

INCH-POUND

MIL-DTL-24643/31E

22 August 2002

SUPERSEDING

MIL-C-24643/31D

22 November 1994

DETAIL SPECIFICATION SHEET

CABLE, ELECTRICAL, TYPE LS2SU (INCLUDING VARIATION LS2SUS)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and the issue of MIL-DTL-24643 listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation.

This cable can be manufactured in three variations: LS2SU and LS2SUS (double overall shield).

REQUIREMENTS:

Qualification required.

Construction (non-watertight)

- First - Copper conductor, uncoated, ASTM B 286, AWG size No. 22,7 strands.
- Second - Separator may be used at manufacturer's option where required to provide free-stripping insulation.
- Third - Crosslinked polyethylene insulation. Nominal wall thickness 0.013 inch; wall thickness may vary from nominal as necessary, in order for completed cable to meet the specified electrical requirements. Colored insulation, one black and one white conductor for each pair.
- Fourth - Two conductors (one black and one white) cabled together with a nominal lay of 2.5 inches to form a pair.
- Fifth - Binder tape over each pair, applied at manufacturer's option, applied helically with overlap.
- Sixth - Braided shield of AWG No. 34 or No. 36 tin coated copper. Braid angle of 20 to 40 degrees; minimum coverage of 85 percent.

Construction (non-watertight) (continued)

- Seventh - Shield insulation of two polyester tapes, per NEMA FI 4, outer tape sealed. An alternate shield insulation may consist of one polyester tape, per NEMA FI 4, plus an extruded jacket of a suitable transparent material, minimum average thickness of the transparent material, 0.003 inch. The standard identification code shall be applied by method 2 on the inner tape.
- Eighth - The required number of pairs (see table I) cabled together with a lay not greater than 24 times the pitch diameter of the layer. Cabling sequence shall be consecutive, starting with no. 1, from the center outward. Fillers shall be used as necessary to make a firm, well rounded assembly.
- Ninth - Binder tape, applied helically with overlap.

Construction variant for type LS2SU

- Tenth - Cross-linked polyolefin jacket. (See table I for thickness).

Construction variant for type LS2SUS

- Tenth - Braided shield of tin coated copper.
- Eleventh - Spirally wrapped 0.002 inch thick polyethylene (polyester film) separator tape with 25 percent minimum overlap.
- Twelfth - Braided shield of tin coated copper.
- Thirteenth - Binder tape applied helically with overlap.
- Fourteenth - Cross-linked polyolefin jacket. (See table I for thickness).

TABLE I. Details.

Military part no. ^{1/} M24643/31	Size ^{2/}	Number of pairs	Cable jacket thickness min avg (inch)	Diameter over shielded core (inch nom)	Overall diameter (inches)			
					TYPE LS2SU		TYPE LS2US	
					min	max	min	max
-01UN	3	3	0.050	0.399	0.480	0.520	0.540	0.580
-02UN	7	7	0.050	0.531	0.610	0.660	0.670	0.720
-03UN	10	10	0.050	0.617	0.770	0.830	0.830	0.890
-04UN	14	14	0.063	0.756	0.860	0.930	0.920	0.990
-05UN	19	19	0.063	0.796	0.970	1.040	1.030	1.100
-06UN	24	24	0.063	0.885	1.120	1.210	1.180	1.270
-07UN	30	30	0.063	0.982	1.190	1.280	1.250	1.340
-08UN	37	37	0.063	1.030	1.290	1.380	1.350	1.440
-09UN	44	44	0.063	1.198	1.460	1.550	1.520	1.610
-10UN	61	61	0.075	1.262	1.660	1.740	1.720	1.800

^{1/} When double overall shield is required, see MIL-DTL-24643 for configuration of part number.

^{2/} Type LS2SU and LS2SUS.

EXAMINATION AND TESTS:

Basic electrical:

Requirements:

Conductor Resistance - ohms/1000 feet at 25°C, maximum	17.37
Voltage withstand - volts, root mean square, minimum	
Conductor to shield	2000
Shield to shield (pair shields only)	500
Shield to shield (LS2SUS, overall shields only).....	200
Insulation resistance - Megohms -1000 feet minimum	
Conductor to conductor	500
Component shield to shield.....	100
Shield to shield (LS2SUS only).....	100
Jacket flaws (LS2SUS only).....	No failure
Conductor and shield continuity.....	No failure

Group A:

Visual and dimensional.....	No failure
Capacitance	
Mutual capacitance - 1 kilohertz (kHz), pF/ft, maximum	30
Capacitance unbalance - percent maximum	8
Characteristic impedance - at 1MHz, ohms.....	75 ± 5

Group B:

Cross-linked proof test (percent, maximum)	
Insulation	50
Jacket (When tested at 200°C).....	50
Attenuation - at 3 MHz, decibels per 100 FT, maximum.....	3
Tear - pounds per inch thickness, minimum (ASTM D 470).....	35
Physicals (unaged)	
Insulation	
Tensile strength - lb/in ² , minimum	1800
Elongation - percent, minimum	250
Jacket (cable)	
Tensile strength - lb/in ² , minimum	1300
Elongation - percent, minimum	160

Group C:

Physicals (aged)	
Insulation	
Air oven	
Tensile strength - percent of unaged, minimum	80
Elongation - percent of unaged minimum	80
Jacket (cable)	
Air oven	
Tensile strength - percent of unaged, minimum	60
Elongation - percent of unaged minimum	60
Hot oil immersion	
Tensile strength - percent of unaged, minimum	50
Elongation - percent of unaged minimum	50
Shrinkage	No failure
Heat distortion - percent of unaged, maximum	30
Permanence of printing (jacket) -	
cycles, minimum.....	125
Shield - conformance to material, construction and coverage	No failure
Surface transfer impedance (type LSMUS only)	
Milliohms per meter, maximum	700
EMP response time - dB, minimum.....	60

Group D:

Flame propagation (cable)	No failure
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QUALIFICATION INSPECTION:

Qualification inspection shall include basic electrical, all of groups A, B, C and D, plus the following:

	<u>Requirements</u>
Aging and compatibility (cable) ($125 \pm 5^{\circ}\text{C}$)	No failure
Abrasion resistance (jacket) - scrapes, minimum	75
Acid gas equivalent - percent, maximum	
Jacket	2
Fillers	2
Insulation	18
Shield insulation	2
Halogen content - percent, maximum	
Jacket	0.2
Fillers	0.2
Immersion (jacket)	
Tensile strength - percent of unaged, minimum	50
Elongation - percent of unaged, minimum	50
Smoke index, maximum	
Jacket	25
Fillers	45
Insulation	45
Toxicity index, maximum	
Jacket	5
Fillers	5
Insulation	1.5
Durometer (jacket) - (type A) hardness, minimum.....	80
Weathering (jacket)	No failure

UNIT ORDERING LENGTHS:

<u>Size</u>	<u>Feet (nominal)</u>
3 through 30	1000
37 through 61	500

Custodians:
 Army - MI
 Navy - SH

Preparing Activity:
 Navy - SH
 (Project 6145-2308-029)

Review Activities:
 Army - AV, CR
 Navy - CG, EC
 DLA - CC