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Cancelled
See -7B

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ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: SPECIFICATION FOR L-824 UNDERGROUND ELECTRICAL CABLES FOR AIRPORT LIGHTING CIRCUITS

1. PURPOSE. This advisory circular describes the specification requirements for underground electrical cables for airport lighting circuits and is published by the Federal Aviation Administration for the guidance of the public.

2. CANCELLATION. AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits dated 4 November 1963.

3. REFERENCES. The following American Society for Testing and Materials (ASTM), Insulated Power Cable Engineers Association (IPCEA), and military specifications, as referred to hereinafter, of the issues in effect on the date of application for qualification (paragraph 8) are applicable to this specification. In case of conflict between this specification and the applicable specifications, this specification shall govern.

   a. ASTM Specification. Copies of ASTM specifications may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103, at published price.

      (1) B3 - Soft or Annealed Copper Wire.

      (2) B8 - Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

      (3) B33 - Tinned Soft or Annealed Copper Wire for Electrical Purposes.

      (4) B189 - Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes.

      (5) D353 - Natural Rubber Performance Insulation for Wire and Cable, 60 C Operation.

      (6) D470 - Testing Rubber and Thermoplastic Insulated Wire and Cable.

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(7) D572 - Accelerated Aging of Vulcanized Rubber by the Oxygen-Pressure Method.

(8) D574 - Ozone-Resisting Insulation for Wire and Cable.

(9) D752 - Heavy-Duty Black Neoprene Sheath for Wire and Cable.

(10) D755 - Synthetic Rubber Insulation for Wire and Cable, 60 C Operation.

(11) D1352 - Ozone-Resisting Butyl Rubber Insulation for Wire and Cable.

b. IPCEA Specifications may be obtained from National Electrical Manufacturers Association, 155 East 44th Street, New York, New York 10017.

(1) IPCEA S-19-81 Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

(2) IPCEA No. S-66-524 Cross Linked Polyethylene for Power Cable Interim Standards Nos. 1 and 2.

c. Military Specification MIL-C-38359 (USAF) Cable, Power, Electrical Airport Lighting, Cross Linked Polyethylene, may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

4. EXPLANATION OF REVISION. This revision adds cross-linked polyethylene cable to the previous types of cables and eliminates 3,000-volt cable. It incorporates the basic requirements of Specification MIL-C-38359, adding additional wire sizes, wire stranding with cross-linked polyethylene insulation.

5. TYPES.

a. Type A. Single and multiple conductor cable with 600 volt "Performance" type insulation and an overall neoprene jacket.

b. Type B. Single and multiple conductor cable with 5,000 volt "Ozone Resistant" insulation and an overall neoprene jacket.

c. Type C. Single or multiple conductor cable with 600 volt or 5,000 volt, cross-linked polyethylene insulation. Multiple conductor cables will have a neoprene jacket applied overall.

6. DETAIL REQUIREMENTS OF CABLE.

The cable shall be a first-grade commercial product, free from defects in material and workmanship which might affect either life or performance. Manufacture the cable in accordance with requirements of Figure 1.

7. SAMPLES AND TESTS.

a. Supply samples of insulated conductors and completed cable in such lengths as required by the testing laboratory for the performance of the tests.

b. Perform the tests shown in Figure 2.

8. QUALIFICATION.

a. The manufacturer shall furnish a sample, or samples to a testing laboratory to be tested as described in paragraph 7 to obtain certification regarding the ability to manufacture cable meeting the requirements of this specification. The testing laboratory shall be a laboratory acceptable to the Federal Aviation Administration, Airports Service, Washington, D.C., 20590. The manufacturer shall furnish two copies of the testing laboratory's reports to the Airports Service for review and approval consideration. Upon approval of test reports which show satisfactory certification of compliance, the Airports Service will list the name of the qualified manufacturer and a description of their cable in Advisory Circular 150/5345-1B, Approved Airport Lighting Equipment. The cost of the testing shall be borne by the manufacturer offering the material for qualification.

b. Manufacturers need qualify only for such types, voltages, or sizes of cables as they propose to furnish. If a manufacturer proposes to furnish all types, all voltages, and all AWG sizes covered by this specification, the procedure listed below must be followed:

(1) For unshielded cable, separate qualification samples of single and multiple (3 or 4 conductors) cable in the 600 volt category for Type "A" or "C" cable shall be furnished for testing.

(2) If separate qualification samples of single and multiple (3 or 4 conductors) shielded cable in the 600 volt, and 5,000 volt category for Type "A", "B", or "C", are submitted for the initial test, approval will also be granted for nonshielded cables in the same classification without the manufacturer submitting nonshielded samples for test.

TYPE		A	B	C	
VOLTAGE RATING		600 V	5000 V	600 V	5000 V
CONDUCTOR	Material, Copper, ASTM B3	X	X	X	X
	Coating ASTM B33 or B189	X	X		
	Stranding ASTM-B8	Class B (7 wires)	Class C (19 wires)	Class B (7 wires)	Class C (19 wires)
	Conductor Shielding-Conforming to good industry practice		Optional		Optional
	AWG Wire Size	#12-4	#8-4	#12-4	#8-4
INSULATION - MATERIAL					
	Performance Grade Conforming to ASTM-D353 or D755	X			
	Ozone Resistance Conforming to ASTM D574 or D1352		X		
	Cross-Linked Polyethylene Conforming to IPCEA No. S66-524			X	X
	Thickness-Min. Average Wall Thickness for Wire Size				
	#12-10	.047"		.060"	
	#8-6-4	.063"	.155"	.060"	
	#8				.110"
	#6-4				.110"
	Minimum Thickness 90% AV				
	Maximum Thickness 105% AV				
	Temperature Rating	60 C	75 C-ASTM D574 80 C-ASTM D1352	90 C	90 C
SHIELDING - Flat tinned copper tape at least .025" thick applied in accordance with IPCEA S-19-81			Optional		Optional on Multi. Cond.
IDENTIFICATION MARKER - NEMA Color Code		X	X	X	X

FIGURE 1. CABLE DETAILS

TYPE	A	B	C	
VOLTAGE RATING	600 V	5000 V	600 V	5000 V
CABLING - 2-conductor type cable may be flat, twin parallel, multi-conductor, laid-up round with interstices filled with suitable materials - Tape used to hold conductors together IPCEA S-19-81	Multi	Multi	Multi	Multi
JACKET - MATERIAL - IPCEA S-19-81-Heavy Duty Black Neoprene or ASTM D752	X	X	On Multi Only	On Multi Only
THICKNESS - Min Thickness 80% of value shown				
Single Conductor				
12-10	.045"		None	None
8	.045"	.060"	On 1/C	On 1/C
6-4	.045"	.060"		
Single Conductor metallic shield				
Diam under Jacket				
.425" or less	.045	.045		
.426" - 0.700	.060	.060		
.701" - 1.050"	.075	.075		
1.051" - 1.500"	.095	.095		
1.500" - 2.000"	.110	.110		
Multi Conductor Diam under Jacket				
.425" or less	.080	.080	.045	.045
.426" - 0.700"	.095	.095	.060	.060
.701" - 1.050"	.110	.110	.080	.080
1.501" - 2.500"	.140	.140	.110	.110
	.155	.155	.140	.140
Cable surface marking, spaced at least every 2', must not affect smoothness of jacket. Manufacturer's name or trademark, conductor size, voltage rating - Identification FAA-L-824 Type (A, B, or C)	X	X	X	X

FIGURE 1. CABLE DETAILS

TYPE	Type A	Type B	Type C	
VOLTAGE RATING	600 V	5000 V	600 V	5000 V
ELECTRICAL TESTS				
AC High Voltage ASTM D470	3.5 KV	14.0 KV	3.5 KV	11.5 KV
DC High Voltage Test ASTM D470		42.0		
Insulation Resistance ASTM D470 or IPCEA S-19-81	X	X	X	X
Corona Level Test ASTM D470, IPCEA S-19-81		5 KV Shielded		
Copper Resistance ASTM B33 or B3	X	X	X	X
Surface Resistivity IPCEA S-19-81				X
PHYSICAL TESTS				
Copper Coating ASTM B33, B189	X	X		
Insulation Thickness - ASTM D470 or IPCEA S-19-81	X	X	X	X
Jacket Thickness - IPCEA S-19-81	X	X	Multi	Multi
Wire Size	X	X	X	X
Bend Tests (See Note 1)	X	X	X	X
Oxygen Pressure ASTM D353, D574, D752, D755	X	X	X	X
Air Oven D353, D574, D752, D1352	X	X	X	X
Oil Immersion ASTM D752	X	X	X	X
Ozone Resistance D470 - Meets requirements of ASTM D574, D1352 IPCEA S-19-81				X
Water absorption D353, D574, D755 or D1352	X	X	X	
Tensile, Elongation and Aging as required in Material Spec.	X	X	X	X

FIGURE 2. CABLE TESTS

NOTE I. Cold Bend Test: Perform the cold bend test by maintaining a cable sample in a cold temperature chamber for the time indicated. Immediately after removing from the chamber, bend the cable around the size of the mandrel shown below for the required number of turns. On completion of the bending, no cracks or breaks shall be visible to the unaided eye.

TYPE CABLE	CHAMBER TEMP C	TIME IN CHAMBER	DIAM OF CABLE	NO OF TURNS	TURNS PER MINUTE	SIZE MANDREL IN CABLE DIAM
All Size A & B	-18 C	1 hour	Less than 1"	2½	6	5
			1.001" - 1.5"	2	6	6
			1.5" or more	1½	6	8
Multi. Cond. Type C						
Single Cond. Type C	-40 C	24 hours		5	5	

c. Qualification of one AWG size conductor will be acceptable as proof of compliance for all other AWG sizes of conductors having the same type insulation and the same voltage rating. Adequate lengths of samples, plainly marked as to type, voltage, size, and number of conductors, shall be forwarded to the testing laboratory.

d. At any time after approval has been granted under the above conditions, a certified copy of factory test reports on the latest production run of any type of cable produced under this specification shall be made available by the manufacturer upon written request by the Federal Aviation Administration, Airports Service, Washington, D.C. 20590.

e. Production testing in the factor shall be made as required by IPCEA S-19-81.

9. HOW TO OBTAIN ADDITIONAL COPIES OF THIS PUBLICATION. Obtain additional copies of this circular, AC 150/5345-7A, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits, from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.

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