Value of X	Number Set				
	Digit 1	Digit 2	Digit 3	Digit 4	Digit 5
0	B	B	A	A	A
1	B	A	B	A	A
2	B	A	A	B	A
3	B	A	A	A	B
4	A	B	B	A	A
5	A	A	B	B	A
6	A	A	A	B	B
7	A	B	A	B	A
8	A	B	A	A	B
9	A	A	B	A	B

For the example, since X = 3, the number sets for the five digits are B A A A B.

5.8.5 Nominal Dimensions of Add-on Bar Codes

The dimensions for the 2-digit and 5-digit add-on bar codes in the nominal size are shown diagramatically in Appendices 17 and 18. These dimensions correspond to the nominal size module width of 0.33mm.

- the add-on code is located to the right of the main bar code and parallel to it
- the lower edge of the bars is aligned with the lower edges of the guard patterns and centre pattern of the main bar code
- the height of the add-on bars in the nominal size is 21.1mm ± 0.1mm
- the digit values are printed in human-readable figures using OCR-B characters above the add-on bars
  - in the same size as for the main code figures, ie 2.75 mm height nominal
  - the upper edges of the OCR-B characters are aligned with the upper edges of the bars of the main code
- the add-on code is located from the main code at a distance of 7 modules minimum to 10 modules maximum
- the light margin to the right of the add-on code as denoted by corner marks has a minimum width of 5 modules

the add-on code and its location distances must be reproduced to the same magnification factor as for the main code, in accordance with the criteria in Section 6.0

6.0 PRODUCTION OF SYMBOLS FOR SOURCE MARKING

The production of a bar code symbol in its finished state on an article involves a number of separate processes, each of which contributes to the quality of the final result.

It is the intention of the ANA, EAN and UPC systems that the required dimensions and tolerances in the final printed symbol should not have to be directly specified as such. Instead, the specification lays down the conditions to be fulfilled at each stage of the production process. Scanning equipment should then be capable of reading a symbol produced in accordance with these conditions. (But see Sect. 6.6).

Great care should be exercised in trying to check the correctness of a printed bar code by using any commercially available verification devices. As explained in the Introduction, Section 1.6, the EAN Memorandum of Agreement specifically absolves manufacturers from any obligation to use checking equipment for this purpose. If, nevertheless, it is wished to make a check that a bar code has been printed in accordance with the requirements of this Manual, it is essential that any verifying equipment used should itself respond exactly in accordance with these requirements. This is particularly vital in regard to the spectral range employed. Otherwise the results given by inappropriate verifiers can be seriously misleading in both over- and under-estimating the acceptability of printed bar codes.

The two main processes in the production of a source marked symbol are:

- the production of a film master representing the symbol

- the printing of the packaging from plates made from the film master

These processes will normally be undertaken by specialist concerns, who may employ techniques at their own discretion in order to produce symbols of acceptable reliability for scanning at an economic cost. In order to define the standards required, the following sections outline the considerations which apply to the production processes, and give methods whereby acceptable quality can be achieved.

6.1 Print Gain and Variation

If a film master containing a symbol bar of nominal width is converted into a printing plate and printed on to a package, the bar as finally printed will usually be found to be wider than the original bar on the film master. This is due to many factors: plate making, print pressure, absorbent material, ink viscosity, and so on.

This increase in width is known as the Print Gain. It is shown diagrammatically in Fig.5.

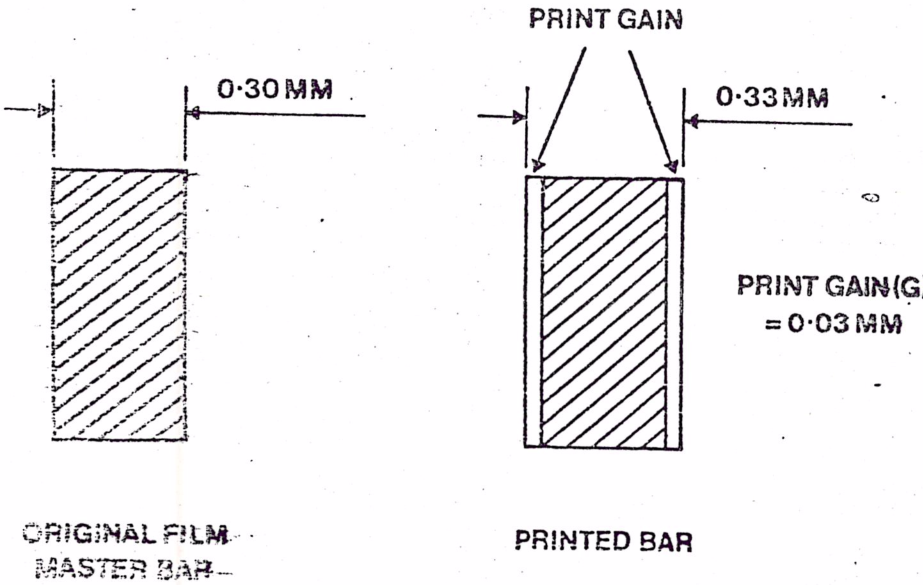

FIG.5

In the course of a print run, it is to be expected that the extent of print gain will differ between individual impressions. This difference in the amount of print gain is known as Variation.

6.2 Assessment of Printing Conditions

In preparation for the printing of a symbol on a package, it is necessary first to assess the amount of print gain and variation normally encountered in the printing of that package. The assessment should be made under the following conditions:

1) The test can be made using either a film master of an actual symbol or a special film master which serves as a "gauge". See Section 6.4. The film used must be integrated into the printing plates, using the standard procedure normally used in the particular operation.

2) The test must be made using qualities of inks and substrate comparable to those which will be used in actual production.

3) The test should include both

   - bars printed parallel to the direction of printing

   - bars printed at right angles to the direction of printing

4) It should include all the variations likely to be encountered in practice in the factors affecting print quality so that the effect of extremes of printing conditions can be measured.

6.3 Basic Assessment Method

A basic method of print quality assessment is to use proper sampling over a sufficiently long print run, and measure directly the bars in printed test symbols to find:

- the average of extremes of Print Gain (G)
- the Variation about this average (V)

If the original bar width on the film master is N and the bar width as printed is L, then

$$L = N + G \pm V$$

6.3.1 Magnification Factor

The extent of print gain Variation V determines the factor by which the entire symbol must be magnified (or may be reduced) in relation to the nominal size.

Appendix 9 gives two tables of values of the Magnification factor M for values of Variation V. The left hand table is based on a regular sequence of values of M. The right hand table is based on a regular sequence of values of V.

The continuous relationship between M and V is shown in a graph in Appendix 10. Any value of M between 0.8 and 2.0 may be adopted from interpolation of the tables or from the graph.

6.3.2 Film Master Tolerances

The Magnification factor M compensates for the Variation V in print gain, and is the minimum magnification required. It does not take into account any further magnification which may be required to compensate for tolerances in the preparation of the film master itself, nor does it allow any additional safety margin. The permissible tolerances in the preparation of a film master of nominal size are given in Appendix 5. These tolerances are ± 0.005 mm on any module of 0.33 mm width and ± 0.013 mm on any complete number character or auxiliary character.

The supplier of the film master should be consulted regarding the variation in tolerance to be expected in practice in the film master. This amount should be added to the value of Variation V measured in respect of the print gain. In general, it may be prudent to add the amount of the modular tolerance (0.005mm) to V before looking up the required value of M.

6.3.3 Symbol Size

Once the value of M has been selected, the space required on the package for the printing of the symbol becomes known. This space will be from 0.8 to 2.0 times the nominal dimensions between corner marks given in Appendices 6,7 and 8. If space on the package is not at a premium, reliability of scanning will always be enhanced by selecting a magnification factor higher than the theoretical minimum. In particular, reduction below the nominal dimensions, ie magnification factors of less than 1.0, may reduce reliability.

Note: The extent of magnification or reduction in the nominal symbol size is determined by the print quality. It is not possible to select an arbitrary symbol size to fit a predetermined space on the package.

6.3.4 Bar Width Reduction

The extent of the average Print Gain G now has to be corrected for. This is done by reducing the width of each bar on the film master symmetrically (on both right and left) by a total amount equal to G in each case. This reduction must be the same amount on each bar in the symbol, irrespective of the width of the bar, ie of the number of modules it contains.

The bar width reduction is applied after any magnification has been carried out, and not the reverse, (except in the case of flexography, see Section 6.4.1; or any other process producing a print gain G in excess of 0.3mm.)

The amount of bar width reduction required is equal to the average Print Gain G in all cases, and is not itself affected by magnification of the symbol. When the reduced width bars on the film master are printed, the average Print Gain will restore the bars to the ideal width. Variation in the average Gain has already been allowed for in the magnification process. The tolerance of bar width reduction is ± 0.008mm.

Note: No bar in a symbol must be reduced below an absolute minimum width of 0.13 mm on the printing plates. If the effect of magnification factor and bar width reduction combined would go below this limit on a single module bar, the magnification must be increased again so as to comply. Nominal module width is 0.33 mm, therefore

$$(0.33 \times M) - G \geqslant 0.13$$

6.4 Printability Gauge Method

Section 6.3 describes the theoretical method of determining the allowances to be made in the printing process. In practice, a simpler alternative operating method can be employed, using a specially calibrated "Printability Gauge".

This gauge is illustrated in Fig.6. Supplies of the gauge are obtainable commercially. It consists of a very precise design in the form of a positive or negative film master. It is made up of eleven sections each of which includes two series of parallel lines perpendicular to each other. This enables print quality to be assessed both in the direction of the print run and at right angles to it.

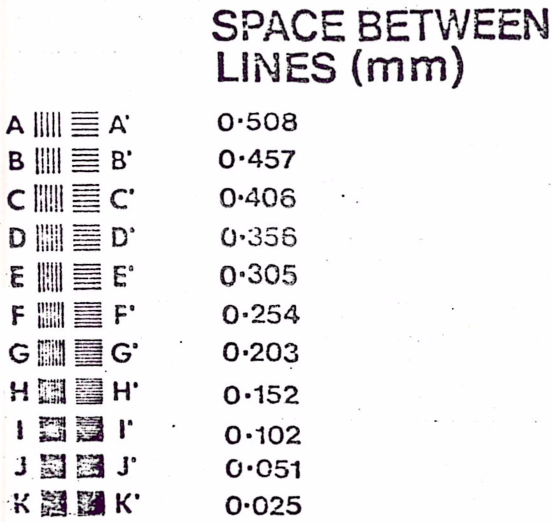

FIG.6 PRINTABILITY GAUGE

The spacing between the lines decreases uniformly from the set marked A to the set marked K. The line spacing is set empirically and it is not necessary to know the dimensional values when using the method described in this Section. * The printability gauge (or the part of it likely to be relevant) is used to test print conditions by including it in an actual press run of the packaging on which a symbol is eventually to be printed, as near as possible to the eventual symbol location, and using the same processing and printing methods.

The printability gauge is specially produced and must be used as supplied. It is essential for the gauge to be introduced into the same stage of the reproduction process and in the same way as eventually for the symbol film master itself. Any photographic enlargement or reduction of the gauge would defeat its purpose.

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* The dimensions of the gauge have however been accurately specified and are shown in Fig. 6. The tolerances are 0.005mm, as for symbol modules in Sect. 6.3.2. Using this data, the printability gauge can also be used for direct measurement as in Sect. 6.3.

6.4.1 Evaluation of Printability Gauge Results

Samples of the test print run incorporating the gauge are examined under a magnifying glass to determine the finest gauge pattern where the printed lines first touch one another. Stray imperfections are disregarded for this purpose; lines are considered to touch when 50% or more of the line length is in contact. For example, the lines in patterns A to D might be quite distinct; patterns G to K completely filled in with ink; and patterns E and F with lines just touching. The printability range of the job would then be classed as E-F.

The printability range is then used in conjunction with the tables given in Appendix 11 to read off directly the magnification factor and bar width reduction to be applied to the symbol film master. Two tables are provided for use with different printing processes.

Table 1 : Printing Techniques other than Flexography

This table shows for each printability range the magnification factor and the bar width reduction to be applied. Note that the magnification factor must be applied before the bar width reduction.

The magnification factors given in this table are subject to the rule in Section 6.3.4 regarding minimum final bar width. This applies particularly to the values given against Printability Ranges E-F, E-G, F-G, and G-H.

Table 2 : Printing by Flexography

This table shows for each printability range the bar width reduction and the magnification factor to be applied. In the case of flexography, the bar width reduction may need to be large, and difficult to achieve reliably. Hence in flexography the bar width reduction is often done first, then magnification is applied. The figures in Table 2 take this sequence into account. But if print gauge data indicates for a particular flexographic operation that results are comparable with other printing processes eg lithography, then Table 1 would be used.

6.5 Print Quality Checks

If allowances for printing quality have been properly made in the preparation of the film master, either by the theoretical method in Section 6.3, or by the gauge method in Section 6.4, it should not be necessary to check the overall quality or performance of the symbol as actually printed. It should be sufficient merely to carry out spot checks in the course of the print run to ensure that print quality does not deteriorate below the levels which were recorded during the test run.

In practice this can be done either directly by measurement of a particular bar in the printed symbol (e.g. the centre or guard pattern bars); or indirectly by means of the printability gauge. The appropriate part of the printability gauge can be incorporated in an inconspicuous part of the finished print, in addition to the symbol itself. Spot checks will then reveal whether the printability gauge pattern is still being reproduced to the same standard achieved during test.

6.6 Alternative Method

In practice, some packaging manufacturers may prefer to determine dimensions and tolerances and by measurement ensure that printing is of acceptable quality. Appendix 12 shows in column D1 an acceptable bar width dimensional tolerance for a given minimum module width, for use with in-score marking equipment (See Sect. 7.0). These figures do not represent a standard for source marked bar codes but can if desired be used as a reference.

7.0 PRODUCTION OF SYMBOLS FOR IN-STORE MARKING

The application of symbols to articles in-store requires the use of automated label printing machines which can convert numerical data directly into bar codes. The processes for the production and control of source marked symbols, described in Sections 6.0 to 6.5, clearly do not apply to in-store label printers.

In order to specify the performance of such label printers, and to control their output, it is necessary to stipulate the tolerances permitted in the symbol as printed.

The tolerances quoted in this connection are in no circumstances to be taken as establishing a standard for symbols printed at source by the processes described in Sections 6.0 to 6.5.

Tolerances for in-store bar code labels are defined for various module widths corresponding to magnification factors from 0.8 to 2.0 times the nominal width of module (0.33mm). Different tolerances apply to different types of dimension.

There are four different types of dimension in a symbol:

Type 1 : measurement of a bar or space inside a character

Type 2 : measurement of the width between corresponding edges of bars inside a character.

Type 3 : measurement between corresponding edges of corresponding bars in adjacent characters

Type 4 : measurement of the space between the last and first bars of adjacent characters.

Appendix 12 shows these types of dimensions diagrammatically, and gives a table of tolerances for dimensions type 1, 2 and 3.

Type 4 dimensions are not subject to explicit tolerances but must not be less than 0.2 mm.

8.0 COLOURS, CONTRAST AND REFLECTANCE

Operation of the scanners depends on the recognition of the contrast between dark and light areas of the symbol. This recognition can be affected by various factors, which are described in this section.

8.1 Reflectance Factor and Reflection Density

The reflectance factor (R) is the ratio of reflected flux Φ_r to the reference reflected Φ_{rs}. Reflected flux is the radiant power reflected by the sample and evaluated by a specified kind of receiver. Reference reflected flux is the radiant power reflected by a magnesium oxide or barium sulphate photometric standard (R = 100 %).

Reflection density (D) is equal to : $D = -\log_{10} R$

The reflection density required for the dark bars depends on the reflection density of the particular light background being used, in other words, of the light modules in the symbol. Appendices 13 and 14 show the minimum dark-bar density required for the permissible range of light background density.

All the measurements mentioned in this section must be made under the following conditions, and with equipment corresponding to the following specifications :

8.1.1 Geometric conditions for reflection measurements

The incident illumination should be centred at 45° to the normal to the sample and the reflected flux collected by a receiver subtending a solid angle centred on the normal to the sample. The sampling aperture should be a circular area 0.2 mm in diameter.

8.1.2 Spectral conditions for reflection measurements

The sample should be illuminated by light having a spectral power distribution which corresponds to the following specification : CIE source A, obtained by using a gas-filled, coiled-tungsten filament lamp operating at a correlated colour temperature of $2856^\circ K$.

The photometric receiver of reflected flux should have a relative spectral sensitivity corresponding to the following specification :

Photomultiplier with an S-4 response as specified by the American Joint Electron Devices Engineering Council, used with a Wratten 26 filter, meeting nominal specifications.

8.2 Print Contrast

Print contrast (PCS) is defined by the relationship :

$$PCS = \frac{R_L - R_D}{R_L}$$

Where R_L is the reflectance factor of the light background (light bars) and R_D is the reflectance factor of the dark bars. Appendixes 13 and 14 indicate the minimum PCS corresponding to the reflection density of the light background.

8.3 Colour

Any combination of colours that will yield the reflectance and print contrast specified in paragraphs 8.1 and 8.2 can be used to represent the "dark" bars and "light" background.

As a general guide to colour selection, it is the cyan content of a colour that yields the "dark" tone when viewed through the Wratten 26 filter; magenta and yellow correspond to the "light" tone. Inks used in the background area must be of sufficiently low gloss to enable the contrast requirements specified in paragraphs 8.1 and 8.2 to be met.

8.4 Show-through

In some packages the product or some inside material may show through the light areas to such an extent that the light appears dark to the scanner. Accordingly, in situations with this potential problem, the finished product - not just the outer package - should be subjected to the procedures for measuring contrast given in paragraph 8.1.

It has been observed that certain materials reflect light differently according to the dimensions of the bars and spaces. This has been especially evident on transparent and translucent packages where the background (spaces) is not printed.

The symbol contrast specifications should be met when the package is in the form in which it will be sold. Contrast measurements should be made within the parts of the symbols where the bars and spaces are both minimum width : for example in the centre pattern.

The preferred printing method is to print the background and bars.

8.5 Transparent Wrapper

A transparent wrapper over the printed symbol tends to reduce contrast slightly. If a transparent wrapper is used over the printed symbol, the transparent wrapper must be considered to be an integral part of the symbol, and all reflectance measurements must be made with the wrapper over the symbol.

8.6 Specularly Reflecting Materials

The use of specularly reflecting materials to directly provide either light or dark areas of the symbol should be avoided. If such material is the substrate for a symbol, the symbol should be provided by overprinting the substrate with two inks with sufficiently different light-absorbing characteristics to meet the print contrast signal requirements of Section 8.2.

If the use of specularly reflecting materials is unavoidable, as with the two-piece can, and the symbol surface is rigid, the spaces should be printed in a light colour to nominal specifications and the bars provided by the specularly reflecting substrate, preferably by leaving bare substrate or by printing any portion of the bar area with a transparent ink that does not significantly change reflectance.

If the bar is not printed, it is preferred that the entire symool surface be varnished.

Printing of the symbol in sizes below a 1.00 magnification is not recommended in these circumstances.

It is preferable that the human-readable number be highly visible.

8.7 Obscuring Patterns

Under certain circumstances it may be desired to obscure a symbol(s) -- eg, on the individual unit packs in a multipack container which carries its own symbol. To accomplish this, a solid layer of ink is sometimes applied over the symbol(s) desired to be obscured. However, this is not always effective. Therefore, the following procedure is suggested for introducing spurious "noise" into the scanner logic and ensuring a non-read of the symbol(s).

When the obscuring pattern is in place over the symbol to be obscured, the print contrast signal (PCS) of the obscuring pattern itself must be such that it (1) meets the minimum PCS requirements set out in Section 8.2 and (2) is at least equal to that of the symbol to be obscured. The bar width of the obscuring pattern should be the "target" module width for the magnification factor of the symbol being obscured. The space width of the obscuring pattern should be no more than twice its own bar width. Examples are given in Appendix 15.

9.0 APPLICATION OF BAR CODES

The bar code symbol, printed in accordance with all the foregoing requirements, must be applied to the packaging of the article in such a way that it can be read by the point of sale scanner. In addition, it is desirable that the symbol should be in such a position on the pack as to give the maximum convenience to the operator at the scanning check-out, so as to increase productivity. At the same time, the symbol location must be governed by the needs of the manufacturer in avoiding excessive additional printing costs and inordinate blemish on packaging attractiveness.

As regards the actual scannability of bar codes, certain mandatory rules must apply, which are given in the following sections. The remaining questions of convenience and compromise on symbol location cannot be made the subject of specific rules and are therefore not included in this Manual. The ANA Council publishes separately a set of "Guidelines on Symbol Location" which cover in detail every type of packaging with recommendations for best practice in each case.

9.1. Code Uniqueness

Different bar codes must never be visible on any one pack. This is particularly relevant to banded packs and other multi-packs, where the individual inner units carry a different bar code from the bar code on the outer wrapper or container. The bar codes on the inner units must be totally obscured so that they cannot be read by mistake by the scanner.

There is no objection to more than one of the same bar code appearing on any one pack. This may occur with so-called random wrapped or continuous wrapped items, where the wrapping is not registered to the item, and it may be necessary for more than one print of the bar code to appear on one item. All readings of the same bar code on any one package are recorded as one item only. There is therefore no danger of one item being recorded as several items..

9.2 Curved Surfaces

If a bar code is printed on a curved surface, it is preferable for the bars to be perpendicular to the generating lines of the surface of the container. (See Fig.7)

This preference may be subject to considerations of space and to the direction of printing. Better printing quality is normally obtained when the bars are parallel to the direction of printing.

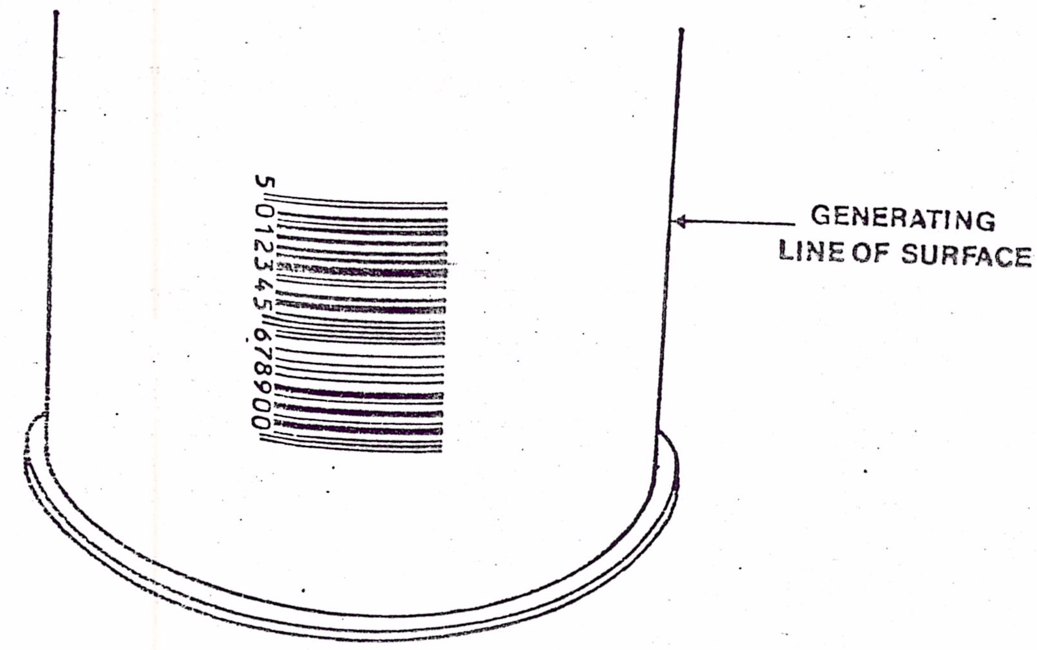


FIG.7

If the symbol has to be printed with the bars parallel to the generating lines of the surface the following constraint applies:

- the curve of the surface must be such that, when the centre of the symbol is touching the checkstand surface there will be an angle of not more than 30 degrees between the checkstand surface and the plane tangent to the surface of the package at either extremity of the symbol. (See Fig.8.)

To facilitate interpretation of this constraint, Appendix 16 gives a table showing maximum permissible magnification factors for the symbol on containers of different diameters.

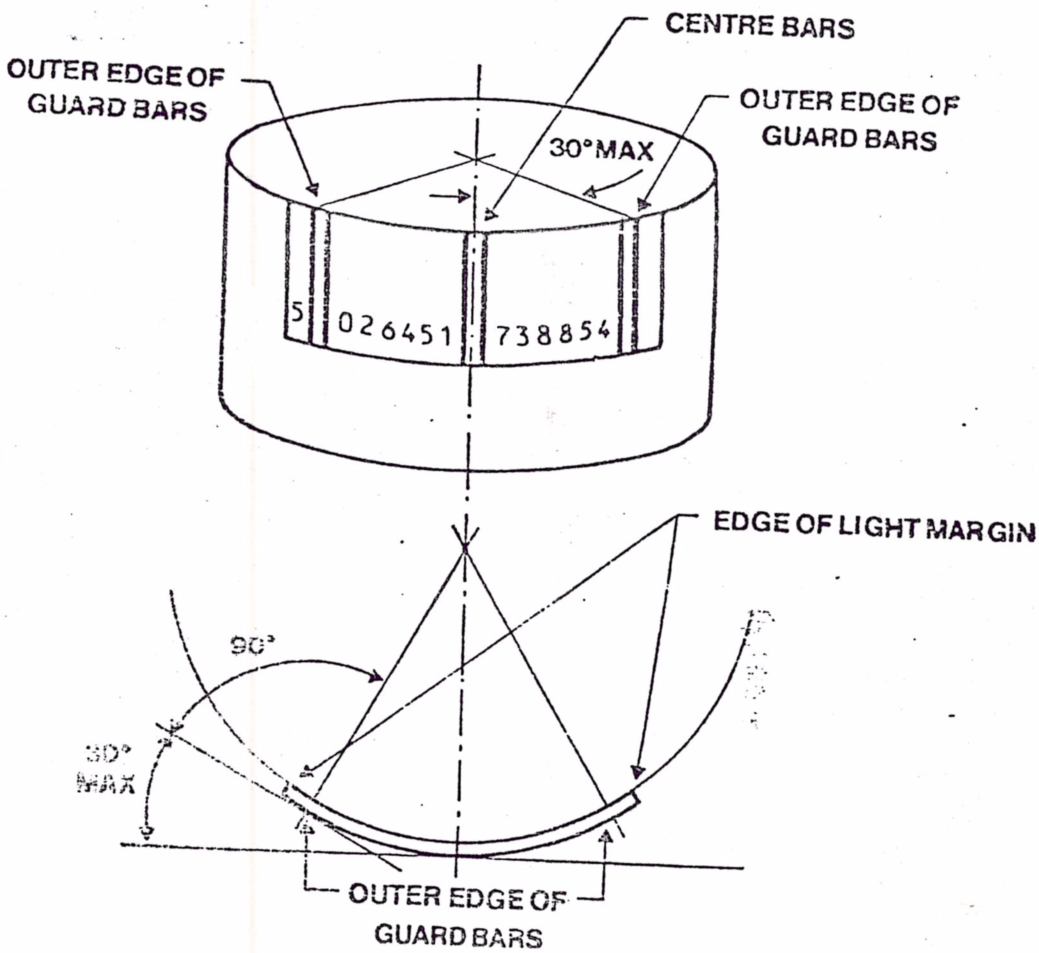


FIG. 8

9.3 Scanning Distance

If the shape of a package prevents the printed symbol from being brought into flat contact with the checkstand surface, the distance between the symbol area and the checkstand surface must not exceed 12 mm. This applies particularly to carded items and concave items. (See Fig. 9)

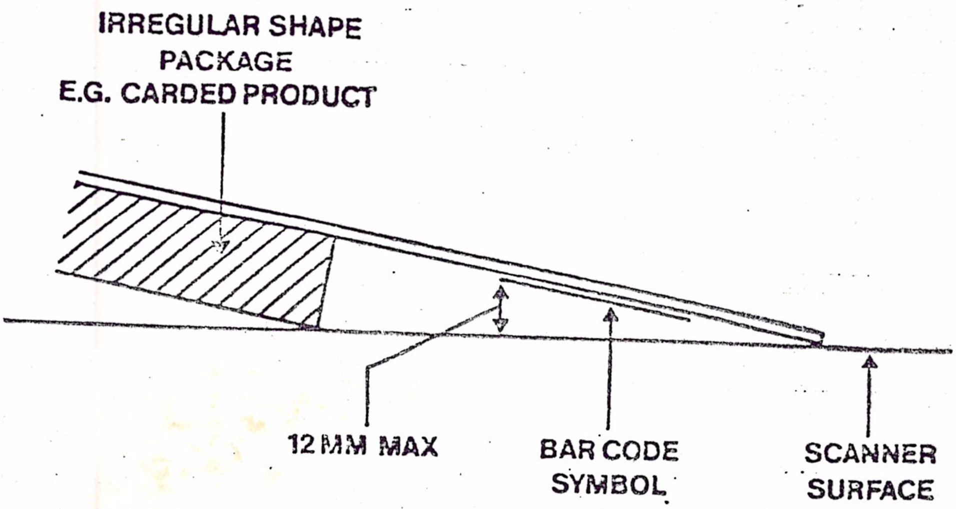


FIG. 9

9.4 Truncated Symbols

In certain exceptional cases, there may simply be insufficient space on a package or label to permit the printing of a symbol in the size rendered necessary by the normal print quality.

If there is absolutely no possibility of printing a symbol in full size, it is as a last resort preferable to print a symbol of normal length, but of reduced height. The effect of this is to lose the omni-directional scanning capability.

A reduced height symbol can only be scanned bi-directionally; for a successful scan the symbol on the package must be oriented in the direction of the scanning beam.

The more the height is reduced, the more critical this orientation becomes. A symbol with much height reduction may not therefore be of any practical use at the checkout. Product manufacturers with this particular problem are advised to consult with their retail customers to see if an acceptable compromise can be reached.

– APPENDIX 1 –

SUMMARY OF NUMBERING SYSTEMS

Section		13	12	11	10	9	8	7	6	5	4	3	2	1
	SOURCE NUMBERING													
2.1.	ANA Standard Long Number	5	0	M	M	M	M	M	I	I	I	I	I	C
2.2	ANA Standard Short Number	(0	0	0	0	0)	5	0	X	X	X	X	X	C
3.1.	EAN-13 Number, General Form	P_1	P_2	X	X	X	X	X	X	X	X	X	X	C
	(see App. 2)													
3.2.	EAN-8 Number, General Form	(0	0	0	0	0)	P_1	P_2	X	X	X	X	X	C
3.3.	UPC Number, General Form	(0)	P	X	X	X	X	X	X	X	X	X	X	C
3.3.	UPC National Drug and NHRI Numbers	(0)	3	X	X	X	X	X	X	X	X	X	X	C
3.3.	UPC Grocery Number	(0)	0	M	M	M	M	M	I	I	I	I	I	C
	excluding		to and to	0 0 0 0	0 0 1 7	0 0 0 9	0 9 0 9	0 9 0 9						
3.4.	USA SI-6 Number	6 6 6 to 6	1 2 5 9	X	X	X	X	X	X	X	X	X	X	C
3.5.	ISBN System in EAN	9	7	8	X	X	X	X	X	X	X	X	X	C
	COUPON NUMBERING													
4.1.1.	UPC Coupon Number (Supplier/Group/Value)	(0)	5	S	S	S	S	S	G	G	V	V	V	C
4.1.2.	EAN Coupon Number	9	9	X	X	X	X	X	X	X	X	X	X	C
4.1.2.	EAN Coupon Number with Specified Territory	9	8	T	X	X	X	X	X	X	X	X	X	C
	IN-STORE NUMBERING													
4.2	UPC In-Store Code, Long Version	(0)	2	X	X	X	X	X	X	X	X	X	X	C
4.2.2.	EAN Standard Variable Weight	(0)	2	I	I	I	I	V	P	P	P	P	P	C
4.3.	EAN-13 In-Store Number	2	X	X	X	X	X	X	X	X	X	X	X	C
4.4.	UPC-E LAC Number	(0)	0	0 0	1 7	0 to 9	0 9	0 9	0	0	0	0	5 to 9	C
4.5.	EAN-8 In-Store Number	(0	0	0	0	0)	2	X	X	X	X	X	X	C
4.6.	EAN-8 Velocity Code	(0	0	0	0	0)	0	X	X	X	X	X	X	C

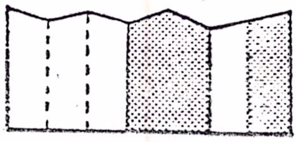
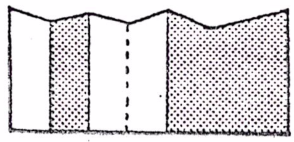
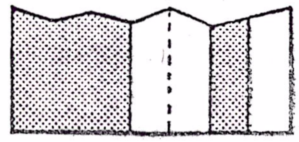
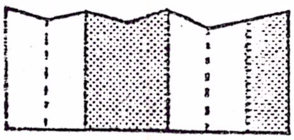
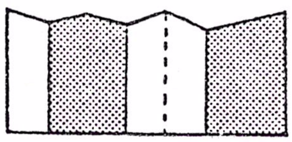
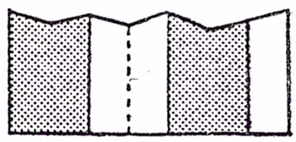
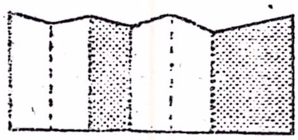
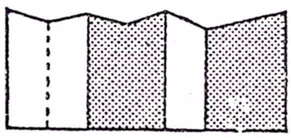
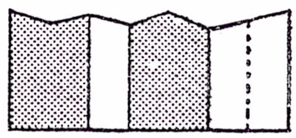
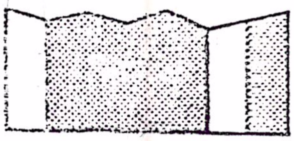
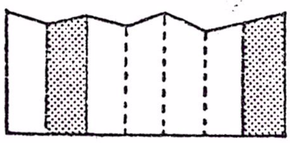
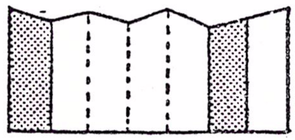
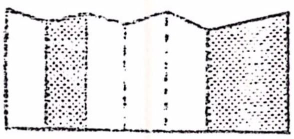
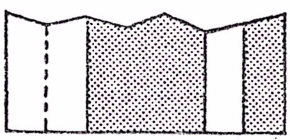
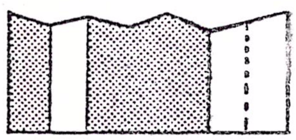
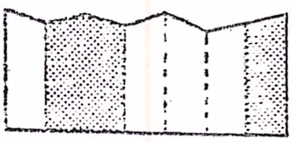
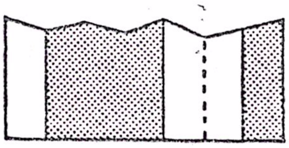
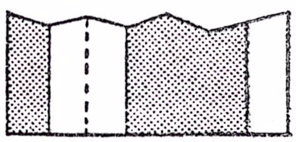
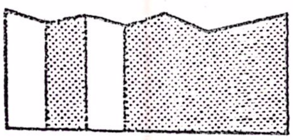
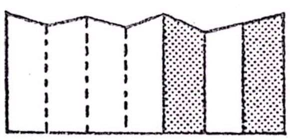
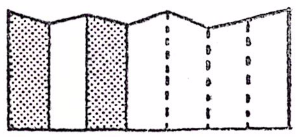
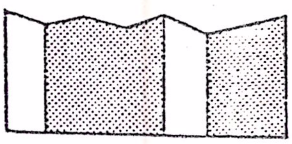
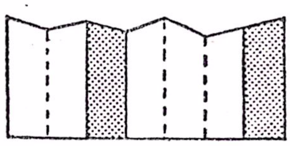
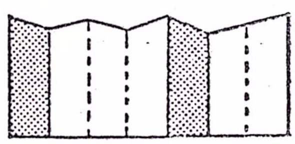
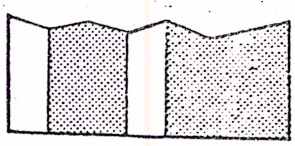
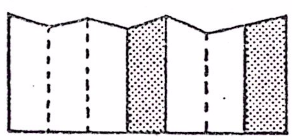
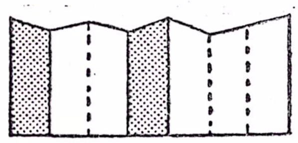
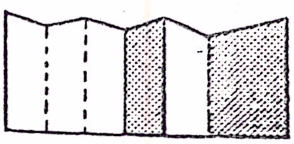
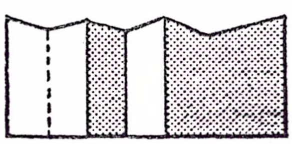
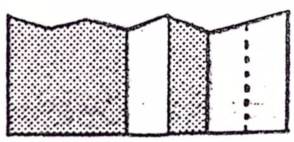
– APPENDIX 2 –

ASSIGNMENT OF PREFIX DIGITS BY EAN

Prefix Values	
00 - 09	(Reserved for UPC)
20 - 29	In-Store Numbers
30 - 37	Gencod (France)
40 - 43	CCG (Germany)
49	Distribution Code Center (Japan)
50	ANA (United Kingdom)
54	ICODIF (Belgium)
57	Dansk Varekode Administration (Denmark)
61 - 62	(Reserved for DCI)
64	The Central Chamber of Commerce (Finland)
65 - 69	(Reserved for DCI)
70	(Norway)
73	Swedish EAN Committee (Sweden)
76	Schweizerische Artikelkode Vereinigung (Switzerland)
77	APNA Australia
80 - 83	(Italy)
84	AECOC (Spain)
87	UAC (Netherlands)
90 - 91	BAN – Austria
94	NEW ZEALAND
978	ISBN
979	Reserved for ISBN
98 - 99	Coupon Numbers

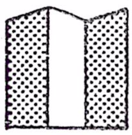
– APPENDIX 3 –

CODING OF NUMBER CHARACTERS

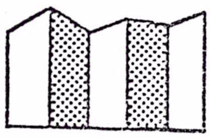
VALUE OF CHARACTER	NUMBER SET A (odd)	NUMBER SET B (even)	NUMBER SET C (even)
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			

CODING OF AUXILIARY CHARACTERS

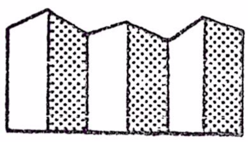
NORMAL
GUARD PATTERN
(RIGHT AND LEFT)



CENTRE PATTERN

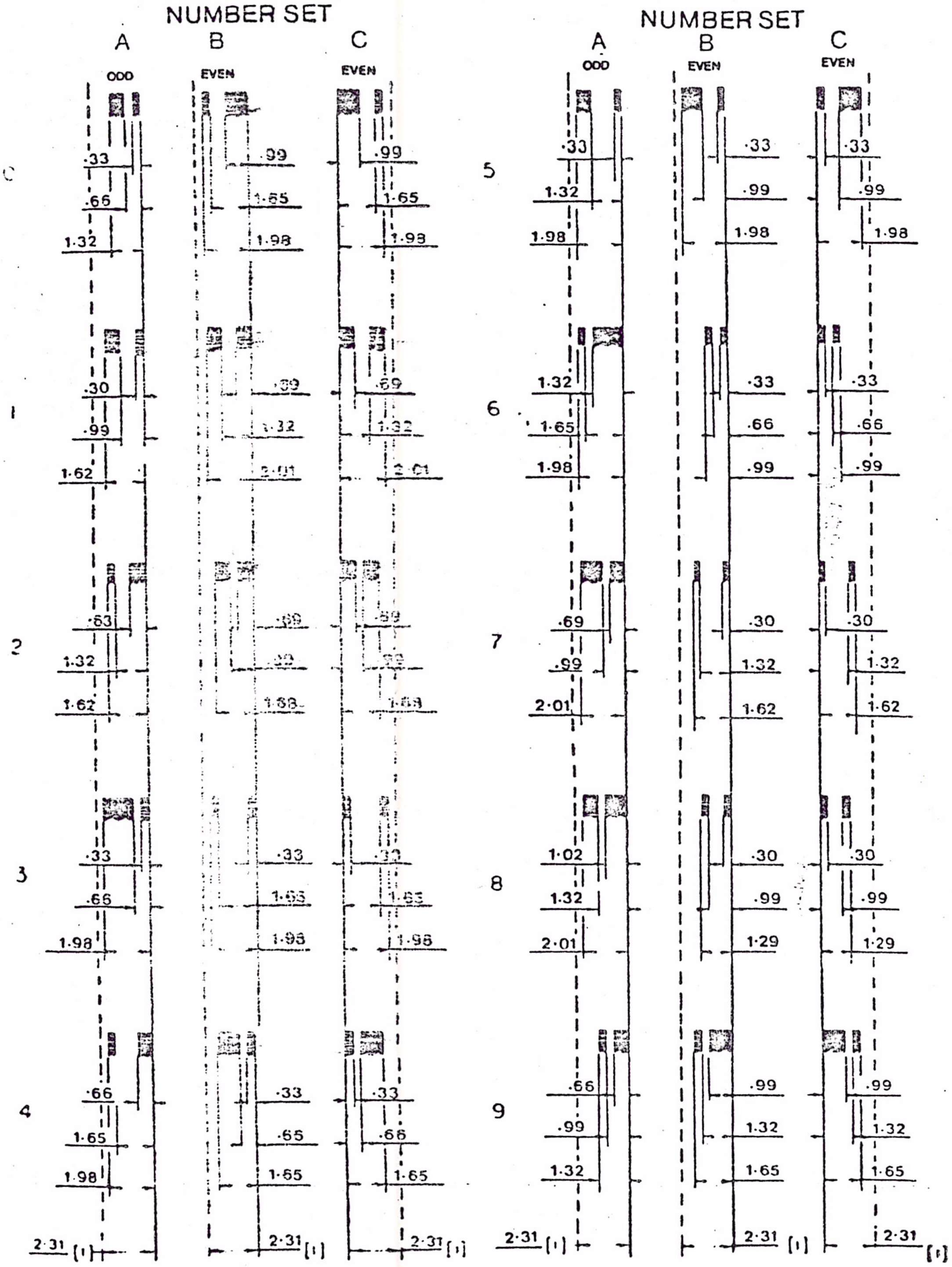


"E" VERSION
RIGHT GUARD
PATTERN

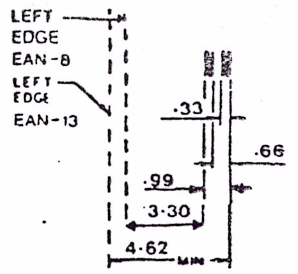


APPENDIX 5

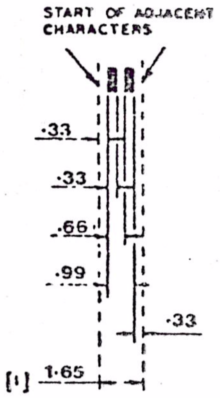
BAR CODE CHARACTERS – NOMINAL DIMENSIONS (IN MILLIMETERS)



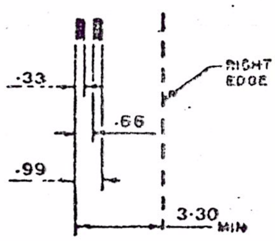
LEFT-HAND LIGHT MARGIN AND GUARD PATTERN



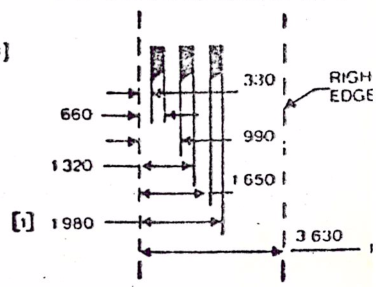
CENTRE PATTERN



RIGHT-HAND GUARD PATTERN AND LIGHT MARGIN



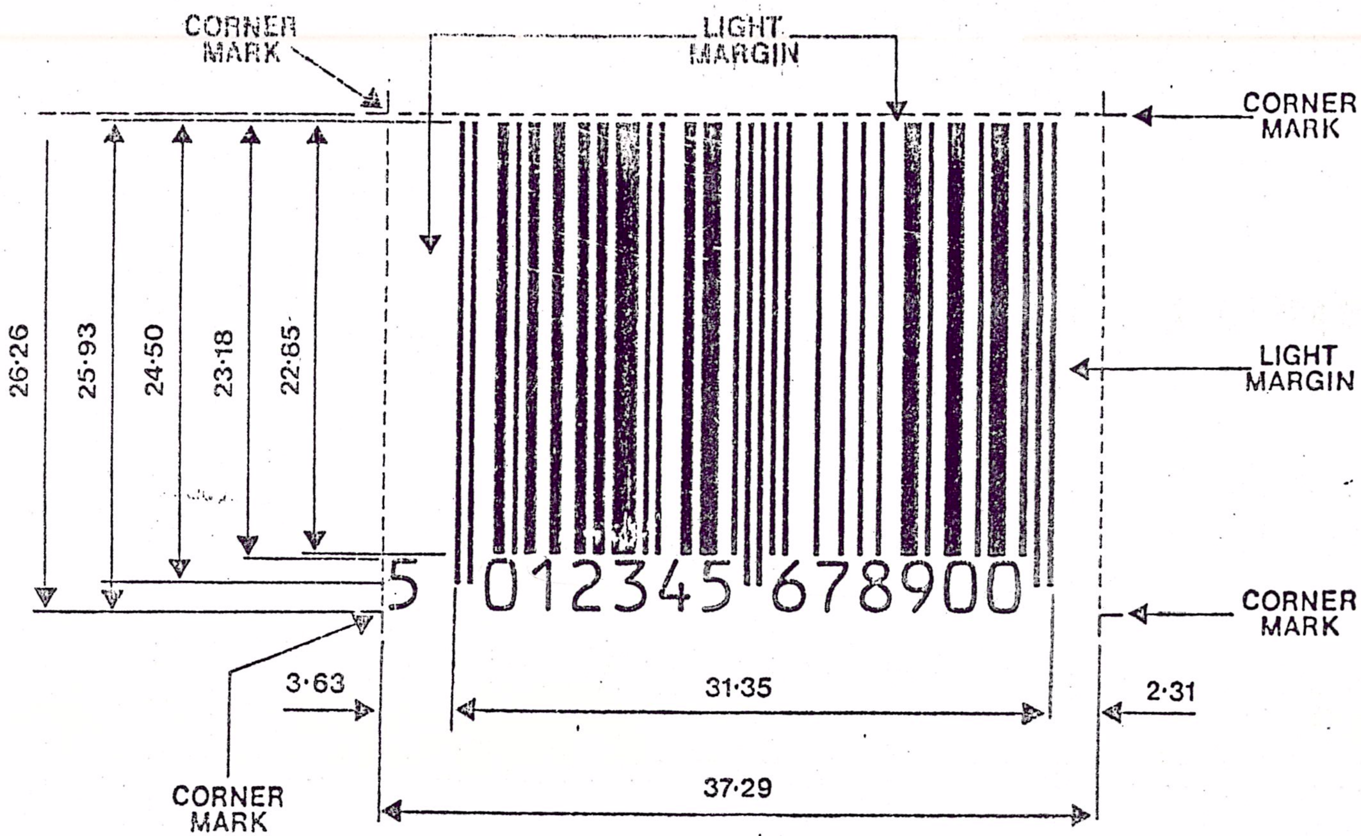
'E' VERSION RIGHT GUARD AND LIGHT MARGIN



DO NOT SCALE
FILM MASTER TOLERANCES ±0·005
EXCEPT REFERENCE [1] WHERE
TOLERANCE IS ±0·013

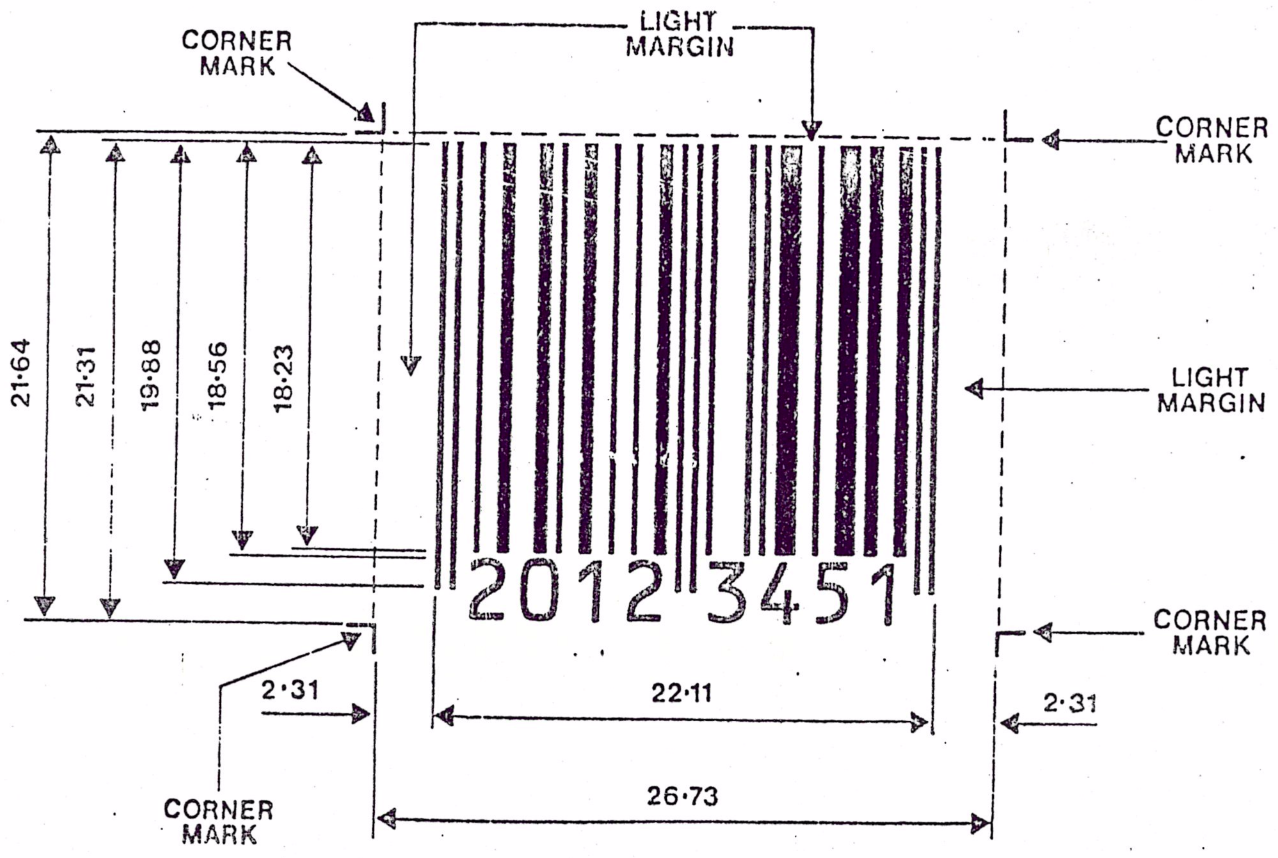
– APPENDIX 6 –

DIMENSIONS OF 12 CHARACTER SYMBOL
NOMINAL SIZE
in millimetres
(1 MODULE = 0·33 mm WIDE)



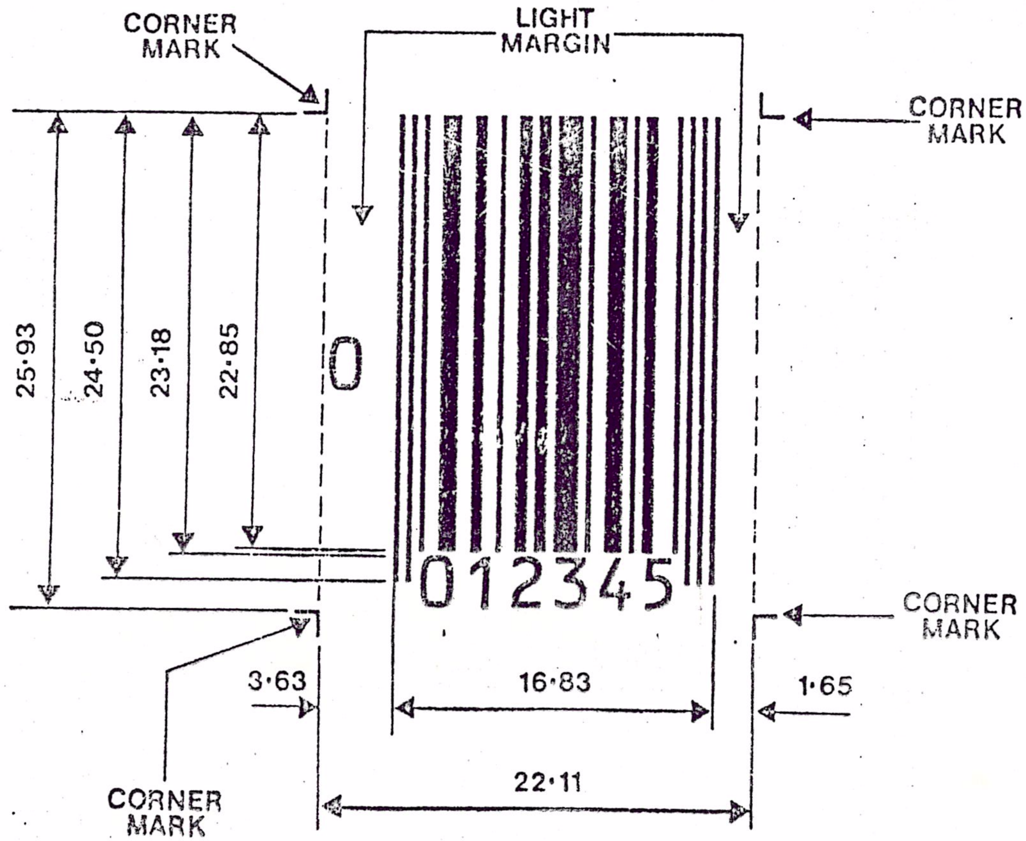
- APPENDIX 7 -

DIMENSIONS OF 8 CHARACTER SYMBOL
NOMINAL SIZE
in millimetres
(1MODULE = 0·33 mm WIDE)



– APPENDIX 8 –

DIMENSIONS OF UPC – E SYMBOL
NOMINAL SIZE
in millimetres
(1 MODULE = 0·33 mm WIDE)



CORRESPONDENCE TABLES SHOWING RELATION BETWEEN MAXIMUM PRINT-GAIN VARIATION AND MINIMUM MAGNIFICATION FACTOR TO BE APPLIED

CONTINUOUS SEQUENCE VALUES OF M

V Maximum variation of print gain (mm)	M Minimum value of magnification factor to be applied
± 0·035	0·8
± 0·051	0·85
± 0·069	0·90
± 0·085	0·95
± 0·101	1
± 0·109	1·05
± 0·115	1·1
± 0·124	1·15
± 0·132	1·20
± 0·140	1·25
± 0·147	1·30
± 0·152	1·35
± 0·163	1·40
± 0·171	1·45
± 0·178	1·50
± 0·184	1·55
± 0·192	1·60
± 0·201	1·65
± 0·209	1·70
± 0·216	1·75
± 0·224	1·80
± 0·233	1·85
± 0·241	1·90
± 0·250	1·95
± 0·256	2

CONTINUOUS SEQUENCE VALUES OF V

V Maximum variation of print gain (mm)	M Minimum value of magnification factor to be applied
± 0·04	0·82
± 0·06	0·88
± 0·08	0·94
± 0·10	1·00
± 0·12	1·14
± 0·14	1·25
± 0·16	1·39
± 0·18	1·52
± 0·20	1·65
± 0·22	1·78
± 0·24	1·90
± 0·26	2·00

APPENDIX 10

GRAPH SHOWING CORRESPONDENCE BETWEEN MAXIMUM PRINT-GAIN VARIATION AND MINIMUM MAGNIFICATION FACTOR TO BE APPLIED