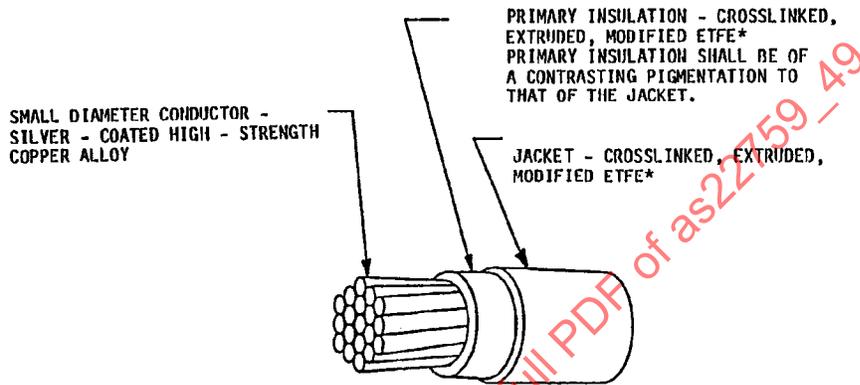


RATIONALE

THE INDUSTRY HAS IDENTIFIED FLUORIDE OFFGASSING AS A POTENTIAL SERIOUS ISSUE IN ENCLOSED ENVIRONMENTS SUCH AS SPACECRAFT AND MISSILES. THE EVOLUTION OF FLUORIDE GAS CAN ACCELERATE CORROSION OF METAL SURFACES AND ETCHING OF OPTICS. IT CAN ALSO ACCELERATE COPPER OXIDATION. THE INDUSTRY HAS ALSO IDENTIFIED ADDITIONAL AEROSPACE CRITICAL TESTS SINCE THE LEGACY CROSSLINKED MODIFIED ETFE DETAILED SPECIFICATIONS SHEETS WERE ORIGINATED. THESE TESTS INCLUDE WET ARC PROPAGATION RESISTANCE, DRY ARC PROPAGATION RESISTANCE, DYNAMIC CUT THROUGH, SCRAPE ABRASION, UV LASER MARKING AND UV LASER CONTRAST AFTER THERMAL AGING AND THE REQUIREMENTS HAVE BEEN INCLUDED IN THIS DETAILED SPECIFICATION SHEET.

NOTICE

THE REQUIREMENTS FOR ACQUIRING THE PRODUCT DESCRIBED HEREIN SHALL CONSIST OF THIS SPECIFICATION SHEET AND THE ISSUE OF THE FOLLOWING SPECIFICATION LISTED IN THAT ISSUE OF THE DEPARTMENT OF DEFENSE QUALIFIED PRODUCTS DATABASE (QPD) SPECIFIED IN THE SOLICITATION: AS22759



* ETFE - Ethylene-tetrafluoroethylene copolymer

FIGURE 1 – GENERAL CONFIGURATION

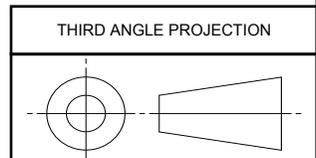
TABLE 1 – CONSTRUCTION DETAILS

PART NO. 1/	WIRE SIZE	STRANDING (NUMBER OF STANDS X AWG GAUGE OF STRANDS) 2/	DIAMETER OF STRANDED CONDUCTOR (INCHES)		FINISHED WIRE		
			(MIN)	(MAX)	RESISTANCE AT 20 °C (68 °F) (OHMS/1000 FT) MAX	DIAMETER (INCHES)	WEIGHT (LBS/1000 FT) (MAX)
M22759/49-26-*	26	19 X 38	.0175	.0204	44.8	.040 * .002	1.7
M22759/49-24-*	24	19 X 36	.0225	.0244	28.4	.045 * .002	2.3
M22759/49-22-*	22	19 X 34	.0185	.0314	17.5	.050 * .002	3.3
M22759/49-20-*	20	19 X 32	.0365	.0395	10.7	.058 * .002	4.8

1/ PART NUMBER: THE ASTERISKS IN THE PART NUMBER COLUMN, TABLES 1 AND 2, SHALL BE REPLACED BY COLOR CODE DESIGNATORS IN ACCORDANCE WITH MIL-STD-681. EXAMPLES: SIZE 20, WHITE-M22759/49-20-9; WHITE WITH ORANGE STRIPE – M22759/49-20-93. PRINTING OF COLOR CODE DESIGNATOR ON SURFACE OF WIRE INSULATION IS NOT REQUIRED.

2/ CONDUCTOR SHALL CONFORM TO MIL-DTL-29606A, TYPE SCA1 80 MICROINCH SILVER PLATED COPPER CONDUCTOR

SAE values your input. To provide feedback on this Technical Report, please visit <http://www.sae.org/technical/standards/AS22759/49>



CUSTODIAN: AE-8/AE-8D

PROCUREMENT SPECIFICATION: AS22759



AEROSPACE STANDARD

WIRE, ELECTRICAL, FLUOROPOLYMER-INSULATED, CROSSLINKED MODIFIED ETFE, LOW FLUORIDE, NORMAL WEIGHT, 80 MICROINCH SILVER-COATED HIGH-STRENGTH COPPER ALLOY. 200 °C. 600 VOLT

SAE AS22759/49
SHEET 1 OF 4

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user." SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

SAE AS22759/49

ISSUED 2011-07

TABLE 2 – PERFORMANCE DETAILS

PART NO.	BEND TESTING			
	MANDREL DIAMETER (INCHES (±3%))		TEST LOAD (LBS) (±3%)	
	CROSSLINKING PROOF, IMMERSION AND LIFE CYCLE TESTS	COLD BEND TEST	CROSSLINKING PROOF, IMMERSION AND LIFE CYCLE TESTS	COLD BEND TEST
M22759/49-26-*	.375	1.00	.500	.500
M22759/49-24-*	.375	1.00	.750	1.00
M22759/49-22-*	.500	1.00	1.00	1.00
M22759/49-20-*	.500	1.00	1.50	1.00

RATINGS:

TEMPERATURE RATING: 200 °C (392 °F) MAXIMUM CONTINUOUS CONDUCTOR TEMPERATURE.

VOLTAGE RATING: 600 VOLTS (RMS) AT SEA LEVEL.

THIS INSULATION SYSTEM HAS BEEN USED IN AEROSPACE APPLICATIONS USING 115 VOLTS (PHASE TO NEUTRAL), 400 HERTZ AC AND 28 VOLTS DC. VERIFICATION OF THE SUITABILITY OF THIS PRODUCT FOR USE IN OTHER ELECTRICAL SYSTEM CONFIGURATIONS IS THE RESPONSIBILITY OF THE USER.

ADDITIONAL REQUIREMENTS:

SILVER PLATED CONDUCTOR: SHALL MEET QUALITY CONFORMANCE TEST FOR CONDUCTOR MATERIAL AND REQUIREMENTS OF MIL-W-29606A AS DEFINED FOR SCA1 TYPE CONDUCTORS.

BLOCKING: 230 °C ±3 °C (446 °F ± 5.4 °F).

COLOR: IN ACCORDANCE WITH MIL-STD-104, CLASS 1; WHITE PREFERRED. CONFORMITY OF COLOR TO THE LIMITS OF MIL-STD-104 SHALL NOT BE REQUIRED AFTER CROSSLINKING PROOF TEST OR LIFE CYCLE OVEN EXPOSURE.

COLOR STRIPING OR BANDING DURABILITY: 125 CYCLES (250 STROKES), (MIN), 500 GRAMS WEIGHT.

CROSSLINKING PROOF TEST: 7 HOURS AT 300 °C ±3 °C (572 °F ±5.4 °F). QUALITY CONFORMANCE TEST, GROUP II. REQUIREMENTS AND PROCEDURES AS FOR LIFE CYCLE EXCEPT FOR TIME AND TEMPERATURE.

DIELECTRIC TEST AFTER IMMERSION: 2500 VOLTS (RMS), 60 HZ.

DRY ARC PROPAGATION RESISTANCE (TEST REQUIRED FOR INITIAL QUALIFICATION ONLY): TEST IN ACCORDANCE WITH AS4373 METHOD 508. MEASURE THE DAMAGE OF THE BUNDLE ALONG THE AXIS. THE WIRE IS ACCEPTABLE IF THE FOLLOWING ARE MET:

1. A MINIMUM OF 70 WIRES PASS THE DIELECTRIC TEST.
2. TWO WIRES OR LESS FAIL THE DIELECTRIC TEST IN ANY ONE BUNDLE.
3. ACTUAL DAMAGE TO THE WIRE IS NOT MORE THAN 1.0 INCHES IN ANY TEST BUNDLE.

DYNAMIC CUT-THROUGH (TEST REQUIRED FOR INITIAL QUALIFICATION ONLY). MINIMUM AVERAGE DYNAMIC CUT THROUGH (LB) SHALL BE AS FOLLOWS:

WIRE SIZE	23 °C ± 5 °C	70 °C ± 5 °C	150 °C ± 5 °C	200 °C ± 5 °C
26	6	4	2	1
20	20	12	3	2

FLAMMABILITY: QUALITY CONFORMANCE TEST, GROUP II. FOR REQUIREMENTS AND PROCEDURES SEE BELOW.

TEST IN ACCORDANCE WITH AS4373, METHOD 801.

REQUIREMENTS:

DURATION AFTER-FLAME	3.0 SECONDS (MAXIMUM)
FLAME TRAVEL	3.0 INCHES (MAXIMUM))
NO FLAMING OF TISSUE	

FLOURIDE OFFGASSING TEST: (GROUP 1 QUALITY CONFORMANCE TEST) FLUORIDE EXTRACTION LEVEL SHALL NOT EXCEED 20 PPM IN ACCORDANCE WITH AS4737 METHOD 608.

 An SAE International Group	AEROSPACE STANDARD	SAE AS22759/49 SHEET 2 OF 4
	WIRE, ELECTRICAL, FLUOROPOLYMER-INSULATED, CROSSLINKED MODIFIED ETFE, LOW FLUORIDE, NORMAL WEIGHT, 80 MICROINCH SILVER-COATED HIGH-STRENGTH COPPER ALLOY, 200 °C, 600 VOLT	

HIGH FREQUENCY SPARK TEST: (WHEN USED IN LIEU OF THE IMPULSE DIELECTRIC TEST) 5.7 KILOVOLTS (RMS). 100 PERCENT TEST

HUMIDITY RESISTANCE: AFTER HUMIDITY EXPOSURE, WIRE SHALL MEET THE REQUIREMENTS FOR INITIAL INSULATION RESISTANCE.

IDENTIFICATION OF PRODUCT: REQUIRED. SEE AS22759 FOR RESTRICTIONS.

IDENTIFICATION DURABILITY: 125 CYCLES (250 STROKES) (MIN), 500 GRAMS WEIGHT.

IMMERSION: FOR PROCEDURE SEE BELOW.

IMPULSE DIELECTRIC TEST: 8.0 KILOVOLTS (PEAK), 100 PERCENT TEST.

INSULATION RESISTANCE, INITIAL:

5000 MEGOHMS FOR 1000 FEET (MIN).

INSULATION THICKNESS:

0.003 INCH (MIN) FOR PRIMARY INSULATION.
0.004 INCH (MIN) FOR OUTER JACKET.
0.008 INCH (MIN) FOR TOTAL INSULATION

LIFE CYCLE: 500 HOURS AT 230 °C ±3 °C (446 °F ±5.4 °F). DIELECTRIC TEST, 2500 VOLTS (RMS), 60 HZ. PROCEDURE TO USE MANDRELS COATED WITH POLYTETRAFLUOROETHYLENE IN THE FORM OF EITHER ENAMEL OR WRAPPED TAPE, SUCH THAT THE DIAMETER OF THE MANDRELS, AFTER COATING, STILL CONFORM TO THE REQUIREMENTS OF PERFORMANCE DETAILS, TABLE 2.

LOW TEMPERATURE (COLD BEND): BEND TEMPERATURE, -65 °C ±3 °C (-85 °F ±5.4 °F).

DIELECTRIC TEST, 2500 VOLTS (RMS), 60 HZ.

NEEDLE ABRASION: (INITIAL QUALIFICATION AND RETENTION OF QUALIFICATION) WIRE SIZE 20 ONLY. WHEN TESTED IN ACCORDANCE WITH AS4373, METHOD 301, THE AVERAGE CYCLES TO FAILURE ON 8 READINGS, AFTER DROPPING THE HIGHEST AND LOWEST VALUE OF THE 10 READINGS TESTED, SHALL NOT BE LESS THAN THE VALUES LISTED BELOW WHEN APPLYING A 1.10 LB ± 0.01 LB LOAD.

TEMPERATURE (°C (°F))	CYCLES TO FAILURE (MIN).
21-25 (67-77)	1000
68-72 (153-163)	500
148-152 (297-307)	50

PHYSICAL PROPERTIES OF INSULATION: PULLED AT 2 INCHES PER MINUTE. PRIMARY INSULATION SHALL BE SEPARATED FROM THE OUTER JACKET FOR DETERMINATION OF PRIMARY INSULATION TENSILE STRENGTH AND ELONGATION.

TENSILE STRENGTH, 5000 LBF/IN₂ (MIN) FOR PRIMARY INSULATION, 5000 LBF/IN₂ (MIN) FOR TOTAL INSULATION (PRIMARY INSULATION AND JACKET).

ELONGATION, 125 PERCENT (MIN) FOR PRIMARY INSULATION. 75 PERCENT (MIN) FOR TOTAL INSULATION (PRIMARY INSULATION AND JACKET).

SHRINKAGE: 0.125 INCH (MAX) AT 230 °C ±3 °C (446 °F ±5.4 °F).

SMOKE: 250 °C ±5 °C (482 °F ±9 °F); NO VISIBLE SMOKE.

SOLDERABILITY: ALL CONDUCTORS SHALL BE TESTED IN ACCORDANCE WITH AS4373, METHOD 105 WITHOUT STEAM AGING.

SPARK TEST OF PRIMARY INSULATION: 1500 VOLTS (RMS), 60 HZ OR HIGH FREQUENCY (3000 HZ).

SURFACE RESISTANCE: 500 MEGOHMS - INCHES (MIN), INITIAL AND FINAL READINGS.

THERMAL SHOCK RESISTANCE: OVEN TEMPERATURE, 200 °C ±3 °C (392 °F ±5.4 °F).

MAXIMUM CHANGE IN MEASUREMENT, 0.060 INCH.

UV LASER MARKING: (GROUP I QUALITY CONFORMANCE TEST) TEST IN ACCORDANCE WITH AS4373, METHOD 1001. CONTRAST SHALL BE A 75 PERCENT MINIMUM AVERAGE ON SIX READINGS.

UV LASER CONTRAST AFTER THERMAL AGING: (INITIAL QUALIFICATION AND RETENTION OF QUALIFICATION) WIRE SIZE 20 ONLY. PREPARE SAMPLE IN ACCORDANCE WITH AS4373 METHOD 1001. PLACE SAMPLE IN AN AIR CIRCULATING OVEN AT 230 °C ±2 °C (554 °F ±3.6 °F) FOR 168 HOURS. MINIMUM AVERAGE CONTRAST AFTER AGING SHALL NOT BE LESS THAN 60 PERCENT.

 An SAE International Group	AEROSPACE STANDARD	SAE AS22759/49 SHEET 3 OF 4	
	WIRE, ELECTRICAL, FLUOROPOLYMER-INSULATED, CROSSLINKED MODIFIED ETFE, LOW FLUORIDE, NORMAL WEIGHT, 80 MICRINCH SILVER-COATED HIGH-STRENGTH COPPER ALLOY, 200 °C, 600 VOLT		