

Implementation of
ISO/IEC 8441-1:1991

Information technology — High density digital recording (HDDR) —

Part 1: Unrecorded magnetic tape for
(HDDR) applications

UDC 681.327.63

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 Information Systems Technology Standards Policy Committee (IST/-) to Technical Committee IST/8, upon which the following bodies were represented:

- British Gas plc
- British Tape Industry Association
- EEA (the Association of Electronics, Telecommunications and Business Equipment Industries)
- Engineering Integrity
- Fulmer Research Laboratory
- GAMBICA (BEAMA Ltd.)
- Institution of Electrical Engineers
- Ministry of Defence
- Tape Recorder and Instrumentation Users' and Manufacturers' Forum

This British Standard, having been prepared under the direction of the Information Systems Technology Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 31 July 1991

© BSI 03-2000

The following BSI references relate to the work on this standard:
Committee reference IST/8
Draft for comment 90/63058 DC

ISBN 0 580 19891 X

Amendments issued since publication

Amd. No.	Date	Comments

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	v
Text of ISO/IEC 8441-1	1

National foreword

This British Standard reproduces verbatim ISO/IEC 8441-1:1991 and implements it as the UK national standard.

This British Standard is published under the direction of the Information Systems Technology Standards Policy Committee whose Technical Committee IST/8 has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

NOTE International and European Standards, as well as overseas standards, are available from BSI Sales Department, BSI, Linford Wood, Milton Keynes, MK14 6LE.

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 and ii, the ISO/IEC title page, pages ii to vi, pages 1 to 23 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.

**Information technology — High density digital
recording (HDDR) —**

Part 1:
Unrecorded magnetic tape for (HDDR)
applications

*Technologies de l'information — Enregistrement numérique à haute
densité (HDDR) —*

Partie 1: Bande magnétique vierge pour les applications HDDR



Reference number
ISO/IEC 8441-1:1991(E)

Contents

	Page
Foreword	v
Introduction	1
1 Scope	1
2 Normative references	1
3 Definitions	1
4 General	3
4.1 Materials	3
4.2 Tape reels	3
4.3 Tape wind	3
4.4 Packaging	3
5 Test conditions	3
5.1 General	3
5.2 Conditioning	3
5.3 Test environment	3
6 Dimensions	3
6.1 Tape width	3
6.2 Tape length	3
6.3 Tape thickness	3
7 Physical properties	4
7.1 Yield strength	4
7.2 Elongation under stress	4
8 Performance	4
8.1 Reference test system	4
8.2 Sensitivity	5
8.3 Wavelength response	5
8.4 Output level uniformity (long term)	5
8.5 Instantaneous nonuniformity (dropouts)	6
8.6 Signal-to-noise ratio	6
8.7 Ease of erasure	6
8.8 Electrical surface resistance	6
8.9 Environmental performance	7
8.10 Durability	7
8.11 Abrasivity	7
Annex A (informative) Glass- and metal-flanged tape reels	10
Annex B (informative) Wear of recording heads	10
Annex C (informative) Environmental conditions	10
C.1 General	10
C.2 Normal operating conditions	10
C.3 Extended operating conditions	11
C.4 Severe operating conditions	11
C.5 Shipping and short-term storage	11
C.6 Extended shipping and short-term storage	11
C.7 Recommended long-term storage	11
C.8 Deterioration of tape arising from exposure to adverse environmental conditions	11
Annex D (informative) Severe operating conditions	12
D.1 Application	12
D.2 Conditions	12
D.3 Environmental performance tests for limited duration recording under severe conditions	12
D.3.1 Definition of severe conditions	12

	Page
D.3.2 Requirement	12
D.3.3 Test procedure	12
Annex E (informative) Surface electrical resistance testing	13
E.1 Scope	13
E.2 Test specimens	13
E.3 Apparatus	13
E.3.1 Electrodes for testing insulation resistance	14
E.3.2 Electrodes for testing volume and surface resistance	14
E.3.3 Electrode materials	14
E.3.4 Direct-current potential	14
E.3.5 Measuring equipment	14
E.3.6 Switches and keys	15
E.4 Procedure	15
E.4.1 Conditioning of specimens	15
E.4.2 Precautions in mounting specimens	15
E.4.3 Method of measuring resistance	15
E.4.4 Insulation resistance determination	16
E.4.5 Volume and surface resistance determination	17
E.4.6 Surface resistance determination	18
E.5 Report	18
Annex F (informative) Tape abrasivity testing	22
F.1 Scope	22
F.2 Principle	22
F.3 Apparatus	22
F.3.1 Sensor	22
F.3.2 Dummy head assembly	22
F.3.3 Tape abrasivity meter	22
F.3.4 Reference tape	23
F.4 Procedure	23
F.4.1 Cleaning and measuring	23
F.4.2 Requirement	23
Annex G (informative) Bibliography	23
Figure 1 — Replayed waveform for output uniformity test	2
Figure 2 — Tape resistance measurement electrodes	8
Figure 3 — Tape resistance measurement circuit	8
Figure C.1 — Contours of constant long-term storage environment	12
Figure D.1 — Temperature dependence of elastic modulus of polyester-base film	13
Figure E.1 — Application of binding-post electrodes to flat, solid specimens	19
Figure E.2 — Application of strip electrodes to flexible tapes and flat solid surfaces	19
Figure E.3 — Application of tapered pin electrodes tubular specimens	20
Figure E.4 — Flat specimen for measurement of volume resistance perpendicular to the specimen face and surface resistance	20
Figure E.5 — Application of mercury electrodes to flat, solid specimens	20
Figure E.6 — Tubular specimen for measurement of volume resistance perpendicular to the specimen wall and surface resistance	21
Figure E.7 — Application of mercury electrodes to tubular specimens	22

	Page
Table 1 — Tape widths	3
Table 2 — Tape lengths	4
Table 3 — Maximum moments of inertia for full reels	5
Table 4 — Wavelength response	5
Table 5 — Performance requirements	9

Descriptors: Data processing, information interchange, digital recording methods, magnetic tapes, specifications, dimensions.

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 8441-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC 8441 consists of the following parts, under the general title *Information technology — High density digital recording (HDDR)*:

- *Part 1: Unrecorded magnetic tape for (HDDR) applications;*
- *Part 2: Guide for interchange practice;*

Annex A, Annex B, Annex C, Annex D, Annex E, Annex F and Annex G of this part of ISO/IEC 8441 are for information only.

Introduction

This part of ISO/IEC 8441 gives guidance on the performance levels of unrecorded tape suitable for high density digital recording for interchange purposes. It should be noted that the performance levels specified may differ from those attained at the time of purchase of the tape.

1 Scope

This part of ISO/IEC 8441 specifies requirements for unrecorded magnetic tape designed for high density digital recording (HDDR) having the following characteristics:

- a) nominal thickness 25,4 μm (0,001 in);
- b) longitudinal magnetic orientation;
- c) coercivity 72 kA/m (900 Oe) max.

These tapes are suitable for interchange in accordance with ISO/IEC 8441-2.

Requirements for packaging are also included.

NOTE 1 Tapes of coercivity above 32 kA/m (400 Oe) are usually classified as high energy tapes and users should establish compatibility with equipment used for driving them.

Annex A gives guidance on glass and metal-flanged reels. Annex B gives information on the wear of recording heads. Different categories of environmental conditions and their effects on tape are dealt with in Annex C. Severe operating conditions are considered in Annex D. Surface electrical resistance testing is dealt with in Annex E. A tape abrasivity testing technique is described in Annex F. A list of bibliographical references is given in Annex G.

NOTE 2 It is recognized that archival interchange tapes, or those produced by systems in use prior to the publication of this part of ISO/IEC 8441, may not comply with the requirements and/or recommendations herein.

NOTE 3 Various tests and procedures herein refer to recording with a.c. HF bias. In practice, certain HDDR systems do not use bias. The use of bias in this part of ISO/IEC 8441 does not imply that the tape so tested is in any way unsuitable for a biasless system.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 8441. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 8441 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1184:1983, *Plastics — Determination of tensile properties of films*.

ISO 1860:1986, *Information processing — Precision reels for magnetic tape used in interchange instrumentation applications*.

3 Definitions

For the purpose of this part of ISO/IEC 8441, the following definitions apply.

NOTE 4 Tape speed is taken to be 3 048 m/s (120 in/s), unless otherwise stated.

3.1

abrasivity

the propensity of a magnetic tape to cause wear of a recording head, by the passage of the tape over the head

NOTE 5 It may be expressed as micrometres of head wear per metre of tape passed (microinches per inch), or as a value relative to a given reference tape.

NOTE 6 The actual wear produced in the recording head will also depend on the tape speed and tension (see Annex B).

3.2

durability

the ability of a tape to maintain its output uniformity and dropout characteristics after a given number of passes on the reference test recorder

3.3

ease of erasure

the ability of a specified erasing field to effect a specified reduction in the level of a signal recorded on a tape

3.4

electrical surface resistance

the surface resistance, in ohms per square, of the magnetic coating or the back surface of a tape, as appropriate

NOTE 7 The SI unit of surface resistivity is the ohm, although ohms per square is used in practice.

3.5

elongation under stress

the increase in the distance between reference lines on the test piece due to a tensile load, expressed as a percentage of the initial distance between the reference lines

3.6

E value

the radial distance by which the reel flanges extend beyond the outermost layer of tape wound on a reel under a tensile force of 0,109 N/mm $\pm$ 0,033 N/mm of tape width (10 ozf/in $\pm$ 3 ozf/in of tape width)

NOTE 8 0,109 N/mm $\pm$ 0,033 N/mm is equivalent to 282 gf/in $\pm$ 85 gf/in.