition, requests to conserve on space have prompted further downsizing and weight reduction for these densely packed electronic components. High performance and reliability in a high-temperature environment has also been a desirable characteristic since use near the engine compartment is projected.

The core materials used in transformers, inductors and other automobile components generally experience high core loss¹ in high-temperature environments. With that loss converted into heat, the resulting loss sometimes acts as a heat source, raising the temperature in the immediate area. This has prompted increasing demands for core materials offering lower core loss in high-temperature environments to minimize the impact of heat on surrounding electronic components.

2. Outline

Created from a Mn-Zn ferrite material with low-loss properties in high-temperature environments, MB20D is a soft ferrite core material made specifically for use in automotive applications. Made by using Hitachi Metals' original technologies in powder metallurgy, processing and heat treatment, MB20D boasts low core loss and high saturation magnetic flux density². With such low core loss and high saturation magnetic flux density—especially in high-temperature environments—it becomes possible to cut power consumption and heat generation. It is highly anticipated that the use of this product will lead to greater



Photo: MB20D soft ferrite core material for automobile components

efficiency and reliability, as well as lower the size and weight of transformers, inductors and other electronic components.

Sample shipments have already begun, with mass production scheduled to begin from 2015. Along with metal powder cores—announced on September 19, 2014—the addition of MB20D to Hitachi Metals' soft magnetic material line-up will enable the company to address a wide range of customer needs.

Hitachi Metals will continue to develop materials that draw out the properties of raw resource materials and contribute to smaller, light weight electronic components with better efficiency and reliability.

■ Main Features of MB20D

- (1) Twenty percent lower core loss in high-temperature environments (130°C) compared to Hitachi Metals' existing ML33D product line
- (2) Twenty-five percent better saturation magnetic flux density in high-temperature environments (130°C) compared to Hitachi Metals' existing ML33D product line

3. Mass Production

Scheduled launch: 2015

Production bases: Hitachi Ferrite Electronics, Ltd.

Hitachi Metals Hong Kong Ltd. (Pan Yu Factory)

4. Patent

One application submitted

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Properties of MB20D Ferrite Core Material for Automobile Components

		MB20D (Newly developed)	ML33D (Existing product)
Core loss	23°C	700 kW/m ³	400 kW/m ³
	100°C	420 kW/m ³	355 kW/m ³
	130°C	370 kW/m ³	460 kW/m ³
Saturation magnetic flux density	23°C	540 mT	530 mT
	100°C	450 mT	400 mT
	130°C	410 mT	330 mT
Electrical resistivity		5.0 Ωm	5.0 Ωm
Curie temperature ³		280°C	230°C

Supplementary Explanations

- 1“Core loss” refers to the loss of energy when magnetic cores are placed in magnetic fields of alternating currents at specific frequencies. Higher core loss leads to higher energy loss.
- 2“Saturation magnetic flux density” is the value that expresses the strength of magnetic force in materials, and is a standard measurement for the performance of magnetic materials. The degree of magnetization upon magnetizing materials is referred to as magnetic flux density, and a higher value leads to the downsizing of cores. Saturation magnetic flux density indicates the limit of magnetization upon magnetizing of materials.
- 3“Curie temperature” refers to the transition temperature when a ferromagnetic substance changes into a paramagnetic substance, or when a ferroelectric substance changes into a paraelectric substance.