
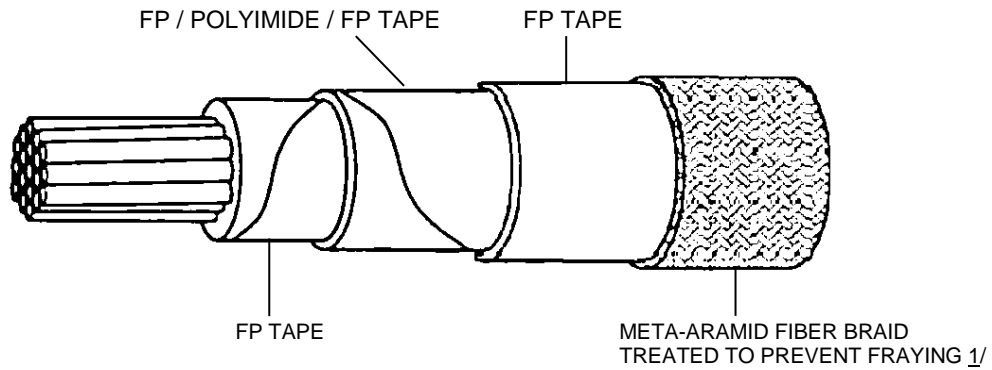
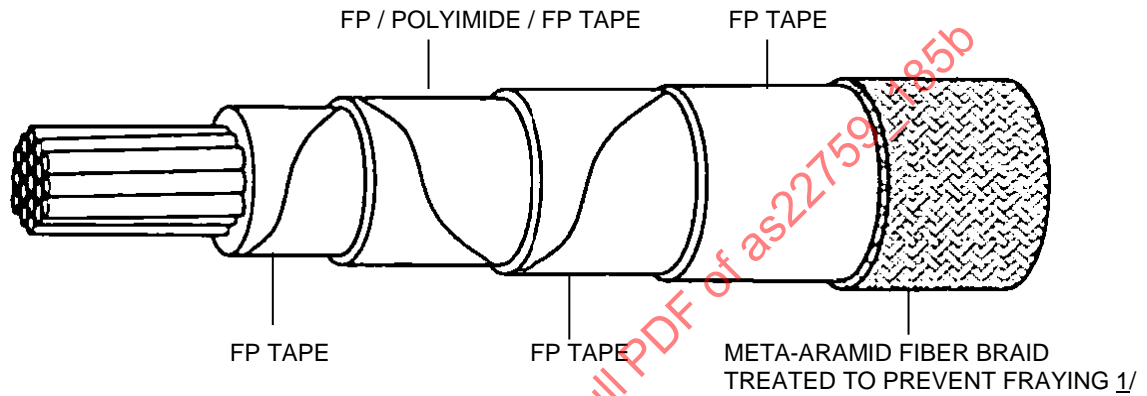


REV. B		FEDERAL SUPPLY CLASS 6145	
RATIONALE			
AS22759™/185		<p>SPECIFICATION UPDATED TO INCLUDE AS29606 CONDUCTOR REQUIREMENTS, ROHS RESTRICTIONS AND AS22759 MODIFICATIONS. THIS CHANGE ALSO INCREASES THE MAXIMUM WEIGHT REQUIREMENTS FOR WIRE SIZES 8 THROUGH 02 TO ACCOUNT FOR INCREASED CIRCULAR MIL AREA (CMA) ADOPTED IN AS29606. AS22759 IS A CONVERTED MILITARY SPECIFICATION ORIGINALLY NOTED AS MIL-W-22759 CREATED IN 1971. CONDUCTOR REQUIREMENTS WERE ORIGINALLY DEFINED BY ASTM B3, B298, AND B355 FOR TIN, SILVER, AND NICKEL PLATE RESPECTIVELY. THESE SPECIFICATIONS CONTROLLED THE CONDUCTOR BY ESTABLISHING STRAND SIZE, CONDUCTOR SIZE, AND MAXIMUM DCR (DIRECT CURRENT RESISTANCE). BY THE LATE 1980'S, CONDUCTOR PRODUCERS WERE PRODUCING TIGHT TOLERANCE CONDUCTORS WHICH WERE MADE AT THE MINIMUM DIMENSIONAL AND MAXIMUM DCR LIMITS OF THE SPECIFICATION TO REDUCE THE WEIGHT (MASS) OF THE FINALLY INSULATED WIRE. BY THE EARLY 1990'S THE TIGHT TOLERANCE CONDUCTORS WERE PREVALENT THROUGHOUT AEROSPACE. ABOUT THE SAME TIME, LARGE GAUGE SIZE CONDUCTORS (SIZE 8 THROUGH 4/0) STARTED EXHIBITING CRIMP FAILURES IN TERMINAL LUGS MOUNTED ON AIRCRAFT GENERATORS. SINCE THESE CIRCUITS ROUTED PRIMARY ELECTRICAL POWER FROM THE GENERATOR TO THE MAIN POWER DISTRIBUTION CENTERS, CRIMP DEGRADATION RESULTING IN DISRUPTION OF ELECTRICAL POWER CAUSED SIGNIFICANT CONCERN. SEVERAL OEM'S AS WELL AS NAVY AND AIR FORCE LABORATORIES INVESTIGATED THE FAILURES AND DETERMINED THAT THE FAILED CRIMPS WERE DUE TO A COMBINATION OF LOW CMA, HIGH VIBRATION, AND THERMAL CYCLING. ADDITIONAL TESTING ESTABLISHED MINIMUM CMA LEVELS WHICH WOULD PREVENT THE CRIMP FAILURES. THESE NEW LIMITS WERE OFFERED TO ASTM, BUT REJECTED. NAVAIR THEN PRODUCED AN ENGINEERING POSITION LETTER (EPL) TO MANDATE THE INCREASED CMAS ON STRANDING USED IN AS22759 CONSTRUCTIONS. NAVAIR THEN CREATED MIL-W-29606 WHICH WAS INTENDED TO REPLACE THE ASTM SPECIFICATIONS AS THE REQUIRED CONDUCTOR SPECIFICATION. BEFORE THE MIL-W-29606 COULD BE ADDED TO MIL-W-22759, THE SPECIFICATION TRANSITION AND ADOPTION TOOK PLACE CONVERTING THE DOCUMENTS FROM MILITARY SPECIFICATIONS TO AS DOCUMENTS IN THE 1999 TO 2000 TIME FRAME. SINCE THE EPL NO LONGER HAD LEGAL STANDING AFTER THE CONVERSION, WIRE PRODUCERS DID NOT HAVE TO ABIDE BY THE RESTRICTIONS WHICH ALLOWED THIS ISSUE TO CREEP BACK INTO THE 'PRODUCTS FROM TIME TO TIME. IN 2011, THE SAE AE-8D COMMITTEE OPENED A PROJECT TO UPDATE THE AS22759 AND ITS ASSOCIATED DETAILED SPECIFICATION SHEETS. WHEN LOOKING AT THIS ISSUE, THE COMMITTEE DECIDED TO ADOPT MIL-W-29606 (NOW AS29606) AND REPLACE THE ASTM REQUIREMENTS WITH THE AS29606 REQUIREMENTS. SINCE THE DIAMETER RANGE OF THE CONDUCTOR STRANDS NEEDED TO SHIFT SLIGHTLY TO THE RIGHT TO MEET THE NEW MINIMUM CMA REQUIREMENTS, OVERALL PRODUCT WEIGHT MAXIMUMS SHIFTED ABOUT 3 TO 5%. THE COMMITTEE EVALUATED SEVERAL METHODS OF INCORPORATING THIS CHANGE INCLUDING CANCELING AND SUPERSESSION, BUT THE END USERS DID NOT WANT TO CHANGE PART NUMBERS FOR PRODUCTS WHICH HAVE BEEN USED IN AEROSPACE AND INDUSTRY FOR OVER 40 YEARS AND IS CURRENTLY ON THOUSANDS OF DRAWINGS. SINCE THESE PRODUCTS ARE PRIMARILY USED FOR PRIMARY POWER DISTRIBUTION FROM THE GENERATORS TO THE MAIN DISTRIBUTION PANELS, THE WEIGHT INCREASE TO THE ELECTRICAL INTERCONNECT SYSTEM IS CONSIDERED INSIGNIFICANT. SINCE THIS CHANGE DOES AFFECT THE MAXIMUM WEIGHT LIMITS FOR SIZES 8 THROUGH 4/0, END USERS SHOULD VERIFY THAT THE NEW WEIGHT RANGES MEET THE DESIGN REQUIREMENTS OF LEGACY APPLICATIONS.</p> <p>AS22759/185B HAS BEEN REAFFIRMED TO COMPLY WITH THE SAE FIVE-YEAR REVIEW POLICY.</p> <p style="text-align: center;">NOTICE</p> <p>THE COMPLETE REQUIREMENTS FOR PROCURING THE PRODUCT DESCRIBED HEREIN SHALL CONSIST OF THIS DOCUMENT AND THE LATEST ISSUE OF AS22759.</p>	
SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.		THIRD ANGLE PROJECTION	
CUSTODIAN: AE-8/AE-8D		PROCUREMENT SPECIFICATION: NONE	
		<p>AEROSPACE STANDARD</p> <p>WIRE, ELECTRICAL, POLYTETRAFLUOROETHYLENE/ POLYIMIDE INSULATED, SMOOTH SURFACE, NORMAL WEIGHT, TIN-COATED COPPER CONDUCTOR, 150 °C, 600 VOLTS ROHS</p>	
		<p>AS22759™/185</p> <p>SHEET 1 OF 5</p>	
		<p>REV. B</p>	



SIZE 8 THROUGH 6



SIZE 4 THROUGH 04

FP – FLUOROCARBON POLYMER MODIFIED POLYTETRAFLUOROETHYLENE (PTFE)
CONDUCTOR – STRANDED TIN COATED COPPER

- ^{1/} BRAID: BRIGHT AROMATIC POLYAMIDE YARN, 200 DENIER, 100 FILAMENTS, TIGHTLY FORMED, UNIFORM IN APPEARANCE, TREATED WITH A CLEAR FINISHER COATING. THE FINISHER COATING SHALL BE COMPATIBLE WITH THE TEMPERATURE RATING AND PERFORMANCE REQUIREMENTS OF THE INSULATED WIRE. BRAID SHALL GRIP THE UNDERLYING INSULATION SUFFICIENTLY AS TO NOT SLIDE ALONG THE TAPE SURFACE DURING NORMAL HANDLING.

FIGURE 1 - AS22759/185 CONFIGURATION

TABLE 1 - CONSTRUCTION DETAILS

PART NO. 1/	WIRE SIZE	CONDUCTOR 4/				FINISHED WIRE 3/				
		STRANDING (NUMBER OF STRANDS X SIZE GAUGE OF STRANDS)	DIAMETER (IN)		RESISTANCE AT 20 °C (68 °F) (OHMS/1000 FEET MAX)	DIAMETER (IN)		WEIGHT (LB/1000 FEET) 2/		
			MIN	MAX		MIN	MAX	MIN	TARGET	MAX
M22759/185-8-*	8	133 X 29	.158	.169	.701	.192	.213	59.0	61.1	63.2
M22759/185-6-*	6	133 X 27	.198	.212	.445	.231	.254	91.8	94.3	96.8
M22759/185-4-*	4	133 X 25	.250	.268	.280	.288	.313	144	148	152
M22759/185-2-*	2	665 X 30	.320	.340	.183	.356	.389	220	229	238
M22759/185-1-*	1	817 X 30	.360	.380	.149	.400	.433	268	277	286
M22759/185-01-*	0	1045 X 30	.395	.425	.116	.432	.475	339	352	365
M22759/185-02-*	00	1330 X 30	.440	.475	.091	.487	.530	422	442	462
M22759/185-03-*	000	1665 X 30	.500	.540	.071	.542	.585	539	554	569
M22759/185-04-*	0000	2109 X 30	.565	.605	.056	.602	.655	654	675	696

- 1/ PART NUMBER: THE PREFERRED COLOR IS DARK GREEN WITH A COLOR DESIGNATOR OF 5D. EXAMPLE: SIZE 2 DARK GREEN – AS22759/185-2-5D. WHITE IS AN ACCEPTABLE ALTERNATIVE WITH A COLOR DESIGNATOR OF 9.
- 2/ THE ACCEPTABLE VALUE FOR THE CPK FOR THE FINISHED WIRE WEIGHT LISTED SHALL BE 1.3, USING A NORMAL (GAUSSIAN) DISTRIBUTION TO OBTAIN THOSE CPK VALUES.
- 3/ THE WIRE CONSTRUCTION SHALL HAVE A SMOOTH POLYTETRAFLUOROETHYLENE (PTFE) OUTER LAYER WITH COMPLETE BONDING BETWEEN THE HOMOGENEOUS LAYERS.
- 4/ CONDUCTOR SHALL CONFORM TO AS29606 TYPE TCC SMALL DIAMETER TIN COATED COPPER CONDUCTOR FOR WIRE SIZES 8 THROUGH 4 AND GENERAL PURPOSE FOR WIRE SIZES 2 THROUGH 0000.

REQUIREMENT: ALL REQUIREMENTS SHALL CONSIST OF THIS DOCUMENT AND THE LATEST ISSUE OF AS22759.

1. WIRE CONSTRUCTION:

WIRE CONSTRUCTION SHALL BE IN ACCORDANCE WITH FIGURE 1 AND TABLES 1, 2, 3, AND 4.


TABLE 2 - WIRE INSULATION MATERIAL

TAPE CODE	THICKNESS (NOM)	MATERIAL
1	.0020	.0005 (FP)/.0010 (POLYIMIDE)/.0005 (FP)
2	.0020	FP (SKIVED)
3	.0030	FP (UNSINTERED)
4	.0010	FP (SKIVED)

TABLE 3 - TAPE OVERLAP REQUIREMENTS 1/

WIRE SIZE	WRAP 1		WRAP 2		WRAP 3		WRAP 4		NOMINAL WALL THICKNESS (MILS) 2/
	TAPE CODE	PERCENT OVERLAP	TAPE CODE	PERCENT OVERLAP	TAPE CODE	PERCENT OVERLAP	TAPE CODE	PERCENT OVERLAP	
		MIN MAX		MIN MAX		MIN MAX		MIN MAX	
8	4	20.5 35.0	1	50.5 55.0	3	67.0 71.0			13.2
6	4	20.5 35.0	1	50.5 55.0	3	67.0 71.0			13.2
4	2	20.5 35.0	1	50.5 55.0	3	50.5 54.0	3	50.5 54.0	16.2
2	2	20.5 35.0	1	50.5 55.9	3	50.5 54.0	3	50.5 54.0	16.2
1	2	20.5 35.0	1	50.5 55.0	3	50.5 54.0	3	50.5 54.0	16.2
1/0	2	20.5 35.0	1	50.5 55.0	3	50.5 54.0	3	50.5 54.0	16.2
2/0	2	20.5 35.0	1	50.5 55.0	3	50.5 54.0	3	50.5 54.0	16.2
3/0	2	20.5 35.0	1	50.5 55.0	3	50.5 54.0	3	50.5 54.0	16.2
4/0	2	20.5 35.0	1	50.5 55.0	3	50.5 54.0	3	50.5 54.0	16.2

- 1/ WRAP 1 IS THE INNERMOST TAPE WHICH IS IN CONTACT WITH THE CONDUCTOR. WRAPS 2, 3, AND 4 ARE PROGRESSIVELY FURTHER AWAY FROM THE CONDUCTOR CORE.
- 2/ NOMINAL WALL THICKNESS DOES NOT INCLUDE THE POLYAMIDE BRAID THICKNESS.

	AEROSPACE STANDARD	AS22759™/185 SHEET 3 OF 5	REV. B
	WIRE, ELECTRICAL, POLYTETRAFLUOROETHYLENE/ POLYIMIDE INSULATED, SMOOTH SURFACE, NORMAL WEIGHT, TIN-COATED COPPER CONDUCTOR, 150 °C, 600 VOLTS ROHS		

2. WIRE PERFORMANCE RATING:

TEMPERATURE RATING: 150 °C (302 °F) MAXIMUM CONDUCTOR CONTINUOUS 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.

3. MATERIALS AND PHYSICAL PROPERTIES:

SEE AS22759 FOR MATERIAL REQUIREMENT. MATERIALS USED IN THE MANUFACTURE OF THESE PRODUCTS SHALL COMPLY WITH THE RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE 2002/95/EC.

4. FINISH WIRE INSULATION PROPERTIES:

FINISH WIRE INSULATION PROPERTIES SHALL BE IN ACCORDANCE WITH TABLE 4.

TABLE 4 - FINISHED WIRE INSULATION PROPERTIES REQUIREMENTS

INSULATION PROPERTIES	
IMPULSE TEST VOLTAGE	8.0 KILOVOLTS (PEAK)
HIGH FREQUENCY TEST VOLTAGE	5.7 KILOVOLTS (RMS)
TAPE OVERLAP	TABLE 3
LAMINATION SEALING	260 °C ± 2 °C (500 °F ± 3.6 °F), 6 HOURS
INSULATION BLOCKING	200 °C ± 2 °C (392 °F ± 3.6 °F)
SHRINKAGE	230 °C ± 2 °C (446 °F ± 3.6 °F)
	MAXIMUM CHANGE .125 INCHES
ELECTRICAL RESISTANCE (IR)	3000 MEGOHMS (MIN)-1000 FEET
WET DIELECTRIC VOLTAGE	2500 VOLTS (RMS), 60 HERTZ
CONTINUOUS LENGTH SCHEDULE	B

5. FINISH WIRE IDENTIFICATION:

WIRE IDENTIFICATION EXCEPTIONS: NONE

WIRE IDENTIFICATION DURABILITY: NOT REQUIRED

STRIPE AND BAND DURABILITY: NOT REQUIRED


6. FINISH WIRE PERFORMANCE:

FINISH WIRE FIXTURES APPLICABLE TO EACH WIRE SIZE SHALL BE IN ACCORDANCE WITH TABLE 5.

TABLE 5 - TEST MANDREL AND TEST LOAD REQUIREMENTS

WIRE SIZE (AWG)	TEST MANDREL DIAMETER 1/ (INCHES)			TEST LOAD (LB)	
	COLD BEND	LIFE CYCLE/ BEND TEST	WRAP	COLD BEND	LIFE CYCLE/ BEND TEST
8	4.00	3.00	.750	10.00	4.00
6	5.00	4.00	1.00	10.00	4.00
4	6.00	5.00	1.25	15.00	4.50
2	8.00	6.00	2.00	15.00	6.00
1	10.00	8.00	2.50	15.00	6.00
0	10.00	8.00	3.00	15.00	6.00
00	12.00	10.00	4.00	20.00	8.00
000	18.00	10.00	5.00	30.00	10.00
0000	18.00	10.00	6.00	30.00	10.00

1/ TOLERANCE SHALL BE ±3% OF THE GIVEN VALUES.

	AEROSPACE STANDARD	AS22759™/185 SHEET 4 OF 5	REV. B
	WIRE, ELECTRICAL, POLYTETRAFLUOROETHYLENE/ POLYIMIDE INSULATED, SMOOTH SURFACE, NORMAL WEIGHT, TIN-COATED COPPER CONDUCTOR, 150 °C, 600 VOLTS ROHS		