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British Standard

Storage, transportation and maintenance of magnetic media for use in data processing and information storage

Part 2. Recommendations for magnetic tape on open spools

Stockage, transport et maintenance des supports magnétiques utilisés pour le traitement
et le stockage des informations

Partie 2. Recommandations pour bandes magnétiques sur mandrins ouverts

Speicherung, Transport und Wartung von magnetischen Datenträgern in der Datenverarbeitung
und Informationsspeicherung

Teil 2. Empfehlungen für Magnetbänder auf offenen Spulen

Foreword

This Part of BS 4783 has been prepared under the direction of the Information Systems Technology Standards Committee. It has been developed from advice and information provided by government computing departments, magnetic media suppliers and manufacturers, users and specialist tape maintenance organizations. It supersedes BS 4783 : 1972 'Recommendations for the care and transportation of magnetic tape', which is withdrawn.

The use of high-grade materials and modern production techniques, that include rigorous testing and inspection, ensures that magnetic tapes are manufactured to exacting standards. To continue to benefit from the care taken during manufacture, and to ensure optimum performance from a product during its life, the user should exercise care, and this British Standard gives appropriate advice.

Manufacturers' publications often cover some of the advice given and, where available, should be read in conjunction with this standard.

BS 4783 is being issued in four Parts as follows.

- Part 1 Recommendations for disk packs, storage modules and disk cartridges
- Part 2 Recommendations for magnetic tape on open spools
- Part 3 Recommendations for flexible disk cartridges
- Part 4 Recommendations for magnetic tape cartridges and cassettes

The following British and international standards are relevant to magnetic tape on open spools.

- BS 6266 Code of practice for fire protection for electronic data processing installations

- ISO 1861 Information processing — 7 Track, 12.7 mm (0.5 in) wide magnetic tape for information interchange recorded at 8 rpmm (200 RPI)
- ISO 1862 Information processing — 9 Track, 12.7 mm (0.5 in) wide magnetic tape for information interchange recorded at 8 rpmm (200 RPI)
- ISO 1863 Information processing — 9 Track, 12.7 mm (0.5 in) wide magnetic tape for information interchange recorded at 32 rpmm (800 RPI)
- ISO 1864 Information processing — Unrecorded 12.7 mm (0.5 in) wide magnetic tape for information interchange — 32 ftpmm (800 ftpi) NRZI, 126 ftpmm (3200 ftpi) phase encoded and 356 ftpmm (9042 ftpi), NRZI
- ISO 2382 Data processing — Vocabulary Section 12 Data media, storage and related equipment
- ISO 3788 Information processing — 9 Track, 12.7 mm (0.5 in) wide magnetic tape for information interchange recorded at 63 rpmm (1600 RPI), phase encoded
- ISO 5652 Information processing — 9 Track, 12.7 mm (0.5 in) wide magnetic tape for information interchange — Format and recording, using group coding at 246 cpmm (6250 cpi)

A British Standard giving recommendations for the accommodation and environment of computer installations is in preparation.

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

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Corrections

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Front cover

In line 2 of the title, delete 'magnetic'.

In line 1 of the French text, delete 'magnétiques'.

In line 1 of the German text, delete 'magnetischen'.

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Recommendations

1 Scope

This Part of BS 4783 provides recommendations on the care and maintenance of magnetic tapes on open spools. It includes recommendations for storage, handling, transportation, inspection, cleaning, maintenance and fault identification.

The photographs that comprise figure 2 give some examples of tape conditions that may lead to poor performance or loss of data or both.

2 Definitions

For the purposes of this Part of BS 4783, the following definitions apply.

- 2.1 accessory.** A container used to protect the reel, such as an autoloader cartridge, a tape canister or a tape seal.
- 2.2 base film.** The substrate material of the tape that supports the coating.
- 2.3 beginning of tape (BOT).** A reflective marker placed on the non-recording side of the tape to indicate the beginning of the permissible recording area.
- 2.4 cinching.** Tape folds between layers of tape in a tape pack resulting from longitudinal slippage caused by uneven tension when the roll is accelerated or decelerated.
- 2.5 coating.** The recording layer of a tape, consisting of oxide particles held in a binder that is applied to the base film.
- 2.6 contamination.** Foreign deposits that may lead to degradation of performance.
- 2.7 edge damage.** Defects at the edge of the tape.
- 2.8 edge lip.** A deformation in the edge of the base film.
- 2.9 end retainer.** A component placed over the end of the tape to prevent loose turns of tape forming during transportation.
- 2.10 end of tape (EOT).** A reflective marker placed on the non-recording side of the tape to indicate the end of the permissible recording area.
- 2.11 error.** A failure to read correctly a bit of information.
- 2.12 extreme environment.** Environmental conditions outside the limits quoted in this Part of BS 4783.
- 2.13 library.** A storage area for media and associated equipment.
- 2.14 magnetic tape.** Tape that will accept and retain the magnetic signals intended for input, output and storage purposes on computer and associated equipment.
- 2.15 permanent error.** An error that remains after retries to read a particular area of tape.
- 2.16 reel.** A spool containing tape.
- 2.17 retries.** A number of reread attempts determined by the type of system.

2.18 spool. A flanged hub, made of metal, glass or plastic, on which tape is to be wound.

2.19 tape cleaner. A device designed to clean both surfaces of the tape.

2.20 tape evaluator. A device that evaluates the physical and magnetic quality of the tape.

2.21 tape pack. The form taken by the tape wound on the spool.

2.22 tape transport. A mechanism that extracts tape from a storage device, moves it across magnetic heads at a controlled speed and then feeds it into another storage device.

2.23 tape wind. The uniformity of layer-to-layer positioning and tension of a tape when wound clockwise onto a spool when viewed from the front flange with the coating facing the hub.

2.24 transient error. An error that does not remain after retries to read a particular area of tape.

2.25 write enable ring. A plastic ring placed in a groove in the rear flange of the spool to enable the tape to be recorded.

3 Tape library

3.1 General

Tapes should be stored in an accessory and their use monitored by means of a central facility typically referred to as a tape library.

3.2 Personnel

Personnel should be trained in their responsibility for the condition, care and handling of reels in order to improve and maintain the proper functioning of any library. Ideally, an individual should be designated as the Librarian with overall responsibility for day-to-day maintenance and control.

3.3 Equipment

The maintenance equipment available at a computer installation will inevitably be governed by the library size and comparative cost effectiveness. Site policy should clearly indicate who is responsible for the provision of resources and equipment (such as tape evaluators and cleaners, and consumables (cleaning fluids and materials)), e.g. the equipment engineers or operational staff.

3.4 Location

The library should be sited away from electrical equipment and dust-producing peripherals such as line printers, paper tape or punched card machines.

The library should be adjacent to the computer room with the same or very similar environmental conditions.

Monitoring devices for temperature and humidity should be installed.

Stationery and cardboard containers should not be stored within the area.

Chemicals and other materials stored in the library should be restricted to those required for ongoing maintenance.

3.5 Security, safety and cleaning

Access to the library and computer areas should be controlled and restricted to essential personnel, both to keep down the amount of dust and dirt and to maintain security.

Items that are hazardous (e.g. tape transport cleaning fluids) should be identified with a suitable warning label and should be kept in a locked cabinet when not in use.

The library should be kept clean and there should be no eating, drinking or smoking in this area because of the risk of tape contamination.

All personnel should wear clothing that is anti-static and does not shed fibres. Some personal cosmetics including hand creams, nail varnish and face powders may lead to contamination and their use should be avoided.

The materials, equipment and methods used by cleaners in computer rooms and magnetic media libraries should be approved by the equipment suppliers or manufacturers.

Library and computer areas should not be allowed to become contaminated and preventative cleaning, using a disciplined schedule, should be implemented. A smart, clean working environment is often an outward sign of an effective unit and may positively assist employee morale.

4 Incoming reels (control procedures)

4.1 Incoming inspection

On receipt of new or interchange reels the recommended inspection procedures outlined in appendix A should be followed.

Any reel delivered in a damaged carton should be set aside for immediate reference to the consignor in case the consignor needs to make a claim against the carrier.

The high standards of dust filtration and cleanliness used during manufacture should ensure that newly delivered reels do not require cleaning prior to use. However, a preliminary inspection by the user is considered essential and, if contamination is suspected, a site engineer or media supplier, or both, should be asked for advice.

4.2 Records

When any reel is brought into the library area, a record should be created or updated similar to the example shown in figure 1.

The record should contain information relating to usage, cleaning, inspection and certification. This information should be used to determine maintenance requirements and end of economic life.

4.3 Acclimatization

Except in extreme environmental conditions, it is possible that a user could bring the reel straight into the library after unpackaging; however, before a reel is brought into service it should be acclimatized. The period required depends on:

- (a) the time that the reel has been outside the computer room environment; and
- (b) the extremes of temperature and humidity to which the reel has been subjected during shipment, albeit in its transit carton.

Ideally, reels should be acclimatized for at least 24 h before use. However, as a general guide, all reels should be conditioned for a minimum of 6 h in the same environment as that in which the tape transport is operating. If full acclimatization is not allowed, error conditions may occur that would otherwise not be present had the tape been stabilized to the computer room environment.

Where extreme environmental conditions exist, with temperatures and/or humidity outside those quoted for storage (see 5.1), then before removal from the transit carton reels should be subjected to at least 24 h acclimatization in the storage environment. Failure to do this may result in condensation forming on the tape surfaces with associated risk to performance.

4.4 Labelling

Before application to the reel, identity labels should be written using a permanent ink pen. Graphite pencil or water-soluble felt-tipped pen should not be used.

Taking care not to deflect the flange, labels should be securely affixed to the front flange of the reel. The whole area of the label should be in contact with the flange.

Where a semi-permanent label is required, the adhesive should be of such a type that negligible residue remains on the flange when the label is removed.

4.5 Equalization of tape tension

As tapes may have been wound at different tensions or have internal stress they should receive a full length forward and rewind cycle on the tape transport before first usage. Degraded performance may occur if this recommendation is not followed.

Magnetic tape record card		Rack Location Tape no.									
Manufacturers' serial nos. Length. Date											
File name	Reel no.	Generation no.	Retention period	Created		Release date	Clean/ test date	Fail type (if any)	Comments (see note)		
				Unit no.	Date						

NOTE. Use 'Comments' space to record additional information. In the event of failure, unit no. and location of fail may be helpful. Abnormal repeat rates should also be noted.

Figure 1. Example of a reel record