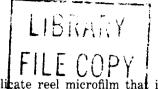
DRAWINGS ON 35 mm MICROFILM READING AND REPRODUCING



	CONTENTS	PAGE	Reference is made to duplicate reel microfilm that is intended for special applications.
1.	GENERAL	1	· · · · · · · · · · · · · · · · · · ·
2.	REPRODUCTION MATERIAL	1	1.02 This section has been reissued to:
	Duplicate Microfilm	1	(a) Revise all EAM cards to include Restrictive Notice (Fig. 1 through 6).
	Duplicate Microfilm Cards	3	(b) Include KS-20563 L7 and KS-21478 L2 cards and to revise card stock or stripe colors
	Paper Prints	3	(Table A, Fig. 1 through 6, and 5.05).
	Processing Material	3	1.03 The term microfilm card refers to an individual 35 mm microfilm frame mounted in an aper-
3.	DUPLICATE MICROFILM	3	tured electrical accounting machine card. The term reel microfilm refers to a continuous strip of 35 mm
4.	ENLARGED REPRODUCTIONS	3	microfilm frames, which is wound on a reel.
5.	REPRODUCTION EQUIPMENT	4	1.04 Use care in handling microfilm to avoid scratching or otherwise damaging the film.
	Manual Card-to-Card Printers	4	
	Automatic Card-to-Card Printers	5	1.05 A list of equipment and materials considered suitable for reading and reproducing drawings from microfilm is covered in Section 006-120-100.
	Readers	5	Section 006-120-100 also covers file equipment for microfilm cards.
	Reader-Printers	10	
	Enlarger-Printers	10	1.06 The general plan for the production, distribution, and use of microfilm of engineering drawings in the Bell System is covered in Section 006-
	Mounters	11	100-100.
6.	FILES (FOR MICROFILM CARDS)	11	1.07 Inspection procedures for duplicate microfilm are covered in Section 006-115-500.
1.	GENERAL		2. REPRODUCTION MATERIAL

1.01 This section primarily covers the requirements for the production of duplicate microfilm cards and enlarged copies, such as paper prints and reproducibles, made from microfilm cards. This section also covers the requirements for the equipment and materials needed to produce these copies and the

readers that are needed to use microfilm directly.

Duplicate Microfilm

2.01 35 mm nonperforated, nonreversing, safety type film shall be used for producing duplicate microfilm copies in card and reel form.

NOTICE

Not for use or disclosure outside the Bell System except under written agreement

TABLE A
ELECTRICAL ACCOUNTING MACHINE (EAM) CARDS

CARD	FIG.	CARD STOCK OR STRIPE COLOR	CORNER CUT	APERTURE INSERT	USE		
KS-20560 L3	1	Green	Upper Left	Protection Sheet	For mounting duplicate microfilm from reels.		
KS-20563 L2, L3, and L7	1	Green	Upper Left	Unexposed Diazo Film (see Note 1)	For making file master duplicate microfilm cards of standard drawings from silver microfilm mounted in KS-20560 L1, or L2 cards (see Section 006-110-100). These duplicates will be distributed to microfilm files.		
KS-20563 L5, and L6	1	Green (With Violet-Stripe)	Upper Left	Unexposed Diazo Film	cate microfilm drawings fro mounted in F cards (see Se These duplications	For making file master duplicate microfilm cards of Job T drawings from silver microfilm mounted in KS-20560 L1 or L2 cards (see Section 006-110-100). These duplicates will be distributed to microfilm files.	
KS-20564 L2, and L3	2	Salmon (or Orange- Stripe)	None* (See figure for corner mark- ing.)	Unexposed Diazo Film	Hand Iden- tification	For use at micro- film files for making nonreturn- able duplicate microfilm cards	
KS-20566 L2, and L3	3	Salmon (or Orange- Stripe)	None* (See figure for corner mark- ing.)	Unexposed Diazo Film	_	from either silver microfilm mounted in KS-20560 L1, or L2 cards (see Section 006-110-100)	
KS-20568 L2, and L3	4	Salmon (or Orange- Stripe)	None* (See figure for corner mark- ing.)	Unexposed Diazo Film	Hand Identification (see Note 2)	or file master duplicate microfilm mounted in KS-20560 L3 or KS-20563 L2,	
KS-20569 L2	5	Salmon (or Orange- Stripe)	None* (See figure for corner mark- ing.)	Unexposed Diazo Film	IBM MCR Printing Identification	L3, L5, L6, and L7 cards	
KS-21478 L2	6	Green	None (See figure for corner mark- ing.)	Unexposed Diazo Film	IBM MCR Printing Identifica- tion	For use by WE Installers and TelCo maintenance person- nel in central office environment.	

^{*} Double sided cards.

→ Notes

1. KS-20563 L7 card is similar to the KS-20563 L2 card but it contains a thicker diazo film (0.004 inch minimum thickness).

2. Format designed to permit reading of posted information while card is in a reader.

Duplicate Microfilm Cards

2.02 The cards used for mounting duplicate microfilm are 3-1/4 by 7-3/8 inch apertured EAM cards that are assigned KS specification numbers as shown in Table A. These cards will be inspected by WE. Special precautions, shelf life, packaging, and ordering information are covered in Section 006-120-100.

Paper Prints

2.03 Printing material (transparent or opaque) for enlarged reproductions shall conform to the type and grade recommendations of the equipment manufacturer. (See specific recommendations in Section 006-120-100.) Where cut material is required, it shall conform to the following standard sizes.

8-1/2 by 11 inches

11 by 17 inches

18 by 24 inches

Punched holes in cut material may be provided locally as required.

Processing Material

2.04 Processing material required for reproduction shall conform to the type and grade recommendations of the equipment manufacturer. (See specific recommendations in Section 006-120-100.)

3. DUPLICATE MICROFILM

- 3.01 All duplicate microfilm shall have negative images (light lines on a dark background) and shall be free of scratches, foreign material, stains, or defects, which make drawing information illegible.
- 3.02 The resolution of the processed duplicate microfilm shall not exceed a loss of one pattern on the test chart when compared to the previous generation microfilm from which it is made nor shall the resolution in lines per millimeter be less than that shown in Table B.

TABLE B
RESOLUTION FOR DUPLICATE MICROFILM

	RESOLUTION					
REDUCTION	SECOND* GENERA- TION	TEST CHART PATTERN	THIRD GENERA- TION	TEST CHART PATTERN		
16X	100.8	6.3	89.6	5.6		
24X	108	4.5	96	4.0		
30X	120	4.0	108	3.6		

- * Duplicate microfilm made from original silver microfilm.
- 3.03 Duplicate microfilm in reel form shall have the drawing image centered across the width of the film within 1/32 inch.
- 3.04 File master duplicate microfilm cards intended for distribution to microfilm files shall be keypunched and interpreted with drawing identification information as indicated in Section 006-110-100. Master data cards (GN-1865) may be used by WE to reproduce information in file master duplicate microfilm cards.
- 3.05 Nonreturnable duplicate microfilm cards prepared to fill requests at files shall have identification information, such as drawing number, sheet number, issue number, size, and section number (if a multiple-frame drawing), entered on the card at the time it is prepared.
- 3.06 Duplicate microfilm in reel form shall have identification information, such as a reel number on the container.

4. ENLARGED REPRODUCTIONS

- **4.02** Enlarged reproductions in the form of paper prints shall have positive images (dark lines on a light background).
- **4.03** Enlarged reproductions shall provide a distinct contrast between the drawing information and the background. The background shall be uniform.
- **4.04** Screen-projected images shall be negative (light lines on a dark background).

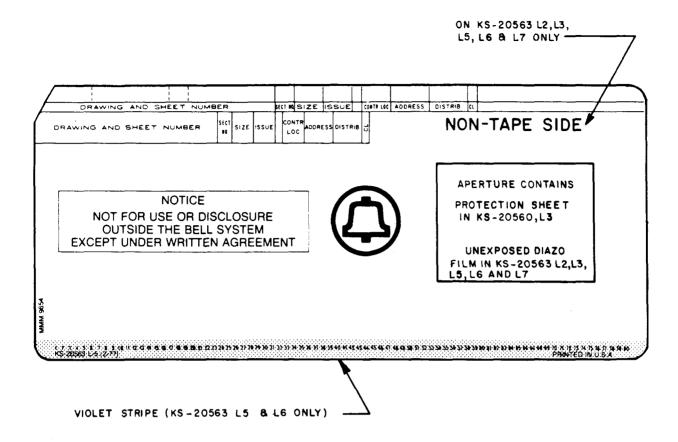


Fig. 1 — KS-20560 L3 or KS-20563 L2, L3, L5, L6, and L7 Card (Green-Stock or Stripe)

5. REPRODUCTION EQUIPMENT

5.01 General

- (a) All reproduction equipment shall be capable of producing legible reproductions from negative 35 mm nonperforated microfilm.
- (b) All printers and readers shall be provided with a means of positioning the microfilm flat and secure in the focal plane during printing and viewing but shall permit the insertion and removal of the microfilm without damage.
- (c) Glass flats and reader screens should be cleaned periodically, as required, and when not in use, readers should be covered with dust covers.
- (d) The installation, operation, and maintenance instructions provided by the equipment manufacturers should be followed, except as modified in this section, to ensure obtaining high quality reproductions.

Manual Card-to-Card Printers

5.02 A manual card-to-card printer is a machine used to produce duplicate microfilm cards on a low volume basis. The duplicate is obtained by placing a card containing unexposed film in contact with the card to be duplicated in an exposure chamber. The card with the newly exposed film is then developed in the developing chamber of the machine.

Caution: Cards containing unexposed film should not be subjected to prolonged exposure to light or ammonia vapors prior to use in card-to-card printers.

- 5.03 Nonreturnable duplicate microfilm cards (KS-20564, KS-20566, KS-20568, and KS-20569) required to fill requests from file should be produced as follows:
- (a) Enter drawing identification information on salmon-colored or orange-stripe cards (KS-20564, KS-20566, KS-20568, and KS-20569) from

the white master cards [KS-20560 L1 or L2 (see Section 006-110-100)] or from their green-stock or stripe card duplicates (KS-20568 L2, L3, L5, L6 and L7). Instructions on salmon-colored or orange-stripe card indicate correct side on which to enter information.

- (b) Place salmon-colored duplicate card in contact with master card, nontape side to nontape side. (See Note.)
- (c) Expose and develop in a card-to-card printer.

Note: The nontape (emulsion) side of the above cards is located as indicated in Table C.

TABLE C

CARD NONTAPE SIDE

CARD	CARD STOCK OR STRIPE COLOR	NONTAPE SIDE
KS-20560 L1 and L2	White	Reverse or nonprinted side
KS-20560 L3	Green	Face or printed side
KS-20563	Green	As indicated on card
KS-20564 KS-20566 KS-20568 KS-20569	Salmon (or Orange- Stripe)	As indicated on card
KS-21478	Green	Reverse or nonprinted side

- 5.04 When producing duplicate cards the exposure is affected by lamp life, line voltage, and the density of the linework and lettering on the file master microfilm cards. If the linework or lettering on the duplicate is too weak, increase the exposure; if linework or lettering fills in or appears blurred or closed up, decrease the exposure.
- 5.05 Periodically check the output of a card-to-card printer to assure that acceptable duplicate microfilm cards are being produced. This can be done by viewing the film image in a reader or by viewing an enlarged print made from the duplicate.

Automatic Card-to-Card Printers

5.06 An automatic card-to-card printer is a machine designed for high volume production of duplicate microfilm cards and will be used by WE to produce duplicate microfilm cards for master microfilm files. These printers are capable of producing approximately 2000 cards per hour with a minimum of manual handling. The master microfilm cards and the unexposed duplicate cards are fed automatically through an exposure chamber. After exposure, the cards are separated automatically, and the duplicate cards are passed through a chamber for development.

Caution: Cards containing unexposed film should not be subjected to prolonged exposure to light or ammonia vapors prior to use in card-to-card printers.

Readers

- 5.07 A reader is a machine that projects an enlarged image from a microfilm card onto a self-contained screen. A reader permits quick and ready reference to drawing information. Two types of readers are available, a scanning type and a non-scanning type.
 - (a) Scanning Type Readers: A scanning type reader has a screen on which a magnified microfilm image may be viewed. These readers are equipped with a scanning device because the screen will not show the entire image of many drawings. The size of these readers makes them suitable for desk-top use.

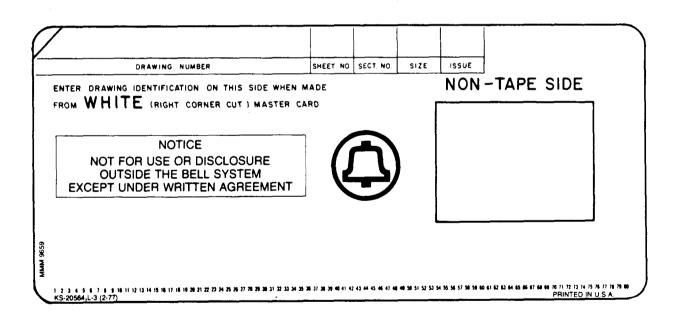
Note: Some readers are provided with the non-coated (smooth) surface of the screen on the front; however, in order to reduce reflections or glare, the screen may be reversed by the user so that the coated (rough) surface is on the front.

Caution: Do not apply solvents or commercial cleaners to the coated (rough) surface of the screen. Avoid scratching it or touching it with the fingers.

(b) Nonscanning Type Readers: A nonscanning type reader has a screen on which a magnified image may be viewed. The size of the screen permits viewing a complete image of a drawing, which occupies the full microfilm frame, without scanning. These readers are suitable for use on a table or stand.

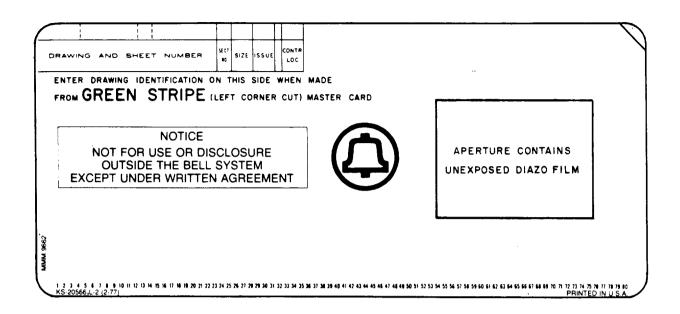
DRAWING NUMBER		ECT NO SIZE	ISSUE
TER DRAWING IDENTIFICATION ON THIS SIDE OM GREEN STRIPE (LEFT CORNI		CARD	
NOTICE	هم /	5)	APERTURE CONTAINS
NOT FOR USE OR DISCLOSURE OUTSIDE THE BELL SYSTEM		رک	UNEXPOSED DIAZO FILM
EXCEPT UNDER WRITTEN AGREEME	NT C	フ	

Face

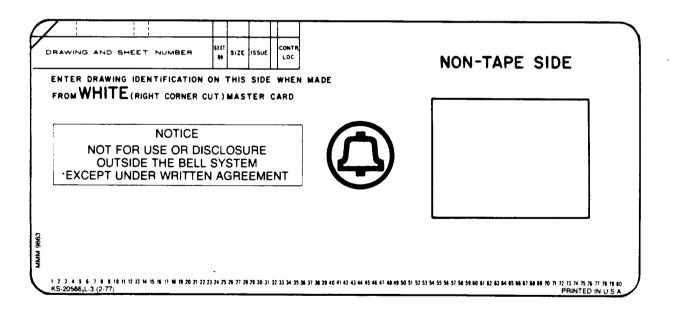


Reverse

Fig. 2—KS-20564 L2 and L3 Card (Salmon-Stock or Orange-Stripe)



Face

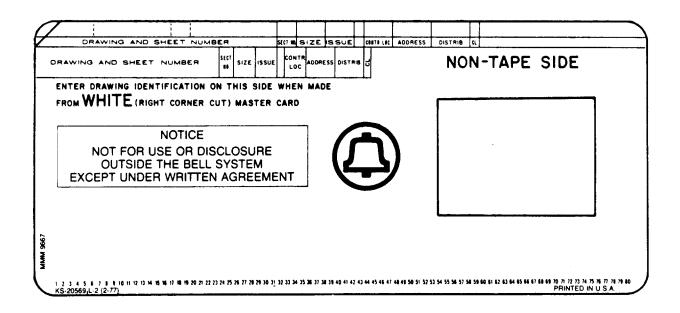


Reverse

Fig. 3—KS-20566 L2 and L3 Card (Salmon-Stock or Orange-Stripe)

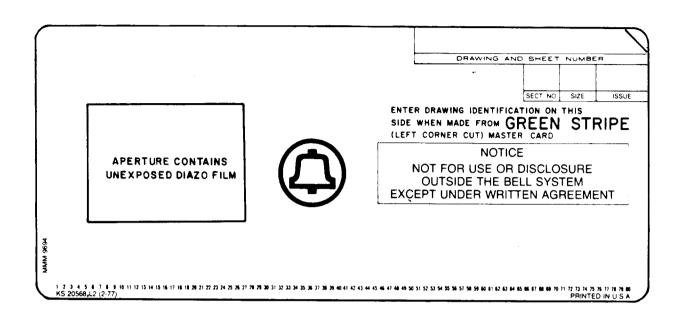
DRAWING AND SHEET NUMBER SECT SIZE ISSUE CONTRANDESS DISTRIB	DRESS DISTRIB &
ENTER DRAWING IDENTIFICATION ON THIS SIDE WHEN MADE FROM GREEN STRIPE (LEFT CORNER CUT) MASTER CARD	
NOTICE NOT FOR USE OR DISCLOSURE OUTSIDE THE BELL SYSTEM EXCEPT UNDER WRITTEN AGREEMENT	APERTURE CONTAINS UNEXPOSED DIAZO FILM

Face

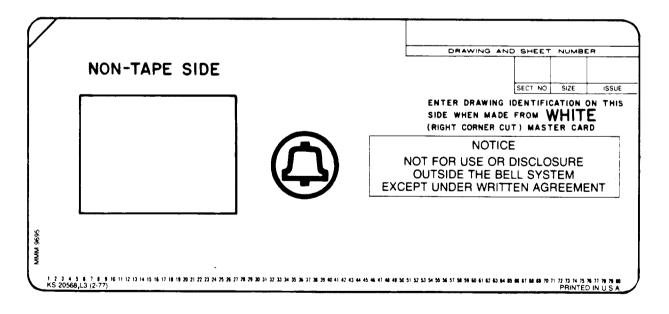


Reverse

Fig. 4—KS-20568 L2 and L3 Card (Salmon-Stock or Orange-Stripe)



Face



Reverse

Fig. 5—KS-20569 L2 Card (Salmon-Stock or Orange-Stripe)

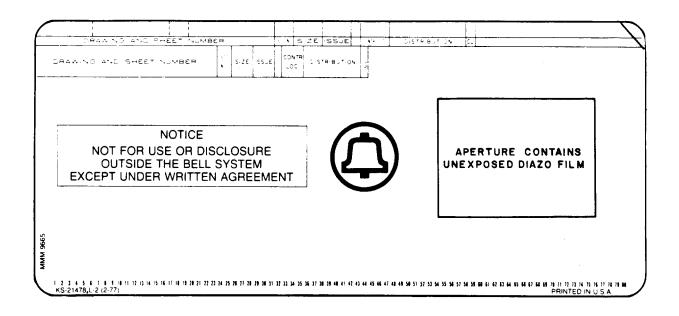


Fig. 6—KS-21478 L2 Card (Green-Stock or Stripe)

Reader-Printers

5.08 A reader-printer is a machine that combines a nonscanning reader with a printer for making paper prints from microfilm. This machine is recommended for use at locations where the demand for prints will be low. A microfilm card is inserted in a card holder and an image may be viewed on a screen or a print can be produced merely by pressing a button.

Note: The paper print produced by an electrochemical process is electroconductive and a caution note such as the following should be stamped in red on the front of the print in the vicinity of the title block.

CAUTION -

ELECTROCONDUCTIVE PAPER
AVOID CONTACT
WITH LIVE CIRCUITS

Enlarger-Printers

5.09 An enlarger-printer is a machine for producing paper prints from microfilm. This machine is recommended for use at locations where the demand for prints will be high. A microfilm card is inserted in a card holder and a print is produced on either cut-sheet paper or roll paper. Table D indicates cut-sheet paper sizes to be used for the standard sizes of BTL and WE drawings.

Note: The image on the paper prints produced by an electrostatic process is fused by heat. A malfunction of the paper transport system of the enlarger-printer may cause charring or burning of the paper.

5.10 An enlarger-printer may be equipped with a focusing control since microfilm cards have film with the emulsion toward the front or back of the card. For Bell System use, the corner cut of microfilm cards may be used to readily identify the emulsion side as follows.

- (a) A card with an upper-right corner cut or marking contains microfilm with the emulsion side toward the back of the card.
- (b) A card with an upper-left corner cut or marking contains microfilm with the emulsion side toward the front of the card.

Note: It may prove helpful to identify the focusing control positions on an enlarger-printer as upper-left and upper-right corner cut, and to provide a chart similar to Table D as an aid in choosing proper cut-sheet paper size.

5.11 A periodic check of the output of an electrostatic enlarger-printer may be made if a test card and optimum quality print are provided by the supplier. See Section 006-120-100. A print made from the test card on the enlarger-printer should be compared with the "optimum quality" print for this purpose.

Mounters

- 5.12 A mounter is a machine used for mounting reel microfilm in apertured EAM cards. The mounter should have a means of accurately positioning the film in the card aperture and shall be capable of meeting requirement 5.13 of this section.
- 5.13 Processed duplicate reel microfilm shall be mounted in KS-20560 L3 aperture cards as follows.
 - (a) Film must hang straight before mounting. See Fig. 7. Rewind the film with the curl reversed if any curl is present.
 - (b) Microfilm shall be mounted completely within the card aperture and no portion of the drawing image shall be under the mounting tape. The edges of the drawing image shall be parallel to the edges of the card aperture and the center of the drawing image shall be located a minimum of 1.563 inches and a maximum of 1.593 inches from the right-hand edge of the card.

- (c) Microfilm shall be right reading and the top edge of the drawing image shall be nearest the top or left edge of the aperture when the indexed side of the card is viewed.
- (d) The drawing identification information that appears on a card shall agree with the drawing identification of the image mounted in the aperture.

FILES (FOR MICROFILM CARDS)

6.01 Several types of EAM card files are suitable for filing microfilm cards. These include rotary files, tub files, drawer-type files, and desk reference files. Rotary files have a high capacity, require relatively little floor space, and are suitable for high activity. Tub files have a low capacity, require considerable floor space, and are suitable for high activity. Drawer-type files have a high capacity, require a minimum of floor space, and are suitable for low or medium activity. Desk reference files are intended for use by engineers at their desks. Conditions at each file area will dictate which type of file will be suitable to assure efficient operation.

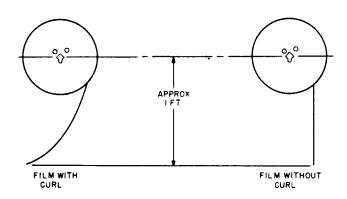


Fig. 7 - Checking for Film Curl

TABLE D
CUT-SHEET SIZE

	SINGLE-FRAME DRAWINGS				MULTIPLE-FRAME DRAWINGS		
DRAWING SIZE DESIGNATION (BTL and WE)	CUT-SHEET SIZE INCHES	DRAWING SIZE DESIGNATION (BTL and WE)	CUT-SHEET SIZE INCHES	DRAWING SIZE DESIGNATION (BTL and WE)	CUT-SHEET* SIZE INCHES		
18	8-1/2x11	L2	11x17				
28	11x17	M M	18x24	13S	18x24(2)		
3C	18x24†	M ₁	18x24†	16S	18x24(2)		
38	11x17	M2	18x24†	198	18x24(3)		
4S	11x17	M3	18x24	218	18x24(4)		
5S	18x24†	MIG	10224		10,24(4)		
0.0	104121	MM	18x24†	248	18x24(4)		
6S	!	0	11x17	M4	18x24(2)		
Job T	18x24†	01	18x24†	02	18x24(2)		
All Other	11x17	05	18x24†	03	18x24(2)		
		OR	18x24†	04	18x24(3)		
7S	18x24†				101121(0)		
8S	18x24†	P1	8-1/2x11	R4	18x24(2)		
10S	18x24	P2	11x17	R5	18x24(2)		
11S	18x24†	P3	18x24†	R6	18x24(2)		
12S	18x24	P4	18x24†	R7	18x24(3)		
A	8-1/2x11	P6	11x17	R8	18x24(3)		
A 0	11 15	DD	11 15	P.O	10. 34/9)		
A2	11x17	PP	11x17	R9	18 24(3)		
AA	18x24†	R	18x24†	RR	18x14(2)		
В	11x17	R1	18x24†	RR1	18x24(3)		
C	11x17	R2	18x24†	X1	18x24(2)		
C1	8-1/2x11	R3	18x24	X2	18x24(3)		
C2	11x17	RU	18x24†	X 3	18x24(3)		
.C3	18x24†	s	8-1/2x11	XX	18x24(2)		
D	18x24†	U	18x24	XX1	18x24(3)		
E	18x24†	X	18x24†				
L	11x17	X8S	18x24				
		XR	18x24				

^{*} The number in parentheses indicates the number of frames for the complete drawing.

^{† 17} by 22 inch cut-sheet size may be used if available.