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# Indian Standard <br> ALPHANUMERIC CHARACTER SETS FOR OPTICAL RECOGNITION <br> <br> PART 2 CHARACTER SET OCR-B - SHAPES AND <br> <br> PART 2 CHARACTER SET OCR-B - SHAPES AND DIMENSIONS OF THE PRINTED IMAGE 

 DIMENSIONS OF THE PRINTED IMAGE}

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## Indian Standard

# ALPHANUMERIC CHARACTER SETS FOR OPTICAL RECOGNITION 

## PART 2 CHARACTER SET OCR-B-SHAPES AND <br> 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 1 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' appearreferring 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

ISO 646information processing-1SO7-bit coded character set for information interchange

Indian Standard
Degree of Correspondence

[^0]As in the Original Standard, this Page is Intentionally Left Blank

## 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 ISORecommendation 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 givenin three sizes.

### 1.3 Definitions

For the purpose of thisinternational Standard the follow ing definitions apply
1.3.1 OCR-A : A repertore of 69 characters of which 56 are graphics included in the ISO 7 bit coded character set (ISO 646.1973). It comprises diguts, capital letters, capital national letters and other graphics(See part I.)
1.3.2 OCR. 6 Arepertaite 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 whrch 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 nominal printed image be less than 0.08 mm ( 0.0035 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 detaits 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 acsthetic reasons, the strokewidth of the letterpress font characters isvarieddeliberately and the stroke endings are speciallydesigned. 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 8 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 print quality 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.
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 constantstrokewidth 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 II 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: | $2,40 \mathrm{~mm}(0.094 \mathrm{in})$ |
| :--- | :--- |
| for size III : | $3,20 \mathrm{~mm}(0.126 \mathrm{in})$ |
| for size IV : | $3.60 \mathrm{~mm}(0.142 \mathrm{in})$ |

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: | $1.40 \mathrm{~mm}(0.055 \mathrm{in})$ |
| :--- | :--- |
| for size III : | $1.52 \mathrm{~mm}(0.060 \mathrm{in})$ |
| for size IV : | $2.10 \mathrm{~mm}(0.083 \mathrm{in})$ |

### 3.8 Constant-pitch printing

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

| size I : | $2.54 \mathrm{~mm}(0.100 \mathrm{in}) \mathrm{min}$. |
| :--- | :--- |
| size IN : | $2,54 \mathrm{~mm}(0.100 \mathrm{in}) \mathrm{min}$. |
| size IV : | $3,63 \mathrm{~mm}(0.143 \mathrm{in}) \mathrm{min}$. |

## 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.


FI GURE 1 - Heights above and below base line

TABLE 1 - Typical dimenṣions $A, 8, C$ and $D$

| Size | millimetres |  |  |  |  | inches |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $A$ | $t ?$ | $C$ | $D$ | $A$ | $B$ | $C$ | $D$ |  |
| 1 | 2.66 | 2.46 | 1.83 | 0,60 | 0.105 | 0.097 | 0.072 | 0.024 |  |

## 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 <+> <br> CENSTXZ 

! SPACE
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 CENSTXZ 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

[^1]This sub-set comprises 98 characters, in particular those of the ISO 7-bit coded character set (ISO 646-1973)
!"\#£

$$
0123456789: ;<=>?
$$

ఎABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_

`abcdefghijklmnō

$$
\text { pqrstuvwxyz\{1\}~ }
$$

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 :

## A'R\&IJÑOU §æijøß§

曈 $\boldsymbol{t}$
1
m
5.5 Sub-set 5 : Erase characters

This sub-set comprises 2 characters :


GROUP ERASE

The dimensions of these two characters are as shown below :


FIGURE 2 -Erase characters

|  | millimetres |  |  | inches |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Size 1 | Sirs III | Size IV | Size I | Size III | Size IV |
| CHARACTER ERASE $\min H$ <br> max. $H$ <br> min. W <br> max. w <br> D | $\begin{aligned} & 2.4 \\ & 2.9 \\ & 1.4 \\ & 1.9 \\ & 0.13 \end{aligned}$ |  | $\begin{aligned} & 3,8 \\ & 4.6 \\ & 2,0 \\ & 2.8 \\ & 0.20 \end{aligned}$ | $\begin{aligned} & 0.094 \\ & 0.115 \\ & 0.055 \\ & 0.075 \\ & 0.005 \end{aligned}$ |  | $\begin{aligned} & 0.149 \\ & 0.181 \\ & 0.079 \\ & 0.110 \\ & 0.008 \end{aligned}$ |
| GROUP ERASE minimum length minimurn width a b | $\begin{aligned} & 7.6 \\ & 0.2 \\ & 0.4 \\ & 2.0 \end{aligned}$ | $\begin{aligned} & 7.6 \\ & 0.2 \\ & 0.5 \\ & 2.7 \end{aligned}$ | $\begin{array}{r} 10.9 \\ 0.2 \\ 0.6 \\ 3.0 \end{array}$ | $\begin{aligned} & 0.300 \\ & 0.008 \\ & 0.016 \\ & 0.077 \end{aligned}$ | $\begin{aligned} & 0.300 \\ & 0.008 \\ & 0.020 \\ & 0.106 \end{aligned}$ | $\begin{aligned} & 0.430 \\ & 0.008 \\ & 0.024 \\ & 0.118 \end{aligned}$ |

## 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 11 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 of 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
I I I : for the constant-strokewidth font, size I I I.
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.

INDEX TABLE

| Ref. NO. | Shape | Drawing(s) NO. | Name | Sets | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 |  | L. c, III | $\begin{aligned} & \text { DIGIT } \\ & \text { ONE } \end{aligned}$ | 1 2 3 |  |
| 2 |  | 2 $L, c$ III | $\begin{aligned} & \text { DIGIT } \\ & \text { TWO } \end{aligned}$ | 1 2 3 |  |
| 3 |  |  | DIGIT THREE | 1 2 3 |  |
| 4 |  | $\begin{gathered} 4 \\ \text { L, c. III } \end{gathered}$ | $\begin{aligned} & \text { DIGIT } \\ & \text { FOUR } \end{aligned}$ | 1 2 3 |  |
| 5 |  | 5 L, c, III | DIGIT <br> FIVE | 1 2 3 |  |
| 6 | $0$ | 6 L, c, III | $\begin{aligned} & \text { DIGIT } \\ & \text { SIX } \end{aligned}$ | 1 2 3 |  |
| 7 |  | 7 L, c. III | DIGIT SEVEN | 1 2 3 |  |
| 8 |  | 8 L, C. III | DIGIT <br> EIGHT | 1 2 3 |  |
| 9 |  | 9 <br> L, c, III | DIGIT <br> NINE | 1 2 3 |  |
| 10 | (〇) |  | $\begin{aligned} & \text { DIGIT } \\ & \text { ZERO } \end{aligned}$ | $\begin{aligned} & 1 \\ & 2 \\ & 3 \end{aligned}$ | 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 agreament between OCR equipment supplier and user. For any application implemented after 1976, only the new design is standard. |
| 11 |  | $\begin{array}{r} 11 \\ \text { L. C } \end{array}$ | CAPITAL LETTER A | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |

INDEX TABLE (continued)

| Rel NO | Shape | Drawing(s) NO. | Name | Sets | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 12 |  | $\begin{aligned} & 12 \\ & +C \end{aligned}$ | CAPITAL LETTER <br> B | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 13 | $\bigcirc$ |  | CAPITAL LETTER C | 1 2 3 |  |
| 14 |  | $\begin{array}{r} 14 \\ L, C \end{array}$ | CAPITAL LETTER D | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 15 |  | 15 L, c, III | CAPITAL LETTER E | $\begin{aligned} & 1 \\ & 2 \\ & 3 \end{aligned}$ |  |
| 16 |  | $\begin{gathered} 16 \\ \text { L, C } \end{gathered}$ | CAPITAL LETTER F. | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 17 |  | $\begin{gathered} 17 \\ \text { L.C } \end{gathered}$ | CAPITAL LETTER <br> G | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 18 |  | $\begin{aligned} & 18 \\ & \text { L. C } \end{aligned}$ | CAPITAL LETTER H | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 19 |  | $\begin{array}{r} 19 \\ \text { L, C } \end{array}$ | CAPITAL LETTER | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 20 |  | $\begin{gathered} 20 \\ L, C \end{gathered}$ | CAPITAL LETTER <br> J | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 21 |  | $\begin{aligned} & 21 \\ & \text { L, C } \end{aligned}$ | CAPITAL LETTER K | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 22 |  | $\begin{aligned} & 22 \\ & \mathrm{~L}, \mathrm{C} \end{aligned}$ | CAPITAL LETTER L | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |

INDEX TABLE (continued)

| Ref. NO. | Shape | Drawing(s) No. | Name | Sets | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 23 | $N$ | 23 <br> L. C | CAPITAL LETTER <br> M | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 24 | $N$ | $\begin{gathered} 24 \\ \text { L. c, III } \end{gathered}$ | CAPITAL LETTER <br> N | $\begin{aligned} & 1 \\ & 2 \\ & 3 \end{aligned}$ |  |
| 25 |  | $\begin{aligned} & 25 \\ & \text { L. C } \end{aligned}$ | CAPITAL LETTER 0 | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 26 |  | 26 <br> L, C | CAPITAL LETTER P | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 27 | $\bigcirc$ | $\begin{aligned} & 27 \\ & \text { L, C } \end{aligned}$ | CAPITAL LETTER 0 | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 28 |  | $\begin{gathered} 28 \\ \text { L, C } \end{gathered}$ | CAPITAL LETTER R | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 29 |  | $\begin{gathered} 29 \\ \mathrm{~L}, \mathrm{c}, \mathrm{III} \end{gathered}$ | CAPITAL LETTER s | $\begin{aligned} & 1 \\ & 2 \\ & 3 \end{aligned}$ |  |
| 30 |  |  | CAPITAL LETTER T | $\begin{aligned} & 1 \\ & 2 \\ & 3 \end{aligned}$ |  |
| 31 |  | 31 <br> L. C | CAPITAL LETTER U | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 32 |  | $32$ <br> L, C | CAPITAL LETTER <br> V | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 33 |  | $33$ L, C | CAPITAL LETTER <br> w | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |

index tablE (continued)

| Ref. <br> No. | Shape | Drawing(s) No. | Name | Sets | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 34 | $N$ | $\begin{gathered} 34 \\ L, c, 111 \end{gathered}$ | CAPITAL LETTER X | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 35 |  | 35 L, C | CAPITAL LETTER Y | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 36 |  | L. C, | CAPITAL LETTER $z$ | 2 3 |  |
| 37 |  | 37 <br> L.C | SMALL LETTER <br> a | 3 | Smaller strokewidth, see clause 11 |
| 38 |  | 38 L, C | SMALL LETTER b | 3 | Smaller strokewidth, see clause 11. |
| 39 |  | 39 <br> L, C | SMALL LETTER c | 3 | Smaller strokewidth, see clause 11 |
| 40 | ( | 40 <br> L. C | SMALL LETTER d | 3 | Smaller strokewidth. see clause 11. |
| 41 |  | $\begin{aligned} & 41 \\ & \text { L. C } \end{aligned}$ | SMALL LETTER <br> e | 3 | Smaller strokewidth, see clause 11. |
| 42 |  | $42$ L. C | SMALL LETTER f | 3 | :Smaller strokewidth. see clause 11. |
| 43 |  | 43 <br> L, C | SMALL LETTER g | 3 | Smaller strokewidth, see clause 11. |
| 44 |  | 44 L, C | SMALL LETTER <br> h | 3 | Smaller strokewidth, see clause 11. |

INDEX TABLE /continued/

| Ref. no. | Shape | Drawing(s) No. | Name | Sets | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 45 | $1$ | 45 L, C | SMALL LETTER <br> । | 3 | Smaller strokewidth, see clause 11. |
| 46 | $5$ | 46 <br> L. c | SMALL LETTER <br> 1 | 3 | Smaller strokewdth. see clause 11 |
| 47 | $K$ | 47 $\mathrm{L}, \mathrm{C}$ | SMALL LETTER <br> k | 3 | Smaller strokewdth, see clause 11 |
| 48 |  | 48 L. C | SMALL LETTER <br> 1 | 3 | Smaller strokewiath, see clause 11. |
| 49 |  | $\begin{gathered} 49 \\ \text { L, C } \end{gathered}$ | SMALL LETTER | 3 | Smaller strokewdth, see clause 11. |
| 50 |  | 50 <br> L. C | SMALL LETTER | 3 | Smaller strokewidth. see clause 11 |
| 51 | 0 | 51 $L, C$ | SMALL LETTER 0 | 3 | Smaller strokewidth. see clause 11 |
| 52 |  | $\begin{aligned} & 52 \\ & \text { L, C } \end{aligned}$ | SMALL LETTER p | 3 | Smaller strokewidth, see clause 11 |
| 53 |  | 53 <br> L. C | SMALL LETTER <br> a | 3 | Smaller strokewdth, see clause 11. |
| 54 | $\sqrt{\pi}$ | 54 <br> L. C | SMALL LETTER | 3 | Smaller srrokewidrh, see clause 11 |
| 55 | S | $\begin{gathered} 55 \\ \text { L. c } \end{gathered}$ | SMALL LETTER <br> s | 3 | Smaller strokewidth, see clause 11. |

INDEX TABLE (continued)

| Ref. NO. | Shape | Drawing (s) No. | Name | Sat | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 56 | $4$ | 56 <br> L. C | SMALL LETTER <br> t | 3 | Smaller strokewidth, see clause 11 |
| 57 |  | 57 <br> L. C | SMALL LETTER <br> u | 3 | Smaller strokewidth, see clause 11. |
| 58 |  | 58 <br> L, C | SMALL LETTER <br> v | 3 | Smaller strokewidth. see clause 11. |
| 59 | M | 59 <br> L. C | SMALL LETTER w | 3 | Smaller strokewidth. see clause 11. |
| 60 | $X$ | $\begin{gathered} 60 \\ \text { L, C } \end{gathered}$ | SMALL LETTER x | 3 | Smaller strokewidth, see clause 11. |
| 61 |  | $61$ $L, c$ | SMALL LETTER y | 3 | Smailber strokewidth ${ }_{\text {, }}$ see cilause 11. |
| 162 |  | $\begin{aligned} & 62 \\ & \text { L. } C \end{aligned}$ | SMALL LETTER <br> $z$ | 3 | Smaller strokewidth, see clause 11. |
| 63 | $\frac{1}{1}$ | $63$ L. C | ASTERISK | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 64 |  | $\begin{gathered} 64 \\ \mathrm{~L}, \mathrm{c}, \mathrm{III} \end{gathered}$ | PLUS SIGN | 1 2 3 |  |
| 65 |  | $\begin{array}{r} 65 \\ L, C \end{array}$ | HYPHEN <br> (MINUS SIGN) | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 6 6 6 |  | 66 <br> L. C | EQUALS SIGN | 2 3 |  |

INDEX TABLE (continued)

| Ref. NO. | Shape | Drawing(s) No. | Name | Sats | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 67 |  | $67$ <br> L. C | SOLIDUS | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 68 |  | 68 <br> L, C | FULL STOP (PERIOD) | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ |  |
| 69 |  | 69 <br> L, C | COMMA | $\begin{aligned} & 2 \\ & 3 \end{aligned}$ | Two vertical locations are specified, one of which projects below the base line for capital letters (see 11.4 and 11.7) |
| 70 |  | 70 <br> L, C | COLON | 3 |  |
| 71 |  | 71 <br> L, C | SEMI-COLON | 3 | Two vertical locations are specified, one of which projects selow the base line for capital letters (see 11.4 and 11.71, |
| 72 |  | $\begin{array}{r} 72 \\ \mathrm{~L}, \mathrm{C} \end{array}$ | QUOTATION MARK | 3 | San be replaced by DIAERESIS (Ref. 107) in non-OCR mpplications, ifitis required to print QUOTATION UARK and DIAERESIS with the same type-face see 7.2). |
| 73 |  | $\begin{array}{r} 73 \\ \mathrm{~L}, \mathrm{C} \end{array}$ | APOSTROPHE | 3 | San be replaced by ACUTE ACCENT (Ref. 108) in ion-OCR applications, if it is required to print APOS. TROPHE and ACUTE ACCENT with the same typeface (see 7.2). |
| 74 |  | 74 <br> L. C | DISCONTINUOUS <br> 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 <br> L.C | QUESTION MARK | 3 |  |
| 76 |  | 76 <br> L, C | EXCLAMATION MARK | 3 |  |
| 77 |  | 77 <br> L.C | LEFT PARENTHESIS | 3 |  |

INDEX TABLE (continued)

| Ref. NO. | Shape | Drawing(s) <br> No. | Name | Sats | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 78 |  | $\begin{aligned} & 78 \\ & \text { L, C } \end{aligned}$ | RIGHT <br> PARENTHESIS | 3 |  |
| 79 |  | $\begin{gathered} 79 \\ \text { L, c, III } \end{gathered}$ | LESS THAN SIGN | $\begin{aligned} & 1 \\ & 2 \\ & 3 \end{aligned}$ |  |
| 80 | > |  | GREATER THAN SIGN | $\begin{aligned} & 1 \\ & 2 \\ & 3 \end{aligned}$ |  |
| 81 |  | 81 L. C | LEFT SQUARE BRACKET | 3 |  |
| a2 |  | $\begin{gathered} \text { a2 } \\ \text { L, C } \end{gathered}$ | RIGHT SQUARE BRACKET | 3 |  |
| 83 | $0 / 0$ | a3 <br> L, C | PERCENT SIGN | 3 | Smaller strokewidth. see clause 11 |
| 84 |  | a4 <br> L. C | NUMBER SIGN | 3 | Smaller strokewidth, see clause 11 |
| a5 |  | $\begin{aligned} & \text { a5 } \\ & \text { L.C } \end{aligned}$ | AMPERSAND | 3 |  |
| 86 | (2 | $86$ <br> L, C | COMMERCIAL AT | 3 | Smaller strokewidth, see clause 11. |
| a7 |  | $\begin{aligned} & 87 \\ & \text { L. C } \end{aligned}$ | 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 <br> L, C | CURRENCY SIGN | 3 |  |

INDEX TABLE (continued\}

| Ref. NO. | Shape | $\begin{gathered} \text { Drawing(s) } \\ \text { 'NO. } \end{gathered}$ | Name | Sets | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 89 |  | 89 <br> L, C | POUND SIGN | 3 |  |
| 90 |  | 90 <br> L, C | DOLLAR SIGN | 3 |  |
| 91 | I | $91$ L, c | VERTICAL LINE | 3 | See clause 10 |
| 92 |  | $\begin{gathered} 92 \\ \mathrm{~L}, \mathrm{c}, \mathrm{III} \end{gathered}$ | LONG MAERTICAL | $\begin{aligned} & 1 \\ & 2 \\ & 3 \end{aligned}$ | see clause 10. |
| 93 | \} | 93 <br> L, C | REVERSE SOLIDUS | 3 |  |
| 94 | A | $\begin{aligned} & 94 \\ & \text { L, C } \end{aligned}$ | CAPITAL LETTER <br> A | 4 | Where possible, substitution by rhe two capital letters $A$ (Ref. 11) and E(Ref.15)is recommended for OCR. |
| 95 |  | $95$ <br> L. C | CAPITAL LETTER \& | 4 |  |
| 96 |  | $96$ L, C | CAPITAL LETTER AE | 4 |  |
| 97 | $0$ | $\begin{aligned} & 97 \\ & \text { L, C } \end{aligned}$ | CAPITAL゚ LETTER <br> 0 | 4 | Where possible. substitution by the two capital letters 0 (Ref.25) end E (Ref. 15) is recommended for OCR. |
| 98 |  | $\begin{aligned} & 98 \\ & \text { L. C } \end{aligned}$ | C Apital LETTER 0 | 4 |  |
| 99 | $\theta$ | $99$ $\mathrm{L}, \mathrm{C}$ | CAPITAL LETTER <br> U | 4 | Where possible, substitution by the two capital lerters $U$ (Ref. 31) and E (Ref. 15) is recommended for OCR. |

INDEX TABLE (continued)

| Ref. No. | Shape | Drawing(s) No. | Name | Sets | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 100 | $I J$ | $\begin{aligned} & 100 \\ & \mathrm{~L}, \mathrm{C} \end{aligned}$ | CAPITAL LETTER DUTCH IJ | 4 | For OCR purpose. separate capital letters 1(Ref.19) and $J$ (Ref. 20) should be used. |
| 101 |  | $\begin{aligned} & 101 \\ & \mathrm{~L}, \mathrm{C} \end{aligned}$ | CAPITAL LETTER $\hat{N}$ | 4 |  |
| 102 |  | $\begin{aligned} & 102 \\ & L, C \end{aligned}$ | SMALL $\underset{a}{\text { LETTER }}$ | 4 | Smaller strokewidth, see clause 11. |
| 103 |  | $\begin{array}{r} 103 \\ \text { L, C } \end{array}$ | SMALL $\underset{\boldsymbol{x}}{ }$ LETTER | 4 | Smaller strokewidth, see clause 11. |
| 104 |  | ${ }_{1 .}^{104}$ | SMALL LETTER <br> $\phi$ | 4 | Smaller strokewidth. see clause 11. |
| 105 |  | $\begin{aligned} & 105 \\ & L, C \end{aligned}$ | SMALL LETTER DUTCH ij | 4 | Smaller strokewidth. see clause 11. |
| 106 |  | 106 <br> L. c | SMALL LETTER GERMAN DOUBLE s | 4 | Smaller strokewidth, see clause 11 |
| 107 | ! | $\begin{aligned} & 107 \\ & \text { L, C } \end{aligned}$ | DIAERESIS | 4 | For use see clause 7. |
| 108 | $\rho$ | $\begin{aligned} & 108 \\ & \text { L, C } \end{aligned}$ | ACUTEACCENT | 4 | For use see clause 7. |
| 109 | \} | $\begin{aligned} & 109 \\ & L, C \end{aligned}$ | GRAVE ACCENT | 3 | For use see clause 7 |
| 110 | A | 110 <br> L, c | CIRCUMFLEX ACCENT | 4 | For useselause 7. |

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INDEX TABLE (concluded)

| Ref. <br> NO. | Shape | Drawing(s) <br> NO. | Name | Sets | Remarks |
| :---: | :---: | :---: | :---: | :---: | :--- |
| 111 |  | TILDE | 4 | For use see clause 7. |  |

## 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) | A |
| :--- | :---: | :---: |
| GRAVE ACCENT | (ref. 109) | (ref. 108) |
| ACUTE ACCENT | (ref. 107) | I |
| DIAERESIS | (ref. 111) |  |
| TILDE | (ref. 112) |  |
| CEDILLA |  |  |

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 -Example 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 :

$$
\begin{array}{ll}
\text { DISCONTINUOUS UNDERLINE } & \text { (ref. 74) } \\
\text { CONTINUOUS UNDERLINE } & (\text { ref. } 116)_{-}
\end{array}
$$

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 positionina line of printing. With constant:pitch printing, its nominal width is equal to the printing pitch (for example, $2,54 \mathrm{~mm}$ if the characters are printed 10 per $25,4 \mathrm{~mm}$ ). 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 verTICAL MARK (ref. 92) are vertical lines but they differ in minimum height, as given in table 3.

TABLE 3 - Dimamions of VERTICAL LINE and LONG VERTICAL MARK

|  | millimetres |  |  | inches |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Size I | Sizalll | 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 sef(ISO 646-1973).

When required by a reading application, the LONG VERTICA 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 $\mathbf{2 8 0} \mathbf{~ m m} \times 380 \mathrm{~mm}$. 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 ( $10 \mu \mathrm{~m}$ at full size), and if desired one-quarter of a square ( $5 \mu \mathrm{~m}$ 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 $280 \mathrm{~mm} \times 380 \mathrm{~mm}$ 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 :
$0.35 \mathrm{~mm}(0.014 \mathrm{in})$ for most of the characters,
$0.31 \mathrm{~mm}(0.012 \mathrm{in})$ 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 । । ।

The nominal printed image of each character is given by its centreline and by its nominal strokewidth. The nominal, strokewidth is $0,38 \mathrm{~mm}(0.015 \mathrm{in})$. The 22 reference drawings for $0123456789<+>$ 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 $1,5 \times 2.40 \mathrm{~mm}=3.60 \mathrm{~mm}$ in size IV . and so on. The nominal strokewidth is :
$0.50 \mathrm{~mm}(0.020 \mathrm{in})$ for most of the characters
$0,44 \mathrm{~mm}(0.017 \mathrm{in})$ 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 $0.35 \mathrm{~mm}(0.014 \mathrm{in})$ for digits and capital letters, and of $0,31 \mathrm{~mm}$ ( 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 printers. It is at the discretion of the manufacturers of such 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 sper: fied 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,PARAGRAPH 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 $70: 1$.

## illustration of size I

SCALE 4 ： 1
0123456789
ABCDEFGHIJKLM NOPQRSTUVWXYZ abcdefghij klm nopqrstuvwxyz ＊ャー＝／－，：」＂ ？！（ ）＜＞［］\％\＃\＆ ®̄＾$^{\wedge}$味\＄1！
A＇A\＆IJÑO் ฐæijøß§ －•，（～～
\｛\}m


0123456789
ABCDEFGHIJKLM NOPQRSTUVWXYZ abcdef ghijkl m nopqrst uvwxyz

－$£ \$ 1: 1$
ARAIJNOOU
S¥ijøß5 7
\｛\}m

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REF DRAWING NR I
SIZE I

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REF. DRAWING NR. 119
SIZE I

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REF: DRAWING NR. 15

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## 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,
 $\mathrm{x}=2000 \mu \mathrm{~m}$. The size I character outline is defined by $x_{12}$ and $\gamma_{1}$.

## 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 $0,38 \mathrm{~mm}$ 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 $\boldsymbol{y}_{1}$.
The size HI character centreline is defined by $x_{3}$ and $\gamma_{3}$.

| N | Y $\quad \times 12$ | $N$ | $Y 1 \times 12$ | N | $Y_{1} \quad \mathbf{1 2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2000. 840 | 101 | 3360. 1173 | 125 | 3357. 1557 |
| 2 | 1363. 2000 | 102 | 3687. 1197 |  |  |
| 3 | 2000. 3143 | 103 | 3957. 1250 | 126 | 3647. 1573 |
|  |  | 104 | 4227. 1353 | 127 | 3893. 1620 |
| 11 | 3357. 1363 | 105 | 4487. 1523 | 128 | 4103. 1693 |
| 12 | 3663. 1387 |  |  | 129 | 4270. 1790 |
| 13 | 3923. 1440 | 106 | 4653. 1763 | 130 | 4353. 1893 |
| 14 | 4167. 1523 | 107 | 4693. 2017 |  |  |
| 15 | 4380. 1657 | 108 | 4617. 2300 | 131 | 4373. 2013 |
|  |  | 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 |
| 23 | 3357. 2617 |  |  | 139 | 2803. 2577 |
| 24 | 3053. 2603 | 116 | 2470. 2643 | 140 | 2593. 2317 |
| 25 | 2770. 2557 | 117 | 2217. 2490 |  |  |
|  |  | 118 | 2030. 2260 | 141 | 2403. 2210 |
|  |  | 119 | 1973. 1990 | 142 | 2310. 2097 |
| 26 | 2533. 2380 | 120 | 2027. 1743 | 143 | 2290. 1993 |
| 27 | 2310. 2350 |  |  | 144 | 2330. 1863 |
| 28 | 2173. 2180 | 121 | 2193. 1517 | 145 | 2423. 1767 |
| 29 | 2130. 1990 | 122 | 2460. 1350 |  |  |
| 30 | 2173. 1800 | 123 | 2743. 1247 | 146 | 2627. 1667 |
|  |  | 124 | 3050. 1187 | 147 | 2843. 1607 |
| 31 | 2310. 1643 |  |  | 148 | 3103. 1567 |
| 32 | 2543. 1507 |  |  |  |  |
| 33 | 2793. 1430 |  |  |  |  |
| 34 | 3000. 1377 |  |  |  |  |


| N | x3 Y3 |
| :---: | :---: |
| 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. 2231 |
| 29 | 1989. 2173 |
| 30 | 1783.2231 |
| 31 | 1613. 2413 |
| 32 | 1464. 2724 |
| 33 | 1381. 3058 |
| 34 | 1323. 3440 |



47.

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## 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 new i nds 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 num bered 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 coordinates, the points 1 and 3 are given the positive ordinate $y=2000 \mu \mathrm{~m}$ and the reference line 2 is given the positive


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Le: ${ }^{11 / 34}$


1

LC. ${ }^{117 / 24}$


LC. $.14 / 16$

$1^{2}$

LC. $11 / 33$


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L.C $=11 / 22$
$L . C=11 / 30$


LE. $11 / 24$


2

IS 72755 (Part 2) : 1989
ISO1073/2 : 1976
L.C. ${ }^{11 / 42}$

${ }^{2}$
L.e. $11 / 31$


2

CHARACTER --

|  | Y1 x 12 Y 2 |
| :---: | :---: |
| 1 | 2000. 840.2000, |
| 2 | 1こ53.c000.12:37. |
| 3 | 2000.3143,2000. |
| 1 | 3357.1363.3556. |
| 12 | 3663.1387.3914. |
| 13 | 3923.1440.4217. |
| 14 | 4167.1523.4501. |
| 15 | 4380 |
| . | 4507.1827.4898 |
| 17 | 4533.2017.4929. |
| 18 | 4473.2217.4859. |
| 19 | 4340.2367 .4703. |
| 20 | 4123.2490.1451 |
| 21 | 3597.2560 |
| 22 | 3653.2607.3902. |
| 23 | 3357.2617.3556. |
| 24 | 3053.2603.3202. |
| 25 | 2773. 2557.2872, |
| 26 | 2533.2480 |
| 27 | 2310.2350 .2335 |
| 28 | 2173.2180.2176 |
| 29 | 2130.1990 .21 |
| 30 | 2173.1800. |
| $3 i$ | 2310.1643,233 |
| 32 | 2543.1507.26 |
| 33 | 2793.1430.289 |
| 34 | 3080.1377. |

CHARACTER-


## CHARACTER -

| N | $Y 1$ | X 12 | $Y 2$ |
| :--- | :--- | :--- | :--- |

f. 2000. 93012000.


11 2147.2623.2191.
j2 2183.1567.2187.
13 2337.1387.2356.
14 2480.1390.2533.
15 2733.1460.2829.
2943.1619.3074,
3097.1793.3253.
3240.2003 .3420.
3407.2230.3614.
3557.2420.3789.
3747.2550.4011. 4.003.2603.4311. 4247.2547,4594. 4427.2380 .4814 , 4513.2123.4906.
264517.1810 .4909.
274440.1537 .4820 .

2e 4343.1340 .4707.

## CHARACTER-

3

| N | $\begin{array}{lll}Y 1 & \mathrm{X} 12 & \mathrm{Y} 2\end{array}$ |
| :---: | :---: |
| 1 | 2000. 809.2000. |
| 2 | 1338.2000.1228. |
| 3 | 2000.3029.2000, |
| 11 | 2234.1179 .2246 |
| 12 | 2181.1342.2184. |
| 13 | 2148.1519.2146. |
| 14 | 2128.1679.2122. |
| 15 | 2142.1892.2136. |
| 1.6 | 2192.2095.2197. |
| 17 | 2289.2259.2310. |
| 18 | 2429.2415.2474. |
| 19 | 2619.2508.2696. |
| 20 | 2812.2541.2921. |
| 21 | 3026.2517.3170. |
| 22 | 3212.2437.3388. |
| 23 | 3345.2290:3543. |
| 24 | 3432.2110.3644. |
| 25 | 3482.1933.3702. |
| . 26 | 3715.1836.3974, |
| 27 | 3912.2026.4204. |
| 28 | 4522.2129.4332. |
| 29 | 4372.2462.4741. |
| 30 | 4486.2459 .4873. |
| 31 | 4485.1905.4872. |
| 32 | 4487.1189.4875. |
| 33 | 3524.1653,3752 |



## CHARACTER -

$$
\begin{array}{llll}
\mathrm{N} & \mathrm{Y} 1 & \mathrm{X} 12 & \mathrm{Y} 2
\end{array}
$$

    2000. 086.2000.
    1348.2000.1240.
    2000.3126.2000.
    $114487 .+2250,4875$.
$124482.2082 .: 369$.
$134479.2665 .4 B+6$.
14 4299.2649.4655.
154189.2609 .4527.
164046.2516 .4360 .
17.3859 .2360 .4142 .
la 3645.2180.3893.
$193432.2027: 3644$.
203158.1874 .3325.
21 2895.1781.3017.
22 2611.1728.2686.
23 2391.1708.2430.
24 2138.1705.2134.

CHARACTER-

| $N$ | $Y 1$ | $X 12$ | $Y 2$ |
| :--- | :--- | :--- | :--- |

1 2000. 833.2000.
21347.2000 .1238. 3 2000.3183.2000.
$N \quad Y 1 \quad X 12 \quad Y 2$
12000.802 .2000.
21352.2000 .1244.
32000.3182 .2000 .

```
11 3615.1733.3857.
12 3694.1.607.3950.
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.
204432.2392.4811.
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 2626.2680.2704.
31 2416. 2615. 2459,
32 2252. 2455. 2268,
33 2155.2229.2155,
34 2135.2016.2131.
35 2145,1782.2142.
36 2234. i 565. 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 -

```
N Y1 x12 Y2
    1 2000. 833.2000.
    21343,2000,1234.
    32000.3187.2000.
11 2097.1737.2086.
12 2523.2110.2584.
    13 2717.2280.2809.
    14 29!17.2407.3031.
    15 3133.2220.3296.
    16 3097.2013.3253.
    17 3107.1803.3264.
    18 3187.1613.3358.
    19 3330.1443.3525.
    20 3547.1330.3778
```

213787.1307 .4053.
224033.1340 .4346.
234230.1437 .4575.
244383.1600 .4754.
254480.1830 .4867 .
264497.2000 .4846.
274430.23 ? 1.4808 ,

28 4290.2521.4645.
29 4097.2647.4419.
303867.2693 .4151.

31 '3423.2650.3634.

# ANNEX C <br> (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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[^0]:    IS 10315: 1982 7-bit coded Technically equivalent character set for information interchange

[^1]:    6.3 Sub-sat 3 : Extended alphanumeric sub-set
    $\square$

