

CABLE AND WIRE
TYPES OF WIRE

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1. GENERAL

1.1 Scope of Section

1.1.1 This section describes the codes of bulk wire, hook up wire, and power wire used on equipment and apparatus and lists the sizes and conductor arrangement available for each type.

1.1.1.1 As a matter of information, the following drawings specify the wire gauge and type of insulation used for various systems.

These drawings will be listed in -92 job specifications and may be requisitioned if not furnished to jobs.

No. 1 Crossbar	ED-27114-01
No. 5 Crossbar	ED-27 042-01
Crossbar Tandem	ED-27127-01
No. 4A and 4M-Type Tool Switching System	ED-68870-01
SxS	ED-32264-10
No. 1 and No. 2 ESS	ED-1A153-01
No. 1A SPS	ED-1C113-01
No. 1 TSPS	ED-1B000-01

1.2 Manufacture Discontinued Codes

1.2.1 In recent years many wire codes have been rerated to Manufacture Discontinued (MD). Refer to Table A for (MD) codes and the standard replacement wire code.

1.3 KS - Hookup Wire Codes

1.3.1 Wire generally procured from outside suppliers is covered by KS-specifications. Table-B covers KS-Coded wire which is available for use along with a brief description and make up of the wire.

1.4 Power Wire

1.4.1 Several KS-codes of wire normally used for power wire applications are listed in Table-C along with pertinent information notes.

1.4.2 Operating Voltage: The maximum operating voltages shown in the tables are intended to represent the potential between wires or between a wire and ground. When voltages on both sides of ground are employed, wire should be insulated for the maximum potential difference between them.

2. CONSTRUCTION OF BULK WIRE

2.1 Conductors

2.1.1 The conductors in bulk wire used for equipment wiring are of solid or stranded copper of different sizes from 8 to 32 gauge. (Refer to Table D.)

2.2 Abbreviations of Wire Insulations

2.2.1 Insulation abbreviations are formed with the following letters having the fixed meaning indicated.

A	= Acetate Yarn
Ab	= Cellulose Aceto butyrate tape
B	= Braid or Braided
C	= Cotton
D	= Double (Serving)

This section includes material from BSP's 800-610-152, 005-150-101, and 800-612-161, dated 1982, 1977, and 1972 respectively, by American Telephone and Telegraph Company
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	= Enamel or Enameled
	= Polyester Enamel
	= Nylon Enamel
	= Polytetrafluoroethylene (Teflon)
	= Polyurethane Enamel
	= Polyurethane Nylon Enamel
	= Vinyl Acetal Enamel
	= Glass
alon	= Chlorosulphonated Polyethylene
c	= Irradiated Polyvinyl Chloride
	= Lacquered
ane	= Polyethylene Terephthalate
	= Nylon Yarn
	= Polyethylene (Extruded)
	= Polyvinyl Chloride (Extruded)
	= Rubber
	= Silk
	= Tinned
zel	= Ethylene-Tetrafluoroethylene
	= Polytetrafluoroethylene

1.1 In forming complete abbreviations for the insulation on wire, the following principles apply.

1.1.1 In forming the abbreviations for wire insulation, the letters have been arranged from left to right in the order that insulation was applied to the conductor.

EXAMPLE: DACL means two servings of acetate yarn, one serving of cotton, lacquered.

1.1.2 For wires having a braided covering, the letter immediately preceding the letter B in the abbreviation indicates the material from which the braid is made.

EXAMPLE: DNCCB means two servings of nylon, one serving of cotton and a cotton braid. CBCB means a double cotton braid.

1.1.3 If neither D nor B appear in an abbreviation, a single serving of insulation is implied with no braid involved.

2. Bulk Wire Colors

2.1 Bulk wire is colored similar to wires in switchboard cables, as explained in Section 102 of handbook No. 8, but the colors are not codified since the colors of the individual wires are given on the wiring diagrams.

CODES OF WIRE

Letter and Number Designations

1. Wires used in equipment modification are normally coded. A code consists of one letter, or in some cases two letters, followed by a numeral (alpha-numeric).

1.1 The letter, or letters, designate the type of wire from a functional standpoint, i.e., for a particular use. For example, type BU wire is generally used for switchboard and local cables. (Refer to Table

D.)

3.1.1.2 The numerical portion of the code indicates the chronological order of design changes, which have been omitted on drawings and in specifications. This practice has been followed throughout this section to avoid the necessity of changing the section each time the wire vintage changes.

3.2 List of Standard Codes

3.2.1 Table D lists and defines the standard codes of bulk wire used in equipment work and shows the principle use, kind of conductor and conductor insulation for each type. The gauges available are also shown in this Table.

4. REQUISITIONS FOR BULK WIRE

4.1 Coded Wire

4.1.1 Since it is not practicable to publish and maintain a complete piece part list of wires, wires may be requisitioned by indicating the COMCODE number, gauge, type, color, and conductor arrangement (single, pair, triple, etc.) specified on the wiring diagram.

EXAMPLE: 500 ft., 102337870 DT22P W&BL
Dist. Fr. Wire (500 Ft. Spool).

4.1.2 In case a code has been superseded, the former or lower numbered code will be furnished until the stock of that wire is exhausted.

4.2 Noncoded Wire

4.2.1 When wiring diagrams, which have not been changed to show the type of wire, are used for ordering, indicate the gauge, insulation abbreviation, color and conductor arrangement (single, pair, triple, etc.) specified.

EXAMPLE: 100', 22DSCL, red-green, single.

4.2.2 The latest available code of wire will automatically be furnished on this type of requisition.

5. CONVERSION COLORS

5.1 Through technology, wire codes have been changed on a regulated basis. Recently BG and BW types of wire have been converted to DP2 (IPVC) type wire. Due to manufacturing problems, DP2 type wire does not utilize three colors in its code CD, therefore, a color conversion chart has been created. Refer to Tables E1 and E2.

6. TABLES

6.1 Table A - Manufacture Discontinued Wire Replacement Codes

Manufacture Discontinued Wire Code	Standard Replacement Wire Code	Manufacture Discontinued Wire Code	Standard Replacement Wire Code
C3	DP2	AK3	KS13385-Shielded per KS-13587
G3	DP2	AM2	AM3
H3	KS-19101	AR1	DR1
K2	DP2*	BG1	DP2
M3	DP2	BK3	20GA. - P5
N2	DP2	BK3	16GA. - KS-13385 Shielded per KS-13587
W	DT	BM1	DD1
W	DT	BS1	DP2 Wire Shielded per X-17198
AA3	KS-13385	BW2	DP2
AB3	KS13385	DJ1	None
AF2	DP2	DM1	DP2
AG2	KS-19101	DW1	DP2

*Indicates 22 Gauge Wire Only.

Table B - KS-Hookup Wire

KS CODE	INSULATION TYPE	WIRE GAUGE		MAX VOLTAGE		NOTES
		STRANDED	SOLID	DC	AC	
5L-1	PVC-CBL	8-24	14-24	600	600	
1	PVC-N	20-26	20-26	300	200	
1	PVC-CBL	20-28	-	400	300	
5	PVC	20-26	20-26	300	200	
4	TFE	20-32	20-32	300	200	
5L-1	TFE	8-26	12-26	1000	600	
5L-2	TFE	8-26	12-26	600	400	1
6L-1	TFE	16-26	16-26	300	300	2
6L-2	TFE	10-26	10-26	600	600	2
6L-3	TFE	10-16	10-16	300	300	
2	TFE	28	30	135	100	2
9	PVC-N	12-26	12-26	600	600	2
66L-1	Milene	-	26-30	-	-	4
66L-2	Milene	-	26-30	-	-	5
67L-1, 3	Milene	-	26-30	-	-	3, 4
67L-2	Milene	-	26-30	-	-	3, 5
71L-1	Tefzel	-	26-30	-	-	2, 4
71L-2	Tefzel	-	26-30	-	-	2, 5
47L-1	Irradiated Polymeric	4-26	12-26	600	400	
47L-2	Irradiated Polymeric	4-26	12-26	600	400	1

35:

Same as L-1 except shielded with a tinned copper braid and PVC outer jacket.

Silver Coated Conductors

(2) KS-21336 twisted together to make a pair

Solid (OFHC) Oxygen Free High Conductivity Wire

Solid Alloy PD 135 Wire

6.3 Table C - KS-Power Wire Codes

KS CODE	WIRE GAUGE	CONDUCTOR INSUL.	VOLTAGE		NOTES
			AC	DC	
19167	No. 10, 12, 14 16 & 18 Stranded	PVC	600	600	Hard Service Cord (Type ST0). Has either Black, Yellow, or Grey PVC Jacket.
19168	No. 14, 16 & 18 Stranded	PVC	300	300	Junior Hard Service Cord (Type SJTO)-Black or Yellow PVC Jacket.
20275	No. 18 Stranded	PVC	300	300	Type (SVTO) available in Black or Yellow PVC Jacket.
5482-01	No. 14 to 750 MCM	Rubber	600	600	Used for power wiring.
1338 5L-2,4	No. 6 to 12	PVC-CBL	600	600	General Power Wiring.
20189	No. 12 to 750 MCM	Rubber	600	600	Stranded Aluminum Power Wire (Fabric Covered).
20195	No. 8 to 1000 MCM	Rubber	600	600	Stranded, Class 1 Flexible Power Wire (Neoprene Covered).
20747	No. 14 to 750 MCM	PVC	600	600	Power Distribution, Lighting, Appliance Circuits, etc. Use only in conduit or where there is no mechanical stress on the wire.
20921	No.8 to 500 MCM	Hypalon	600	600	High Temperature Insulation. Replaces KS-20195.
21115	No. 14 to 500 MCM	Hypalon	600	600	Used in the 140V DC Distributing System.
21338	No. 6 & 12 Pairs Only	Milene	-	-	Power Distribution Wiring in ESS Systems.
22641	No. 14 & No. 12	PVC	600	600	THWN and THHN Classification. Use in conduit or raceways only.

Table D - Western Electric Coded Wire

RECOMMENDED USE	CONDUCTOR				NOTES
	TYPE	SIZE	INSUL		
General Strapping	Solid	16-24	CBCB		1
Transmission, Special Applications	Solid	22-24	IPVC		2,3
Cross-Connections	Solid	24	PVC		4
Used Where Wire is Subject to Mechanical Injury	Solid	14-19	PVC CBL		
Transmission	Solid	22,24	PE		2,5
Used Where Wire is Subject to Mechanical Injury	Solid	20-24	PVC CBL		6
General Use in Cable, LC, LW, and X-Connections	Solid	22,24	PVC		4,7
General Use in Cable LC and LW	Solid	26	PVC		4,7
Telephone Sets-High Flexibility	Stranded	22,24,27	PVC		
Telephone Sets-High Flexibility	Stranded	27	PVC		8
Transmission & Special Applications	Solid	24	PE		9
General Use in Cable LC, LW, SW and Strapping	Solid	20-26	IPVC		10
SXS Bank Multiple	Stranded	24	IPVC		11
D.F. X-Connection Wire	Solid	20-24	IPVC		10
No. 1 ESS D.F. X-Connect Wire	Solid	22	IPVC		12

PS:

Push back type insulation; not recommended for new designs.

Braided tinned copper shield with PVC Jacket.

Used for leads marked "U" on circuit drawing - being replaced by "BF" type wire.

wire wrap/non-solder applications.

Used for leads marked "EU" on circuit drawing.

BH-2 wire has a high grade insulation; it has a semirigid base covered with an outer skin of IPVC.

Not to be used as surface wiring.

Copper conductor with thin coating of tin to hold strands together.

Has a silver coated braided shield over conductors and used a "Picturephone" Distribution Frame - Cross connect wire. (Same as BF wire.)

- Heat resistant and used for both soldered and solderless wrap connections.

- Has poor stripping characteristic and not recommended for general use.

- Untinned copper, steel wire with IPVC insulation.

6.5 Table E1 - Color Code Conversion Chart

22 GAUGE WIRE (SINGLES)			
BG or BW COLOR	DP2 COLOR	BG or BW COLOR	DP2 COLOR
BL-NOV-R	BL-R	R-BR-W	R-BR
O-NOV-R	O-R	R-BR-S	R-BR
G-NOV-R	G-R	R-S-W	RS
BR-NOV-R	BR-R	BK-BL-W	BK-BL
R-BL-W	R-BL	R-S-W	R-S
R-BL-O	R-BL	BK-BL-W	BK-BL
R-BL-G	R-BL	BK-O-G	BK-O
R-BL-BR	R-BL	BK-O-BR	BK-O
R-BL-S	R-BL	BK-O-S	BK-O
R-O-G	R-O	BK-O-W	BK-O
R-O-BR	R-O	BK-G-BR	BK-G
R-O-S	R-O	BK-G-S	BK-G
R-O-W	R-O	BK-G-W	BK-G
R-G-BR	R-G	BK-BR-W	BK-BR
R-G-S	R-G	BK-BL-BR	BK-BL
R-G-W	R-G	22 GAUGE WIRE	PAIRS
R-BK-BL	R-BK	BL & BL-NOV-R	BL & BL-R
R-BK-O	R-BK	O & O-NOV-R	O & O-R
R-BK-G	R-BK	G & G-NOV-R	G & G-R
R-BK-BR	R-BK	BR & BR-NOV-R	BR & BR-R
R-BK-S	R-BK		

Table E2 - Color Conversion Chart

24 GAUGE WIRE (SINGLES)			
or BW COLOR	DP2 COLOR	BG or BW COLOR	DP2 COLOR
BL-W	R-BL	R-BK-BR	R-BK
BL-O	R-BL	R-BK-S	R-BK
BL-G	R-BL	R-BR-W	R-BR
BL-BR	R-BL	R-BR-S	R-BR
BL-S	R-BL	R-S-W	R-S
BL-G	R-O	BK-BL-W	BK-BL
BL-BR	R-O	BK-O-G	BK-O
BL-S	R-O	BK-O-BR	BK-O
BL-W	R-O	BK-O-S	BK-O
BL-BR	R-G	BK-O-W	BK-O
BL-S	R-G	BK-G-BR	BK-G
BL-W	R-G	BK-G-S	BK-G
BL-BL	R-BK	BK-G-W	BK-G
BK-O	R-BK	BK-BR-W	BK-BR
BK-G	R-BK	R-BK-W	R-BK

arrows due to complete revision.

son for Reissue:

ate and revise and add Tables.

Engineering Planning Manager
(Installation)