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INFORMATION PROCESSING

PROPERTIES OF UNPUNCHED PAPER TAPE

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BRIEF HISTORY

The ISO Recommendation R 1729, *Information processing – Properties of unpunched paper tape,* was drawn up by Technical Committee ISO/TC 97, *Computers and information processing,* the Secretariat of which is held by the American National Standards Institute (ANSI).

Work on this question led to the adoption of Draft ISO Recommendation No. 1729, which was circulated to all the ISO Member Bodies for enquiry in March 1969. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Belgium	Iran	Switzerland
Brazil	Italy	Thailand
Canada	Japan	Turkey
Czechoslovakia	New Zealand	U.A.R.
France	Romania	United Kingdom
Germany	Spain	U.S.A.
Greece	Sweden	

No Member Body opposed the approval of the Draft.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

ISO Recommendation | R 1729 | March 1971

INFORMATION PROCESSING

PROPERTIES OF UNPUNCHED PAPER TAPE

1. SCOPE

This ISO Recommendation specifies the physical properties of paper tape to be used for data interchange, when the tape is in the unpunched condition.

2. TEST CONDITIONS AND METHODS OF TEST

2.1 Sampling

Sampling shall be carried out in accordance with the procedures described in Annex A unless otherwise agreed between customer and supplier.

NOTE. – It is important to recognize that the majority of the physical properties will be tested by the paper maker and the paper tape coil converter. Since the quantity of paper involved is usually quite large it is necessary to adopt a balanced sampling procedure and often to report the result in terms of a mean value and a permissible deviation.

2.2 Test conditions

The test conditions for measurement shall be the following :

Relative humidity (R.H.)	50 ± 2 %
Temperature	23 ± 2 °C (73 ± 3.5 °F)

2.3 Conditioning of test samples

Samples shall be conditioned prior to test in accordance with the procedures described in Annex B.

2.4 Methods of test

Tests shall be carried out in accordance with the methods standardized by Technical Committee ISO/TC 6, *Paper, board and pulps.* Until the appropriate ISO Recommendations are published, the test methods specified in Annexes C to L shall apply.

3. DIMENSIONS

3.1 Width

The width of the unpunched tape shall be :

	mm	in
Nominal width	25.40	1.000
Tolerance :		
95 % of samples	± 0.05	± 0.002
100 % of samples	± 0.08	± 0.003

3.2 Thickness

The thickness of the unpunched tape shall be :

	mm	in
Nominal thickness	0.100	0.0040
Tolerance :		
95 % of samples	± 0.008	± 0.0003
100 % of samples	± 0.010	± 0.0004

4. CHEMICAL PROPERTIES OF PAPER TAPE

4.1 Hydrogen ion concentration

pH = 6 ± 1.5.

NOTE. – It is desirable that the pH value of the paper be as high as possible within these limits.

4.2 Ash content

maximum 1 %.

4.3 Grit content

maximum 0.04 %.

4.4 Lubricating additives

In order to ensure the minimum wear of the punch elements, the tape may have lubricating additives. The percentage of lubricating additives will depend largely on the type(s) of lubricant(s) used. It is important that the lubricant should not adversely affect the properties of the paper tape as defined elsewhere in this ISO Recommendation.

NOTE. – It has been observed that silicone oils can cause paper tape to have corrosive properties.

4.5 Composition and quality

The paper shall be free from mechanical (ground wood) pulp, holes, slime spots, shives, unbeaten fibres, fluff, dust, grit and abrasive particles. In addition it is important that the lignin content be kept to a minimum and that the tapes be free from translucent spots and any other defects which would interfere with reading or punching.

5. PHYSICAL PROPERTIES OF PAPER TAPE

5.1 Basic weight

76 to 94 g/m^2 (0.25 to 0.31 oz/ft^2). This refers only to unoiled paper tape.

5.2 Strength

5.2.1 *Static tensile strength* shall be measured in the machine direction. The mean value shall be not less than 177 N (18.1 kgf) per 25.4 mm of width (40 lbf per inch of width). In addition the arithmetic mean of the results less twice the standard deviation shall be not less than 156 N (15.9 kgf) per 25.4 mm of width (35 lbf per inch of width).

5.2.2 *Internal tear resistance* in both the machine direction and the cross direction shall be not less than 0.56 N (55 gf).

5.3 Dimensional stability

5.3.1 The maximum variation of the dimension in the cross direction when the relative humidity is varied from 20 % to 75 % and also when it is varied from 75 % to 20 % shall not exceed 1 % of the length measured at 50 % R.H.

5.3.2 Under the same changes of relative humidity the maximum variation of the dimension in the machine direction shall not exceed 0.5 % of the length measured at 50 % R.H.

5.4 Percentage of light transmission

The maximum value of light transmission shall not exceed 50 %. The method of measurement is described in Annex M.

5.5 Electrical properties

Bulk conductivity. For the purpose of sensing, the paper shall act substantially as an insulator when placed between two low-voltage sensing contacts.

5.6 Printability

The surface of the oiled tape shall legibly accept and retain interpretive printing, handwriting by means of ordinary pen nib or ball point pens using commercial quality inks, lead or coloured pencils, and rubber stamping. The legibility of both manuscript and print shall not be adversely affected by either the type of material or the finish.

5.7 Colour

The paper tape may be of any colour, provided that all the specifications of this ISO Recommendation are satisfied.

5.8 Pre-printing

Tapes may be pre-printed if required provided that each tape after printing meets all the requirements of this ISO Recommendation.

5.9 Quality

The paper shall be free of slime spots, pin holes, translucent spots, holes, tears, wrinkles and creases. The paper shall also be as free of lint, fuzz and dust as the best manufacturing practices permit.

6. COILING OF UNPUNCHED TAPE

6.1 Inner diameter

The inner diameter of the core shall be :

	mm	in
Nominal	50.8	2.000
Tolerance	$^{+1.6}_{0}$	$^{+0.063}_{0}$

6.2 **Outer diameter**

The outer diameter of a coil of unpunched tape shall be :

	mm	in
Nominal	203	8.00
Tolerance	0 - 3	0 - 0.12

6.3 **End of paper tape marker**

6.3.1 Each coil of tape shall be marked with a pink or red warning mark (but a contrasting colour on pink or red tapes).

6.3.2 The length of this mark shall be about 6 m (20 ft) and there shall be an unmarked length of about 3 m (10 ft) from the inner end of the coil.

6.3.3 The colouring matter of the marker shall be non-adhesive, non-abrasive and non-poisonous.

6.4 If the tape is fastened to the core, it shall not require a tension of more than 4 N (400 gf or 14 ozf) to pull it off the core.

6.5 The face of the coils shall be as clean and smooth, free from dust and undamaged as the best manufacturing process will permit. The coils shall unwind freely without sticking.

6.6 **Tightness of coiling**

Each coil shall be wound evenly and sufficiently tightly on the core that it does not telescope with normal handling.

ANNEX A

METHOD OF SAMPLING PAPER TAPE FOR TESTING

(Based on ISO Recommendation R 186)

A.1 SCOPE

This Annex specifies a method of obtaining a representative sample of a lot of coils of paper tape for test purposes.

For certain tests, special methods of sampling will be given in the text of the appropriate method of test.

NOTE. – If, at the time of sampling, less than 50 % of the lot remains, sampling will be invalid in the absence of agreement to the contrary.

A.2 DEFINITIONS

A.2.1 *Consignment.* One or more lots.

A.2.2 *Lot.* The aggregate of paper of a single kind, of specified characteristics, for example a box of coils.

A lot comprises one or more similar units, for example coils.

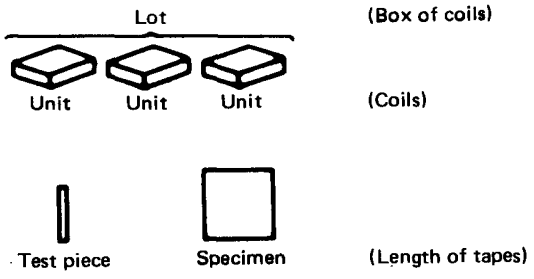
A.2.3 *Specimens.* Rectangles of paper cut to given dimensions, from the selected units.

A.2.4 *Sample.* All the specimens.

A.2.5 *Test piece.* The quantity of paper on which the test is carried out in accordance with the stipulations of the method of test.

It may be taken from a specimen; in certain instances, the test piece may be the specimen itself, or several specimens.

A.2.6 *Selected at random.* Taken in such a way that each part of the whole has an equal chance of being selected.



A.3 PRINCIPLE

Withdrawal of a certain number of units from each lot.

Taking of a certain number of specimens from each of these units.

In general, obtaining from these specimens the test pieces necessary for the various tests.

A.4 PREPARATION OF SPECIMENS

A.4.1 Selection of units

The units to be sampled should be selected according to the following table :

Size of lot (n) units	Number of units selected	Method of selection
1 to 5	all	–
6 to 99	5	at random
100 to 399*	$n/20$	at random
400 or more	20	at random

* In deciding the number of units to be selected, any remainder of less than 20 units should be ignored.

The units selected should be intact and in good external condition.

A.4.2 Selection of specimens

For each unit withdrawn from the lot, proceed as follows :

Take the length of paper tape from each coil, as long as necessary for the tests requested.

The selection of the length of tape from the coils is made as follows :

Remove all damaged layers of paper from the outside of the coil (if any); discard in all cases at least three undamaged layers; remove the requisite length of tape.

A.4.3 Size of specimens

It is recognized that only a limited range of tests can be performed on the specimens obtained by this method.

A.5 ADDITIONAL REQUIREMENTS

A.5.1 Specimens

A.5.1.1 *Precautions.* Specimens should be kept flat, free from wrinkles and folds and protected from exposure to direct sunlight, liquids, varying humidity conditions and any other harmful influences. Care should be taken in handling specimens, as contact with the hands can appreciably affect the chemical, physical, optical, surface or other characteristics of the paper.

A.5.1.2 *Marking.* Each specimen should be provided with identification marks, this being necessary to ensure that it can be recognized beyond all doubt. These marks should be indelible; they may be limited to the number of the sampling report and the signature of the sampler. They should be in one corner and as small as possible.

A.5.2 **Re-sampling**

A.5.2.1 If, as a result of an accident during sampling or testing, re-sampling is necessary, a new sample should be taken according to the rules set out above; unless otherwise indicated, the selection may be made from the same units as before.

A.5.2.2 In other circumstances, should re-sampling be deemed necessary, it is recommended that the parties concerned should agree upon the procedure to be adopted, with due regard for the principles specified above.

A.6 SAMPLING REPORT

The sampling report should state

(*a*) the name of the person drawing the sample;

(*b*) the name and address of the purchaser and the name of his representative;

(*c*) the name and address of the supplier and the name of his representative;

(*d*) the size of the lot;

(*e*) the constitution of the lot;

(*f*) if necessary, the references of the lot and of the units;

(*g*) the conditions in which the lot appears;

(*h*) number of specimens constituting the sample;

(*i*) the procedure employed;

(*j*) all the circumstances of such nature as to influence results of the future tests;

(*k*) the date of the operations;

(*l*) the place of sampling;

(*m*) a reference corresponding to that indicated on the samples;

(*n*) any deviation from this method of sampling.