

INFORMATION ON STATIONERY FOR TELETYPEWRITERS

1. GENERAL

1.01 This section provides the code designations and ordering information on stationery used by the telephone company with teletypewriter apparatus. It also gives information in the form of Notes which may be furnished to the customers or the suppliers in order to assist in obtaining suitable stationery. Copies of the Notes are stocked separately and when desired for use by customers or others may be ordered from the Western Electric Company in the usual way by calling for the items listed in 1.03. The section is issued concurrently as Section P70.253 and Section P30.022.

1.02 This section is reissued for the following reasons:

(a) To revise Table A to include therein information on roll paper and superfold paper for sprocket-feed teletypewriters, to remove information on teletypewriter tapes, perforator tapes, and ribbons, and to change the title of the table accordingly.

(b) To add Table B which gives information on teletypewriter tapes, perforator tapes, and ribbons.

(c) To revise the Notes on Paper for Page-type Friction-feed Teletypewriters by adding information relative to limitations of chemical duplicating process carbon paper.

(d) To revise the Notes on Perforator Tape to add tape of 1-inch width and to revise the tests for strength of tape.

(e) To revise the Notes on Teletypewriter Ribbons.

(f) To bring up to date the Notes on Tape for Tape-type Teletypewriters.

Changes and additions are indicated by marginal arrows.

1.03 The Notes on stationery which are attached are as follows:

Notes on Continuous Superfold Forms for 15, 19, and 28 Sprocket-feed Teletypewriters

Notes on Paper for Page-type Friction-feed Teletypewriters

Notes on Tape for Tape-type Teletypewriters (14 Type)

Notes on Perforator Tape

Notes on Teletypewriter Ribbons

2. STATIONERY

A. For Telephone Company Use

2.01 Stationery may be purchased by the telephone company from the Western Electric Company by ordering in accordance with Table A or Table B. Table A contains ordering information on teletypewriter paper. Table B contains ordering information on teletypewriter tapes and ribbons.

B. For Customer Use

2.02 Stationery that meets the standard requirements specified in the attached Notes should provide satisfactory copy and may be purchased by the customer from any reliable supplier with whose particular product he is familiar.

TABLE A — TELETYPEWRITER PAPER AVAILABLE FROM WESTERN ELECTRIC COMPANY

Item

Ordering Information

Paper in Roll Form (Friction Feed)

3 to 8-1/2" Wide, 5" Dia, 400 ±50' per Roll

(No.) roll(s) PAPER, TELETYPEWRITER, KS-1920, (Nominal width), (WHITE or CANARY)

8-1/2" Wide, 5" Dia, 400 ±50' per Roll
For permanent record

(No.) roll(s) PAPER, TELETYPEWRITER, KS-8621, (WHITE or CANARY)

Paper in Roll Form (Sprocket Feed)

Yellow Paper for Left-hand Sprocket Feed

List 1 — 5" Wide, 400' (Nominal) per Roll

(No.) roll(s) PAPER, TELETYPEWRITER, YELLOW, KS-13970, LIST 1

List 2 — 2.5" Wide, 800' or 600' (Nominal) per Roll

(No.) roll(s) PAPER, TELETYPEWRITER, YELLOW, KS-13970, LIST 2 (Nominal length of roll)

Paper in Superfold Form (Sprocket Feed)

White Paper, Continuous Superfold, Sprocket Holes Along One or Both Edges

(No.) pack(s) PAPER, TELETYPEWRITER, WHITE, KS-13969, LIST (1, 2, or 3)

List 1 — 3" Wide, 11" Superfold, Perforated for Left-hand Sprocket Feed

List 2 — 7" Wide, 11" Superfold, Perforated for Left-hand Sprocket Feed

List 3 — 7" Wide, 11" Superfold, Perforated Along Both Edges

Each individual pack consisting of 1000 folds.

TABLE B — TELETYPEWRITER TAPES, PERFORATOR TAPES, AND RIBBONS
AVAILABLE FROM WESTERN ELECTRIC COMPANY

Item	Ordering Information
<i>Gummed or Ungummed Tape</i>	
Gummed Tape, 900' per Roll	(No.) roll(s) TAPE, TELETYPEWRITER, KS-7745, GUMMED, (WHITE or CANARY)
Ungummed Tape, 950' per Roll	(No.) roll(s) TAPE, TELETYPEWRITER, KS-7745, UNGUMMED, (WHITE or CANARY)
<i>Perforator Tapes</i>	
Perforator Tape for Ordinary Use	(No.) roll(s) TAPE, PERFORATOR, KS-8483, LIST (1, 2, or 3), COLOR, FEET PER ROLL (1000' or 3000')
List 1 is 11/16" wide, 1000' or 3000' (Nominal) per roll	
List 2 is 7/8" wide, 1000' or 3000' (Nominal) per roll	
List 3 is 1" wide, 1000' (Nominal) per roll	
Perforator Tape for Testing	(No.) roll(s) TAPE, PERFORATOR, KS-9781, LIST (1 or 2)
List 1 is 11/16" wide, 1000' (Nominal) per roll	
List 2 is 7/8" wide, 1000' (Nominal) per roll	
<i>Ribbons</i>	
Ribbons for Teletypewriters	(No.) RIBBON(S), TELETYPEWRITER, CODE (as 6141)
Various Colors — Order by code (See Part 3)	

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3. TELETYPEWRITER RIBBONS

A. For Telephone Company Use

3.01 The types and colors of ribbons available from the Western Electric Company and their respective ordering numbers are as follows:

→ Black Record	6141
Black-Red Record	6241
Red Record	6341
Blue Record	6441
Purple Hectograph	6541
Purple Record	6641
Green Record	6741
Brown Record	6841
Black Record — Purple Hectograph	6941

B. For Customer Use

3.02 Ribbons that meet the standard requirements specified in the attached Notes should provide satisfactory copy and may be purchased by the customer from any reliable supplier with whose particular product he is familiar.

**Attached:
Five sets
of Notes**

**NOTES ON CONTINUOUS SUPERFOLD FORMS
FOR 15, 19, AND 28
SPROCKET-FEED TELETYPEWRITERS**

A customer desiring to purchase superfold forms from a supplier with whose particular product he is unfamiliar, should conduct a trial of the forms under actual service conditions so that a conclusive test will have been made before a large lot is purchased. The quality of the superfold forms may tend to deteriorate if they are unused for a period of longer than 6 months or stored in an extremely hot or damp location, such as under a roof or near a radiator or steam-pipe. For best results, therefore, forms should be purchased in quantities that will be used within a 6-month period and, until used, should be stored in as cool and dry a location as possible.

Since fanfold stationery is designed to meet the specific requirements involved, it is a matter which should be discussed with the supplier in each case and therefore is not discussed in these Notes. It is recommended, however, that the same precautions given previously for purchasing and storing superfold forms be taken for fanfold stationery.

1. WIDTH

The widths of forms for the 15 and 19 sprocket-feed teletypewriters are nominally 8-1/2, 6, and 5-1/2 inches, although other widths between 3-5/8 and 8-1/2 inches can be supplied to meet special requirements. Forms for use with the 28 sprocket-feed teletypewriter are nominally 8-1/2 inches wide, but to meet special requirements can be supplied in widths between 3-5/8 and 9 inches.

The width of the forms at the time of cutting should be as specified within tolerances of $\pm 1/64$ inch. Humidity may later affect the width but the paper should in no case vary from its nominal width by more than $\pm 3/64$ inch.

The maximum width is set by the design of the particular teletypewriter, 8-1/2 inches for

the 15 and 19 types, and 9 inches for the 28 type. The minimum width is set by the widest practicable right-hand margin adjustment.

Paper for use in TWX service should always have a nominal width of 8-1/2 inches.

2. HORIZONTAL SCORINGS

The horizontal scorings should be located midway between sprocket holes. The horizontal scoring should not overlap the sprocket holes due to the possibility of the forms prematurely parting and jamming the machine.

3. SPROCKET HOLES

Sprocket holes should be 5/32 inch in diameter, spaced 1/2 inch between centers without cumulative error. A horizontal line drawn even with the bottom of a sprocket hole should be even with the bottom of the corresponding left or right sprocket hole. The location of the holes with respect to the edges of the forms should be such that the vertical center lines through them are parallel and 1/4 inch from the edges of the paper. The holes should be cleanly punched.

4. LENGTH OF FORMS

As a consequence of requirements 2 and 3, the length of the paper form to be used for single-line feed should be a multiple of 1/2 inch. For use with double-line feed, the length of the paper form should be a multiple of 1 inch.

5. RELATION BETWEEN SPROCKET HOLES AND TYPING LINES

Sprocket-feed teletypewriters are adjusted so that the lower edges of the characters

Note: Changes and additions are indicated by marginal arrows.

typed by the teletypewriter will be $1/32 \pm 1/64$ inch above a horizontal line drawn even with, or a multiple of $1/6$ inch from, the bottom of any sprocket hole. If horizontal ruled lines are provided on which typing is to be done, these should be even with, or a multiple of $1/6$ inch from, the bottom of any sprocket hole within a tolerance of $\pm 1/64$ inch. This enables the forms to be interchangeable on different machines without requiring readjustment of the machine.

6. WIDTH OF COLUMNS

To provide space for typing in each vertical column so that the first and last characters do not touch the vertical lines separating the columns, the width of each column ordinarily should be at least $1/10$ inch greater than the space required for typing the maximum number of characters used in the column; and the vertical lines should be spaced in multiples of $1/10$ inch from the left margin. (See Items 8 and 10 to avoid conflicting dimensions.)

Where double-ruled vertical column lines are desired, the spacing of the lines should refer to the position of the right-hand line so that the first character typed to the right of the line is adjacent to but not touching that line.

The machine may be adjusted to accommodate forms requiring completely filled columns; for example, ten characters in a 1-inch column, provided the space between vertical column lines is closely held to multiples of $1/10$ inch.

7. POSITION OF FIRST LINE OF TYPING

To permit removal of the preceding typed form from the teletypewriter without disturbing the following form, the applicable limits given in (A) and (B) should be maintained.

(A) 15 and 19 Teletypewriters

The distance from the top edge of the form to the first line on which typing is to be done should not be less than $5/8$ inch on superfold forms intended for snap separation and not less than $7/8$ inch on superfold forms intended for tearing-edge separation.

(B) 28 Teletypewriter

The distance from the top edge of the form to the first line on which typing is to be done should not be less than $3/4$ inch where the forms are used on a unit equipped with a paper guide consisting of horizontal arms and vertical guide fingers. On a unit equipped with a paper guide consisting of a horizontal bar extending the width of the paper, the distance should not be less than $1-5/8$ inches.

8. LEFT-HAND MARGIN OF TYPING

The machine will normally be adjusted to type the left edge of the first character of a line $3/8 \pm 1/16$ inch from the center line of the left sprocket holes (nominally $5/8$ inch from the left edge of the paper). The left margin may be made as large as desired to within $3-1/8$ inches of the right-hand edge of the paper. The typing can be placed more exactly when required to type between vertical column lines.

9. RIGHT-HAND MARGIN OF TYPING

The minimum right-hand margin, from the right-hand edge of the extreme right-hand character to the center of the right-hand sprocket holes is $1/4$ inch.

10. NUMBER OF CHARACTERS TYPED PER LINE

The teletypewriter types ten characters per inch and normally will be adjusted to type 72 characters per line ($5/8$ -inch left margin) on an $8-1/2$ inch page. Under certain circumstances, more than 72 characters may be obtained by making certain readjustments. TWX machines should be adjusted to type 72 characters per line.

11. CARBON PAPER

One-time carbon paper is ordinarily used with forms for use on sprocket-feed teletypewriters, although if desired, the forms may be carbon-backed. The carbon paper should be of suitable weight and coating to produce the required number of legible copies.

12. REGISTRATION OF FORMS

It is essential in an assembly of multiple-copy forms that the printing on the several copies be accurately aligned so that the typing will be in correct relation to the printed matter.

13. WEIGHT OF PAPER WHICH MAY BE USED WITH ONE-TIME CARBON PAPER

Probably the most generally suitable grade of paper for manifolding purposes on teletypewriters, considering availability and other factors, is Sulphite Bond. However, strictly from the standpoint of legibility on the final copies of an assembly of several sheets and neglecting the possibility that it may not be generally available, Sulphite Writing grade is the best. A Bond paper is characterized by a rougher finish than the Writing grade and presents the better handling qualities but the Writing grade offers greater legibility on the final copies, particularly when typing an assembly of several sheets.

Certain requirements may be most satisfactorily met by using one or the other of either the Writing or the Bond grades of paper. However, in so far as the requirements imposed by the machines are concerned, either grade may be used. Substances 24 and 28 sulphite ledger papers have been found satisfactory. Jute Manila is often used where an extremely tough paper is required. This paper is usually specified on a weight basis of 480 sheets, 24 by 36 inches, whereas the substance numbers referred to heretofore are the weight in pounds of 500 sheets, 17 by 22 inches.

It is possible that there are other papers which may be suitable for use in the sprocket-feed teletypewriter. However, the requirements of tensile strength to insure proper feeding, weight and grade to obtain legible typing, and freedom from lint to avoid jamming the teletypewriter mechanism demand that a careful selection of the stationery be made. Unless conclusive tests demonstrate the practicability of other papers, the grades and weights noted herein should be used. In any case, a grade of paper which will break on less than 10 points per square inch on the Mullen Test should not be used.

The specifications assume the use of non-fractions type, that is, the use of regular figures

and an oblique line for typing fractions. With fractions type the maximum number of legible copies obtainable may be assumed to be two less than the maximum number given in the table later on. The maximum number of copies specified is predicated upon the assumption that one of the best grades of one-time carbon paper available will be used.

14. GENERAL DESIGN

Forms should be of the continuous super-fold type. The usual assembly consists of two or more separate continuous strips of paper superposed one upon another, either carbon-backed or with carbon paper interleaved, perforated at the end of each printed form and folded at the perforation at the end of each form or at the end of several forms, depending upon the size of the individual form and the packing required.

In stationery where the carbon paper does not extend to the edge of the forms, the carbon paper should be approximately $5/32$ inch less in width than the distance between the inner edges of the sprocket holes. It should be securely stapled, spot-gummed, or satisfactorily restrained from shifting by some other method at intervals not greater than about 22 inches.

In stationery arranged so that the carbon paper extends to the edge of the forms and the sprocket pins pass through it, the carbon paper may be secured in the assembly by stapling or spot-gumming or by the usual feed holes along the edges of the stationery. In the latter case the carbons may be held in alignment by sprocket holes which are somewhat larger in diameter than the feed holes in the stationery. When stationery of this type is employed, special feeding arrangements are required as discussed later.

Stationery is also available in which the printed forms and carbon sheets are of the same width but are assembled and stapled so that the carbon sheets are transversely offset to the *right* of the printed forms. Stationery of this type is supported in the machine by sprocket holes in the right-hand margin of the carbon sheets and the left-hand margin of the stationery. The distance between the two lines of sprocket holes in the forms and the carbons is maintained by the stapling in the center of the stationery at the

WEIGHTS OF PAPER RECOMMENDED

PLATEN USED (R = RUBBER) (SJ = STEEL JACKETED)		NO. OF COPIES TO BE TYPED	FIRST COPY		INTERMEDIATE COPIES LB	LAST COPY	
15 & 19 TTY	28 TTY		MIN LB	MAX LB		MIN LB	MAX LB
R**	R	1	16	*32-80‡			
R	R	2, 3	13	20	10, 12, 13, 16	13	*32-80‡
SJ***	R	4, 5	13	20†	10, 12, 13, 16	13	20
SJ	R	6	13	20	10, 12, or 13	13	16
SJ	R	7, 8	13		10, 12, or 13	13	16

Weight basis is the weight of 500 sheets 17 by 22 inches unless otherwise noted.

*It is probable that stationery heavier than 28 pounds may cause an appreciable increase in noise of the typing blow and may also result in slight smudging of the typing due to the stationery bowing away from the platen.

†If 20-pound stationery is used for the first copy, the paper used for the intermediate copies should be limited to the 10-pound, 12-pound, or 13-pound weights.

‡Weight basis is the weight of 480 sheets 24 by 36 inches which is the basis on which Jute Manila is usually ordered.

**On 15 and 19 teletypewriters a harder rubber platen is available for 8-1/2 inch width paper where it is desired alternately to type single copy or multicopy (one to six copies). The weights of the first and intermediate copies should not exceed 16 pounds. The weight of the last copy should not exceed 28 pounds.

***On 15 and 19 teletypewriters under certain conditions it may be desired to use a rubber platen for four or five copies, in which case it may not be practicable to obtain good legibility with the maximum weights of paper specified for the steel-jacketed platen.

top of each form. In considering the use of stationery of this type, it should be recognized that the finished sets will be narrower for a given width of platen than stationery of other types. Because the feeding of stationery of this type is partly dependent upon the sprocket holes in the lightweight carbon sheets on the right side, this stationery is not recommended for use in sets of less than three copies. The weights of stationery given in the table are also correct for this particular type of stationery.

An additional feature which may be incorporated in any of the stationery discussed

above is vertical perforation to permit removal of the strip containing the marginal sprocket holes. It should be kept in mind that the removal of the strip bearing the sprocket holes will reduce the finished size of the form by 1/2 inch so that the final result will be a form about 1 inch narrower than with other types of stationery. The removal of the marginal strip will also add to the labor involved in handling the forms.

To facilitate removal of carbon sheets, some stationery designs extend a carbon tab below the center of the form and locate the staple

in the center of this tab on the perforating line. Use of stationery of this design should be restricted to installations in which the forms are *not* separated on a tearing edge or on the cover glass. If this type of form is separated on the cover glass or a tearing edge, not only is the carbon tab torn off and the facility for removal of carbons provided by this design destroyed, but the staple is free to drop into the machine and cause trouble.

15. CONTINUITY

The paper in any individual package should be continuous. If forms bearing serial numbers are used, the packages of forms should be broken at the same place so that the machines will require reloading at all stations on the circuit at the same time.

16. PERFORATION

The perforation between successive forms in the assembly should be sufficiently deep to permit easy separation near the typing point without opening the cover, but not so deep as to tear in ordinary handling or feeding through the teletypewriter. After a new form has been fed up to the first line of typing, it should be possible to tear off the preceding form.

17. STAPLING

Any stapling arrangement proposed for use should satisfy the following requirements: (1) the location of the staple should be such that (a) there is no possibility of its falling into the machine when the forms are separated; (b) there is no possibility of a type pallet striking it; (2) the staples should be properly crimped so they will not catch on the stationery or staples in succeeding forms as they emerge from the container and thus interfere with satisfactory feeding of the stationery; (3) they should be secured in a manner which will not cause bulging as the forms are fed through the teletypewriter.

Frequently, the staple is located at the top center of the form not less than 1/16 inch from the scoring line, nor less than 3/8 inch above the first line on which typing is to be done. In forms perforated vertically for removal of

sprocket holes, the staples are often located in the removable margin strip. *Stationery of special design in which staples are placed on the perforation line is not recommended unless the customer insists on snap separation and does not intend to use a tearing edge or separate the forms on the cover glass.* Forms of this design are not suitable for tearing edge separation because the staples are likely to fall into the machine and cause trouble.

18. ABSENCE OF PAPER DUST AND PARTICLES

The forms should contain no paper dust or particles resulting from trimming the edges of the paper, punching the sprocket holes, or cutting the scoring perforations. The presence of any considerable amount of superfluous material which may drop into the machine may be the cause of excessive maintenance and interruption to service.

19. NUMBERING

The forms should be numbered if so specified by the customer. The numbers should be consecutive unless otherwise specified.

20. PROTECTION FROM SOILING

Sufficient protection against possibility of soiling the forms should be provided at all stages of preparation and during shipment. This is especially important when the pages are numbered.

21. PACKING

Stationery should be packed in individual packages of not over 20 pounds. The individual containers should be sufficiently substantial to permit convenient handling without wrinkling or otherwise damaging the forms.

The individual packages should be plainly marked with information as to which side is to be opened and the serial numbers of the forms included in the package. If more than one packing case is used for a given shipment, each such case should be marked with the serial numbers contained therein.

The paper should be packed for shipment so that it will arrive at the destination in good

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condition without deformation, creasing, damaged corners, or other damage to the forms.

22. FEEDING OF THE STATIONERY

(A) 15 and 19 Teletypewriters

Stationery employing one-time carbons in which the carbons are secured by stapling or spot-gumming, may be fed into the machine from a box or container located on the floor at the back of the machine or, where the 15N teletypewriter table is used, the 15A teletypewriter paper box may be mounted on the back of the table. The forms are brought up through the cover paper guide and if of satisfactory design, will feed smoothly through the machine, provided the container on the floor is not displaced more than four or five inches from a central location at the back of the machine.

Stationery in which the sprocket holes are the sole means for maintaining alignment between the carbons and the several sheets will not feed satisfactorily from a box on the floor at the back of the machine. A table of a height to bring the top of the container slightly below the slot in the rear of the cover through which the paper is fed, should be arranged by the customer. When this type of stationery is employed the guide posts and guide strip on the cover paper guide are not used, the guide plate being used only to furnish a rounded surface over which the stationery feeds directly into the cover. It should not be threaded through the retarding rods in the manner of other types of stationery but should pass over these rods directly into the platen. The guide posts on the loading plate inside the machine are adjusted as for other stationery to maintain horizontal alignment. The usual cover lip furnished may not be sufficiently long to insure freedom from difficulty under humid weather conditions due to this type of stationery feeding back into the machine as it emerges from the platen. It may, therefore, be desirable to use, with this type of stationery, a longer cover lip, TP121098.

Feeding of stationery in which the carbons are offset may be facilitated in some cases by the provision of a wide pressure roller, TP89858. This roller should be installed on the

side of the platen at which the carbon sheets project from the assembly, to give a better grip on the stationery.

(B) 28 Teletypewriter

Stationery using one-time carbons may be fed into the teletypewriter from the 28A paper box which is secured to the rear of the machine. The forms are brought up over the cover paper guide and if satisfactory design, will feed smoothly through the machine.

23. PERFORMANCE IN THE MACHINE

For satisfactory performance in the teletypewriter, the design and assembly of sprocket-feed stationery should be such that the feeding of the forms through the teletypewriter does not interfere with the normal operation of the teletypewriter and that the stationery meets the following requirements:

- (1) Bowing of the paper away from the platen along the typing line, such as may be experienced at the top of the form in the machine upon separation of the previous typed form, should not materially reduce legibility of the carbon copies, interfere with smooth feeding of the paper, nor introduce the possibility of the paper catching on any part of the typing unit.
- (2) There should be no cumulative creepage nor buckling of the forms or carbon paper which results in the stationery jamming, being forced off the sprocket pins, or being torn at the sprocket holes.
- (3) Strength of the assembly at the sprocket holes should be such that the strain in feeding the paper does not tear the paper nor elongate the sprocket holes.

24. USE OF TYPES OF STATIONERY NOT DISCUSSED IN THESE NOTES

Where it is desired to use stationery which is not covered in these notes but which appears suitable, it is recommended that the customer make a trial of the stationery under actual service conditions before a large lot is purchased. These notes do not cover fanfold stationery.

NOTES ON PAPER FOR PAGE-TYPE FRICTION-FEED TELETYPEWRITERS

A customer desiring to purchase stationery from a supplier with whose particular product he is unfamiliar, should conduct a trial of the stationery under actual service conditions so that a conclusive test will have been made before a large lot is purchased. The quality of the stationery may tend to deteriorate if it is unused for a period of longer than 6 months or stored in an extremely hot or damp location, such as directly under a roof or near a radiator or steampipe. For best results, therefore, stationery should be purchased in quantities that will be used within a 6-month period and, until used, should be stored in as cool and dry a location as possible.

The requirements for paper, which follow, cover particularly plain paper in continuous lengths, which is furnished in rolls or packages. Where the use of printed forms is involved or where many copies are required either on forms or on plain paper, it is usually desirable for satisfactory paper feeding to provide sprocket-feed teletypewriters or to handle the paper in the form of "books" which are fed individually into the teletypewriter by hand. Specifications for forms are contained in Notes on Continuous Superfold Forms for 15, 19, and 28 Sprocket-feed Teletypewriters. When "books" are used, the paper may be chosen to meet the requirements of the particular case, as for instance, books of "flimsy" may be used with interleaved carbon sheets where a large number of copies are to be made.

Multicopy paper in roll form may be employed where only two or three copies are required and may be lighter in weight than specified in these Notes, provided it produces satisfactory results. It will be necessary with this paper to realign the copies on the platen from time to time because of the slack which results when the paper comes off the roll. For making copies the roll paper may be carbon-backed or the rolls may be made up with interleaved carbons. When interleaved carbons are used, it will

be necessary for the typist to keep the copies in lateral alignment to prevent undue lateral slipping.

The requirements which paper for use with page-type friction-feed teletypewriters should meet may be divided into two parts — the first part covering the more important requirements which are listed as Items 1 through 6, and the second part covering additional requirements which relate to the more or less indeterminate factors having to do with quality. These are listed in Items 7 through 10. It is recommended, in order to get best results, that all of the requirements be used in ordering this type of paper. In all cases the dimensions as specified below should be followed. Single-copy paper for page-type friction-feed teletypewriters is usually supplied in rolls, although superfold paper is used in many cases. The following is a list of the factors which are important in purchasing multicopy paper in roll form or single-copy paper for friction-feed teletypewriters.

1. DESCRIPTION

Teletypewriter paper is intended for use with record typewriter ribbons (black or other colors) and hectograph copying ribbons. The material usually required is a loaded wood-pulp paper of uniform thickness and the colors are usually white or canary but other colors can be provided without deteriorating the quality of the paper.

2. DIMENSIONS

The nominal width of paper used is from 3 to 8-1/2 inches. (Paper for use with machines in TWX service should have a width of 8-1/2 inches.) The width at the time of cutting the paper should be $1/16 \pm 1/64$ inch less than the

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width ordered. For example, paper ordered as 8-1/2 inches wide should be 8-7/16 \pm 1/64 inches wide.

When roll paper is used the diameter of the large roll should not exceed 5 inches and the roll should be concentric with the strawboard tube on which the paper is wound. This strawboard tube should have an inside diameter of not less than 0.95 inch nor more than 1.10 inches. The tubing should be approximately 1/8 inch thick.

3. WINDING

The paper should have clean-cut edges and should be wound evenly and tightly on the tubes to avoid damage to the edges when handling. Each roll must contain one continuous piece without splices or tears, and should be free from paper dust and lint.

4. MARKING

It is desirable that the roll of paper be marked on both sides of either the right-hand or left-hand edge with a mark, in the form of a light red dye, 1/4 to 3/4 inch wide and extending approximately 10 feet, within the first 15 feet from the inner end of the roll, to indicate that the end of the roll is being approached.

5. WEIGHT

An 18-pound paper should be used, this weight being based on 500 sheets, 17 by 22 inches, with allowable weight variation of \pm 5 per cent.

6. THICKNESS

The paper should have a thickness of min 0.0034 inch, max 0.0043 inch.

7. CHARACTER OF SURFACE

The paper should have a smooth but not glossy surface.

8. STRENGTH

The tensile strength when determined on test pieces 1/2 inch wide and 7 inches between the jaws of the testing machine should be as follows: Average of ten tests on a sample cut in the paper machine direction should not be less than 3.4 kilograms. Average of ten tests on samples cut at right angles to the paper machine direction should not be less than 1.7 kilograms.

9. STOCK

The paper should be made from a mixture of chemical and mechanical wood stock, the portion of mechanical wood not to exceed 65 per cent of the total.

10. FASTENING END OF ROLL

The free end of the paper should be fastened to the roll by means of spot-gumming.

11. CHEMICAL DUPLICATING PROCESS CARBON PAPER

A customer desiring to purchase chemical duplicating process carbon paper should discuss the matter with the supplier and make exhaustive tests of the carbon paper under actual service conditions. The heat generated in a teletypewriter cabinet, particularly operating during the summer months at a high room temperature, will cause deterioration of some duplicating carbon papers to the extent of almost complete loss of reproduction.

NOTES ON TAPE FOR TAPE-TYPE TELETYPEWRITERS (14 TYPE)

A customer desiring to purchase tape from a supplier with whose particular product he is unfamiliar, should conduct a trial of the tape under actual service conditions so that a conclusive test will have been made before a large lot is purchased. The quality of the tape may tend to deteriorate if it is unused for a period of longer than 6 months or stored in an extremely hot or damp location, such as directly under a roof or near a radiator or steam pipe. For satisfactory results, therefore, tape should be purchased in quantities that will be used within a 6-month period and, until used, should be stored in as cool and dry a location as possible.

The requirements for paper tape which follow deal with tape for ordinary use in the 14 teletypewriters and do not cover tape for special purposes, such as used with projection apparatus or where more than one copy is desired, except as regards dimensions.

Tape for the 14 teletypewriters is supplied in rolls which fit into a tape reel mounted on the side of the machine. Two different types of tape are in general use, gummed tape suitable for pasting on blanks or forms and ungummed tape. The requirements which the tape should meet may be divided into two parts, the first part covering the more important requirements which are listed as Items 1 through 8, and the second part covering additional requirements which relate to the more or less indeterminate factors having to do with quality. These are listed as Items 9 and 10. It is recommended, in order to get the best results, that all of the requirements be used in ordering tape. In all cases the dimensions as specified in Item 3 should be followed.

The ordinary requirement in a 14 teletypewriter is for single-copy tape, gummed or ungummed. Where more than one copy is desired, the best results can be obtained through the use of separate rolls of tape and carbon paper. Auxiliary tape reels are available for

holding the extra rolls involved so that the paper from all of the rolls can be fed through the teletypewriter simultaneously. As many as three copies (one original and two carbons) can be made on a 14 teletypewriter in this way but the feeding of the tape is not satisfactory for a larger number of copies. Carbon-backed tape may also be used in order to make copies but this arrangement is less desirable than the use of separate carbon paper. Rolls having more than one copy wound on the same roll will not feed satisfactorily in the 14 teletypewriter.

Tape for projection purposes is usually made of cellophane, although glassine tape of a good grade has been employed in some cases.

1. DESCRIPTION

Teletypewriter tape is intended for use with record typewriter ribbons (black or other colors). The material required for both gummed and ungummed tape is a Bond quality paper of uniform thickness made from a 100 per cent chemical wood pulp, and the colors used are usually white or canary.

2. WINDING

The tape should be wound evenly and tightly in rolls, the edges being smooth and free from paper dust and lint. Each roll should consist of one continuous length of tape without splices.

3. DIMENSIONS

The width of the gummed or ungummed tape should not be less than 0.36 inch nor more than 0.38 inch. The diameter of the roll should be $8 \pm 1/8$ inches, and the tape should be wound on a wooden spool with an inside diameter of min 25/64 inch, max 27/64 inch and an outside diameter of min 11/16 inch, max 7/8 inch.

Note: Changes and additions are indicated by marginal arrows.

4. MARKING

It is desirable that the roll of ungummed tape be marked across the full width and on both sides of the tape with a mark, in the form of a light red dye, extending approximately 6 feet within the first 12 feet from the inner end of the roll, to indicate that the end of the roll is being approached.

5. WEIGHT

An 18-pound paper should be used for ungummed tape, this weight being based on 500 sheets 17 by 22 inches with an allowable variation of ± 5 per cent. In the case of gummed tape, a gummed weight of not less than 23 pounds is desirable.

6. THICKNESS

The thickness of ungummed tape should be min 0.0032 inch, max 0.0043 inch; of gummed tape min 0.0034 inch, max 0.0045 inch.

7. CHARACTERISTICS OF SURFACE

The paper should have a smooth but not glossy surface of uniform color free from undesirable amounts of dirt spots and shives. The surface finish should be such as to insure good typing qualities when used with typewriter inks.

8. ADHESIVE

The adhesive used in making gummed tape should meet the following requirements:

(a) Sufficient glue should be applied to the tape to insure firm adhesion to a sheet of raw paper stock when the tape is moistened with a saturated wick, allowed to dry in the air for 15 seconds, and then applied to the paper.

(b) The adherence of strips of gummed tape attached to a sheet of raw paper stock according to (a) above, should not be affected when the sheet is completely immersed for 10 minutes in water at a temperature of from 70° to 72° F and allowed to dry thoroughly.

(c) The gummed tape should be capable of being unwound without the sticking of adjacent layers and should retain this characteristic when stored in a dry place.

Oil of cloves or some other deodorant should be added to the adhesive before application to the paper. The adhesive coating should be applied evenly so that there will be no spots devoid of glue. When the adhesive coating has been thoroughly dried, it should be broken to lessen the tendency of the unwound tape to coil and twist and lessen the spoking of the roll (i.e., taking on the permanent shape of a polygon after subjection to larger variations in humidity). The lines of breakage in the adhesive should run diagonally across the tape in both directions at an angle of approximately 45 degrees with the edge of the tape.

9. PACKING

Each roll of gummed tape should be supplied in an individual moistureproof wrapping, such as a glassine envelope, with the flaps glued, and 25 such rolls should be wrapped in an asphalt lined paper and securely sealed; two such packages to the shipping carton. Ungummed tape is normally packed 25 rolls, wrapped in heavy kraft paper and securely sealed; two such packages to the shipping carton.

10. STRENGTH

The tensile breaking strength of the tape, when determined on test pieces 3/8 inch wide and 7 inches between the jaws of the testing machine should not be less than 2.5 kilograms average for ten tests.

NOTES ON PERFORATOR TAPE

A customer desiring to purchase tape from a supplier with whose particular product he is unfamiliar, should conduct a trial of the tape under actual service conditions so that a conclusive test will have been made before a large lot is purchased. The quality of the tape may tend to deteriorate if it is unused for a period of longer than 6 months or stored in an extremely hot or damp location, such as directly under a roof or near a radiator or steampipe. For satisfactory results, therefore, tape should be purchased in quantities that will be used within a 6-month period and, until used, should be stored in as cool and dry a location as possible.

1. DESCRIPTION

Perforator tape for use in Bell System perforators, reperforators, and transmitter-distributors should be of such quality as to perform satisfactorily through periods of varying humidity in the various units in which it is used. The tape should not clog in any of the units nor be subject to ragged punching. It should operate in Bell System tape transmitters at least ten transmissions without errors.

The tape should consist of a bleached 100 per cent chemical wood-pulp paper impregnated with a light grade refined petroleum base lubricating oil, as nearly odorless as is commercially practicable. It can be provided in various colors or with colored stripes (printed on both sides) or dashes (printed on one side), without deteriorating the quality of the tape.

Where tape-storage bin capacity greater than usual is required, such as in the 81D1 teletypewriter switching system, a perforator tape with a thickness of min 0.0027 inch, max 0.0033 inch can be used satisfactorily. It is important, however, that except for the thickness, weight, and tensile strength, the tape meet the standard requirements for perforator tape given in these Notes.

2. WINDING

The tape should be wound evenly and tightly in rolls, the edges being smooth and free from paper dust. Each roll should consist of one continuous length of tape without splices. The outer end should be secured by spot-gumming.

3. DIMENSIONS

The tape may be in one of three widths. The 11/16-inch width (for 5-unit code) should have outside limits of min 0.683 inch, max 0.689 inch. The 7/8-inch width (for 6-unit code) should have outside limits of min 0.870 inch, max 0.877 inch. The 1-inch width (for 8-unit code) should have outside limits of min 0.995 inch, max 1.002 inches. The tape should be tightly wound on a pasteboard tube having an inside diameter of min 2 inches, max 2-1/16 inches. The outside diameter of the roll of 11/16- or 7/8-inch tape should be either $8 \pm 1/16$ inches or $14 \begin{smallmatrix} +1/8 \\ -1/16 \end{smallmatrix}$ inches. The outside diameter of the roll of 1-inch tape should be $8 \pm 1/16$ inches.

4. MARKING

It is desirable that the roll of tape be marked across the full width and on both sides of the tape with a mark, in the form of a light red dye, extending approximately 10 feet within the first 15 feet from the inner end of the roll, to indicate that the end of the roll is being approached.

5. WEIGHT

The weight before oiling of the paper from which the tape is made should be 20.6 to 22.7 pounds to the ream (500 sheets, 17 by 22 inches) or 47.5 to 52.5 pounds to the ream (500 sheets, 24 by 36 inches).

Note: Changes and additions are indicated by marginal arrows.

6. THICKNESS

The tape should be uniform in thickness, min 0.0037 inch, max 0.0043 inch. Before measuring this thickness, the tape should be conditioned for at least 16 hours at a relative humidity of 50 ± 2 per cent and a temperature of $70^\circ \pm 3$ F. The tape should be kept unrolled while conditioning.

7. CHARACTERISTICS OF SURFACE

The tape should have a hard, smooth, dull finish and should be as opaque and as free from extraneous and unbeaten fibers as the best manufacturing practices will permit. It should be free of holes, tears, and wrinkles and should be free of glue or other adhesives.

8. CONTENTS OF TAPE

The oil content of the tape should be min 12 per cent, max 22 per cent.

The ash content of the tape should not exceed 1 per cent after the oil in the tape has been extracted by hot petroleum ether.

The pH value of the water extract of 1.00 gram of the oil-free paper extracted in 250 ml. of water should be min 4.5 pH in accordance

with D778 Method of the American Society for Testing Materials.

The siliceous grit content of the tape should not be greater than 0.040 per cent based on the weight of the oil-free paper.

9. PACKING

The tape should be packed in such a way as to insure against loss of oil or deforming of the roll during shipment so as to be in good condition when it is placed in use.

10. STRENGTH

The tensile strength of a sample of the oiled tape 7 inches long and 1/2 inch wide should be at least 5.4 kilograms measured longitudinally.

The edge tearing strength of the oiled tape should be at least 1.2 kilograms, determined in cross direction only and in accordance with ASTM D827.

The resistance to perforation of the oiled tape should be min 2.0 pounds, max 3.0 pounds, as measured by a reliable punch pressure testing tool.

NOTES ON TELETYPEWRITER RIBBONS

The following items are of importance in purchasing ribbons for teletypewriters.

(1) Cotton ribbons are the most economical but silk or nylon ribbons wear longer. ←

(2) Cotton ribbons should be of very strong grade, evenly woven from long-staple cotton. The thread count should be approximately 272 threads per square inch and the thickness not over 0.007 inch.

(3) Silk or nylon ribbons should be of equally good grade as the cotton ribbons described in (2) and, like the cotton ribbons, should conform to the requirements which follow. ↵

(4) The edges of the ribbons should be smooth, straight and even, and strongly gummed.

(5) Use heavy-inked ribbons for all units. ←

(6) Ribbons should be supplied in a length of 12 yards and a width of 1/2 inch.

(7) Teletypewriters require ribbons on spools of the same type as those used on Underwood typewriters. Reversing eyelets as furnished in these ribbons should be the same as those in the Underwood ribbons.

(8) Ribbons may be used of any color to suit the customer's requirements. However, it has been found that some types of colored ribbons cause a waxy deposit to collect on the type pallets and adjacent parts resulting in poor printing or failure to print and in rapid deterioration of typebar backstops. Such ribbons should not be used on teletypewriters.

(9) Ribbons inked with hectograph copying ink are usually inked on one side only (the side next to the paper) in order to prevent clogging of the type by the heavy hectograph ink. Some types of semi-inked hectograph ribbons have been found to contain an abrasive filler that causes rapid wear of the type pallets and ribbon carriers. Ribbons that cause rapid wear to teletypewriter parts should not be used. Because of the design of the teletypewriters, semihectograph ribbons for use with these machines, except 28 teletypewriters, should be wound in the reverse direction to those ribbons used on the Underwood standard typewriter in order to bring the inked side of the ribbon next to the paper. Semihectograph ribbons for use with the 28 teletypewriters should be wound in the standard forward direction.

Note: Changes and additions are indicated by marginal arrows.