# REVISIONS

| LTR | DASH NO. | DESCRIPTION | DATE | APPROVED |
|-----|----------|-------------|------|----------|
| X1 | 9001 | LIMITED REL PER LRA 0055 | 15 JUN 82 | ⟁ |

RESTRICTED RELEASE JUN 198_

(9001)

355

USED ON

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1st APPLICATION

| DWG APPROVAL DATE | |
|---|---|
| DWN | 5/12/82 |
| CHK | 15 JUNE2 |
| DR MGR | 6-15-82 |
| DES ENG | 6/15/82 |
| | |

| DWG RELEASE DATE | |
|---|---|
| ENG PROG MGR | |
| MFG ENG | |
| QA | |

# CENTRONICS
## data computer corp.
HUDSON, NEW HAMPSHIRE U.S.A.

TITLE

ENGINEERING PRODUCT SPECIFICATION

## 355 PRINT QUALITY

| SIZE | CODE IDENT | NUMBER | REV |
|------|-----------|--------|-----|
| A | 50163 | 80002188 | X1 |

SCALE ___   DO NOT SCALE PRINT   SHEET 1 OF 16

REP 6/18

# ENGINEERING PRODUCT SPECIFICATION

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1.0     SCOPE

This document establishes the basic print quality requirements for the Orion printer.

All dimensions given are in inches, unless otherwise specified.

Printing can be done in one of the following modes.

1.1     DATA PROCESSING MODES

1.1.1     7x9

A character matrix that has a 7 dot wide row by a 9 dot high column and is printed bidirectionally a column at a time at 24 to 35 IPS.  The number of characters per inch is selectable at 10, 12, 13.3 and 16.7 cpi.

1.1.2     9x9

Same as above except the rows are 9 dots wide.

1.1.3     7x8

A 10 cpi character matrix that is 7 dots wide by 8 dots high and is printed bidirectionally at 35 IPS.  The distance between columns is .010 inches in this mode (non-APA normal).

1.1.4     Proportional Draft

A character matrix that is N dots wide by 9 dots high.  The columns are spaced .005 inches apart.  The characters are printed bidirectionally at 24 inches per second.

1.2     GRAPHICS MODES

1.2.1     Eight Dots High

A.   50 dots per inch at 20 inches per second (non-APA graphics).
B.   100 DPI at 10 IPS (APA graphics).
C.   50 DPI at 35 IPS (non-APA graphics of 7x8 matrix).
D.   75 DPI at 20 IPS.
E.   150 DPI at 10 IPS - This density is intended as a two-pass high resolution mode with a 1/120 inch vertical offset.

1.2.2     Six Dots High

66.7 DPI at 20 IPS.

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1.3    HIGH DENSITY CHARACTER MODES

Two pass, 1/120 inch vertical offset, character sets.  The
matrices are N dots wide by 18 dots high.  The columns are
spaced .005 inches apart in 10 cpi and proportional modes and
.0033 inches apart in 12 cpi.  The characters are printed
unidirectionally or bidirectionally.  Proportional and 10 cpi
are printed at 20 ips and 12 cpi mode is printed at 16 ips.

2.0    PARAMETERS

2.1    TEST PAPER

2.1.1    Cut Sheet Paper

Cut sheet paper will be single ply 8.5" W x 11.0" L .0035" +
.0005 thick 20# weight.

2.1.2    Fanfold Paper

Fanfold paper shall be single ply 11.0" W x 14.875" L .0035" +
.0005" thick 15-20# weight per CDCC specification 80001126-9001
Appendix A1.

2.2    RIBBON SPECIFICATION

Ribbon will be per specification #80002189-9001.

2.3    HEAD

All values apply for at least 100 million characters provided
paper and ribbon are used per Paragraphs 2.1 and 2.2.

Head design shall be an 18 wire (two in-line 9 wire columns)
stored energy technology, with wire diameter of .014 inches and
a vertical wire separation, measured center-to-center of .01456
inches.

3.0    REQUIREMENTS

3.1    HEIGHT OF CHARACTER IMAGE, OVERALL

Equals .101 + .006 inches, for 7 dot high character.
(Reference Figure 1, Dimension A).

3.2    WIDTH OF CHARACTER IMAGE, OVERALL

| Character Matrix | 10 CPI | 12 CPI | 13.3 CPI | 15 CPI | 16.7 CPI |
|---|---|---|---|---|---|
| 7x8 | .075 | N/A | N/A | N/A | N/A |
| 7x9 | .075 | .065 | .065 | .055 | .055 |
| 9x9 | .082 | .068 | .068 | .055 | .055 |
| Multipass | .085 | .062 | N/A | N/A | N/A |

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Tolerance is + .005 inches for 7x9, 7x8 and 9x9 matrices and + .002 inches for multipass modes.
(Reference Figure 1, Dimension B).

3.3 DOT DIAMETER

Equals .014 - .001 + .005 inches.
(Reference Figure 1, Dimension C).

3.4 DOT SPACING - HORIZONTAL

The following assumes two consecutive wire firings as close as allowed by character design and head limits. Tolerance is + .002 inches for multipass modes and + .005 inches for all other matrices.

| Character Matrix | 10 CPI | 12 CPI | 13.3 CPI | 15 CPI | 16.7 CPI | Proportional |
|---|---|---|---|---|---|---|
| 7x8 | .020 | N/A | N/A | N/A | N/A | N/A |
| 7x9 | .020 | .017 | .017 | .013 | .013 | N/A |
| 9x9 | .017 | .013 | .013 | .010 | .010 | N/A |
| Multipass Draft | .010 | .007 | N/A | N/A | N/A | .010 |
| Proportional | N/A | N/A | N/A | N/A | N/A | .010 |

(Reference Figure 1, Dimension D).

3.5 VERTICAL AND HORIZONTAL DOT ALIGNMENT

Equals + .002 centerline to centerline for graphics and high density modes.
Equals + .004 centerline to centerline for data processing modes.
(Reference Figure 1, Dimension E).

3.6 LINE STRAIGHTNESS

For a given line, the lateral deviation of a printed character shall not exceed + .005 from the average centerline of the printed line. (Reference Figure 2, Dimension F).

3.7 COLUMN STRAIGHTNESS

For a given column, the lateral deviation of a printed character shall not exceed + .005 inches from the average centerline of that column. (Reference Figure 3, Dimension G.)

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## 3.8     LINE SKEW

### 3.8.1   Fanfold Paper

The average centerline of the print shall not deviate more than
+ 30 min. from a line perpendicular to the edge of the paper.
(Reference Figure 4, Dimension H.)

### 3.8.2   Cut Sheet Paper

Line skew relative to paper edges is dependent on operator
loading technique and cannot be controlled.  Parallelism
between lines is a function of the printer and shall meet the
following requirements:  (1)  The average centerline of two
adjacent lines over 48 lines (8" nominal) shall not deviate
more than 5 min. from being parallel; (2) The accumulative
line skew between the average centerlines of line 1 and
line 48 shall not deviate more than 50 min. from being
parallel.

## 3.9    LINE SPACING

All dimensions are toleranced non-accumulative from line to
line.  The mean horizontal centerline of a print line is a
straight line perpendicular to the edge of the paper drawn
through the print line in such a manner as to minimize deviations
of individual character centers from the straight line.  Line
spacing dimensions for the different modes of print shall be as
follows:

|                      |          | FANFOLD       |          | CUT SHEET     |
|----------------------|----------|---------------|----------|---------------|
| 1 step (multipass)   |          | .008 + .002   |          | .009 + .002   |
| 6 dot graphics       | 10 steps | .083 + .004   | 9 steps  | .083 + .004   |
| 8 dot graphics       | 14 steps | .117 + .004   | 12 steps | .111 + .004   |
| 6 lpi                | 20 steps | .167 + .015   | 18 steps | .167 + .015   |
| 8 lpi                | 15 steps | .125 + .015   | Note 1:  | .125 + .015   |

NOTE 1:  Alternating 13 steps and 14 steps.

The above tolerances are only valid outside the area of one
inch above and below the perforation.  The line spacing toler-
ance will be + .020 inch within the zone, one inch above a
perforation to one inch below a perforation.

## 3.10    COLUMN SKEW

### 3.10.1   Fanfold Paper

The average centerline of a column relative to a line parallel
to the paper edge shall not deviate more than + 30 minutes.
Measurement to be made over a 10.0" column length.  (Reference
Figure 6, Dimension J.)

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3.10.2    Cut Sheet Paper

Column skew relative to paper edges is dependent upon operator loading technique and cannot be controlled.  Parallelism between columns is a function of the printer and shall meet the following requirements:

A.    The average centerline of two adjacent columns over 80 column width shall not deviate more than 5 min. from being parallel.

B.    The accumulative column skew between the average center lines of column 1 and column 80 shall not deviate more than 50 min. from being parallel.

The above measurements are to be taken over an 8.0" column length.

3.11    COLUMN SPACING

When printing full lines of the character (1) one, the following dimension, non-accumulative - from column to column, will be maintained.

    .100 + .005 at 10 characters per inch
    .083 ∓ .005 at 12 characters per inch
    .075 ∓ .005 at 13.3 characters per inch
    .067 ∓ .005 at 15 characters per inch
    .060 ∓ .005 at 16.7 characters per inch
(Reference Figure 7, Dimension K).

3.12    HORIZONTAL CHARACTER CLEARANCE

The horizontal character spacing equals the column spacing minus the character width.  Tolerance is ± .005 inch.  (Reference Figure 8, Dimension L).

3.13    VERTICAL CHARACTER CLEARANCE

    .066 + .015 inches at 6 LPI
    .025 ∓ .015 inches at 8 LPI
(Reference Figure 9, Dimension M)

3.14    EMBOSSING

    +.005 inches maximum
(Reference Figure 10, Dimension N).

3.15    ACCEPTABLE VOIDS

An acceptable void is a missing portion of a character which does not prevent the character from being read correctly.

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The following are printer malfunctions and are not permitted by this specification:

Miss           - a miss is the complete absence of a character.

Print Error - a print error is a character substitution, difference character of partial print resulting in an erroneous character (e.g., "E" with the bottom stroke lost and giving the appearance of an "F").

## 3.16    GENERAL PRINT APPEARANCE

When print is observed at 3 feet under lighting conditions of 150 foot candle maximum, the character outline and print density appears uniform, legible on a character to character basis and standard, on a given page.  The comparison will always be made with the matching standard for the same page of copy.  The agreed to standard will have approval of the Director of Engineering, Director of Quality and the Product Line Manager.

No ribbon smear should occur in margins and between lines or characters.

The print appearance of the second through sixth copies of a multi-part form should be legible on a character-to-character basis and uniform on a given page as outlined in the above paragraph.

## 3.17    FIRST PRINT POSITION

### 3.17.1    Fanfold Paper

The first printed position for continuous forms is 0.625 inches nominal from the left edge of the paper to the center of the first column of the first character.  Adjustment allows this position to change from 0.525 inches minimum to 0.725 inches maximum.

### 3.17.2    Cut Sheet Paper

In the cut sheet mode, the first print position is moved 1.09 inches to the right.  A restricted area above the paper feed tractors disallows paper insertion in this area.  With paper to the left, but not in the restricted area, the first print position is approximately 0.62 inches from the left edge of the paper to the centerline of the first column of the first character.

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SECONDARY GRID HALF STEPS
(MIDPOINTS OF FULL STEPS)

PRIMARY GRID - FULL STEPS

.01456 NOM.

.00833 NOM.

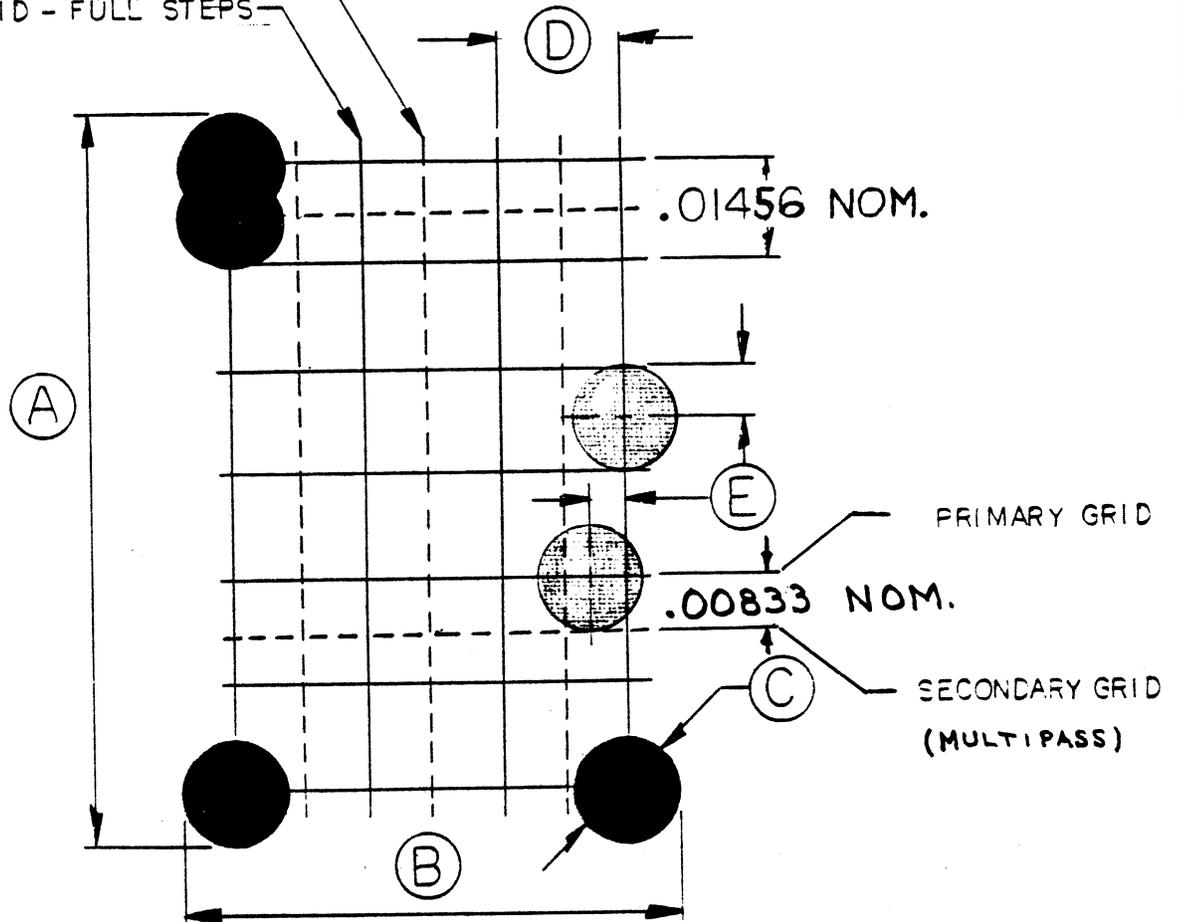PRIMARY GRID

SECONDARY GRID
(MULTIPASS)

Figure 1.   CHARACTER IMAGE

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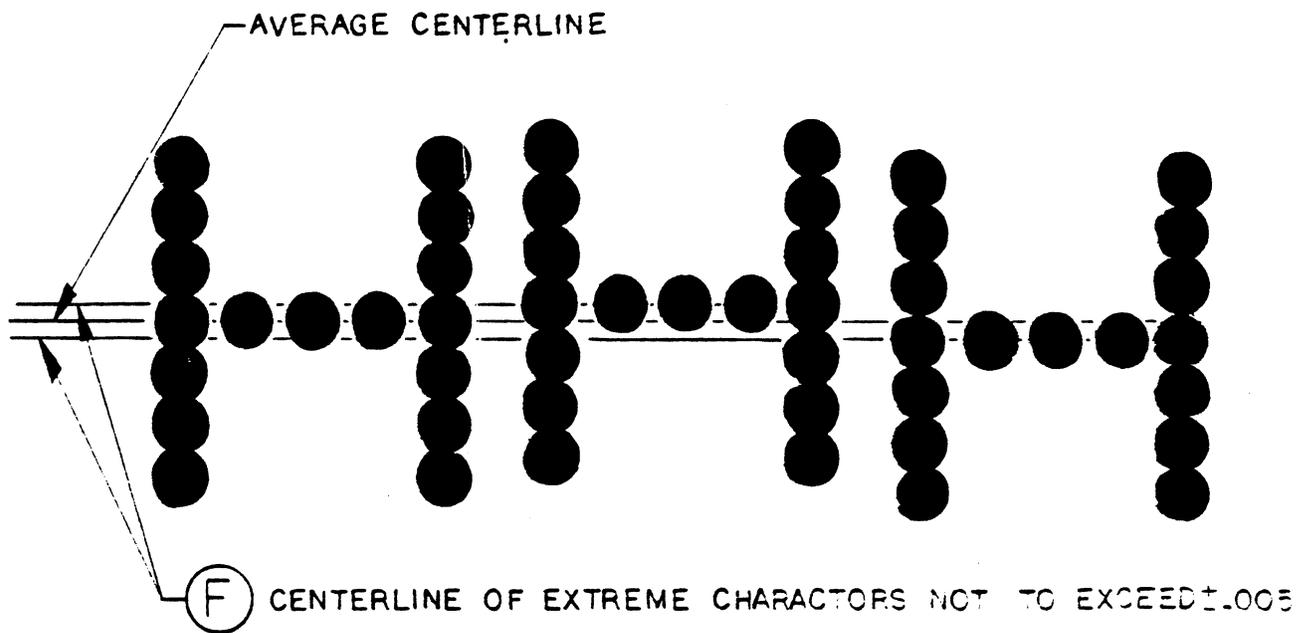SPEC. NO.    80002188-9001

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—AVERAGE CENTERLINE

(F) CENTERLINE OF EXTREME CHARACTORS NOT TO EXCEED±.005

Figure 2.   VERTICAL CENTERLINE

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SPEC. NO.    80002188-9001
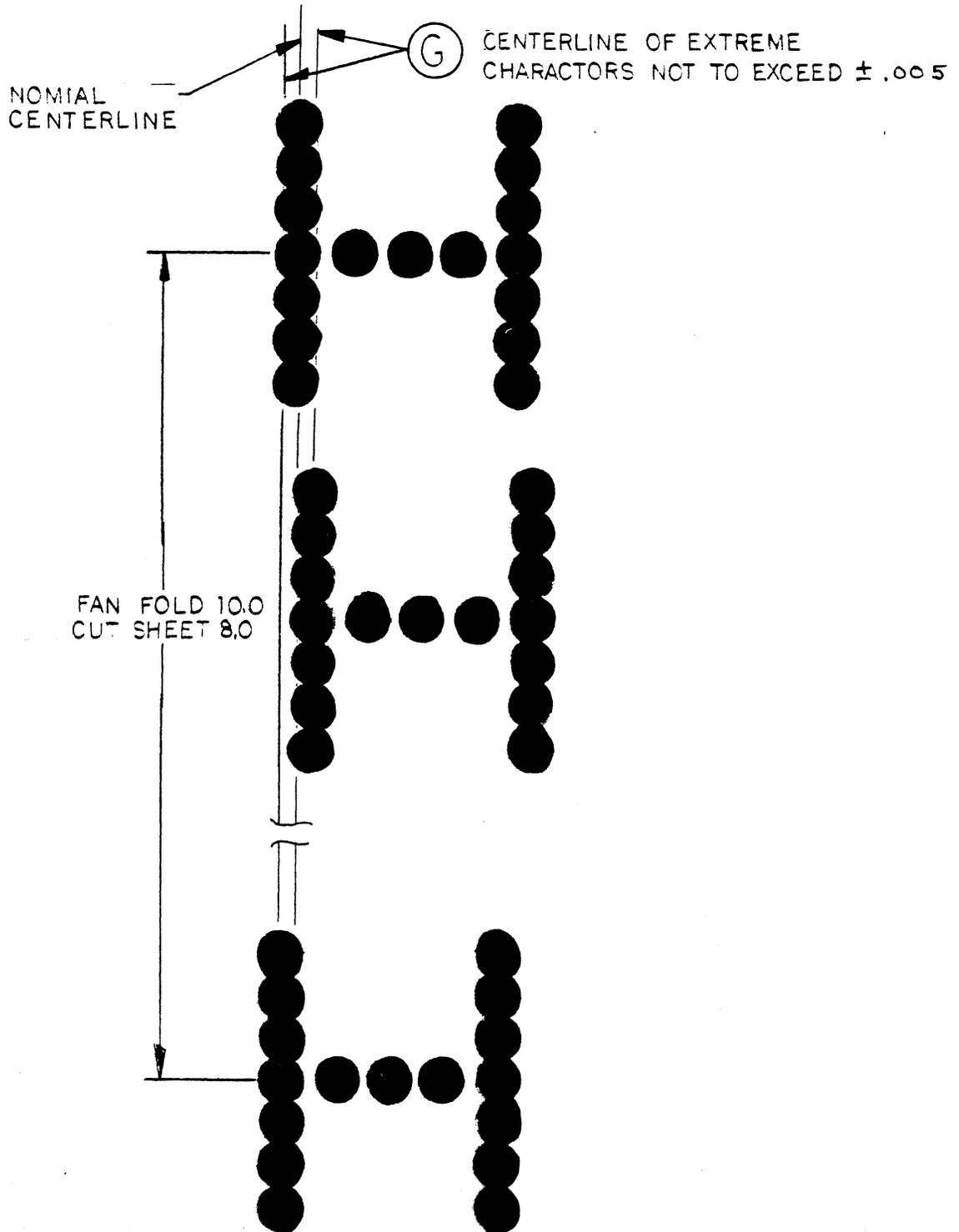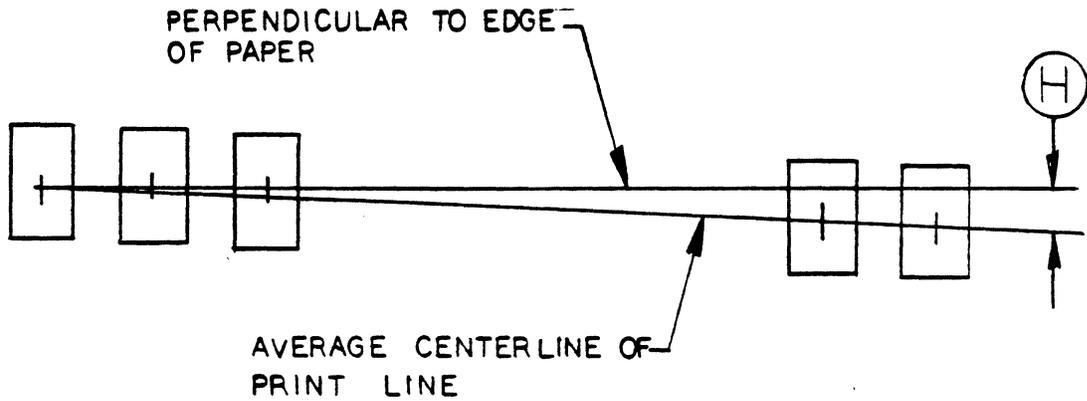
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NOMIAL
CENTERLINE

G   CENTERLINE OF EXTREME
CHARACTORS NOT TO EXCEED ± .005

FAN FOLD 10.0
CUT SHEET 8.0

Figure 3.   HORIZONTAL CENTERLINE

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PERPENDICULAR TO EDGE
OF PAPER

AVERAGE CENTERLINE OF
PRINT LINE

Figure 4.   LINE SKEW

AVERAGE HORIZONTAL CENTERLINES OF
PRINT LINE
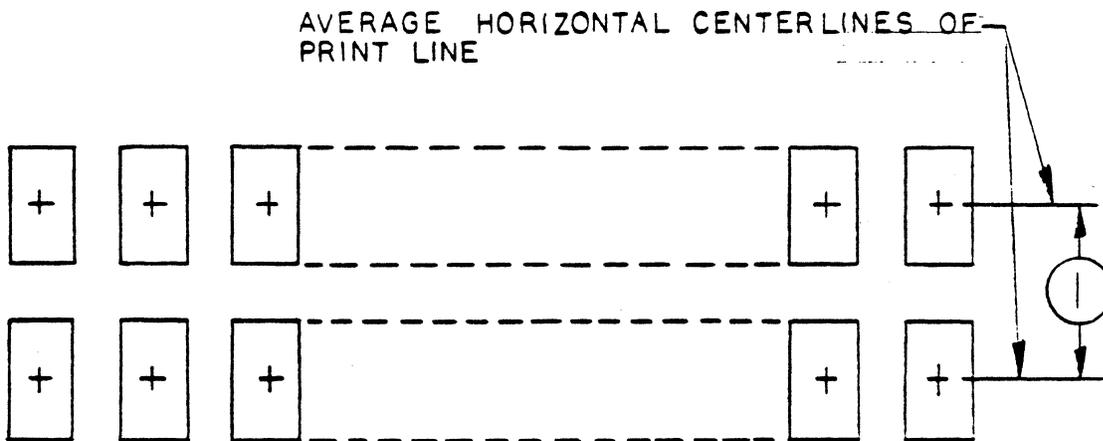
Figure 5.   LINE SPACING

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AVERAGE CENTERLINE OF COLUMN

PARALLEL TO EDGE OF PAPER

FAN FOLD PAPER 10.0
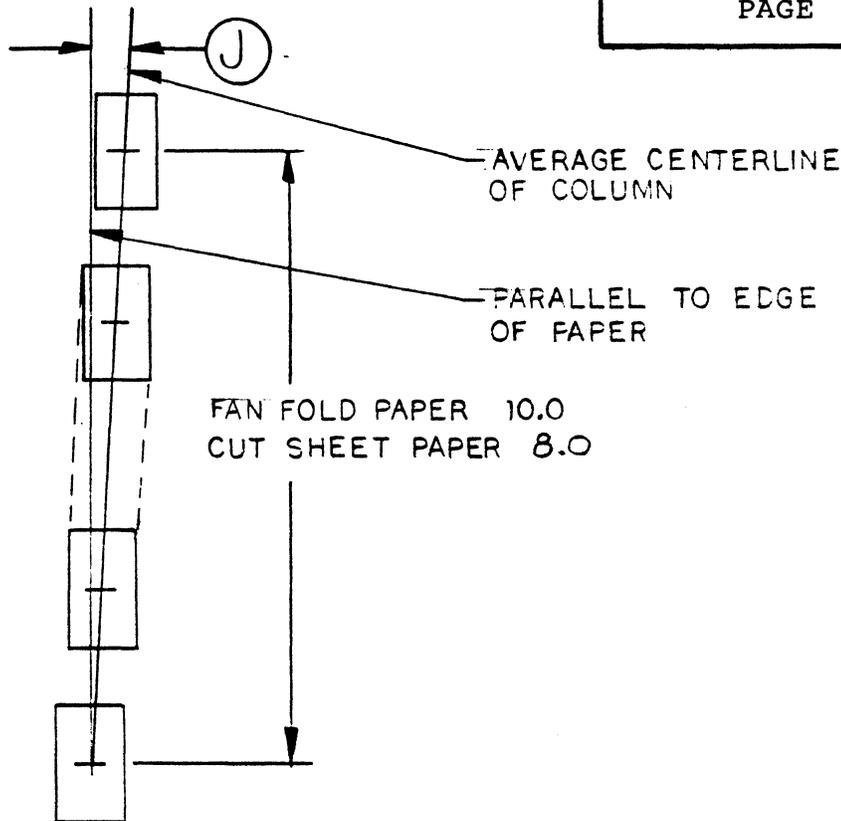CUT SHEET PAPER 8.0

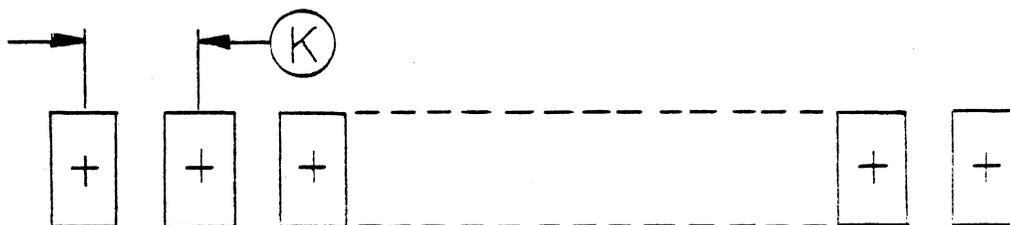Figure 6.  COLUMN SKEW

Figure 7.  COLUMN SPACING

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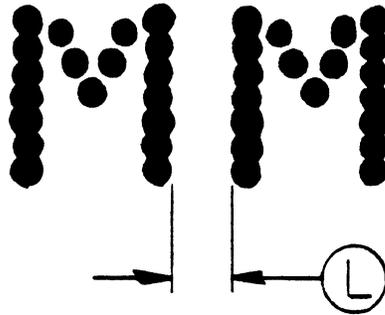DATE  15 JUN 82

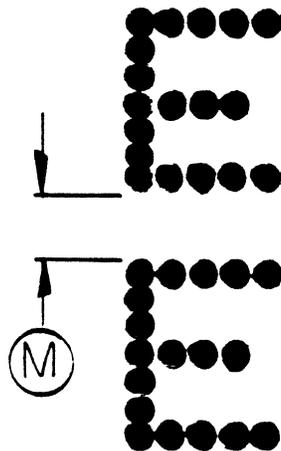PAGE    15   OF   16

Figure 8.   HORIZONTAL CHARACTER CLEARANCE

Figure 9.   VERTICAL CHARACTER CLEARANCE

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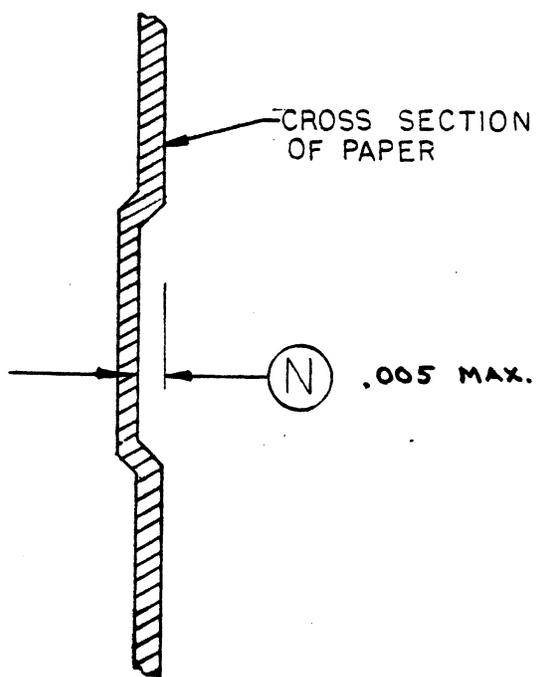
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CROSS SECTION
OF PAPER

Ⓝ   .005 MAX.

Figure 10.   EMBOSSING

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A. The maximum Mechanism Failure Rate during the Infant Mortality Period shall not exceed .0008 failures per hour.

B. The Mechanism Failure Rate for the overall population shall not exceed .0004 failures per hour, during the Mechanism Useful Life.

C. Ninety percent (90%) of the individual Mechanisms shall have a Mechanism Failure Rate of less than .00067 failures per hour during the Mechanism Useful Life.

D. The Mechanism Useful Life shall exceed 4,500 hours of Mechanism Operating Time.

E. MTTR shall be less than .5 hours.

F. Ninety percent (90%) of all repair actions shall require less than one (1) hour to complete.

G. Any randomly selected sample of mechanisms shall be capable of demonstrating conformance to the above parameters with a 90% level of statistical confidence.