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**REV.
A**

AS6070™/6

FEDERAL SUPPLY CLASS
6145

RATIONALE

LIMITED SCOPE REVISION IS REQUIRED TO CLARIFY EXPANDED PTFE/PTFE TAPE PRIMARY INSULATION CONSTRUCTION IN TABLE 3.

NOTICE

THE COMPLETE REQUIREMENTS FOR PROCURING THE PRODUCT DESCRIBED HEREIN SHALL CONSIST OF THIS DOCUMENT AND THE LATEST ISSUE OF AS6070.

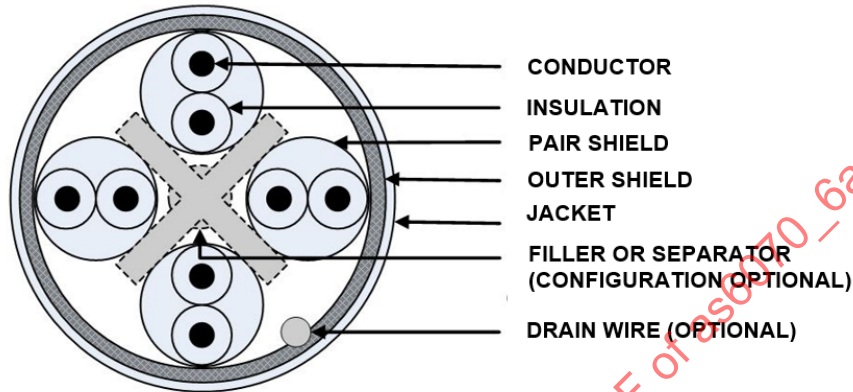
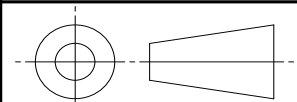


FIGURE 1 - FOUR PAIR CONFIGURATION (DESIGN SHOWN IS NOTIONAL)

For more information on this standard, visit
<https://www.sae.org/standards/content/AS6070/6A/>

THIRD ANGLE PROJECTION



CUSTODIAN: AE-8D

PROCUREMENT SPECIFICATION: AS6070



AEROSPACE STANDARD

CABLE, HIGH PERFORMANCE,
4 PAIR, SHIELDED, 100 OHM,
200 °C, ETHERNET 10G BASE T

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1. CONSTRUCTION DETAILS

TABLE 1

COMPONENT	MATERIAL		REQUIREMENT
CONDUCTOR	24 AWG 19X36 SILVER PLATED COPPER OR COPPER ALLOY <u>1/</u> 26 AWG 19X38 SILVER PLATED COPPER ALLOY <u>2/</u>		.0254 INCH MAXIMUM .0204 INCH MAXIMUM
INSULATION	FLUOROPOLYMER	24 AWG 26 AWG	.060 INCH NOMINAL .050 INCH NOMINAL
INSULATED CONDUCTOR COLORS	PAIR 1: WHITE/BLUE & BLUE OR WHITE & BLUE <u>3/</u> PAIR 2: WHITE/ORANGE & ORANGE OR WHITE & ORANGE <u>3/</u> PAIR 3: WHITE/GREEN & GREEN OR WHITE & GREEN <u>3/</u> PAIR 4: WHITE/BROWN & BROWN OR WHITE & BROWN <u>3/</u>		
BINDER	PTFE (POLYTETRAFLUOROETHYLENE) TAPE (OPTIONAL)		
INNER OR PAIR SHIELD	FLAT SILVER PLATED COPPER OR ALUMINUM/POLYIMIDE FOIL (OPTIONAL)		COPPER BRAID (92% COVERAGE) FOIL (100% COVERAGE)
OUTER SHIELD	38 OR 40 AWG ROUND SILVER PLATED COPPER BRAID		92% MINIMUM COVERAGE
DRAIN WIRE	OPTIONAL		
COLOR	SEE TABLE 3		

- 1/ SIZE 24 CONDUCTOR SHALL BE ANNEALED COPPER TYPE SCC; COPPER ALLOY SCA OF AS29606 TABLES 3 AND 4.
2/ SIZE 26 CONDUCTOR SHALL BE ANNEALED COPPER TYPE SCC; COPPER ALLOY SCA OF AS29606 TABLES 3 AND 4.
3/ PAIRS CONTAINING SOLID WHITE WIRE NOT FOR U.S. DEPARTMENT OF DEFENSE (NAVY) USE.

TABLE 2

LIGHT/STANDARD CABLE REQUIREMENTS			
CABLE	CONDUCTOR	WEIGHT	DIAMETER
LIGHT	24 AWG	45.0 POUNDS/1000 FEET MAXIMUM	.270 INCH MAXIMUM
	26 AWG	35.0 POUNDS/1000 FEET MAXIMUM	.230 INCH MAXIMUM
STANDARD	24 AWG	57.0 POUNDS/1000 FEET MAXIMUM	.300 INCH MAXIMUM
	26 AWG	45.0 POUNDS/1000 FEET MAXIMUM	.250 INCH MAXIMUM

2. CABLE CONFIGURATION

CABLE CONSTRUCTION SHALL BE IN ACCORDANCE WITH TABLE 1. THE CABLE SHALL HAVE THE FOLLOWING OPERATING CHARACTERISTICS AND DESIGN REQUIREMENTS:

2.1 CONTINUOUS WORKING VOLTAGE

60 VDC (SEE NOTE 1).

2.2 OPERATING FREQUENCY

1 TO 500 MHz.

2.3 OPERATING TEMPERATURE RATING

-55 °C MINIMUM TO +200 °C MAXIMUM.

2.4 CONDUCTOR DCR (PRIOR TO INSULATING) AT 20 °C:

24 AWG ANNEALED COPPER: 24.3 OHMS/1000 FEET MAXIMUM.

24 AWG COPPER ALLOY (HIGH STRENGTH): 28.4 OHMS/1000 FEET MAXIMUM.

26 AWG COPPER ALLOY (HIGH STRENGTH): 44.8 OHMS/1000 FEET MAXIMUM.

2.5 CABLE MINIMUM BEND RADIUS

7 TIMES DIAMETER.

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3. PERFORMANCE REQUIREMENTS

IN ACCORDANCE WITH AS6070, UNLESS OTHERWISE SPECIFIED.

3.1 LIFE CYCLE

OVEN TEMPERATURE: 200 °C ± 5 °C. WIRE INSULATION SHALL NOT SHRINK MORE THAN .090 INCH AND JACKET INSULATION SHALL NOT SHRINK MORE THAN .150 INCH. NO MANDREL OR WEIGHTS ARE REQUIRED DURING THE LIFE CYCLE TEST. PERFORM THE BEND TEST AFTER OVEN AGING. JACKET AND COMPONENT WIRES SHALL MEET DIELECTRIC WITHSTAND REQUIREMENTS.

3.2 BEND

REQUIRED AFTER LIFE CYCLE AND FLUID IMMERSION. THE JACKET AND COMPONENT WIRES SHALL MEET DIELECTRIC WITHSTAND REQUIREMENTS. MANDREL SIZE: TEN TIMES CABLE DIAMETER (±10%). WEIGHTS: NONE. WRAP CABLE BY HAND AROUND MANDREL WITH SUFFICIENT TENSION TO HOLD CABLE FIRMLY AGAINST MANDREL.

3.3 BLOCKING

OVEN TEMPERATURE: 200 °C ± 5 °C; MANDREL SIZE: TEN TIMES CABLE DIAMETER (±10%). NO BLOCKING BETWEEN ADJACENT LAYERS ALLOWED. JACKET AND COMPONENT WIRES SHALL MEET DIELECTRIC WITHSTAND REQUIREMENTS.

3.4 COLD BEND

COLD CHAMBER TEMPERATURE: -55 °C ± 5 °C; MANDREL SIZE: TEN TIMES CABLE DIAMETER (±10%). NO CRACKING OF JACKET ALLOWED. JACKET AND COMPONENT WIRES SHALL MEET DIELECTRIC WITHSTAND REQUIREMENTS. A SINGLE TEST WEIGHT SHALL BE ATTACHED TO ALL OF THE COMPONENTS WIRES TO HOLD THE CABLE TAUT ON THE MANDREL.

3.5 ALLOY CONDUCTOR ELONGATION AND TENSILE BREAK STRENGTH SHALL BE IN ACCORDANCE WITH AS29606:

24 AWG ANNEALED COPPER (SCC): REFER TO AS29606 TABLE 4A.

24 AWG HIGH STRENGTH COPPER-ALLOY (SCA): REFER TO AS29606 TABLE 4C.

26 AWG ANNEALED COPPER (SCC): REFER TO AS29606 TABLE 4A.

26 AWG HIGH STRENGTH COPPER-ALLOY (SCA): REFER TO AS29606 TABLE 4C.

3.6 DRY DIELECTRIC WITHSTAND - COMPONENT WIRES

COMPONENT WIRES SHALL WITHSTAND 1500 VRMS FOR BOTH INITIAL QUALIFICATION AND QUALITY CONFORMANCE TESTING. THE WITHSTAND VOLTAGE SHALL BE APPLIED FOR 1 MINUTE WIRE TO WIRE AND WIRE TO SHIELD. NO SPECIAL PREPARATION OR CONDITIONS APPLY. THERE SHALL BE NO EVIDENCE OF DAMAGE TO WIRE PAIR INSULATION.

3.7 DIMENSIONAL

SEE TABLE 1.

3.8 FLAMMABILITY

MAXIMUM FLAME TRAVEL SHALL BE 3 INCHES, THERE SHALL BE NO EVIDENCE OF FLAMING PARTICLES, AND FLAME EXTINGUISH TIME SHALL BE 5 SECONDS MAX.

3.9 FLUID IMMERSION

AFTER THE FLUID IMMERSION TEST THE DIAMETER OF THE CABLE SHALL NOT CHANGE MORE THAN 5%. JACKET SHALL NOT CRACK. AFTER BEND TEST, THE JACKET AND COMPONENT WIRES SHALL MEET DIELECTRIC WITHSTAND REQUIREMENTS.

3.10 HUMIDITY RESISTANCE

FOLLOWING THE COMPLETION OF THE HUMIDITY TEST THE CABLE SHALL MEET THE DRY DIELECTRIC REQUIREMENTS.

3.11 SPARK TEST ON FINISHED CABLE (SHIELD TO GROUND) (MANUFACTURING REQUIREMENT ONLY)

CABLE SHALL BE TESTED IN ACCORDANCE WITH AS4373, METHOD 1. THE INTERNAL AND OUTER SHIELDS SHALL BE ELECTRICALLY CONNECTED TOGETHER. THE SIGNAL AMPLITUDE AND FREQUENCY SHALL BE: 1500 VRMS AND 3 KHz.

3.12 SMOKE QUANTITY

MAXIMUM SPECIFIC OPTICAL DENSITY (DS) SHALL BE LESS THAN 50 AFTER 4.0 MINUTES.

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3.13 THERMAL SHOCK RESISTANCE

OVEN TEMPERATURE: 200 °C ± 5 °C, ENDS DO NOT SHRINK OR EXPAND MORE THAN .25 INCH AND NO JACKET CRACKING. JACKET AND COMPONENT WIRES MEET DIELECTRIC WITHSTAND REQUIREMENTS.

3.14 WEIGHT

SEE TABLE 2.

3.15 ATTENUATION

ATTENUATION SHALL MEET THE VALUES DETERMINED BY THE FOLLOWING EQUATION FOR FREQUENCIES FROM 1 TO 500 MHz. ATTENUATION FOR AS6070/6 CABLE SHALL BE ADJUSTED BY 2% PER °C FROM 20 TO 60 °C AND SHALL BE VERIFIED AT 40 °C ± 3 °C AND 60 °C ± 3 °C. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

ATTENUATION $\leq [1.82 \times \sqrt{f} + .0091 \times f + 0.25 / \sqrt{f}]$ dB/262 FEET (80 M)

FREQUENCY (MHz)	10.0	100.0	200.0	250.0	500.0
24 AWG (dB/80 M)	5.9	19.1	27.6	31.1	45.3
26 AWG (dB/65 M)	5.9	19.1	27.6	31.1	45.3

3.16 DIFFERENTIAL IMPEDANCE

DIFFERENTIAL IMPEDANCE SHALL BE 100 OHMS ± 10 OHMS.

3.17 NEAR END CROSS TALK (NEXT) AND NEAR END CROSS TALK (NEXT) ON MANDREL

SHALL MEET THE VALUES DETERMINED BY THE FOLLOWING EQUATION FOR FREQUENCIES FROM 1 TO 500 MHz TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

NEXT $\geq$ NEXT (100) TO 15 LOG (f/100) dB

NEXT (100) SHALL BE 44.3 dB

FREQUENCY (MHz)	10.0	100.0	200.0	250.0	500.0
NEXT (dB) 24 & 26 AWG	59.3	44.3	39.8	38.3	33.8

3.18 POWER SUM NEAR-END CROSS TALK (PSNEXT)

FOR FREQUENCIES FROM 1 TO 500 MHz, PSNEXT SHALL MEET THE VALUES DETERMINED BY THE FOLLOWING EQUATION. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

PSNEXT $\geq$ 42.3 TO 15 LOG (f/100) dB

FREQUENCY (MHz)	10.0	100.0	200.0	250.0	500.0
PSNEXT (dB) 24 & 26 AWG	57.3	42.3	37.8	36.3	31.8

3.19 ATTENUATION TO CROSSTALK RATIO-FAR END (ACR-F)

FOR FREQUENCIES FROM 1 TO 500 MHz AND A LENGTH OF 262 FEET (80 M), ACR-F SHALL MEET VALUES DETERMINED BY THE FOLLOWING EQUATION. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

ACR-F $\geq$ 27.8 TO 20 LOG (f/100) dB

FREQUENCY (MHz)	10.0	100.0	200.0	250.0	500.0
ACR-F (dB) 24 & 26 AWG	47.8	27.8	21.8	19.8	13.8

3.20 POWER SUM ATTENUATION TO CROSSTALK RATIO-FAR END (PSACR-F)

FOR FREQUENCIES FROM 1 TO 500 MHz AND A LENGTH OF 262 FEET (80 M), PSACR-F SHALL MEET VALUES DETERMINED BY THE FOLLOWING EQUATION. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

PSACR-F $\geq$ 24.8 TO 20 LOG (f/100) dB

FREQUENCY (MHz)	10.0	100.0	200.0	250.0	500.0
PSACR-F (dB) 24 & 26 AWG	44.8	24.8	18.8	16.8	10.8