

PIC AND PULP STEAMPETH CABLES

DESCRIPTION, USE, AND REEL LENGTHS

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	GENERAL	1	<ul style="list-style-type: none"> ● Delete information on the steam problem and selection of steampeth sheath which is now in Section 626-020-020
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1.	GENERAL		
1.01	This section covers the core lay-ups, use, and reel lengths of PIC (DHA-, DKM-, and DKT-type) and pulp ♦(CDA-, ♦CDM-, and CDT-type) steampeth sheath cables . These PIC and pulp steampeth cables are designed for use in underground conduit exposed to steam.		
1.02	This section is reissued to:		
	<ul style="list-style-type: none"> ● Delete information on ADA cable ● Include information on CDA (pseudo-MUP) cable which replaces ADA cable ● Indicate that steampeth sheath (letter-coded "B") with a composite polybutylene-polyethylene is Manufacture Discontinued 		
2.	DESCRIPTION		
	GENERAL		
2.01	Steampeth cables consist of plastic- or pulp-insulated annealed copper conductors (22-, 24-, or 26-gauge), a core wrap, and the steampeth sheath (paragraph 1.04).		
	PIC STEAMPETH CABLES		
2.02	Core Construction: With the exception of the 600-pair 26-gauge size which has standard PIC (color-code), PIC steampeth cables use "mirror-image PIC" scheme for identifying multiunits.		

NOTICE

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2.03 Standard PIC Cable—Core Lay-Ups:

For core lay-up of 600-pair 26-gauge steampeth sheath cable, see Fig. 1.

2.04 Figure 1 illustrates mirror-image PIC cable lay-ups. Each multiunit in these cables has a two-color binder: the green, red, or blue binder indicates position of multiunit within a layer, and black or yellow indicates the layer. In each layer, a unit with a green (yellow or black) binder is the marker unit. The marker units are placed radially over each other, and each one is flanked alternately by red- and then blue-bound multiunits. The binder color which indicates layer alternates between yellow and black, starting with yellow in the outside layer. This follows the color-coding scheme used for multiunit pulp (MUP) cables.

2.05 Multiunit Makeup: Either 100 or 50 pairs make up a multiunit.

- **100-Pair Multiunits**—The 100-pair multiunits consist of four 25-pair primary units. Pairs within each 25-pair primary unit are PIC color coded, and the binders of the primary units in each multiunit are in the standard PIC color sequence: blue, orange, green, and brown (Fig. 2A).

- **50-Pair Multiunits**—The 50-pair multiunits are used only in 900-pair 22-gauge (DHAV) PIC steampeth cable and consist of two 12-pair and two 13-pair primary units. Within each 50-pair multiunit, pairs are identified by pair and binder colors (Fig. 2B).

2.06 Mirror-Image PIC—Extra Pairs: ♦PIC

steampeth cables of 900 pairs and larger have extra pairs to ensure the guaranteed number of good pairs. The extra pairs are positioned in interstices of the outer layer and the number of good extra pairs will equal or exceed the number of defective pairs. A maximum of six extra pairs may be placed in 22-gauge cable. A maximum of 10 extra pairs may be placed in 24- and 26-gauge cables.

2.07 The color code of extra pairs is derived from the tip series of the PIC color code (Table A). In each cable the No. 1 extra pair (white-red) is placed next to the green-yellow marker multiunit.♦

2.08 In assigning pair identification to mirror-image design cables, the factory has to adopt a direction of counting. Looking at the end of the cable, the count is: (1) clockwise—if extra pair 1 (white-red) is to the **right** of the marker multiunit(s) in the outside layer, the cable end will have a band of yellow tape; (2) counterclockwise—if extra pair 1 (white-red) is to the **left** of the marker multiunit(s) in the outside layer, the cable end will have a band of green tape. Note especially that about half the time the counting sequence used to identify defective pairs in mirror-image cables will not be the sequence defined for the installation (clockwise count with back to reference office). Once extra pair substitutions have been arranged, the installation sequence takes over completely and is the one to be used in labeling 710 connectors or splice bundles.

2.09 Missing or Defective Pairs: The pair number of missing or defective pairs is marked on the tag attached at each end of the shipped cable.

2.10 Mirror-Image PIC Cable—Core Lay-Ups: Figure 1 illustrates the available pair sizes and core lay-ups of these cables.

PULP STEAMPETH CABLES**2.11 ♦CDA PULP CABLE—Core Lay-Ups:**

The 22-gauge pulp steampeth cables have a psuedo-**multiunit pulp** (MUP) construction. They differ from the standard MUP cables in that they use the 50-pair AD-type units which do not have 25-pair primary units separated by distinctive binders. The 50-pair units have plastic color-coded binders that follow the MUP coding scheme. Using these unit binders which identify the 50-pair unit count and the predominant pair color within the unit, 25-pair groupings can be recognized for splicing. This procedure is called “psuedo-MUP splicing.” The 900- and 1200-pair 22-gauge cable lay-ups are shown in Fig. 3A. Note that the 1200-pair 22-gauge MUP cable contains two G-BK banded multiunits in the first layer. When counting, both multiunits should be included at the beginning of the counting for the first layer. Namely, when counting clockwise, the count for layer one would begin with the left-hand G-BK multiunit as group 3, then the right-hand G-BK multiunit is counted as group 4. When counting counterclockwise, the right-hand G-BK is group 3, and the left-hand G-BK is group 4.

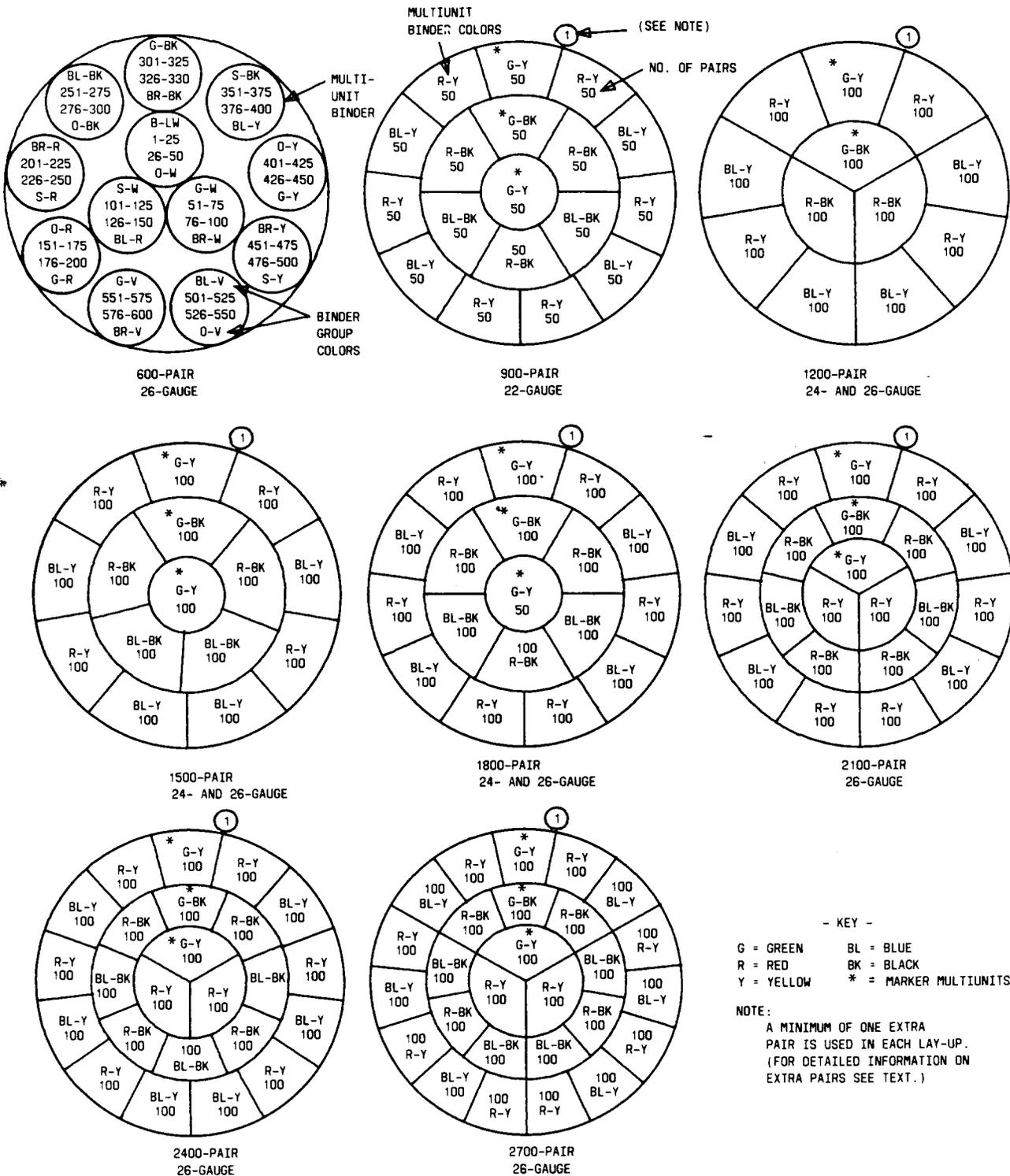
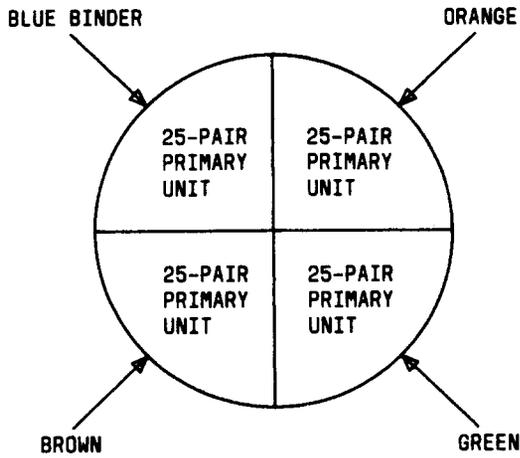
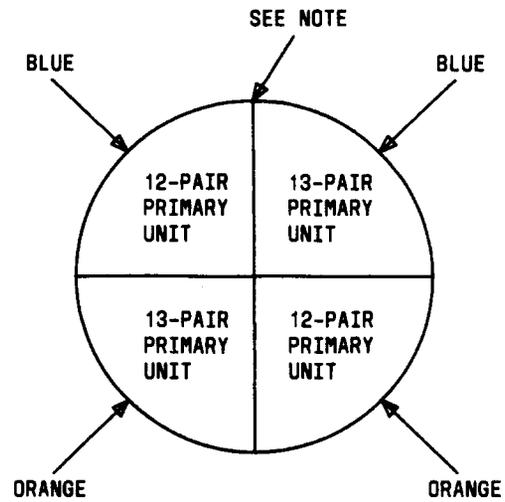


Fig. 1—PIC Steampath Cable Lay-Ups



A. 100-PAIR MULTIUNITS
(USED IN 24 AND 26 GAUGE PIC STEAMPETH)



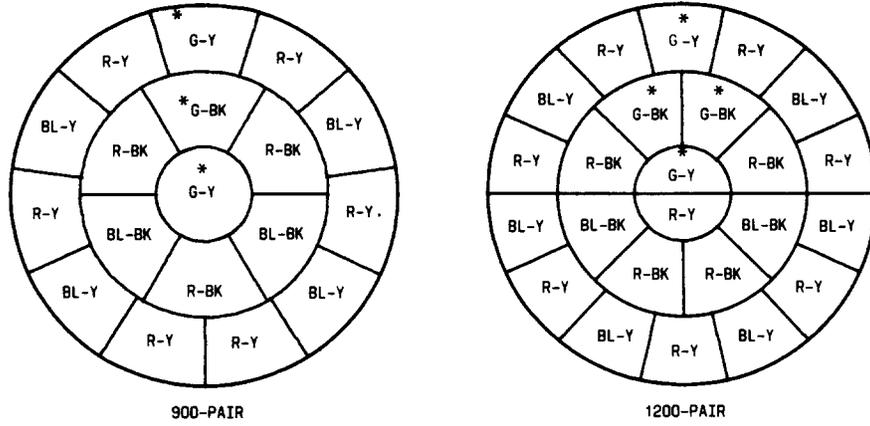
B. 50-PAIR MULTIUNITS
(USED ONLY IN THE PIC STEAMPETH 900 PAIR-22 GAUGE)

Fig. 2—Multiunits Used on PIC Steampeth

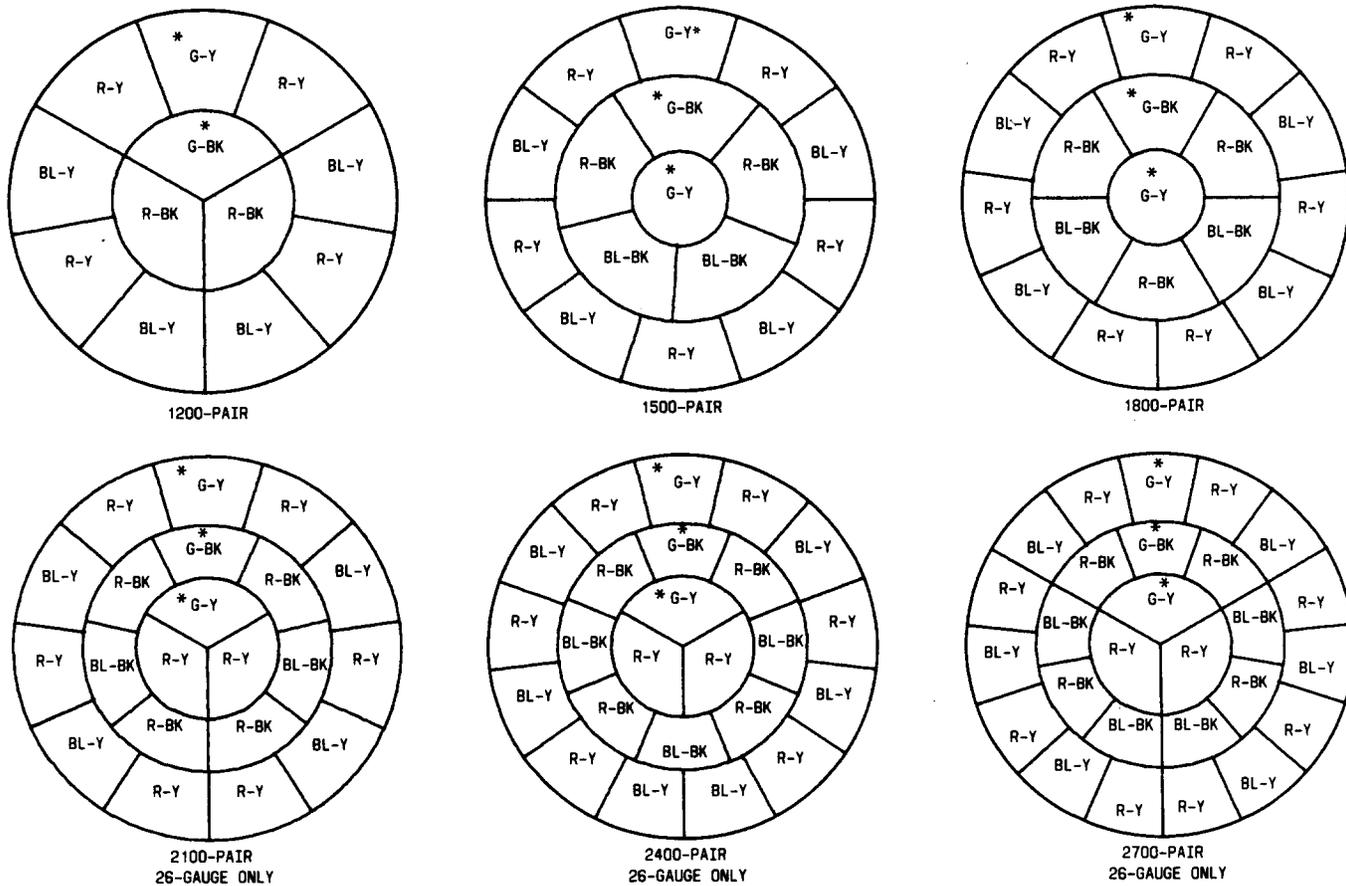
◆TABLE A◆

EXTRA PAIR COLOR CODE

PAIR NO.	COLOR	
	TIP	RING
1	White	Red
2	White	Black
3	White	Yellow
4	White	Violet
5	Red	Black
6	Red	Yellow
7	Red	Violet
8	Black	Yellow
9	Black	Violet
10	Yellow	Violet



A. 22 (CDA) GAUGE MUP CABLE CORES



B. 24 (CDM) AND 26 (CDT) GAUGE MUP CABLE CORES

- KEY -
 R = RED BL = BLUE
 G = GREEN BK = BLACK
 Y = YELLOW * = MARKER MULTIUNITS

Fig. 3—Pulp Steampath Cable Lay-Ups

2.12 CDM and CDT Pulp Cables—Core

Lay-Ups: The 24- and 26-gauge pulp steampeth cables are MUP cables. The MUP design breaks standard pulp construction into multiunits. With the exception of the 1500-pair cable, only 100-pair multiunits consisting of four 25-pair primary units are used. The primary unit binder colors for 100-pair multiunit are blue, orange, green, and brown (Fig. 4A). The 1500-pair cable contains two 50-pair units with binder coding as shown in Fig. 4B. Figure 3B illustrates the core lay-ups for 24- and 26-gauge MUP steampeth cables.◆

3. USE

3.01 PIC and pulp steampeth cables are intended for use in high temperature areas. These designs will significantly reduce cable failures now being experienced by pulp stalpeth cables exposed to steam lines.

3.02 ◆Compared with stalpeth, the steampeth sheath raises high temperature sheath survival from 140°F to 230°F. This improvement will prevent the majority of sheath failures, but it will not prevent insulation failures. At high temperature, the pulp core can fail (for details see Section 626-020-020).

3.03 To overcome these pulp-insulation failures, a well stabilized polypropylene-insulated (PIC) steampeth cable was developed. Because of its better insulation, PIC steampeth is generally recommended. However, on occasion, pulp steampeth may be used if other considerations, such as the need for the maximum number of pairs per duct, outweigh the risk of future pulp insulation failures.◆

4. ELECTRICAL CHARACTERISTICS

4.01 The electrical characteristics of steampeth cables are given in Tables B and C for PIC and Tables D and E for pulp.

5. PHYSICAL CHARACTERISTICS AND REEL LENGTHS**DEFINITIONS**

5.01 Coded Cable Designations: When ordering letter-coded cables, use the assigned letter code. (Cable codes are explained in Section 626-020-011 which is scheduled for reissue as Section

626-020-004.) For example, a steampeth sheath DK-type (PIC) letter-coded cable with 2100 pair, 26-gauge is ordered as ◆DKTV-2100.◆ A steampeth sheath CD-type (pulp) letter-coded with 2100 pairs, 26-gauge is ordered as ◆CDTV-2100.◆

5.02 Maximum Reel Lengths (PIC and Pulp Steampeth Cable):

This is the longest length of cable that can be obtained on the reel and is specified in the length data tables.

STEAMPETH SHIPPING LENGTH POLICY

5.03 Whenever an order requests a specific cut length (ie, "X" type) of steampeth cable, the following three paragraphs will apply.

(a) No reel of cable will be shipped shorter than the length ordered without reference to and concurrence from the operating company. If concurrence to ship a reel shorter than the ordered length is received, the company will be billed only for the length shipped.

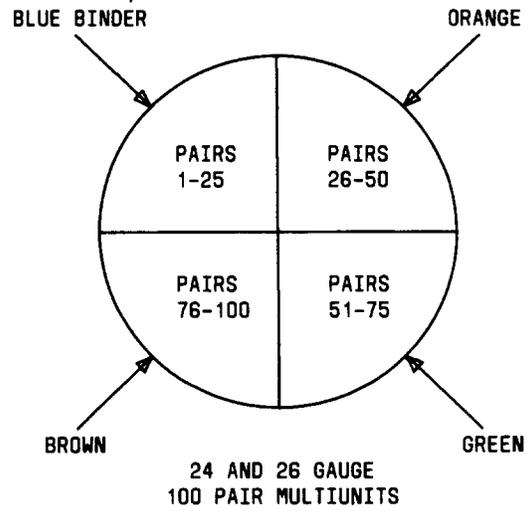
(b) Shipment of reels of cable up to ten feet in excess of ordered lengths may be made without referral to the operating company. When such shipments take place, the customer will be billed only for the length ordered.

(c) It is not expected that cables which exceed this ten-foot tolerance will need to be shipped. If such an occasion does arise, advance concurrence of the operating company will be obtained and the billing will be negotiated.

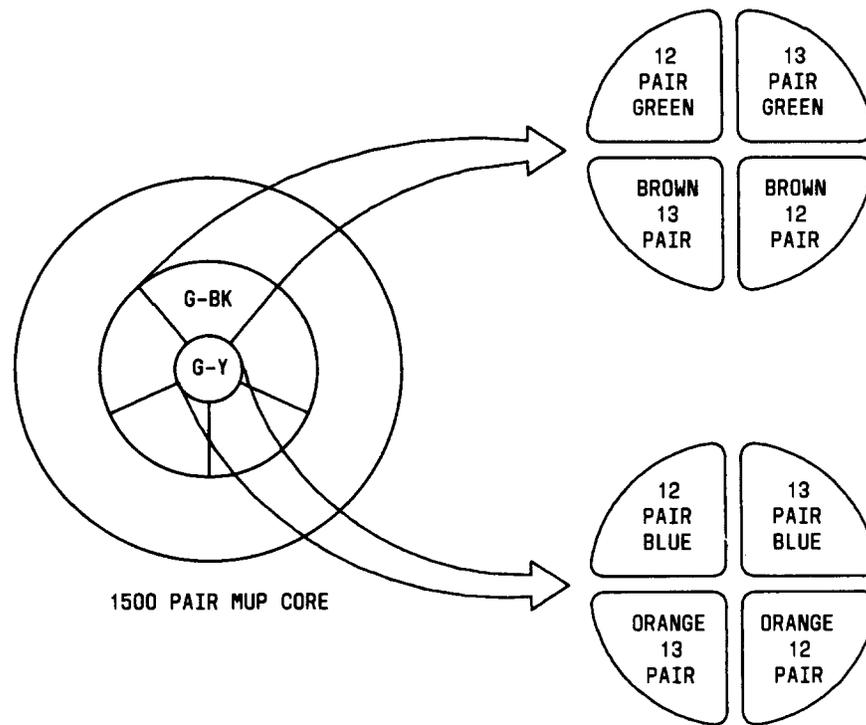
REEL LENGTH DATA

5.04 Information on pair sizes, diameter, weights, and reel lengths of PIC steampeth cables is given in Table F. Pulp steampeth cables are covered in Table G. The diameters and weights shown are approximate.

Note: In reading the length tables, the user will observe a few situations where the maximum length increases as the diameter of the cable increases. This is not an error, but is a phenomenon of the manner in which cable distribution behaves within the limiting reel dimensions, as observed in actual practice.



A. 100-PAIR MUP MULTIUNITS



B. 50-PAIR MULTIUNITS OF 1500 PAIR MUP CABLE

Fig. 4—24- and 26-Gauge MUP Multiunit Construction

TABLE B

PIC STEAMPETH CABLES – ELECTRICAL CHARACTERISTICS

GAUGE AND CABLE CODE	DC RESISTANCE (OHMS/ LOOP MILE AT 68° F)	CAP (nF/MILE AT 60° F 900 OR 1000 Hz)	CONDUCTANCE (μS/MILE AT 900 Hz)	INSULATION RESISTANCE GREATER THAN (MEGOHM MILE)	DIELECTRIC STRENGTH (GREATER THAN)	
					BETWEEN CONDUCTORS (VOLTS DC)	BETWEEN CONDUCTORS AND STEAMPETH SHEATH
22-Ga DHA	173	83	0.2	1000	4000	10,000V dc
24-Ga DKM	274	83	0.2	1000	3000	5,000V dc
26-Ga DKT	440	83	0.2	1000	2400	5,000V dc

TABLE C

PIC STEAMPETH CABLES
ATTENUATION AT 55° F

FREQUENCY (kHz)	dB/1000 FT (APPROX)		
	DHA (22-GA)	DKM (24-GA)	DKT (26-GA)
1	0.34	0.43	0.56
48	1.36	2.04	2.91
96	1.62	2.31	3.25
136	1.80	2.46	3.44
168	1.98	2.61	3.63
208	2.14	2.84	3.80
256	2.38	3.03	4.16
772	4.39	5.60	7.50
1660	6.30	—	—

◆TABLE D◆

PULP STEAMPETH CABLES – ELECTRICAL CHARACTERISTICS

GAUGE AND CABLE CODE	DC RESISTANCE (OHMS/ LOOP MILE AT 68° F)	CAP (nF/MILE AT 60° F 900 OR 1000 Hz)	CONDUCTANCE (μS/MILE AT 900 Hz)	INSULATION RESISTANCE GREATER THAN (MEGOHM MILE)	DIELECTRIC STRENGTH (GREATER THAN)	
					BETWEEN CONDUCTORS (VOLTS RMS)	BETWEEN CONDUCTORS AND STEAMPETH SHEATH
22-Ga CDA	173	83	2	500	350	1000V rms
24-Ga CDM	274	83	2	500	350	1000V rms
26-Ga CDT	440	83	2	500	350	1000V rms

◆TABLE E◆

PULP STEAMPETH CABLES
ATTENUATION AT 55° F

FREQUENCY (kHz)	dB/1000 FT (APPROX)		
	CDA (22-GA)	CDM (24-GA)	CDT (26-GA)
1	0.34	0.43	0.56
48	1.44	2.04	2.94
96	1.76	2.50	3.28
136	1.99	2.82	3.48
168	2.15	3.03	3.71
208	2.40	3.29	3.99
256	2.59	3.61	4.31
772	5.09	6.79	8.20
1600	7.20	—	—

◆TABLE F◆

PIC STEAMPETH CABLE^(Note 1)

CABLE	NO. OF PAIRS	GAUGE	MAXIMUM LENGTH ON 420 REEL (FEET)	OUTSIDE DIAMETER (INCHES)	WEIGHT PER FOOT (POUNDS)
DHAV	900	22	1222	2.87	4.96
DKMV ↓	1200	24	1296	2.61	4.20
	1500	24	1224	2.89	5.18
	1800	24	934	3.14	6.15
DKTV ↓	600	26	4525	1.53	1.44
	1200	26	2241	2.09	2.73
	1500	26	1731	2.30	3.34
	1800	26	1648	2.50	3.96
	2100	26	1306	2.68	4.57
	2400	26	1218	2.84	5.17
	2700	26	1014	3.00	5.78

Note 1: All steampeth cables are shipped under air pressure. Pulling eyes and bond wires are furnished on factory shipment when specified on the order.

♦TABLE G♦

PULP STEAMPETH CABLE (Note 1)

CABLE CODE	NO. OF PAIRS	GAUGE	MAXIMUM LENGTH ON 420 REEL (FEET)	OUTSIDE DIAMETER (INCHES)	WEIGHT PER FOOT (POUNDS)
CDAV	900	22	1317	2.76	4.71
	1200	22	935	3.16	6.18
CDMV (Note 2)	1200	24	1395	2.55	4.02
	1500	24	1326	2.82	4.93
	1800	24	1021	3.08	5.88
CDTV (Note 2)	1200	26	2247	2.11	2.65
	1500	26	1736	2.32	3.25
	1800	26	1652	2.52	3.84
	2100	26	1309	2.70	4.42
	2400	26	1220	2.86	5.01
	2700	26	1018	3.04	5.61

Note 1: All steampeth cables are shipped under air pressure. Pulling eyes and bond wires are furnished on factory shipments when specified on the order.

Note 2: MUP construction.