Standard Alphabets
For Traffic Control Devices

Introduction

The Standard Alphabets for Traffic Control Devices were prepared by the Federal Highway Administration for signing and marking all streets, highways, bike routes, trails and other by-ways open to public travel.

The alphabets were first adopted nationwide some time in the late 1940's and early 1950's after completion of studies by the California Department of Transportation. A modified version of the Gothic style alphabet was adopted having an openness in the rounded shaped characters. This modification provided better legibility and readability for traffic control devices. These alphabets contained dimensions for each letter (A, B, C, etc.) and a table that permitted several sizes to be drawn mechanically to scale for upper case series A through F.

In 1966, the Federal Highway Administration reprinted the Standard Alphabets For Traffic Control Devices. This edition contained upper case series B, C, D, E, E Modified, Lower case E Modified and F (series A was deleted from this edition). These Alphabets were placed on 1/4 inch grids which eliminated the need for the previous tables of dimensions. However, the 1966 edition did contain six tables for character widths and spacings for upper case letters and numerals. A simplified spacing chart also was included for E Modified characters. In 1977, the Federal Highway Administration issued a metric edition of the 1966 Standard Highway Alphabets in upper case Series B, C, D, E, E Modified, F and Lower case E Modified. The 1977 edition also contained the design standards for alphabets, numerals and symbols to be placed on roadway pavements. These alphabets were placed on five millimeter grids for ease of use.

The 1977 edition also contained spacing charts for all alphabets and numerals which specified exact letter to letter distances to be used when constructing words or legends. Depending upon the letter to letter combination a different dimension was prescribed. In concept this approach is correct; however, it makes this method useable with only the more sophisticated signmaking software programs, because the myriad of unique spacing values can only be reproduced through the use of kerning pairs. Typically, CAD software applications are not typographically sophisticated enough to handle kerning information. Unfortunately, this limits the use for the 1966 and 1977 alphabets.

This edition of the Standard Alphabets For Traffic Control Devices contains a complete functional specification for designing standard highway alphabets. Much work has gone into updating the alphabets. Particular attention has been paid to make them adaptable to a broader range of equipment and software application tools in use within engineering departments and sign fabrication facilities in the transportation industry.

Overview of the alphabet spacing

Spacing for the 1966 and 1977 alphabets was developed a long time before computers and plotters would be used to design and fabricate traffic control signs. Letter spacing in particular reflects this because the method applied is better suited to manual layout when using die stamp equipment and silk screen printing.

Generally, a variety of different space values are reserved for each letter of the alphabet. These space values are applied depending upon a particular letter to letter occurrence. This method is acceptable when a sign is being manually laid out, letter by letter and measurements are being made with a scale along a drawn baseline.

In an attempt to simplify this system the FHWA implemented a procedure which converted the spacing values into a limited number of codes (see Figure 1). While this has helped the situation, it continues to have drawbacks because more than one spacing value is required for each and every letter of the alphabet.
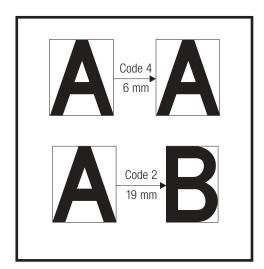
Figure 1.

Understanding Industry Specifications

Current software industry specifications for TrueType[1] and PostScript[2] format fonts assumes that every character will be positioned within a bounding box and the bounding box will be assigned a fixed value (see Figure 2). Within the bounding box, each character will have some amount of "white space" to its left, right, top and bottom. This allows software to place bounding boxes side by side, top to bottom, or line by line without needing to worry about the shape and size of the character or object (see Figure 3).

[1]TrueType refers to Microsoft's industry standard font format description and specification.
[2]PostScript refers to Adobe's industry standard font format description and specification.

Updating The Standard Alphabets

In this Edition, a new specification for using the Standard Alphabets For Traffic Control Devices is presented. The new specification will make the alphabets adaptable to current industry software requirements. It is important to note that every effort has been made to maintain the same properties of the existing 1966 and 1977 Standard Alphabets. A uniform stroke width has been adopted for all letters and numerals. Following is the specific criteria that was used to prepare this edition of the Standard Highway Alphabets For Traffic Control Devices.

Criteria

1.	Develop a method of spacing using the metric system of measure.

2.	Retain the letterforms basic shape, stroke weight and proportion. Make slight changes where necessary to ensure

Figure 2.

Line space is controlled by a separate function in most software and is normally added in an increment of measure specified by the user. What's important to know about line space is a correctly designed font will have some amount of line space built into it to prevent succeeding lines of characters from crashing into one another.

consistency of stroke weight and optical balance from letter to letter.

3.	Maintain overall existing spacing of Standard Alphabets to ensure an easy transition in the field as it relates to the design and fabrication of new signs.

Alphabet Specification

Line space

Figure 3.

4. Develop spacing that will be proportionally scalable and based upon a upper case letter height of 100 mm. This will eradicate the need for complicated spacing charts and codes which are based upon discreet letter heights.

5. Standardize the inter-character spacing by applying space to both the right and left side of each letter. The objective is to create an industry standard specification that will make the Standard Alphabets For Traffic Control Devices adaptable to a broad range of software applications commonly used in engineering departments and sign shops for standard highway sign design and production.

6. Add drawings of lowercase letters to all Standard Alphabets.

In order to proceed, first a departure from the code based spacing system is necessary. A careful redistribution of white space must be applied with emphasis on maintaining the existing spacial relationships of the 1966 and 1977 Alphabets.

For each letter there are basically three classes of relationships with respect to spacing. These classes are determined largely by the simple geometric form that best describes their shape. For example; first, the letters B, D, E, F, H, I, K, L, M, N, P, R and to a great extent U all share one common c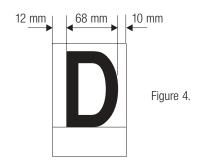haracteristic. They have one or more straight vertical stems that makes up their design. Also, they can be thought of as rectangular in shape. Second; the letters C, G, O and Q are obviously round and third, the letters A, V, T, W, Y are triangular in nature.

The goal in letter spacing is to develop an ideal negative (white) space for each class of letter. When these letters are then juxtaposed, the white space between them balances with the white within them to create an optically even (balanced) tone or flow. This produces optimum readability and good legibility.

The spacing tables listed in the Series D 1977 Metric Standard Alphabet specification shows the distance from the uppercase H to other similar letters (B, D, E, F, H, I, K, L, M, N, P, R, U) in its class to be 24 mm (at a letter height of 100 mm). In order to obtain a proper left and right margin, or white space, it is necessary to divide this measure in half and apply 12 mm of space to every character that has a straight vertical stem. This will ensure that the distance between these letter combinations will remain consistent.

The round letters are treated basically the same way. The Series D 1977 Metric Standard Alphabet specification shows the distance from the uppercase O to other similar letters (C, G, O, Q) in its class to be 19 mm (at a letter height of 100 mm). To keep the conversion simple and orderly the value is rounded up to the next nearest even value and then divided. The result is a value of 10 mm of

space which is applied to the side of every letter having this round characteristic. With these two basic values established for the two most symmetrical letters in the alphabet space values can be built for the remainder of letters in these classes. For example, the letter D will receive a left margin of 12 mm because it is a vertical stem, while the right margin will receive a space of 10 mm. The width of the letter is 68 mm, therefore the total value is (12+68+10) 90 mm (see Figure 4).

Figure 4.

Figure 5.

By dissecting and distributing the space values as described it is possible to redistribute the white space and assign each character its own unique space value. The net result when the letters are set in succession will be of lines, or legends having a very close length to those created using the 1977 Metric Standard Alphabet specification (see Figure 5). An additional advantage to using this method of spacing is it provides a more even flow of black to white shapes which helps increase readability.

The Alphabets

The spacing tables on the following pages show the actual width of each letter (in millimeters), along with the space to the left and to the right of each letter. All dimensions are based upon an upper case letter height of 100 mm. The lower case letter height is 73 millimeters from the baseline. The height of the round (or loop) letter height is 75 millimeters (see Figure 6). Round or loop letters extend slightly below the baseline and above the x-height of both upper and lower case letters.

Alternate sizes are proportional (scalable) and can be obtained by simply enlarging or reducing the upper case letter (along with its associated width and space) to the desired dimension.

All letters are laid out on a grid and spaced flush left to illustrate both upper case and lower case letter height relationships, along with the correct inter-character spacing. In order to illustrate these aspects all alphabets are shown at a upper case letter height of 50 millimeters.
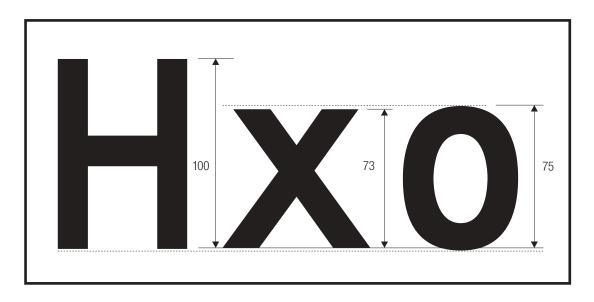
Figure 6.

Standard Alphabets Spacing Chart

Series B 2000

Measurements based on 100 millimeter upper case letter height

Character	Left (mm)	Width (mm)	Right (mm)
A	3	54	3
B	11	43	5
C	8	43	8
D	11	43	8
E	11	38	5
F	11	38	3
G	8	43	8
H	11	43	11
I	11	13	11
J	3	44	11
K	11	44	5
L	11	38	3
M	11	49	11
N	11	43	11
O	8	46	8
P	11	43	3
Q	8	46	8
R	11	43	5
S	5	43	5
T	3	38	3
U	11	43	11
V	3	47	3
W	3	64	3
X	5	47	5
Y	3	54	3
Z	5	43	5
a	3	37	7
b	8	37	5
c	5	37	2
d	5	37	8
e	5	37	3
f	3	23	2
g	5	36	8
h	8	36	7
i	8	13	8
j	0	23	8
k	8	40	2
l	8	13	8
m	8	59	7
n	8	36	7

Character	Left (mm)	Width (mm)	Right (mm)
o	5	37	5
p	8	37	5
q	5	37	8
r	8	26	2
s	3	32	2
t	0	30	0
u	7	36	8
v	2	43	2
w	2	56	2
x	0	46	0
y	2	46	2
z	3	36	3
1	5	21	11
2	5	43	5
3	3	43	5
4	5	49	8
5	8	43	5
6	3	43	8
7	5	43	8
8	5	43	5
9	8	43	5
0	8	46	8
&	5	74	3
!	11	13	11
"	11	39	11
#	8	63	8
$	5	43	5
¢	8	44	8
/	0	99	0
aster	8	52	8
period	8	14	8
comma / apos	8	15	8
colon	8	14	8
(	8	30	5
)	5	30	8
hyphen	3	31	3
@	8	100	8
=	3	56	3
+	3	56	3
?	5	52	5

ABCDE
FGHIJ
KLMNO

PQRST
UVWX
YZabcd

efghijk

lmnopq

rstuvw

xyz123
45678
90&!"

#$¢/
*():-
.,:;()-
@=+?

Standard Alphabets Spacing Chart

Series C 2000

Measurements based on 100 millimeter upper case letter height

Character	Left (mm)	Width (mm)	Right (mm)
A	3	64	3
B	11	56	6
C	9	56	9
D	11	56	9
E	11	51	6
F	11	51	3
G	9	56	9
H	11	56	11
I	11	14	11
J	3	51	11
K	11	56	6
L	11	51	3
M	11	66	11
N	11	56	11
O	9	59	9
P	11	56	9
Q	9	59	9
R	11	56	6
S	6	56	6
T	3	51	3
U	11	56	11
V	3	62	3
W	3	76	3
X	3	59	3
Y	3	64	3
Z	6	56	6
a	4	48	8
b	9	51	6
c	6	50	3
d	6	51	9
e	6	51	4
f	4	31	2
g	6	51	9
h	9	51	8
i	9	14	9
j	0	29	9
k	9	54	2
l	9	14	9
m	9	84	8
n	9	51	8

Character	Left (mm)	Width (mm)	Right (mm)
o	6	51	6
p	9	51	6
q	6	51	9
r	9	33	2
s	4	42	3
t	1	36	1
u	8	51	9
v	2	59	2
w	2	94	2
x	0	65	0
y	2	62	2
z	3	42	3
1	9	21	11
2	6	56	6
3	6	56	6
4	3	62	9
5	6	56	6
6	9	56	9
7	3	56	9
8	6	56	6
9	6	56	6
0	9	59	9
&	9	100	0
!	11	14	11
"	11	43	11
#	6	76	6
$	9	56	9
¢	6	49	3
/	0	102	0
aster	8	52	8
period	4	16	4
comma / apos	4	16	4
colon	4	16	4
(	9	30	4
)	4	30	9
hyphen	3	35	3
@	9	100	9
=	3	65	3
+	3	65	3
?	6	61	6

ABCD
EFGH
IJKLM

NOPQ
RSTU
VWXY

Zabc
defgh
ijklm

nopqr

stuvw

xyz12

3456
7890
&!'"#

$¢/*
;:()-@
.,. =+?
·

Standard Alphabets Spacing Chart

Series D 2000

Measurements based on 100 millimeter upper case letter height

Character	Left (mm)	Width (mm)	Right (mm)
A	3	85	3
B	12	68	5
C	10	68	10
D	12	68	10
E	12	62	5
F	12	62	3
G	10	68	10
H	12	68	12
I	12	16	12
J	3	64	12
K	12	70	5
L	12	62	3
M	12	78	12
N	12	68	12
O	10	71	10
P	12	68	3
Q	10	71	10
R	12	68	5
S	5	68	5
T	3	62	3
U	12	68	12
V	3	76	3
W	3	89	3
X	5	68	5
Y	3	86	3
Z	5	68	5
a	5	57	9
b	10	60	6
c	6	59	3
d	6	60	10
e	6	59	4
f	4	36	2
g	6	60	10
h	10	59	9
i	10	16	10
j	0	33	10
k	10	64	2
l	10	16	10
m	10	99	9
n	10	59	9

Character	Left (mm)	Width (mm)	Right (mm)
o	6	61	6
p	10	60	6
q	6	60	10
r	10	38	2
s	4	47	3
t	1	40	1
u	9	59	10
v	2	71	2
w	2	113	2
x	0	78	0
y	2	75	2
z	3	50	3
1	10	25	12
2	10	68	10
3	18	68	10
4	2	75	12
5	10	68	10
6	10	68	10
7	7	68	7
8	10	68	10
9	10	68	10
0	10	71	10
&	10	89	0
!	12	16	12
"	4	18	4
#	6	85	6
$	5	68	5
¢	10	61	7
/	0	103	0
aster	8	54	8
period	4	18	4
comma / apos	4	18	4
colon	4	18	4
(	10	33	4
)	4	33	10
hyphen	3	35	3
@	10	100	10
=	12	48	12
+	3	67	3
?	7	65	7

ABC
DEFG
HIJK

LMN
OPQ
RSTU

VWX
YZab
cdef

ghijk
lmno
pqrst

uvw
xyz1
234

456
789
0&!'"

$/¢
* .,:;()-
@=+?

Standard Alphabets Spacing Chart

Series E 2000

Measurements based on 100 millimeter upper case letter height

Character	Left (mm)	Width (mm)	Right (mm)
A	4	102	4
B	13	81	7
C	10	81	10
D	13	81	10
E	13	75	7
F	13	75	4
G	10	81	10
H	13	81	13
I	13	18	13
J	4	76	13
K	13	83	3
L	13	75	4
M	13	94	13
N	13	81	13
O	10	84	10
P	13	81	4
Q	10	84	10
R	13	81	7
S	7	81	7
T	4	75	4
U	13	81	13
V	4	92	4
W	4	106	4
X	7	87	7
Y	4	102	4
Z	7	81	7
a	5	61	8
b	9	62	6
c	6	62	3
d	6	62	9
e	6	62	4
f	4	38	2
g	6	62	9
h	9	62	8
i	9	18	9
j	0	30	9
k	9	60	2
l	9	18	9
m	9	104	8
n	9	62	8

Character	Left (mm)	Width (mm)	Right (mm)
o	6	64	6
p	9	62	6
q	6	62	9
r	9	46	2
s	4	61	3
t	1	46	1
u	8	62	9
v	2	71	2
w	2	96	2
x	0	73	0
y	2	77	2
z	3	64	3
1	10	30	13
2	7	81	7
3	7	81	7
4	4	94	10
5	7	81	7
6	10	81	10
7	4	81	10
8	7	81	7
9	7	81	7
0	10	84	10
&	10	90	0
!	13	18	13
"	13	51	13
#	6	87	6
$	10	81	10
¢	10	73	7
/	0	105	0
aster	8	55	8
period	4	18	4
comma / apos	4	18	4
colon	4	18	4
(	10	33	4
)	4	33	10
hyphen	3	35	3
@	10	100	10
=	3	65	3
+	3	65	3
?	7	67	7

ABC
DEF
GHIJ

KLM
NOP
QRS

TUV
WXY
Zabc

defgh
ijklm
nopq

rstuv
wxyz
1234

567
890
&!'"#

$ / ¢
* .,:; () -
@ = + ?

Standard Alphabets Spacing Chart

Measurements based on 100 millimeter upper case letter height

Series E Modified 2000

Character	Left (mm)	Width (mm)	Right (mm)
A	4	101	4
B	14	81	8
C	10	81	8
D	14	81	10
E	14	74	7
F	14	74	7
G	10	81	10
H	14	81	14
I	14	20	14
J	4	76	14
K	14	82	2
L	14	74	2
M	14	93	14
N	14	81	14
O	10	84	10
P	14	81	4
Q	10	84	10
R	14	81	7
S	11	81	11
T	4	74	4
U	14	81	14
V	4	92	4
W	4	106	4
X	7	87	7
Y	4	101	4
Z	7	81	7
a	11	66	20
b	20	66	11
c	11	66	11
d	11	66	20
e	11	66	11
f	10	42	11
g	11	66	20
h	20	66	20
i	20	20	20
j	2	37	20
k	20	66	11
l	20	20	20
m	20	110	20
n	20	66	20

Character	Left (mm)	Width (mm)	Right (mm)
o	11	68	11
p	20	66	11
q	11	66	20
r	20	50	4
s	9	66	11
t	9	52	12
u	20	66	20
v	9	77	9
w	9	102	9
x	11	80	11
y	9	85	9
z	12	68	12
1	12	30	14
2	11	81	11
3	5	81	10
4	3	93	14
5	11	81	11
6	10	81	10
7	6	81	10
8	10	81	10
9	10	81	10
0	10	84	10
&	10	90	10
!	14	20	14
"	14	57	14
#	10	88	10
$	11	81	11
¢	10	67	7
/	0	107	0
aster	8	56	8
period	4	20	4
comma / apos	4	20	4
colon	4	20	4
(	10	38	4
)	4	38	10
hyphen	3	35	3
@	10	101	10
=	3	65	3
+	3	65	3
?	7	69	7

ABC
DEF
GHI

JKL
MNO
PQR

STU
VWX
YZa

bcd
efg
hijk

lmn
opq
rstu

v w x
y z 1
2 3 4

567
890
&!'''#

$ / ¢

* . : ( ) -
., :

@ = + ?

Standard Alphabets Spacing Chart

Series F 2000

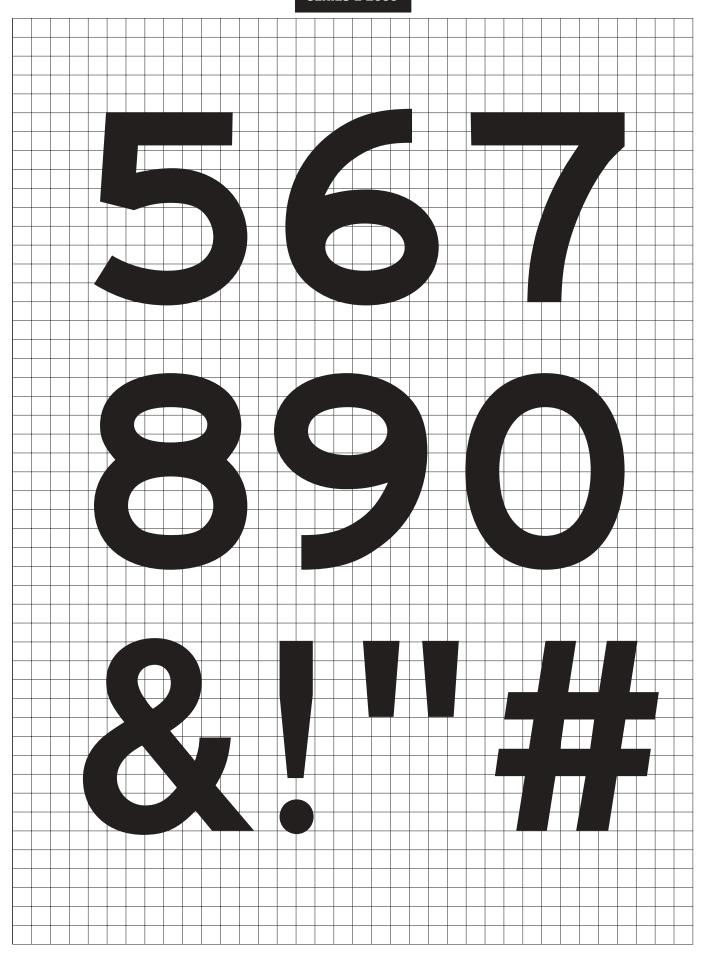Measurements based on 100 millimeter upper case letter height

Character	Left (mm)	Width (mm)	Right (mm)
A	4	114	4
B	14	94	10
C	10	94	7
D	14	94	10
E	14	81	10
F	14	81	10
G	10	94	10
H	14	94	14
I	14	19	14
J	4	83	14
K	14	94	4
L	14	86	4
M	14	108	14
N	14	94	14
O	10	105	10
P	14	94	10
Q	14	105	10
R	14	94	10
S	10	94	10
T	4	86	4
U	14	94	14
V	4	105	4
W	4	117	4
X	4	102	4
Y	4	114	4
Z	7	94	7
a	8	76	12
b	12	79	8
c	8	70	5
d	8	79	12
e	8	80	8
f	3	43	3
g	8	75	12
h	12	74	12
i	12	19	12
j	1	31	12
k	12	70	3
l	12	19	12
m	12	118	12
n	12	74	12

Character	Left (mm)	Width (mm)	Right (mm)
o	8	80	8
p	12	79	8
q	8	79	12
r	12	50	3
s	7	73	7
t	3	48	4
u	12	74	12
v	2	84	2
w	2	115	2
x	2	88	2
y	2	92	2
z	5	76	5
1	14	33	14
2	10	94	10
3	10	94	10
4	4	102	14
5	10	94	10
6	10	94	10
7	4	94	4
8	10	94	10
9	10	94	10
0	10	97	10
&	14	115	4
!	14	19	14
"	14	50	14
#	2	88	2
$	10	94	10
¢	8	75	5
/	0	107	0
aster	7	56	7
period	7	19	7
comma / apos	7	19	7
colon	7	19	7
(	10	34	3
)	3	34	10
hyphen	4	35	4
@	10	100	10
=	4	65	4
+	4	65	4
?	10	84	10

ABC
DEF
GHI

JKL
MN
OPQ

RST
UVW
XYZ

abc
defg
hijkl

mno
pqrs
tuv

WXY
Z12
345

678
90&
!"#$

¢ / * .
., : ( ) - @
= + ?