

ECMA

EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

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RECOMMENDED OCR PAPER  
SPECIFICATIONS

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MECHANICAL PROPERTIES

2nd Edition — January 1977

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## BRIEF HISTORY

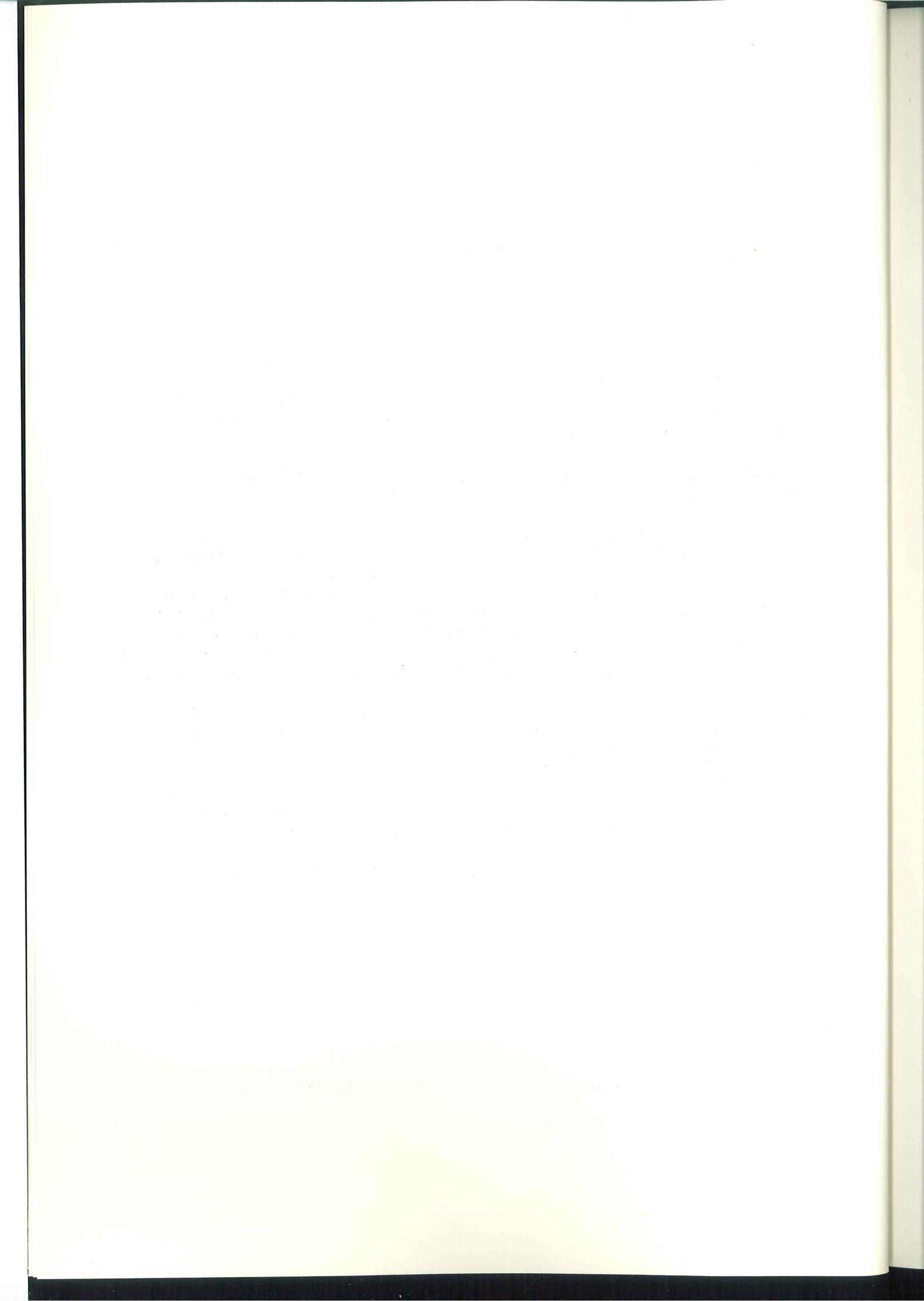
During its initial investigations into the specification and measurement of the quality of printed characters for input to Optical Character Recognition (OCR) systems, ECMA Committee TC 4 realized the importance of the base paper upon which characters were printed.

Accordingly, TC 4 set up a task group which examined two aspects of the effect of paper on OCR systems.

Optical properties, i.e. reflectance, dirt count and opacity were considered basic to the OCR system and were, therefore, specified in the print quality standard ECMA-15. Mechanical properties were found to have a direct bearing on both the ability of the paper to accept print and its ability to be fed through reading devices. TC 4 felt that a statement on mechanical properties should be made in a separate document: "Recommended OCR Paper Specifications", issued in March 1970.

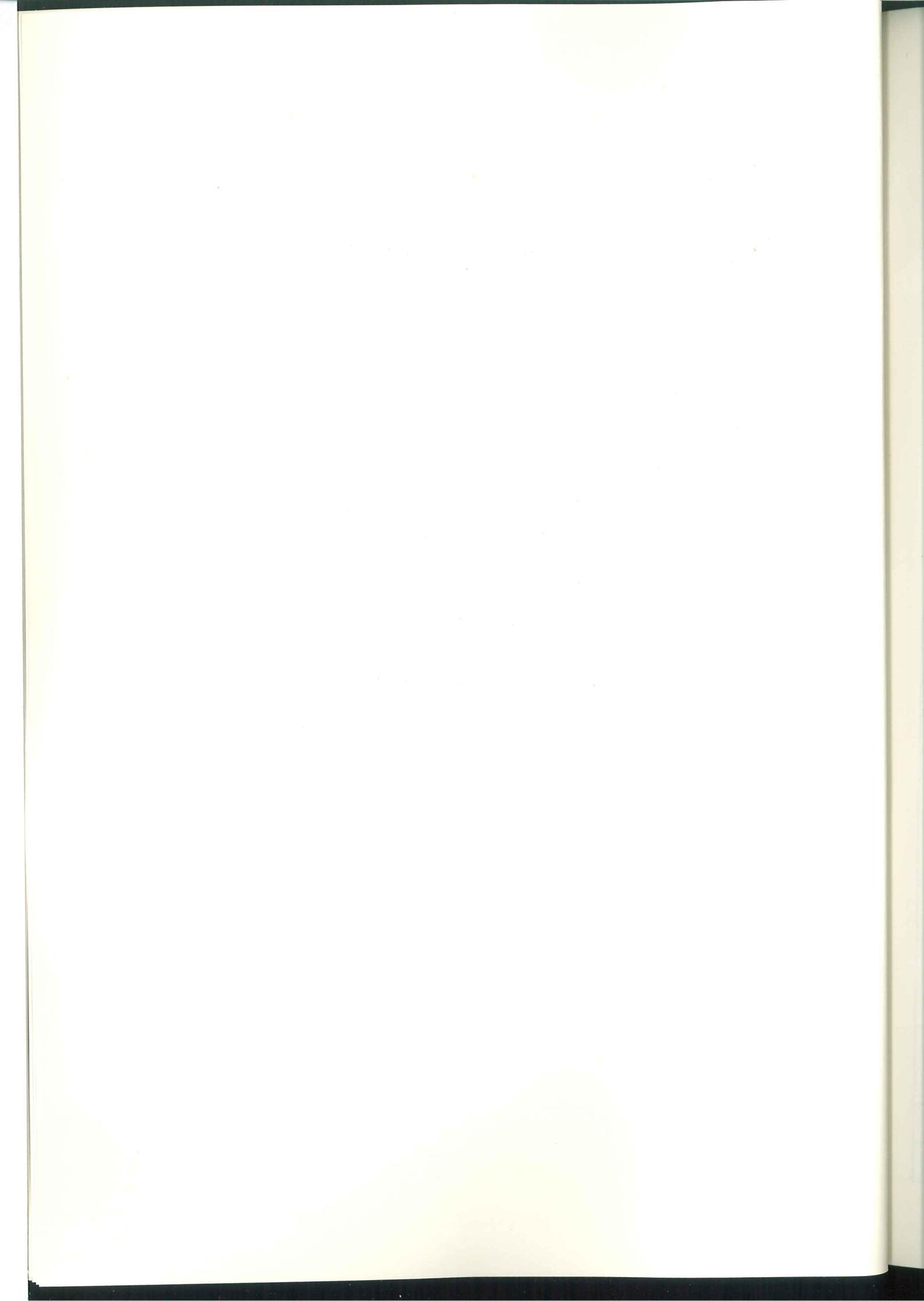
During work leading to the revised edition of ECMA-15, TC 4 decided that this OCR Paper Recommendation should be reviewed in the light of further experience and recent developments. The 2nd edition differs from the first in that paper for a third category of machine, page readers, has been specified separately from paper for single line document readers and journal tape. Further, test methods used have been updated and ISO standards for them quoted, where appropriate. In addition to the recommended methods, a list of alternatives has been added.

THIS 2nd EDITION SUPERSEDES THE EDITION DATED MARCH 1970.



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PRIMARY IMPORTANCE

... first paragraph considered to be of primary importance for each reader, single line heading respectively.

The number of primary parameters has been kept as small as possible, while covering the properties known to be important. All parameters suggested have been considered but in the absence of general agreement, they have only been included on production of factual evidence to support their importance.

ISO standards, draft standards and recommendations have been included where available. Where ISO methods are not available, only methods for which test equipment is commercially obtainable have been considered. For all parameters, alternative methods are allowed, providing that correlation to the method listed in the following sections has been established. Known alternatives and sources of correlations are listed in the Appendix for help and guidance.

Sources of suitable instruments are also listed in the Appendix.

#### 4.2 Parameters for Documents for Page Readers

Table 1

PARAMETER	STANDARD TEST REFERENCE	TEST INSTRUMENTS	UNIT	SPECIFICATION
Grammage	ISO R 536		g/m <sup>2</sup>	90-100 ± 5 %
Thickness	ISO R 534		um	100-125
Stiffness	MD CD	ISO 2493	TABER UNITS	3,0 min 1,5 min
	MD CD	ISO 2493	KENLEY	g 0,74 min 0,37 min
	MD CD	ISO 2493	LORENTZEN & WETTERS (5cm)	mN 6,1 min 3,05 min
	Porosity	TAPPI T460/ 05-68	GURLEY	sec/100ml
-		BENDTSEN	ml/min	400 max
Smoothness TS	ISO 2494	BENDTSEN	ml/min	225 max
	ISO 2494	SHEFFIELD	ml/min	160 max
Abrasion	ISO DIS 3444	TABER	mg	500 max
Cur1	DIN 6723-4		min	4 max



NOTES

1. In the above table MD and CD (Machine direction and cross direction) refer to the relationship of the axis of the test piece to the direction in which the paper was laid down on the machine during manufacture and hence to the direction of the fibres in the paper.
2. The uniformity of thickness is of great importance as variation in a batch of documents can affect the transport of the documents through the reader. The variation should not exceed 15 % in any batch.
3. "Smoothness" sometimes described "Roughness" is specified for the Top Side (TS) only assuming that printing will be on that side. Should printing be required on the wire side of the paper, then that too should meet the specification in Table 1.

4.3 Parameters for Documents for Single Line Reading Devices

Paper for such documents should meet the requirements laid down in Table 1 and following notes for page readers. In addition it should meet the parameters shown in Table 2.

Table 2

PARAMETER	STANDARD TEST REFERENCE	TEST INSTRUMENT	UNIT	SPECIFICATION
Internal Tear Strength (MD & CD)	ISO R 1974	ELMENDORF	mN	590 min
Coefficient of static friction (MD)	-	IBM	-	0,2 - 0,4

NOTE 4

Friction measurements should be made with the IBM tester as described in the TAPPI Journal Volume 40, No.12, December 1957, or equivalent correlated instrument. It is recommended that at least ten samples of the same batch should be measured. Where the variation of the readings exceeds a range of 0,08, the number of readings should be increased to 20. To avoid spurious results, great care should be taken when the samples are handled and the test area should never be touched with the fingers. The samples should be placed top (felt) side to wire side during testing.



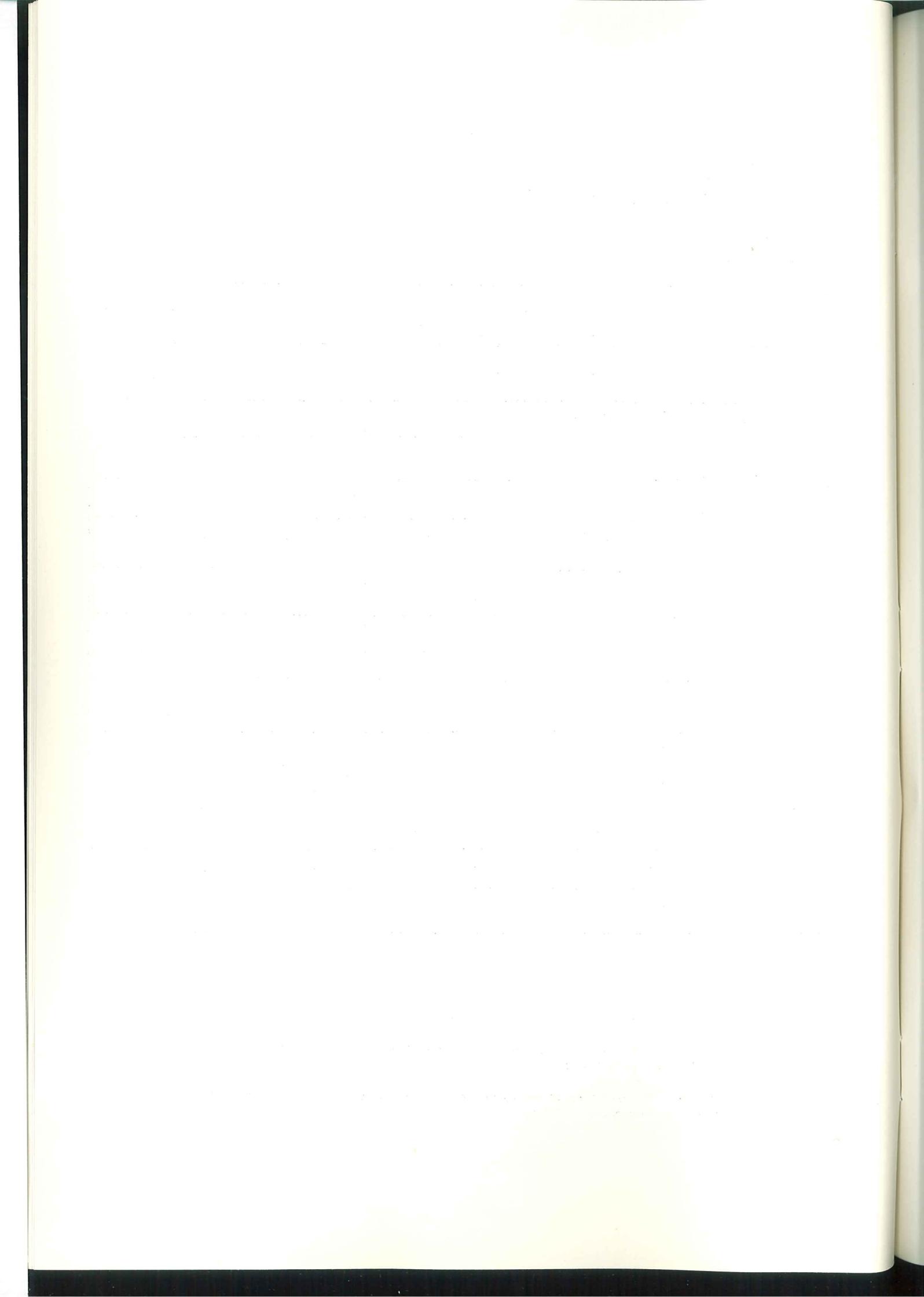
4.4 Parameters for Journal Tape

Table 3

PARAMETER		STANDARD TEST REFERENCE	TEST INSTRUMENT	UNIT	SPECIFICATION
Grammage		ISO R536		g/m <sup>2</sup>	56-70 ± 5 %
Thickness		ISO R534		um	65-100
Stiffness	MD		GURLEY	mg	60 minimum
	CD		GURLEY	mg	30 minimum
Porosity		TAPPI T460/ 05-68	GURLEY	sec/100ml	15-40
			BENDTSEN	ml/min	300-750
Internal Tear Strength	MD	ISO R1974	ELMENDORF	mN	176 minimum
	CD	ISO R1974	ELMENDORF	mN	255 Minimum
Tensile Strength MD		ISO 1974		N/15 min Strip	31,5
Smoothness TS		ISO 2494	BENDTSEN	ml/min	100-200
		ISO 2494	SHEFFIELD	ml/min	100-150
Abrasion		ISO DIS 3444	TABER	mg	600 maximum

NOTES

5. Explanations of the abbreviations MD, CD and TS are as stated in Notes 1 and 3.
6. Some equipment can accept an extended range of basis weight of 40 - 70 g/m<sup>2</sup>. Such a range should only be used where the machine specification permits.
7. The values of stiffness are specified in Gurley because of the low substance range. No satisfactory correlation can be applied for conversion to Taber.



## 5. PARAMETERS OF SECONDARY IMPORTANCE

These are intended only to apply to paper for page reader and single line reader documents.

### 5.1 Surface Finish

Papers should have a good even finish with uniform surface structure.

The surface should be capable of accepting printing without feathering or any other undesirable characteristics.

Such papers are generally made from chemical pulp.

### 5.2 Dust and Ash Content

Dust from all sources should be eliminated as far as possible and should not cause corrosive or abrasive damage to reading machine transports. For this reason it is usual to control the ash content of papers for these applications to a maximum of about 8 %.

### 5.3 Dimensional Stability

Papers should have good dimensional stability within the relative humidity and temperature range normally encountered in printing and processing areas.

### 5.4 Grain Direction

Forms in which the machine direction, as previously defined, is along the length of the form are known as long grain, and where it is across, they are called short grain. Grain direction is not generally critical providing the other requirements stated in this specification are met. When a lower or much higher grammage paper is used, the grain direction may be important. Grain direction is specified for a few machines however, and users should check with suppliers and machine specifications.



APPENDIX

A 1. ALTERNATIVE TEST METHODS

PARAMETER	INSTRUMENT	CORRELATION
Stiffness	GURLEY	PIRA/PBHT-6 Test data comparisons
	CLARK	" "
	L'HOMARGY	PIRA/TS.88 Measurement of stiffness
	SCHLENKER	Das Papier Vol. 14 No. 9 (5/9/60 pp. 412-422).
Porosity	BENDTSEN	PIRA/PBHT-6 Test data comparisons
	POTTS	" "
	GURLEY	" "
	SHEFFIELD	" "
Smoothness	BEKK	" "
	BENDTSEN	" "
	GURLEY	" "
	SHEFFIELD	" "

A 2. REFERENCES AND SOURCES OF EQUIPMENT

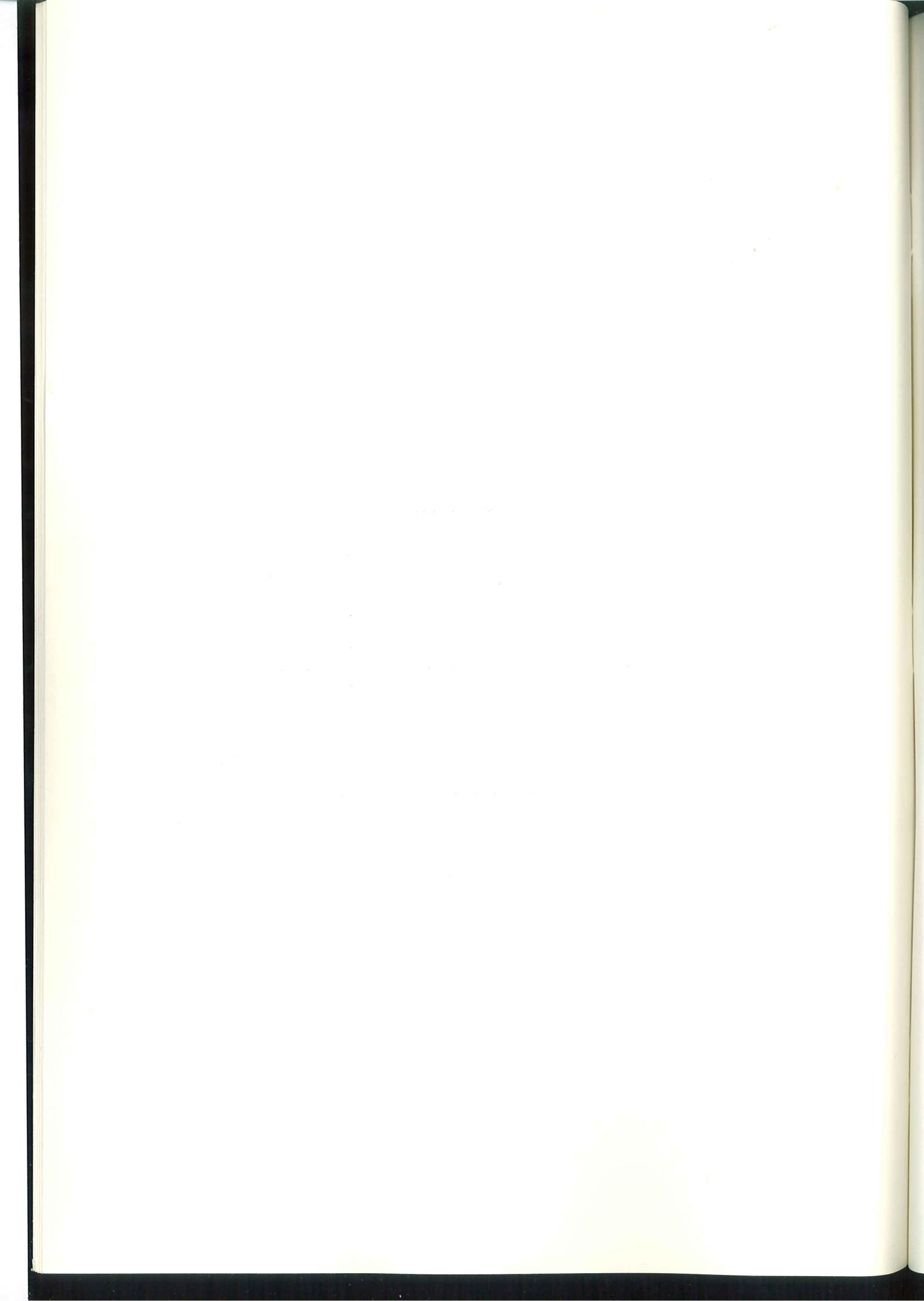
A 2.1 International standards and recommendations are available from each national standards organization.

A 2.2 TAPPI Standards can be obtained from : -

Technical Association for Pulp and Paper Industry  
360, Lexington Avenue  
NEW YORK, (N.Y.)  
USA

A 2.3 PIRA reports can be purchased from : -

P I R A  
Randalls Road  
LEATHERHEAD, (Surrey)  
UNITED KINGDOM



A 2.4 Paper testing instruments can be supplied by a number of laboratory instrument agents throughout the world, who can advise on cost and availability.

In case of difficulty a list of the recommended instruments and their manufacturers is given below :

Taber Instrument	Taber Instruments Co. North Tonawonda, N.Y., USA
Gurley Instrument	WTLE Gurley TROY, (N.Y.), USA
Bendtsen Instrument	A. Anderson and O. Sørensen, Niels Juelsgade, 9-11 COPENHAGEN, Denmark
Sheffield Instrument	Sheffield Corp. DAYTON, Ohio, USA
IBM Friction Tester	Precision Machinery Engineers, (Harrow) Ltd., 1 Peel Road Wealdstone HARROW, Middlesex, United Kingdom
Elmendorf Tear Tester (other manufacturers also available)	A.B. Lorentzen & Wettres, Maskinaffär, STOCKHOLM, Sweden
Kenley Stiffness Tester	Shirley Developments Ltd. 856, Wilmslow Road, Didsbury, MANCHESTER United Kingdom
Lorentzen & Wettres Stiffness Tester	As above.





