

Magnetic materials —

Part 6: Methods of measurement of the magnetic properties of isotropic nickel-iron soft magnetic alloys, types E1, E3 and E4

UDC [621.318.1 + 669.018.5] – 034.12:620.1.08

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Iron and Steel Standards Committee (ISM/-) and the Non-ferrous Metals Standards Committee (NFM/-) to Technical Committee ISM/NFM/5 upon which the following bodies were represented:

- Association of Manufacturers Allied to the Electrical and Electronic Industry (BEAMA Ltd.)
- British Steel Industry
- Department of Trade and Industry (National Physical Laboratory)
- Electricity Supply Industry in England and Wales
- Electronic Components Industry Federation
- GAMBICA (BEAMA Ltd.)
- Institute of Physics
- Rotating Electrical Machines Association (BEAMA Ltd.)
- Sunderland Polytechnic (Magnet Centre)
- Transmission and Distribution Association (BEAMA Ltd.)
- Wolfson Centre for Magnets Technology
- Coopted members

This British Standard, having been prepared under the direction of the Iron and Steel and Non-ferrous Metals Standards Committees, was published under the authority of the Board of BSI and comes into effect on 31 January 1989

© BSI 10-1999

The following BSI references relate to the work on this standard:
Committee reference ISM/NFM/5
Draft for comment 83/79062 DC

ISBN 0 580 16779 8

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
1 Scope and object	1
2 Reproducibility	1
Chapter I: Determination of the magnetic characteristics under D.C. conditions	
Section 1. General	
3 Object	1
4 Field of application	1
5 Test specimen	1
6 Windings	2
Section 2. Methods of measurement	
7 Magnetic field strength	2
8 Magnetic flux density	2
9 Connection of apparatus	2
10 Determination of normal magnetization curve	3
11 Determination of a complete hysteresis loop	3
12 Determination of remanent flux density	4
13 Determination of coercive field strength	4
Chapter II: Determination of the magnetic characteristics under A.C. conditions	
Section 1. General	
14 Object	4
15 Field of application	4
16 Test specimen	4
17 Windings	4
18 Waveform	4
Section 2. Methods of measurement — a.c. magnetization curve	
19 Connection of apparatus	5
20 Magnetic field strength	5
21 Magnetic flux density	5
22 Permeability	6
23 Determination of a.c. magnetization curve	6
Section 3. Method of measurement of specific total losses	
24 Wattmeter method	6
Chapter III: Test report	
Appendix A Methods of calibrating the flux integrator for d.c. testing	8
Appendix B Specification of direct current source	8
Figure 1 — Circuit for the determination of the magnetic characteristics by the ring method	10
Figure 2 — Hysteresis loop	11
Figure 3 — Circuit for determination of the a.c. magnetizing curve	11
Figure 4 — Circuit for the wattmeter method	12
Figure 5 — Circuit for calibrating the flux integrator by the capacitor discharge method	12
Table I — Switching sequence	4
Publications referred to	Inside back cover

National foreword

This Part of BS 6404 has been prepared under the direction of the Iron and Steel and Non-ferrous Metals Standards Committees. It is identical with IEC 404-6:1986 “*Magnetic materials — Part 6: Methods of measurement of the magnetic properties of isotropic nickel-iron soft magnetic alloys, types E1, E3 and E4*”, published by the International Electrotechnical Commission (IEC).

The following Parts of BS 6404 have been published:

- *Part 1: Classification;*
- *Part 2: Methods of measurement of magnetic, electrical and physical properties of magnetic sheet and strip;*
- *Part 3: Methods of measurement of specific total losses of magnetic sheet and strip by means of a single sheet tester;*
- *Part 4: Methods of measurement of the d.c. magnetic properties of solid steels;*
- *Part 5: Methods of measurement of the magnetic properties of magnetically hard (permanent magnet) materials;*
- *Part 7: Method of measurement of the coercivity of magnetic materials in an open magnetic circuit;*
- *Part 8: Individual materials;*
- *Section 8.1: Specification for magnetically hard materials;*
- *Section 8.2: Specification for cold-rolled, magnetic, non-oriented, alloyed steel strip delivered in the semi-processed state;*
- *Section 8.3: Specification for cold-rolled, magnetic, non-oriented, non-alloyed steel strip delivered in the semi-processed state;*
- *Section 8.4: Specification for cold-rolled, non-oriented magnetic steel sheet and strip delivered in the finally annealed state;*
- *Section 8.6: Specification for soft magnetic metallic materials;*
- *Section 8.7: Specification for grain-oriented magnetic steel sheet and strip;*
- *Part 9: Methods for determination of the geometric characteristics of magnetic steel sheet and strip.*

Additional Parts of IEC 404 will be published and are expected to provide the basis for additional Parts of BS 6404.

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

Cross-references

International Standard	Corresponding British Standard
	BS 6404 <i>Magnetic materials</i>
IEC 404-1:1979	Part 1:1984 <i>Classification</i> (Technically equivalent)
IEC 404-8-6:1986	Section 8.6:1988 <i>Specification for soft magnetic metallic materials</i> (Identical)

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 12, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

