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EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

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CONTINUOUS  
SPROCKET-PUNCHED STATIONERY  
PART II

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PHYSICAL PROPERTIES, FASTENINGS,  
PACKAGING AND STORAGE

March 1972

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European Computer Manufacturers Association  
114 Rue du Rhône - 1204 Geneva (Switzerland)

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## BRIEF HISTORY

A Technical Committee, TC14, was formed by ECMA in September 1967 to study paper sizes. The first task of this Committee was to consider sizes of continuous sprocket-punched forms. A survey of existing practice indicated that a wide variety of both form depths and widths were in use and that rationalization to an acceptable range would be of economic advantage.

The second task of this Committee was to consider the physical properties, fastening, packaging and storage of the sprocket-punched continuous forms.

Part I of this recommendation is published in the hope that it will provide the necessary lead to the industry in the choice of sizes of continuous forms.

Part II identifies the requirements for satisfactory performance over output printers.

The work in preparing this document has been closely co-ordinated with the activity in ISO and several national bodies. ISO/TC95/SC9 has adopted a similar recommendation for form sizes.



## TABLE OF CONTENTS

1. SCOPE
2. PHYSICAL PROPERTIES
  - 2.1 Test Conditions
  - 2.2 Material
  - 2.3 Smoothness
  - 2.4 Strength
  - 2.5 Writeability
3. SINGLE PART FORMS
  - 3.1 Basis Weight
4. MULTI-PART FORMS
  - 4.1 Basis Weight
  - 4.2 Number of Parts
5. CARBON PAPER
  - 5.1 Material
  - 5.2 Basis Weight
  - 5.3 Coating
6. SELF COPYING PAPERS
7. FASTENING
  - 7.1 Type of Fastenings
  - 7.2 Alignment
  - 7.3 Location of Fastenings
  - 7.4 Permeability
8. PERFORATIONS
  - 8.1 Perforations at Fold
  - 8.2 Additional Perforations
  - 8.3 Type of Perforations
  - 8.4 Specification of Perforations
9. PACKAGING
  - 9.1 Joins
  - 9.2 Boxes
  - 9.3 Size of Boxes
  - 9.4 Position of the Form in the Box
  - 9.5 Filling of the Box
  - 9.6 Splits
  - 9.7 Labels
10. STORAGE
  - 10.1 Temperature and Humidity
  - 10.2 Stacking

1920  
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1. SCOPE

This document provides recommendations on the choice of the paper, method of fastening of multipart sets, and packaging and storage of folded continuous sprocket-punched stationery for use with automatic data processing (ADP) equipment. Given the wide variety of data processing printers, types of paper and fastening methods this document offers a general recommendation for satisfactory performance of continuous stationery.

2. PHYSICAL PROPERTIES OF PAPER

2.1 Test conditions

23°C ± 1°C

50% ± 2% RH

2.2 Material

Paper manufactured from 100% chemical pulp should be used.

A mixture of chemical and mechanical pulp is acceptable provided that the values listed below are met and ADP printer tests are satisfactory.

2.3 Smoothness

The smoothness of the paper has a direct influence on print quality. For satisfactory results smoothness should be in the range:

100-300 ml/min (Bendtsen) B.S. 4420-69

For high speed and multipart form applications papers at the smoother end of the range are advised.

2.4 Strength

The strength characteristics are important for satisfactory performance in paper transport systems. Tests indicating strength with the minimum recommended values for 45 and 60 g/m<sup>2</sup> papers are:

		45 g/m <sup>2</sup>	60 g/m <sup>2</sup>
Tensile Strength	TAPPI T404 TS66 MD	29N/15 mm (71bs F/5/8)	44N/15 mm (10,5 lbs F/5/8)
Tearing Resistance	TAPPI T414 TS65 MD and CD	200 mN (20 gf)	300 mN (30 gf)
Bursting Strength	TAPPI T403 TS63	96 KPa (14 lbs in <sup>2</sup> )	140 KPa (20 lbs in <sup>2</sup> )

100	100	100	100
100	100	100	100
100	100	100	100
100	100	100	100

## 2.5 Writeability

It should be possible to write with either pen and ink or ball point pen on the paper surface.

## 3. SINGLE PART FORMS

### 3.1 Basis Weight

For high speed line printers: 60 g/m<sup>2</sup> minimum.  
For printers below 300 lines per min., serial printers, automatic typewriters, etc.: 45 g/m<sup>2</sup> minimum.

## 4. MULTIPART FORMS

### 4.1 Basis Weight

The number of copies required is a factor in determining the weight of paper. For best results paper of 40-50 g/m<sup>2</sup> is recommended. Where heavier weight or differing weight papers are to be used tests should be made.

### 4.2 Number of Parts

Normally, the maximum number of parts is six.

## 5. CARBON PAPER

### 5.1 Material

Tissue manufactured from 100% chemical pulp should be used. A mixture of chemical and mechanical pulps may be acceptable.

### 5.2 Basis Weight

Depending on the number of copies required, the base tissue weight should be 14-22 g/m<sup>2</sup>.

### 5.3 Coating

The coating should be uniform and provide an image which under normal filing conditions remains legible for a period of ten years. Its transfer properties should be maintained for at least one year.

## 6. SELF COPYING PAPERS

A number of self copying papers are available. Some of these papers meet the requirements in this document. Where this is not the case advice on their application should be sought from the paper supplier.

## 7. FASTENINGS

7.1 Papers and carbons, or self copying papers, perform best over transport systems if some means of fastening



is used. The use of hard fastenings, e.g. metal staples or nylon threads should be avoided.

- 7.2 Fastening may be fixed or flexible. If fixed, the forms through the set are permanently aligned; if flexible the forms may misalign when folded, but must realign on paper transport system.
- 7.3 Fastenings should be located in the sprocket hole margin, but should be clear of sprocket holes and the folds.
- 7.4 The air must be able to escape easily from between the papers.

## 8. PERFORATIONS

- 8.1 A perforation shall be made across the paper at each horizontal fold. The perforation should be at 90° to the paper edges.
- 8.2 Additional horizontal perforations may be required between folds; these intermediate perforations should not cut into the sprocket holes.
- 8.3 The type of perforation should be designated by the length of the cuts and the length of each uncut portion of paper (tie). Perforations consisting of straight clean cuts (slits) are preferred.
- 8.4 Factors to be considered in the specification of horizontal (cross) and vertical (down) perforations should include the following:
  - The stresses imposed on the paper by the operation of the machine, e.g. perforations should be cut in such a way that the edge of the form is not unduly weakened.
  - The application to single-part or multi-part stationery.
  - The characteristics of the paper, e.g. weight and strength.
  - The subsequent processes to be used, e.g. decollating, bursting and folding.

## 9. PACKAGING

- 9.1 Continuous paper shall be supplied free of joins, unless the type and location of joins is agreed between supplier and purchaser.
- 9.2 Continuous paper shall be supplied in a box with a separate lid. The box and the lid shall be sufficiently strong to protect the contents from damage during normal commercial handling and transportation and when boxes are stacked during storage.

Continuous paper shall be printed in a box with a  
series 10. The box and the series shall be printed  
series to protect the series from being  
and appropriate handling and packaging and that  
boxes are stacked before shipping.

- 9.3 The size of boxes shall be chosen with reference to any rules which specify maximum package weights and as agreed between the supplier and the purchaser.
- 9.4 The first form in a box shall face upwards, i.e. its face shall be immediately visible when the box is opened.
- 9.5 A box shall be filled to such an extent that the lid prevents movement of the contents within the box but not to such an extent that carbon is offset from one form to another through the pressure applied by boxes during stacking.
- 9.6 A box containing a split shall be labelled prominently to this effect. The upper part of the split shall be wrapped with a paper strip to indicate the size of the split. Each part of the split shall be correctly oriented to the direction of the transport system.
- 9.7 Boxes should be labelled on the outside, describing the content. The label should also advise that the box be kept unopened until required for use.

## 10. STORAGE

### 10.1 Temperature and Humidity

Paper is a material which is rapidly and considerably affected by variations in temperature and humidity during storage or use. Variation in the humidity is the more serious, since changes will affect the size and strength characteristics.

- 10.1.1 Continuous forms should be stored and used in the following conditions:

40% RH to 60% RH  
16°C to 24°C

- 10.1.2 If continuous forms are stored outside these limits, (e.g. close to pipes, radiators, hot air ducts, open windows, etc.) a deterioration in performance must be expected. This will minimize if sufficient time is allowed for acclimatization to the conditions in which it is to be used. It is recommended that the stationery be exposed to the conditions of use for a minimum of 24 hours for acclimatization.

Paper exposed to extremes of humidity may be permanently damaged.

### 10.2 Stacking

Continuous stationery should be kept in the original boxes until required for use.





- 10.2.1 The boxes should be stacked lid uppermost and not directly touching the floor.
- 10.2.2 Boxes may be stacked up to six high, should be supported squarely and should have no heavy weights placed upon them. When stacking, consideration must be given to the strength and stability of the boxes and the weight of the paper.
- 10.2.3 Partly used boxes should not be placed within a stack, but may be placed as the top box of a stack.





