

ICS 29.030  
CCS L19



**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 43870.2-2024**

---

**Measurement methods for Curie temperature of magnetic  
materials - Part 2: Soft magnetic materials**

磁性材料居里温度的测量方法 第2部分：软磁材料

**Issued on: April 25, 2024**

**Implemented on: November 1, 2024**

---

**Issued by: State Administration for Market Regulation;  
Standardization Administration of the PRC**

## Table of Contents

|                                                                               |   |
|-------------------------------------------------------------------------------|---|
| 1 Scope .....                                                                 | 1 |
| 2 Normative references .....                                                  | 1 |
| 3 Terms and Definitions .....                                                 | 1 |
| 4 How to determine the Curie temperature .....                                | 1 |
| 6 Data Processing 4 5:2 mT Curve Method .....                                 | 4 |
| 1 Typical values of Curie temperature of common soft magnetic materials ..... | 5 |

## Foreword

This document is in accordance with the provisions of GB/T 1:1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents"

Drafting: This document is part 2 of GB/T 43870 "Measurement method of Curie temperature of magnetic materials": GB/T 43870 has been published in Lower part:

--- Part 1: Permanent magnetic materials;

--- Part 2: Soft magnetic materials: Please note that some of the contents of this document may involve patents: The issuing organization of this document does not assume the responsibility for identifying patents: This document was proposed by the Ministry of Industry and Information Technology of the People's Republic of China: This document is under the jurisdiction of the National Technical Committee for Standardization of Magnetic Components and Ferrite Materials (SAC/TC89): This document was drafted by: China University of Metrology, the Ninth Institute of China Electronics Technology Group Corporation, China Institute of Metrology, Zhejiang Province Institute of Metrology, Hengdian Group DMEGC Co., Ltd., and Changsha Tianheng Measurement and Control Technology Co., Ltd: The main drafters of this document are: Ge Hongliang, Wu Qiong, Yan Chong, Peng Qinggui, Gong Wenjie, Yu Zhishu, Zhou Xinhua, Zhang Aiguo, Lei Guoli, Wang Zisheng, Pan Minxiang, Yang Hangfu, and Yu Nengjun:

Curie temperature is the transition temperature of the internal magnetic moment of ferromagnetic/ferrimagnetic materials from order to disorder, that is, the transition temperature between ferromagnetism/ferrimagnetism and order: The temperature at which magnetic properties change is one of the basic characteristics of ferromagnetic materials: Curie temperature measurement is part of magnetic property measurement: GB/T 43870 "Measurement method of Curie temperature of magnetic materials" consists of two parts:

--- Part 1: Permanent magnetic materials: The purpose is to specify the measurement method of the Curie temperature of permanent magnetic materials:

--- Part 2: Soft magnetic materials: The purpose is to specify the measurement method of Curie temperature of soft magnetic materials: Measuring Method of Curie Temperature of Magnetic Materials Part 2: Soft magnetic materials

## 1 Scope

GB/T 43870.2-2024 is Part 2 of the Chinese series on measuring the Curie temperature of magnetic materials, and covers soft magnetic materials. For a ferrite core in a power converter the Curie point is a design limit reached in ordinary service: as the core heats, the permeability climbs to a peak just below the transition and then collapses, so a converter running its core too hot can lose its inductance and fail catastrophically rather than gradually. The standard sets the determination of what is measured and then two methods - the LT curve method, in which inductance is followed against temperature, and the mT curve method - each with its principle, measuring device, sample, coil, measurement procedure and data processing, followed by the results report, with an informative annex giving typical Curie temperatures of common soft magnetic materials. It took effect on 1 November 2024.

This document describes a method for the measurement of the Curie temperature of soft magnetic materials: This document is applicable to the measurement of Curie temperature of ferrite soft magnetic materials and metal soft magnetic materials:

## 2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document: For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document: GB/T 2900:

60 Electrical terminology - Electromagnetism

GB/T 9637 Electrical terminology magnetic materials and components

GB/T 28869:1-2012 Measurement methods for cores made of soft magnetic materials Part 1: General specifications

GB/T 28869:2-2023 Measurement methods for cores made of soft magnetic materials Part 2: Magnetic properties at low excitation levels GB/T 43870:

1 Methods for measuring the Curie temperature of magnetic materials Part 1: Permanent magnetic materials

JJF1101-2019 Environmental test equipment temperature and humidity parameter calibration specification

### 3 Terms and definitions

The terms and definitions defined in GB/T 2900:60 and GB/T 9637 apply to this document:

### 4 How to determine the Curie temperature

Measure the curve of inductance  $L$  changing with temperature  $T$  (LT curve) or the curve of magnetic moment  $m$  changing with temperature  $T$  (mT curve), L- The tangent line at the point where the absolute value of the slope of the  $T$  curve or mT curve ( $dL/dT$  or  $dm/dT$ ) is the maximum and  $L=L_0$  ( $L_0$  is the inductance of the air-core coil) Or  $m=0$  intersects the horizontal axis, and the temperature value here is the Curie temperature, as shown in Figure 1: When the Curie temperature is not higher than 300°C, it is recommended to use the LT curve method; when the Curie temperature is higher than 300°C, it is recommended to use the mT curve method: Line method: The Curie temperature can also be determined in accordance with Chapter 14 of GB/T 28869:2-2023: