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IS 12755-2 (1989): Alphanumeric character sets for optical recognition, Part 2: Character set OCR - B - Shapes and dimensions of the printed image [LITD 15: Data Management Systems]

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IS 12755 (Part 2) : 1989 ISO 1073/2: 1976

Indian Standard

ALPHANUMERIC CHARACTER SETS FOR OPTICAL RECOGNITION

PART 2 CHARACTER SET OCR-B - SHAPES AND DIMENSIONS OF THE PRINTED IMAGE

UDC 681.3.048

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BUREAU OF INDIAN STANDARDS

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG NEW DELHI 110002

August 1990

Price Group 14

Indian Standard ALPHANUMERIC CHARACTER SETS FOR OPTICAL RECOGNITION

PART 2 CHARACTER SET OCR B-SHAPES AND DIMENSIONS OF THE PRINTED IMAGE

NATIONAL FOREWORD

This Indian Standard(Part 2), which is identical with ISO1073/2:1976 'Alphanumericcharactersets for optical recognition-Part 2 : Character set # OCR -B -- Shapes and dimensions of the printed image', issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on 15 December 1989 on the recommendation of the Computers, Business Machines and Calculators Sectional Committee (LTD 24) and approval of , the Electronics and Telecommunication Division Council.,

In the adopted standard certain terminology and conventions are not identical with those used in Indian Standards; attention is specially drawn to the following:

- a) Comma (,) has been used as a decimal marker while in Indian Standards the current practice is to use a point (.) as the decimal marker.
- b) Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'Indian Standard'.

For the purpose of this Indian Standard, only metric dimensions are applicable.

CROSS REFERENCE

In this Indian Standard, the following International Standard'is referred to. Read in its place the following:

International Standard	Indian Standard	Degree of Correspondence
ISO 646 Information processing — ISO 7-bit coded character set for information interchange	IS 10315 : 1982 7-bit coded character set for information interchange	Technically equivalent

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1 GENERAL

1.1 Scope

This International Standard for character shapes and sizes is intended to facilitate and foster the use of Optical Character Recognition (OCR) in data processing, by defining character shapes suitable for both human and machine reading.

It establishes a common basis for printing equipment and optical scanning equipment for OCR interchange applications

Additional International Standards will cover the print quality and the relevant characteristics of the formats needed to satisfy interchange requirements.

1.2 Field of application

This International Standard specifies the printed image shapes and sizes of alphanumeric characters, graphics and symbols designed for use in Optical Character Recognition. They are also suitable for general purposes.

In order to satisfy present requirements and encourage the wide extension of OCR applications, two sets of characters are specified. These are named OCR-A and OCR-B.

Character set OCR-A includes the numeric subset which was recommended in draft ISO Recommendation No. 890 (now part of this International Standard). The shapes of the characters have been designed to be suitable for use in many applications of OCR Dimensions of OCR A are given in three SIZES. (See part 1.)

The shapes of the OCR-B characters have been designed for use in OCR systems without undue sacrifice of theirsuit ability for general purposes in a wide range of applications. Dimensions of OCR-B are given in three sizes.

1.3 Definitions

For the purpose of this International Standard the following definitions apply

1.3.1 OCR-A : A repertoire of 69 characters of which 56 are graphics included in the ISO 7 bit coded character set (ISO 646-1973). It comprises digits, capital letters, capital national letters and other graphics(See part 1.)

1.3.2 OCR.6 A repertoire of 121 characters comprising

digits, capital and small letters, all the graphics specified in the ISO7-bit coded character set (ISO646-1973), national letters, diacritical.signs and further graphics.

NOTES

1 For applications which involve circulation of documents across boundaries between areas in which different national characters are in use, agreement between the sender and the recipient of the documents is required.

2 The metric and inch dimensions in this International Standard are rounded and therefore consistent but not exactly equal. Either system may be used but the two should not be intermixed.

3 It is recognized that some type-making and printing processes will not be able to produce sharp corners. Corners not specified as having a specific radius should be as sharp as practicable. However, it is not necessary for OCR purposes that the radii of the corners of the norminal printed Image be less than 0.08 mm (0.00035 in).

2 STYLES

The OCR-E font (see clause 13) comprises 121 characters, but. In general, only a subset will be used for a specific application.

The character shapes and dimensions are specified by refer ence drawings on a reference grid. The nominal strokewidth is constant for each character of the standard set entitled "constant-strokewidth font", the centreline of each character is indicated on the reference grid.

A second style of characters entitled "letterpress font" may be used with printiny equipment which can reproduce fine details with sufficient accuracy. For many classes of printers, however, the strokewidth is less controllable and therefore tor these printers the constant-strokewidth font shall be used

For aesthetic reasons, the strokewidth of the letterpress font characters is varied deliberately and the stroke endings are specially designed. But the centrelines are the same for both fonts and these centrelines, as defined for the constant strokewidth font, are the definitive part of this standard

3 OCR B SIZES

3.1 Three sizes are specified for OCR-B characters in order to provide for use with a wide range of printingequipment processing differing printiquality characteristics. Devices such astypewriters, cash registers, numbering machines, high-speed printers, and credit card imprinters, besides printingprocesses such asletterpress and offset lithography, are all suitable.

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3.2 The letterpress font is specified in size **I** (the smallest) 'only. It provides the option of a variable pitch between characters as is usual with letterpress.

3.3 The constant-strokewidth font is specified in three sizes, I, III and IV. Mechanisms using the constant-strokewidth font will usually maintain a fixed pitch.

3.4 Size I I which was in ISO/R 1073-I 969 has been deleted. (See annex B.)

3.5 The centrelines for the three sizes are simply related by appropriate horizontal and vertical scale factors. The factors for size I I I and size IV referred to size I are :

for size I I I	
Vertical: 1,333	Horizontal: 1,086
for size IV	
Vertical: 1,500	Horizontal : 1,500

This scale relationship does not apply to the outline shapes, since nominal strokewidth is not strictly proportional to centreline dimensions. The strokewidths for each size are shown in the reference drawings.

3.6 The character with the greatest height in each size is digit *EIGHT*. It is the character which extends farthest above the base line for capital letters. The longest character is small letter j, because of its descender.

The centreline heights of the character EIGHT are :

for size I:	2,40 mm (0.094 in)
for size III :	3,20 mm (0.126 in)
for size IV :	3.60 mm (0.142 in)

3.7 The widest character in each size (except for the alternative small letter m) is digit ZERO. Its centreline widths are :

for size I :	1.40 mm (0.055 in)
for size III :	1.52 mm (0.060 in)
for size IV :	2,10 mm (0.083 in)

3.8 Constant-pitch printing

In constant-pitch printing for OCR applications, the following minimum nominal pitches are appropriate :

size I :	2.54 mm (0.100 in) min.
size IN :	2,54 mm (0.100 in) min.
size IV :	3,63 mm (0.143 in) min.

4 TYPICAL DIMENSIONS OF THE NOMINAL PRINTED IMAGE

4.1 Constant-strokewidth font

Typical dimensions for the nominal printed image of the constant-strokewidth font in size I are given below. These dimensions are the heights above and below the horizontal base line of digits, capital and small letters, ascenders and descenders (see figure 1). These dimensions are for general information only. The values for individual characters art obtainable from the reference drawings.

4.2 Letterprerr font

The shapes of the letterpress characters are similar except that the stroke ends are not rounded.



FIGURE1 - Heights above and below base line

TABLE 1 - Typical dimensions A, 8, C and D

nillimetres			inches					
0120	A	t?	с	D	A	В	с	D
I	2.66	2.46	1.83	0,60	0.105	0.097	0.072	0.024

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5 OCR-B CHARACTER SET

The full character set comprises 121 characters. The following sub-sets can be distinguished.

5.1 Sub-set 1 : Numeric sub-set

This sub-set comprises 22 characters :

0123456789 <+> CENSTXZ

NOTES

1 The character ZERO is the only digit which had to be modified in this revision of ISO/R 1073.1969. The use of the original design is tolerated in numeric applications implemented before 1976. OCR reading of both old and revised design is subject to special agreement between OCR equipment supplier and user. For any application implemented after 1976. only the new design is standard.

2 The characters C E N ST X Z should preferably not be used in document reading applications.

5.2 Sub-set 2 : Initial alphanumeric sub-set

This sub-set comprises 47 characters :

0123456789 ABCDEFGHIJKLM NOPQRSTUVWXYZ <+>*-=/.,

SPACE

This sub-set comprises 98 characters, in particular those of the ISO 7-bit coded character set (ISO 646-1973) •

!"#£¤\$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZE\]^_ `abcdefghijklmno pqrstuvwxyz{|}~ |space

5.4 Sub-sat 4 : Options sub-set

This sub-set comprises 8 capital national letters, 5 small national letters, 4 diacritical signs and 4 Further characters :

Ä A ÆIJñöØÜ aæijøß§¥

m

5.5 Sub-set 5 : Erase characters

This sub-set comprises 2 characters :



The dimensions of these two characters are as shown below :



CHARACTER ERASE

GROUP ERASE

		millimetres			inches		
	Size I	Sirs III	Size IV	Size I	Size III	Size IV	
CHARACTER ERASE							
min H	2,4		3,8	0.094		0.149	
max. H	2,9		4.6	0.115		0.181	
min. W	1.4		2,0	0 055		0.079	
max. w	1.9		2,8	0.075		0.110	
D	0.13		0.20	0.005		0.008	
GROUP ERASE							
minimum length	7.6	7.6	10.9	0.300	0.300	0.430	
minimum width	0,2	0,2	0,2	0.008	0.008	0.008	
а	0.4	0.5	0,6	0.016	0.020	0.024	
Ь	2.0	2.7	3.0	0.077	0.106	0.118	

TABLE 2 - Dimensions of erase characters

FIGURE 2 - Erase characters

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6 INDEX TABLE

6.1 All characters are available in size I as constantstrokewidth font and as letterpress font.

Only the characters of the numeric sub-set (sub-set 1) and the character GROUP ERASE are available in size III as constant-strokewidth font.

All characters are available in size IV as constant-strokewidth font, with the exception ∂f VERTICAL LINE.

6.2 In the following index table each character is given with the indication of the reference drawing or drawings and the sub-set or sub-sets in which it is comprised.

The drawings are identified as follows :

L: for letterpress font, size I

C : for the constant-strokewidth font, size I

III: for the constant-strokewidth font, size III.

6.3 As stated in 11.6, the character shapes for size IV are derived from those of size I for the constant-strokewidth font (designated by C).

6.4 Application advice is given in the column "Remarks", where it is indicated, *inter alia*, which characters are included for general-purpose use only and should not be used for OCR purposes.

It is recommended that prospective users of this standard consult manufacturers before deciding on a particular character set.

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Ref. NO.	Shape	Drawing(s) NO.	Name	Sets	Remarks
1	1	1 ٤, c, III	DIGIT ONE	1 2 3	
2	2	2 L, c III	.DIGIT TWO	1 2 3	
3	3	3 L, c, Ⅲ	DIGIT THREE	1 2 3	
4	4	4 ∟, с. Ⅲ	DIGIT FOUR	1 2 3	
5	5	5 L, c, Ⅲ	DIGIT FIVE	1 2 3	
6	6	6 L, c, III	DIGIT SIX	1 2 3	
7	7	7 L, c. III	DIGIT SEVEN	1 2 3	
8	8	8 L, C, III	DIGIT EIGHT	1 2 3	
9	9	9 L, c, III	DIGIT NINE	1 2 3	
ťÓ	0	10 L, c, III	DIGIT ZERO	1 2 3	The character ZERO is the only digit which hed to be modified in this revision of ISO/R1073-1969. The use of the original design is tolerated in numeric applications implemented before 1976. OCR reading of both old and revised design is subject to special agreement between OCR equipment supplier and user. For any application implemented after 1976, only the new design is standard.
11	Α	11 L, C	CAPITAL LETTER A	2 3	

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INDEX TABLE	(continued)
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Rei NO	Shape	Drawing(s) NO.	Name	Sets	Remarks
12	В	12 L, C	CAPITAL LETTER B	2 3	
13	С	13 L, c, III	CAPITAL LETTER C	1 2 3	
14	D	14 L, C	CAPITAL LETTER D	2 3	
15	Ε	15 L, c, III	CAPITAL LETTER E	1 2 3	
16	F	16 L, C	CAPITAL LETTER F.	2 3	
17	G	17 L, C	CAPITAL LETTER G	2 3	
18	Η	18 L, C	CAPITAL LETTER H	2 3	
19		19 L, C	CAPITAL LETTER	2 3	
20	J	20 L, C	CAPITAL LETTER	2 3	
21	Κ	21 L, C	CAPITAL LETTER K	2 3	
22	L	22 L, C	CAPITAL LETTER L	2 3	

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Ref. NO.	Shape	Drawing(s) No.	Name	Sets	Remarks
23	Μ	23 L, C	CAPITAL LETTER M	2 3	
24	Ν	24 L, c, III	CAPITAL LETTER N	1 2 3	
25	0	25 L, C	CAPITAL LETTER O	2 3	
26	Ρ	26 L, C	CAPITAL LETTER P	2 3	
27	Q	27 L, C	CAPITAL LETTER Q	2 3	
28	R	28 L, C	CAPITAL LETTER R	2 3	
29	S	29 L, c, III	CAPITAL LETTER S	1 2 3	
30	Τ	30 L.C. III	CAPITAL LETTER T	1 2 3	
31	U	31 L, C	CAPITAL LETTER U	2 3	
32	V	32 L, C	CAPITAL LETTER V	2 3	
33	W	33 L, C	CAPITAL LETTER W	2 3	

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Ref. NO.	Shape	Drawing(s) NO.	Name	Sets	Remarks
34	Χ	34 L, c, iii	CAPITAL LETTER X	1 2 3	
35	Y	35 L, C	CAPITAL LETTER Y	2 3	
36		7 36	CAPITAL LETTER	1 2 3	
37	a	37 L, C	SMALL LETTER a	3	Smaller strokewidth, see clause 11
38	b	38 L, C	SMALL LETTER b	3	Smaller strokewidth, see clause 11.
39	С	39 L, C	SMALL LETTER	3	Smaller strokewidth, see clause 11
40	d	40 L, C	SMALL LETTER d	3	Smaller strokewidth, see clause 11.
41	e	41 L, C	SMALL LETTER e	3	Smaller strokewidth, see clause 11.
42	f	42 L, C	SMALL LETTER f	3	Smaller strokewidth. see clause 11 .
43	g	43 L, C	SMALL LETTER	3	Smaller strokewidth, see clause 11.
44	h	44 L, C	SMALL LETTER	3	Smaller strokewidth, see clause 11.

INDEX TABL**E** (continued)

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Ref. NO.	Shape	Drawing(s) NO.	Name	Sets	Remarks
45	1	45 L, C	SMALL LETTER	3	Smaller strokewidth, see clause 11.
46	J	46 L, c	SMALL LETTER J	3	Smaller strokewdth. see clause 11
47	k	47 L, C	SMALL LETTER k	3	Smaller strokewdth, see clause 11
48		48 L, C	SMALL LETTER	3	Smaller Strokewioth, see clause 11.
49	m	49 L, C	SMALL LETTER	3	Smaller strokewdth, see clause 11.
50	n	50 L, C	SMALL LETTER	3	Smaller strokewidth. see clause 11
51	0	51 L, C	SMALL LETTER o	3	Smaller strokewidth. see clause 11
52	Ρ	52 L, C	SMALL LETTER	3	Smaller strokewidth, see clause 11
53	q	53 L, C	SMALL LETTER q	3	Smaller strokewdth, see clause 11.
54	r	54 L, C	SMALL LETTER r	3	Smaller srrokewidrh, see clause 11
55	S	55 L, c	SMALL LETTER	3	Smaller Strökewidth, see clause 11.

INDEX TABLE /continued/

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INDEX	TABLE	(continued)
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Ref. NO.	Shape	Drawing(s) NO.	Name	Şeti	Remarks
56	t	56 L, c	SMALL LETTER t	3	Smaller strokewidth,see clause 11
57	u	57 L, C	SMALL LETTER	3	Smaller_strokewidth, see clause11.
58	V	58 L, C	SMALL LETTER V	3	Smaller strokewidth. see clause 11.
59	W	59 L, C	SMALL LETTER W	3	Smaller strokewidth. see clause 11.
60	Х	60 L, C	SMALL LETTER x	3	Smaller strokewidth, see clause 11.
[,] 61	У	61 L, c	SMALL LETTER y	3	Smallerstrokewidth, see clause 11.
162	Z	62 L, c	SMALL LETTER z	3	Smaller strokewidth,see clause 111.
63	*	63 L, C	ASTERISK	2 3	
64	t	64 L, c, III	PLUS SIGN	1 2 3	
65		65 L, C	HYPHEN (MINUS SIGN)	2 3	
66		66 L, C	EQUALS SIGN	2 3	

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INDEA TABLE (CONUNACU)	INDEX	TABLE ((continued)
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Ref. NO.	Shape	Drawing(s) No.	Name	Sets	Remarks
67	/	67 L, C	SOLIDUS	2 3	
68		68 L, C	FULL STOP (PERIOD)	2 3	
69	/	69 L, C	СОММА	2 3	Two vertical locations are specified, one of which projects below the base line for capital letters (see 11.4 and 11.7)
70		70 L, C	COLON	3	
71		71 L, C	SEMI-COLON	3	Two vertical locations are specified, one of which projects Delow the base line for capital letters (see 11.4 and 11.71,
72	11	72 L, C	QUOTATION MARK	3	Can be replaced by DIAERESIS (Ref. 107) in non-OCR applications,ifitis required to print QUOTATION VIARK and DIAERESIS with the same type-face see 7.2).
73	IJ	73 L, C	APOSTROPHE	3	Can be replaced by ACUTE ACCENT (Ref. 108) in 1007-OCR applications, if it is required to print APOS- FROPHE and ACUTE ACCENT with the same type- face (see 7.2).
74		74 L, C	DISCONTINUOUS UNDERLINE	3	For OCR this character shell be used as stand alone character only. and shall not be printed under another character (see clause 8).
75	?	75 L, C	QUESTION MARK	3	
76	!	76 L, C	EXCLAMATION MARK	3	
77	(77 L, C	LEFT PARENTHESIS	3	

Ref. NO.	Shape	Drawing(s) No.	Name	Sets	Remarks
78)	78 L, C	RIGHT PARENTHESIS	3	
79	<	79 L, c, III	LESS THAN SIGN	1 2 3	
80	>	80 L, c, III	GREATER THAN SIGN	1 2 3	
81	Γ	81 L, C	LEFT SQUARE BRACKET	3	
a2	1	a2 L, C	RIGHT SQUARE BRACKET	3	
83	%	a3 L, C	PERCENT SIGN	3	Smaller strokewidth. see clause 11
84	#	a4 L, C	NUMBER SIGN	3	Smaller strokewidth, see clause 11
а5	&	a5 L, C	AMPERSAND	3	
86	ຝ	86 L, C	COMMERCIAL AT	3	Smaller strokewidth, see clause 11.
a7	•	87 L, C	UPWARD ARROW HEAD	3	Can be replaced by CIRCUMFLEX ACCENT (Ref110) in non-OCR applications, if it is required to print UPWARD ARROW HEAD and CIRCUMFLEX ACCENT with the same type-face (see 7.21.
88	¤	88 L, C	CURRENCY SIGN	3	

INDEX TABLE (continued)

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Ref. NO.	Shape	Drawing(s) 'NO.	Name	Sets	Remarks
89	ſ	89 L, C	POUND SIGN	3	
90	\$	90 L, C	DOLLAR SIGN	3	
91	I	91 L , c	VERTICAL LINE	3	See clause 10
92		92 L, c, III	LONG VERTICAL	1 2 3	see clause 10.
93	١	93 L, C	REVERSE SOLIDUS	3	
94	· ►	94 L, C	CAPITAL LETTER	4	Where possible, substitution by rhe two capital letters A (Ref. 11) and E(Ref.15)ıs recommended for OCR.
95	Ă	95 L, c	CAPITAL LETTER Å	4	
96	Æ	96 L, C	CAPITAL LETTER Æ	4	
97	0 •	97 L, C	CAPITAL LETTER Ö	4	Where possible. substitution by the two capital letters 0 (Ref.25) end E (Ref. 15) is recommended for OCR.
98	Ø	98 L, C	C APITAL LETTER 0 .	4	
99	Ü	99 L, C	CAPITAL LETTER U	4	Where pOSSible, substitution by the two capital letters U (Ref. 31) and E (Ref. 15) is recommended for OCR.

INDEX TABLE (continued)

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Ref. NO.	Shape	Drawing(s) NO.	Name	Sets	Remarks
100	IJ	100 L, C	CAPITAL LETTER DUTCH IJ	4	For OCR purpose. separate capital letters 1(Ref.19) and J (Ref. 20) should be used.
101	N	101 L, C	CAPITAL LETTER Ń	4	
102	aa	102 L, C	SMALL LETTER	4	Smaller strokewidth, see clause 11.
103	æ	103 L, C	SMALL LETTER æ	4	Smaller strokewidth, see clause 11.
104	Ø	104 L C	SMALL LETTER ϕ	4	Smaller strokewidth. see clause 11.
105	IJ	105 L, C	SMALL LETTER DUTCH ïj	4	Smaller strokewidth. see clause 11.
106	ß	106 ⊾, շ	SMALL LETTER GERMAN DOUBLE s	4	Smaller strokewidth, see clause 11
107	88	107 L, C	DIAERESIS	4	For use see clause 7.
108		108 L, C	ACUTEACCENT	4	For use see clause 7.
109	•	109 L, C	GRAVE ACCENT	3	For USE See clause 7
110	A	110 L, c	CIRCUMFLEX ACCENT	4	For usesqelause 7.

INDEX TABLE (continued)

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INDEX	TABLE	(concluded)
INDEX	TABLE	(concluded)

Ref. NO.	Shape	Drawing(s) NO.	Name	Sets	Remarks
111	2	111 L, C	TILDE	4	For use see clause 7.
112		112 L, c	CEDILLA	4	For use see clause 7.
113	{	113 L, C	LEFT CURLY BRACKET	3	Use is not recommended for OCR.
114	}	114 L, C	RIGHT CURLŸBRACKET	3	Use is not recommended for OCR.
115	m	115 L, C	ALTERNATIVE SMALL LETTER m	4	May be used in variable-pitch printing as a substitute for Fief. 49.
116		116 L, C	CONTINUOUS UNDERLINE	4	CONTINUOUS UNDERLINE is not intended for use Its width must be such rhat adjacent CONTINUOUS OCF UNDERLINES have no gap between them. See clause 8
117		No drawing	SPACE	1 2 3	SPACE is a non-printing character. For definition, see clause 9. Not all readers will necessarily recognize SPACE
118	ŝ	118 L, C	PARAGRAPH	4	
119	¥	119 L, C	YEN SIGN	4	
120		No drawing L, C	CHARACTER ERASE	5	
121		No drawing L, c, III	GROUP ERASE	5	

7 USE OF DIACRITICAL SIGNS

7.1 Besides the specially designed national letters (subset 4) a number of diacritical marks are provided which have been designed and positioned in such a way that they can be combined with small letters in order to modify or stress their meaning. These are :

CIRCUMFLEX ACCENT	(ref. 110)	Α
GRAVE ACCENT	(ref. 109)	•
ACUTE ACCENT	(ref. 108)	I
DIAERESIS	(ref. 107)	
TILDE	(ref. 111)	~
CEDILLA	(ref. 112)	1

The relative position of the accent and of the letter is obtained by superimposing the horizontal and vertical axes of the two graphics concerned. Accented letters can be obtained as shown in figure 3. For OCR purposes, the superposition of an accent on a character shape must be done very accurately. Composite characters may be printed in a single operation or in two operations. Prospective users should consult manufacturers before planning inclusion of accented letters in OCR character sets.



FIGURE 3 - Examples of accented letters

7.2 In non-OCR applications the DIARESIS, ACUTE ACCENT and CIRCUMFLEX ACCENT may be used as free-standing characters, to mean QUOTATION MARKS, APOSTROPHE and UPWARD ARROW HEAD respectively, thereby reducing the total number of characters required. For OCR, however, this practice is not recommended and the proper designs must be used (ref. 72, 73 and 87) for these three characters.

8 USE OF THE TWO UNDERLINE CHARACTERS

Two characters are provided for underlining :

DISCONTINUC	US UNDERLINE	(ref. 74) _
CONTINUOUS	UNDERLINE	(ref. 116) _

The latter, CONTINUOUS UNDERLINE. IS not intended for use in OCR applications. The character DISCONTINU-OUS UNDERLINE shall be used in OCR applications as a free-standing character only, and shall not be printed under another character.

DH_1925

FIGURE 4 - Example of use of DISCONTINUOUS UNDERLINE

9 SPACE (no reference drawing)

The character SPACE is an intentionally blank positionin a line of printing. With constant;pitch printing, its nominal width is equal to the printing pitch (for example, 2,54 mm if the characters are printed 10 per 25,4 mm). With variable. pitch printing, its nominal width is equal to the largest character pitch available.

10 VERTICAL LINE AND LONG VERTICAL MARK

Both the VERTICAL LINE (ref. 91) and the LONG VER-TICAL MARK (ref. 92) are vertical lines but they differ in minimum height, as given in table 3.

TABLE 3 — Dimensions of	VERTICAL LINE and LONG	VERTICAL MARK

	millimetres			inches		
	Size I	Size 111	Size IV	Sire I	Sire III	Size IV
Height of VERTICAL LINE	3.2			0.126		
Minimum height of LONG VERTICAL MARK	3.7	5,0	5,6	0.146	0.196	0.220
Nominal strokewidth of VERTICAL LINE and LONG VERTICAL MARK	0.35	0,38	0.50	0.014	0.015	0.019

NOTE - The character VERTICAL LINE is available in size I only

The character VERTICAL LINE has been introduced specifically for high-speed or other printers, to allow them to print the character allocated to the position 7/12 of the ISO 7-bit coded character see (ISO 646-1973).

When required by a reading application, the LONG VER-TICA L MARK can be allocated the same code combination (7/12) as vERTICAL LINE. For the purpose of character spacing, both characters shall be considered as a full-width character.

11 CHARACTER SHAPE DEFINITION

11.1 Reference drawings

The shapes and dimensions of the OCR-B characters for both the letterpress and the constant-strokewidth fonts are specified by original drawings for size I and III.

The characters are drawn at scale 100 : 1 on a 2 mm square grid. The total grid measures 280 mm x 380 mm. For the purpose of illustration in this standard, some of these original drawings have been reduced to 'approximately $70 \times$ full size. Gride readings should be made only from drawings on stable material. Photographic reproductions of drawings printed on paper are not satisfactory for this purpose – the dimensional stability of paper is not sufficient.

Points on the reference drawing can certainly be determined with an accuracy of half a square (10 μ m at full size), and if desired one-quarter of a square (5 μ m at full size) should be possible. The number of readings taken on a character further determines the accuracy of the work drawing.

11.2 Availability of duplicates

Duplicates of the original drawings on a stable base at exact 100 : 1 scale with the 280 mm \times 380 mm grid can be obtained upon request. Reproduction and mailing costs only will be charged.

Requests with precise indication of the set(s) desired should be addressed to :

The Secretary General ECMA 114, rue du Rhône CH-1204 GENEVA Switzerland

or

Office of Standard Reference Materials Room 8311, Chemistry Building National Bureau of Standards Washington (D.C. 20234) U.S.A. The following sets of drawings are available :

- OD 1. Letterpress font, size I. (Only from ECMA.)
- OD 2. Letterpress font, size I with the grid removed over approximately 2 mm around the character outline. This set is particularly suitable for photographic reduction. (Only from ECMA.)
- OD 3. Constant-strokewidth font, size I.
- OD 4. Constant-strokewidth font, size III.

11.3 Type dimensions

Attention is called to the fact that since this standard specifies the nominal printed images, the type should not necessarily be cut to these dimensions. Type dimensions should be deduced from the nominal printed images after due correction for the systematic effects occurring in the printing process.

11.4 Constant-strokewidth font, size I

11.4.1 The nominal printed image of each character is defined by its centreline and by its nominal strokewidth. The nominal strokewidth is :

0.35 mm (0.014 in) for most of the characters,

0.31 mm (0.012 in) for all small letters and the three characters #, % and @.

The'centreline and preferred line endings and corners are given in drawings marked "C". Pointers establish the vertical position (base line) and the orientation. Another pointer establishes the horizontal position for fixed-pitch printing. Reference drawings 69 C and 71 C contain also pointers, to indicate alternative positions.

11.42 A special effort should be made in type design and manufacturing to arrive at actual print that conforms as closely as possible to the given line endings and corners. This is especially important for the square corners of capital letters B and D.

11.4.3 A pointer is provided to produce the most aesthetic spacing of characters in a line of printing. However, on printers having a significant horizontal spacing tolerance it is recommended to use the geometric character centreline instead of the line defined by the pointer where necessary to achieve an acceptable character separation.

11.5 Constant-strokewidth font, size I I I

The nominal printed image of each character is given by its centreline and by its nominal strokewidth. The nominal, strokewidth is 0,38 mm (0.015 in). The 22 reference drawings for 0 1 2 3 4 5 6 7 8 9 < + > LONG VERTICAL MARK C E N ST X Z and GROUP ERASE are marked "III" and include pointers. Sub-clauses 11.4.2 and 11.4.3 also apply.

11.6 Constant-strokewidth font, size IV

The nominal printed image of each character is given by its centreline and by its nominal strokewidth. The size IV centreline is derived from the corresponding size I centreline (see 11.4 and reference drawings marked "C") by a linear magnification of exactly 1.5. For example, a character centreline width of 2.40 mm becomes 1,5 x2.40 mm = 3.60 mm in size IV. and so on. The nominal strokewidth is :

0.50 mm (0.020 in) for most of the characters

0,44 mm (0.017 in) for all small letters and the three characters #, % and @.

Preferred line endings and corners cannot be accurately arrived at by a 1.5 magnification since the ratio of nominal strokewidths for size IV and I is not exactly 1.5. However, given a 1.5 magnification of the size I drawing, the nominal size IV constant-strokewidth image can easily be constructed.

11.7 Letterpress font, size I

The nominal printed image of each character is drawn on a reference grid (see 11.1) to allow readings with any desired accuracy from drawings marked "L". Pointers establish the vertical position (base line), the orientation and for letterpress type the body width. A pointer establishes the horizontal position for fixed-pitch printing. Reference drawings 69 L and 71 L contain also pointers, to indicate alternative positions.

The characters of the letterpress font are designed with minor strokewidth variations. However, strokewidths are always close to the nominal value of 0.35 mm (0.014 in) for digits and capital letters, and of 0,31 mm (0.012 in) for small letters and the three characters #, % and @.

12 PRINTING THE LETTERPRESS AND CONSTANT-STROKEWIDTH FONTS

In order to print the letterpress font and to achieve the most satisfactory appearance, the printing device should be able to print sharp corners and to keep the strokewidth variations under close control. These features are not required for printing the constant-strokewidth fonts, although a special effort should be made to produce sharp corners in the capital letters B and D. There may well be printing equipment in which the accuracy of strokewidth control is intermediate between that required in letterpress quality and that provided by, for example, high-speed printing equipment to design their type so that the printed images incorporate as many as practicable of the strokewidth variations which contribute to the aesthetically satisfactory appearance of the letterpress character shapes.

Care should be taken that the printed image strokes are symmetrically distributed around the centrelines as specified in this document.

13 ILLUSTRATION OF OCR-B

The following drawings show :

- the complete character set in size I at scales 4 :1 and 1:1;

-- digit ONE, capital letter E,PARAGFAPH and YEN in size I as letterpress font and as constant-strokewidth font;

- digit ONE and capital letter E in size III as constantstrokewidth font.

These reproductions of the original drawings are approximately at scale 70 :1.

IS 12755 (Part 2): 1989 ISO 1073/2: 1976

ILLUSTRATION OF SIZE I





















ANNEX A

(not part of the standard)'

OLD DESIGN OF DIGIT ZERO

The character ZERO is the only numeral which had to be modified in this revision of ISO/R 1073-1969. The use of the original design is tolerated in numeric applications implemented before October 1976. OCR reading of both old and revised design is subject to special agreement between OCR equipment supplier and user. For any application implemented after 1976, only the new design & standard.

The following illustration shows the letterpress font and the constant-strokewidth font of digit ZERO in size I at scale 30 :1 and the centreline of the constant-strokewidth font in size III also at scale 30 :1.

Letterpress font

The nominal printed image of the character is described by a series of points on the character outline, numbered from **101** onwards. Two additional reference points numbered 1 and 3 are provided together with a vertical reference line 2. Reference points 1 and 3 establish the vertical position, the orientation and the width. Reference line 2 establishes the horizontal position for printing pitch. All the points are described in a rectangular co-ordinate system. To avoid negative co-ordinates, the points 1 and 3 are given the positive vertical ordinate $\gamma = 2000 \,\mu$ m and the reference line 2 is given the positive **abscisse** x = 2 000 μ m. The size **i** character outline is defined by x_{12} and y_1 .

Constant-strokewidth font

The nominal printed image of the character is defined by its centreline and by its nominal strokewidth 0.35 mm for size I and 0,38 mm for size III.

The character centreline is described by a series of points numbered from 11 onwards.

The size I character centreline is defined by x_{12} and y_1 .

The size HI character centreline is defined by x_3 and y_3 .

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•/ -								
N	Yl x12	Ν	11	X12		N	Y1	x12
1	2000. 840	101		1170		195	2257	1557
2	1363.2000	101	3360	. 1173		165	3337	. 1337
3	2000. 3143	102	3687	. 1197		100	9047	1 5 7 9
•		103	3957	. 1250		120	3047.	10/3
11	3357 1363	104	4227	. 1353		127	3893.	1620
12	3663 1387	105	4487	. 1523		128	4103.	1693
19						129	4270.	1790
13	JJ2J. 1440 4167 1599	106	4653	. 1763		130	4353.	. 1893
14	4107.1363	107	4693	. 2017				
15	4380.1037	108	4617	. 2300		131	4373.	2013
10	4505 1005	109	4433	. 2510		132	4330.	2130
16	4507.1827	110	4180	. 2653		133	4243.	2220
17	4533.2017					134	4070.	2317
18	4473. 2217	111	3927	. 2747		135	3870.	2373
19	4340. 2367	112	3663	. 2790				
20	4123.2490	113	3357	. 2810		136	3647.	2410
		114	3043	. 2797		137	3363.	2427
21	3897.2560	110	2733	. 2740		138	3063.	2420
22	3653.2607				,	139	2803.	2577
23	3357.2617	116	2470	. 2643		140	2593.	2317
24	3053.2603	117	2217	2490				
25	2770. 2557	118	2030	. 2260		141	2403.	2210
		119	1973	1990		142	2310.	2097
26	2533. 2380	120	2027	1743		143	2290.	1993
27	2310. 2350	180	2021	. 1740		144	2330.	1863
28	2173. 2180	121	2193	1517		145	2423	1767
29	2130. 1990	122	2460	1350			- 1-0.	1.0.
30	2173.1800	123	2743	1247		146	2627.	1667
		120	2050	1187	1	147	2843	1607
31	2310. 1643	181	3030	. 1107	•	148	3103	1567
32	2543.1507				-		0100.	1007
33	2793. 1430							
34	3000. 1377							
		Ν	x 3	¥3				
		t	L 74:	1.2000				
		2	2 200	0.1151				
		3	3 324	1.2000				
		11	130	9. 3809				
		12	2 133	4.4218				
		13	5 139	2.4564				
		14	148	2.4889				
		15	5 162	7.5173				
		16	5 1812	2.5342				
		17	201	8. 5378				

IN	AU	10
1	741.	2000
2	2000.	1151
3	3241.	2000
11	1309.	3809
12	1334.	4218
13	1392.	4564
14	1482.	4889
15	1627.	5173
16	1812.	5342
17	2018.	5378
18	2235.	5298
19	2398.	5120
20	2532.	4831
21	2608.	4529
22	2659.	4204
23	2670.	3809
24	2655.	3404
25	2604.	3027
26	2521.	2711
27	2380.	2413
28	2195.2	2231
29	1989.	2173
30	1783.2	2231
31	1613.2	413
32	1464.2	2724
33	1381.3	058
34	1323.3	440
	46	0

IS 12755 (Part 2) : 1989 ISO1073/2 : 1976



IS 12755 (Part 2) : 1989 ISO 1073/2: 1976

ANNEX B

(not part of the standard)

EXISTING APPLICATIONS USING FORMER SIZE II WITH FORMER FONT DESIGN OF THE TEN DIGITS

This annex is not part of the standard; it is presented for information only.

The previous version of this International Standard (ISO/R1073-1969) included a size which has been removed from the present edition.

However, some long-term numeric applications have in the meantime implemented the ten digits in size II and their existence must be recognized for a long period after-the issue of this edition of the standard.

Those applications, initiated before 1976, may be considered as standard, as far as they conform to the specification, charts and drawings given in the following pages. An application such as the printing of transferable securities (shares, bonds) implemented prior to 1976 is entitled to continue even for newcards issued after 1976.

For any application implemented after 1976, only sizes I, III and IV with the new font design are standard.

Use of co-ordinate tables and reference point drawings

The nominal printed image of each character is defined by its centreline and by its nominal strokewidth.

The character centreline is described by a series of points numbered from 11 onwards. Two additional reference points numbered 1 and 3 are provided together with a vertical reference line 2.

Reference points 1 and 3 establish the vertical position, the orientation and the set-width. Reference line 2 establishes the horizontal position for printing pitch. All the points are described in a-rectangular co-ordinate system. To avoid negative co-ordinates, the points 1 and 3 are given the positive ordinate $y = 2\ 000\ \mu$ m and the reference line 2 is given the positive abscissa $x = 2\ 000\ \mu$ m. Character centrelines are established for size II by x_{12} and y_2 . The nominal strokewidth is 0,35 mm.

IS 12755 (Part 2) : 1989 ISO 1073/2 : 1976

Le. 11/34





LC. 11/28



LC = 11/33



Lc.11/16

L.C = 11/22















IS 72755 (Part 2) : 1989 ISO 1073/2 : 1976

LC . 11/42

L.c. 1/31



IS 12755 (Part 2): 1989. ISO 1073/2 : 1976

CHARACTER	0	11 2187.2623.2191. 12 2183.1567.2187.
N Y1 x12 Y2 ,		13 2337. 1387 ,2336, 14 2480.1390.2533.
1 2000. 840.2000,		15 2733.1460.2829,
2 1 7 3 3 . 2000 , 1297 . 3 2000 . 3143 , 2000 .		16 2943.1611.3074 , 17 3097.1793.3253 .
11 3357.1363.3556.		18 3240.2003.3420. 19 3407.2230.3614
12 3663.1387.3914. 13 3923.1440.4217.		20 3557.2420.3789.
14 4167.1523.4501. 15 4380.1657.4750.		21 3747.2550.4011.
lb 4507.1827.4898.		22 4003.2003.4311, 23 4247.2547.4594,
17 4533.2017.4929. 18 4473.2217.4859.		24 4427.2380.4804. 25 4513.2123.4906.
19 4340.2367.4703. 20 4123.2490.4451.		26 4517.1810.4909.
21 3897.2560.4186.		27 4440.1537,4820, 28 4343.1340,4707,
22 3653,2607,3902, 23 3357,2617,3556,		
24 3053.2603.3202. 25 2773 2557 2872		CHARACTER-
25 2773. 2557.2072,		N Y1 x12 Y2
20 2333.2480.2390.		1 2000. 809.2000. 2 1338.2000.1228 .
29 2130.1990.2125.		3 2000.3029.2000,
30 21/3.1800.21/6.		11 2234.1179.2246. 12 2181.1342.2184.
31 2310.1043.2333. 32 2543.1507.2607.		13 2148 .1519.2146. 14 2128 .1679.2122.
33 2793,1430,2899, 34 3080,1377,3233,		15 2142.1892.2136.
		16 2192.2095.2197.
CHARACTER-	1	18 2429.2415.2474.
N YI X12 Y2		20 2812.2541.2921.
1 2000.1078.2000.		21 3026.2517.3170. 22 3212 2437 3368
2 1348.2000.1240, 3 2000.2758.2000,		23 3345.2290.3543. 24 3432.2110.3644 .
11 2138.2112.2134.		25 3482.1933.3702.
12 3911.2138.4203. 13 4511.2150.4903.		26 3715.1836.3974,
14 4512.2033.4904. 15 4206.1676.4547.		28 4522.2129.4332.
16 3983.1412.4287.		30 4486.2459.4873.
		31 4485.1905.4872.
CHARACTER -	2	32 448/.1189.4875. 33 3524.1653.3752.
N Y1 x12 Y2		
1 2000. 93012000. 2 1343 2000. 1234. 3 2000.3067.2000.	53	

3

IS 12/55 (Part 2): 1989 ISO 1073/2: 1976

CHARACTER	4	11 4543.2270.4941.
		12 4327.2080.4688.
		13.4100.1883.4423.
í 2000. 899.2000		14 3890.1/10.41/8. 15 3737 1587 3008
2 1375.2000,1271		1) 0/2/ 1)0/ 3980 1
3 2000,3099,2000).	16 3493.1767.371s.
	_	17 3550.2030.3782.
11 2139.2342.2135		18 3517.2263.3743.
)	19 3397.2493.3003.
13 2/99.2/20.2090) • 7	20 3177e2647.3346.
15 3326.2337.3520		
17 00201200710720		21 2900. 2717. 3023,
16 2906. 2341. 3030).	22 203/12003,2/10, 92 2403 2573 2444
17 2749. 216802847	' .	24 2253.241 n. 2 259.
18 2751,1861,2850).	25 2190.2270 2195.
19 2751.1301,2849		· - ·
20 2901.1304.3024	• •	26 2147.2040.2144.
21 3321.1497.3514	1.	27 2157.1833.2156.
22 4538.2059.4935	5.	28 2217.1653.2226,
	•	29 23//.149/.2413. 20 2583 1350 265 4
		30 2983.1390,2094,
CHARACTER-	5	31 2827.1307.2938.
		32 3227.1353.3404.
N Yl x12 Y2		
1 9000 057 9000		CHARACTER -
). A	
3 2000.3043.2001	••• 0.	N Y1 x12 Y2
3 2000100 1012001		_
44 4407 0577 407		
11 440/.200/.40/	4	1 2000. 086.2000.
12 4493.1667.4882	9, 2,	1 2000. 086.2000. 2 1348.2000.1240.
11 4487.2557.487 12 4493.1667.4882 13 4487.1493.4874	9 . 2 . 4 .	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000.
11 4487.2537,487 12 4493.1667,4882 13 4487.1493,487 14 4343.1483.4707	4 , 2 , 4 , 7 ,	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000.
11 4487.2557,487 12 4493.1667,4882 13 4487.1493,487 14 4343.1483,4707 15 3767.1453.4034	4 , 2 , 4 , 7 , 1:	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259.4875. 12 4482.2082.1869.
11 4487.2557.487 12 4493.1667.4882 13 4487.1493.487 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844	4, 2, 4, 7, 1:	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259.4875. 12 4482.2082.5869. 13 4479.2665.4866.
11 4487.2557.487 12 4493.1667.4882 13 4487.1493.487 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844 17 3613.1623.3856	4 , 2 , 4 . 7 , 1: 4 , 5 ,	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259.4875. 12 4482.2082.5869. 13 4479.2665.4866. 14 4299.2649.4655.
11 4487.2557.487 12 4493.1667.4882 13 4487.1493.487 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844 17 3613.1623.3856 1a 3597.1833.3836	4 , 2 , 4 . 7 , 1: 4 . 5 , 5 ,	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259,4875. 12 4482.2082.5869. 13 4479.2665.4866. 14 4299.2649.4655. 15 4189.2609.4527.
11 4487.2557.4874 12 4493.1667.4882 13 4487.1493.4874 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844 17 3613.1623.3856 1a 3597.1833.3836 19 3583.2043.3821	4 , 2 , 4 . 7 . 1:	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259.4875. 12 4482.2082.5869. 13 4479.2665.4866. 14 4299.2649.4655. 15 4189.2609.4527.
11 4487.2537.487 12 4493.1667.4882 13 4487.1493.487 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844 17 3613.1623.3856 1a 3597.1833.3836 19 3583.2043.3821 20 3500.2253.3723	4 , 2 , 4 , 7 , 1 : 5 , 5 , 5 , 5 ,	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259.4875. 12 4482.2082.5869. 13 4479.2665.4866. 14 4299.2649.4655. 15 4189.2609.4527. 16 4046.2516.4360.
11 4487.2557.487 12 4493.1667.4882 13 4487.1493.487 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844 17 3613.1623.3856 1a 3597.1833.3836 19 3583.2043.3821 20 3500.2253.3723	4 , 2 , 4 , 7 , 1: 4 , 5 , 5 , 5 , 5 ,	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259.4875. 12 4482.2082.7869. 13 4479.2665.4866. 14 4299.2649.4655. 15 4189.2609.4527. 16 4046.2516.4360. 17 3859.2360.4142. 18 3645.2180.3893
11 4487.2557.4874 12 4493.1667.4882 13 4487.1493.4874 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844 17 3613.1623.3856 1a 3597.1833.3836 19 3583.2043.3821 20 3500.2253.3723 21 3360.2423.3560	4 . 2 . 4 . 7 . 1: 4 . 5 . 5 . 5 . 5 . 5 .	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259.4875. 12 4482.2082.3869. 13 4479.2665.4866. 14 4299.2649.4655. 15 4189.2609.4527. 16 4046.2516.4360. 17 3859.2360.4142. 1a 3645.2180.3893. 19 3432.2027.3644.
11 4487.2557.4874 12 4493.1667.4882 13 4487.1493.4874 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844 17 3613.1623.3856 1a 3597.1833.3836 19 3583.2043.3821 20 3500.2253.3723 21 3360.2423.3560 22 3160.2527.3327 23 2923.2553.3051	4 . 2 . 4 . 7 . 1: 4 . 5 . 5 . 5 . 5 . 5 .	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259,4875. 12 4482.2082.5869. 13 4479.2665.4866. 14 4299.2649.4655. 15 4189.2609.4527. 16 4046.2516.4360. 17 3859.2360.4142. 1a 3645.2180.3893. 19 3432.2027.3644. 20 3158.1874.3325.
11 4487.2557.487 12 4493.1667.4882 13 4487.1493.487 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844 17 3613.1623.3856 18 3597.1833.3836 19 3583.2043.3821 20 3500.2253.3723 21 3360.2423.3560 22 3160.2527.3327 23 2923.2553.3051 24 2710.2520.2805	4 . 2 . 4 . 7 . 2 .	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259,4875. 12 4482.2082.5869. 13 4479.2665.4866. 14 4299.2649.4655. 15 4189.2609.4527. 16 4046.2516.4360. 17 3859.2360.4142. 1a 3645.2180.3893. 19 3432.2027.3644. 20 3158.1874.3325.
11 4487.2537.4874 12 4493.1667.4882 13 4487.1493.4874 14 4343.1483.4707 15 3767.1453.4034 16 3603.1443.3844 17 3613.1623.3856 1a 3597.1833.3836 19 3583.2043.3821 20 3500.2253.3723 21 3360.2423.3560 22 3160.2527.3327 23 2923.2553.3051 24 2710.2520.2802 25 2510.2417.2568	4 . 2 . 4 . 7 . 2 .	1 2000. 086.2000. 2 1348.2000.1240. 3 2000.3126.2000. 11 4487.1259.4875. 12 4482.2082.5869. 13 4479.2665.4866. 14 4299.2649.4655. 15 4189.2609.4527. 16 4046.2516.4360. 17 3859.2360.4142. 1a 3645.2180.3893. 19 3432.2027.3644. 20 3158.1874.3325. 21 2895.1781.3017.
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21 3787.1307.4053. 22 4033.1340.4346. 23 4230.1437.4575. 24 4383.1600.4754. 25 4480.1830.4867. 26 4497.2000.4886. 27 4430.2377.4808. 28 4290.2527.4645. 29 4097.2647.4419. 30 3867.2693.4151. 31' 3423.2650.3634.

11 3615.1733.3857. 12 3694.1607.3950. 13 3831.1490.4109. 14 4028.1416,4339. 15 4248.1449.4595. 16 4408.1572.4782. 17 4515.1772.4907. 18 4535.1989.4931. 19 4515.2192.4908. 20 4432.2392.4811. 21 4279. 2526. 4632, 22 4089.2569.4411. 23 3909.2536.4201. 24 3749.2443,4014. 25 3615.2250.3858. 26 3349.2241.3547. 27 3242.2424.3423. 28 3069.2591.3221. 29 2849.2688.2964. 30 2626.2688.2704. 31 2416. 2615. 2459, 32 2252.2455.2268, 33 2155.2229.2155, 34 2135.2016.2131. 35 2145.1782.2142. 36 2234. 1565. 2247, 37 2421.1375.2464, 38 2634.1302.2713. 39 2894.1318.3016s 40 3091.1408.3246. 41 3238.1564.3417. 42 3355.1741.3554.

CHARACTER -

Ν	Y1	x12	Y 2
1 2 3	2000. 1343. 2000.	833, 2000, 3187.	2000. 1234. 2000.
11 12 13 14	2097. 2523. 2717. 2917.	1737. 2110. 2280.	2086. 2584. 2809. 3031.
15	3133.	2220.	3296.
16 17 18	3097. 3107. 3187.	2013. 1803.	3253. 3264. 3358.
19 20	3330.	1443.	3525

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ANNEX C

(not part of the standard)

RECOMMENDATION FOR THE IMPLEMENTATION OF OCR.B ON TYPEWRITERS

The design of OCR-B is based on fundamental aesthetic laws which, as far as feasible, correspond to the criteria emerging from the long development of our classic typography. One of the essential principles prescribes that in a letter design all vertical parts must be heavier than the horizontal parts. This is also true for so-called sans serif characters, that is for a design which at first sight has a thread-like appearance. This is precisely the case for OCR-B.

The OCR-B character set can be implemented in twoclearly different forms. It can be used as a font with constant-strokewidth as well as a letterpress font. Type engraving can be based on either implementation,

For printing devices like high-speed printers and similar machines, the centreline is the skeleton along which a stroke of prescribed width is placed. It is recommended to use a tool the diameter of which is equal to the strokewidth. The resulting engraving is completely thread-like, all strokes having an equal width. The aesthetic appearance as well as readability are partly diminished by this process.

In spite of strong technical limitations and difficulties, there is a tendency to design type fonts for typewriters which, as close as possible, look like letterpress fonts. For this type of application it is therefore strongly recommended to use a finer tool and to base the design on the OCR-B letterpress font used as basic pattern. Using a tool with a diameter equal to half the strokewidth, it should be possible to engrave types presenting most of the intended variations of the strokewidth. Furthermore, the ends of the strokes, instead of being rounded, would then have a more rectangular appearance. Also, the internal angles would remain more open. The whole character set then looks less mechanical and bears more resemblance to the typographic forms to which the human eye has been accustomed for centuries.

Each manufacturer is, of course, free to take advantage of the aesthetic features of the letterpress font, depending on the technical means at his disposal and on his desire to achieve a more typographic appearance of the characters.

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