FEDERAL SUPPLY CLASS
6145

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 ASLO ACCELERATE COPPER OXIDATION. THE INDUSTRY HAS ALSO IDENTIFIED ADDITIONAL AEROSPACE CRITICAL TESTS SINCE THE LEGACY CROSS-LINKED MODIFED ETFE DETAILED SPECIFICATIONS SHEETS WERE ORIGNATED. THESE TESTS INCLUDE 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

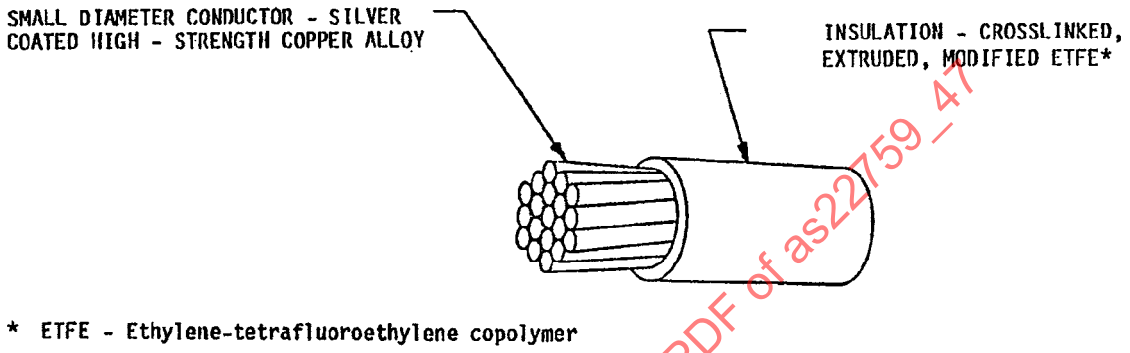


FIGURE 1 – GENERAL CONFIGURATION

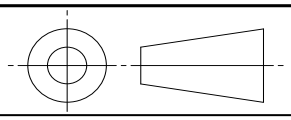
TABLE 1 – CONSTRUCTION DETAILS

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)
M22759/47-30-*	30	7 X 38	.0105	.0124	117.4	.024 * .002	0.66
M22759/47-28-*	28	7 X 36	.0135	.0154	74.4	.027 * .002	0.91
M22759/47-26-*	26	19 X 38	.0175	.0204	44.8	.032 * .002	1.4
M22759/47-24-*	24	19 X 36	.0225	.0244	28.4	.037 * .002	2.0
M22759/47-22-*	22	19 X 34	.0185	.0314	17.5	.043 * .002	2.9
M22759/47-20-*	20	19 X 32	.0365	.0394	10.7	.050 * .002	4.4

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-M22759/47-20-9; WHITE WITH ORANGE STRIPE – M22759/47-20-93. 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

THIRD ANGLE PROJECTION



ISSUED 2011-08

CUSTODIAN: AE-8/AE-8D

PROCUREMENT SPECIFICATION: AS22759

SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

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

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
M22759/47-30-*	.250	.375	.125	.500
M22759/47-28-*	.250	.375	.125	.500
M22759/47-26-*	.375	.500	.125	.500
M22759/47-24-*	..375	.500	.250	1.00
M22759/47-22-*	.500	.750	.375	1.00
M22759/47-20-*	.500	.750	.500	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: NOT REQUIRED.

DYNAMIC CUT-THROUGH: NOT REQUIRED.

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	

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

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: 0.005 INCH (MIN)

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: NOT REQUIRED.

PHYSICAL PROPERTIES OF INSULATION: PULLED AT 2 INCHES PER MINUTE.

TENSILE STRENGTH, 5000 LBF/IN2 (MIN).
ELONGATION, 75 PERCENT (MIN).

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: NOT APPLICABLE

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.

WET ARC PROPAGATION RESISTANCE: NOT REQUIRED.

WICKING: NOT APPLICABLE.

WIRE LENGTH REQUIREMENTS: SCHEDULE B.

WRAP BACK TEST.: OVEN TEMPERATURE, 313 °C ±3 °C (595 °F ±5.4 °F).

IMMERSION PROCEDURE:

A 24-INCH SPECIMEN, FOR EACH TEST FLUID LISTED IN AS22759 , SHALL HAVE ITS DIAMETER MEASURED AND SHALL THEN BE IMMERSED TO WITHIN 6 INCHES OF EACH END FOR THE TIME AND TEMPERATURE SPECIFIED. DURING IMMERSION, THE RADIUS OF BEND OF THE WIRE SHALL BE NOT LESS THAN 14 NOR MORE THAN 35 TIMES THE SPECIFIED MAXIMUM DIAMETER OF THE WIRE UNDER TEST. UPON REMOVAL FROM THE TEST FLUID, THE SPECIMEN SHALL BE WIPED DRY AND THEN REMAIN FOR 1 HOUR IN FREE AIR AT ROOM TEMPERATURE. THE DIAMETER SHALL BE MEASURED AND COMPARED TO THE INITIAL DIAMETER. THE INSULATION SHALL BE REMOVED FOR A DISTANCE OF 1/2 INCH FROM EACH END OF THE SPECIMEN. THE SPECIMEN SHALL THEN BE SUBJECTED TO THE BEND TEST AND DIELECTRIC TEST SPECIFIED IN THE PROCEDURE FOR LIFE CYCLE TESTING.

QUALIFICATION OF WIRE:

FOR QUALIFICATION, A SOURCE IS REQUIRED TO SUBMIT DATA ON QUALITY CONFORMANCE TESTS AND ANY FINISHED WIRE TESTS AS REQUIRED BY THE QUALIFICATION AUTHORIZATION LETTER. ALL OTHER TESTING WILL BE PERFORMED BY THE QUALIFYING ACTIVITY AT THE SOURCE'S EXPENSE.