

REV.
B

AS6070™/2

FEDERAL SUPPLY CLASS
6145

RATIONALE

LIMITED SCOPE REVISION IS REQUIRED TO CLARIFY EXPANDED PTFE/PTFE TAPE PRIMARY INSULATION CONSTRUCTION IN TABLE 2.

NOTICE

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

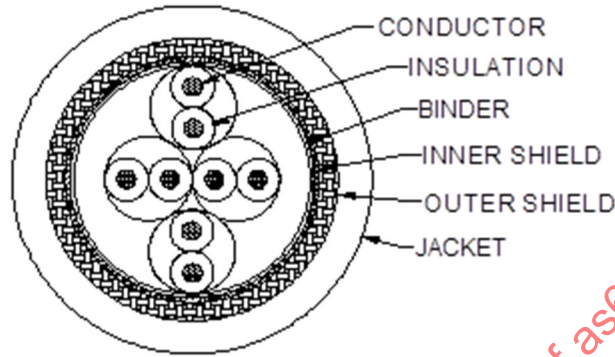


FIGURE 1 - FOUR PAIR CONFIGURATION (DESIGN SHOWN IS NOTATIONAL)

1.0 CONSTRUCTION DETAILS

TABLE 1

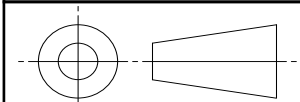
COMPONENT	MATERIAL	REQUIREMENT
CONDUCTOR 1/ INSULATION	24 AWG 19X36 SILVER PLATED COPPER ALLOY FLUOROPOLYMER	.0244 INCH MAXIMUM .045 INCH ± .003 INCH
INSULATION COLOR	PAIR 1: WHITE/BLUE & BLUE OR WHITE & BLUE 2/ PAIR 2: WHITE/ORANGE & ORANGE OR WHITE & ORANGE 2/ PAIR 3: WHITE/GREEN & GREEN OR WHITE & GREEN 2/ PAIR 4: WHITE/BROWN & BROWN OR WHITE & BROWN 2/	
BINDER	PTFE TAPE	
INNER SHIELD	FLAT SILVER PLATED COPPER BRAID	92% MINIMUM COVERAGE
OUTER SHIELD	ROUND SILVER PLATED COPPER BRAID	85% MINIMUM COVERAGE
JACKET	FEP	.270 INCH ± .010 INCH
COLOR	SEE TABLE 2	
CABLE WEIGHT	24 AWG	60.0 POUNDS/1000 FEET MAXIMUM

1/ CONDUCTOR SHALL BE IN ACCORDANCE WITH TYPE SCA OR SCA1 OF AS29606 TABLE 4C.

2/ PAIRS CONTAINING SOLID WHITE WIRE NOT FOR U.S. DEPARTMENT OF DEFENSE (NAVY) USE.

For more information on this standard, visit
<https://www.sae.org/standards/content/AS6070/2B/>

THIRD ANGLE PROJECTION



CUSTODIAN: AE-8/AE-8D

PROCUREMENT SPECIFICATION: AS6070



AEROSPACE STANDARD

CABLE, 4 PAIR 24 AWG
COPPER ALLOY, SHIELDED, 100 OHM,
200 °C, ETHERNET 1000 BASE T

AS6070™/2
SHEET 1 OF 5

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2.0 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.

2.2 OPERATING FREQUENCY

1 TO 100 MHz.

2.3 OPERATING TEMPERATURE

-55 °C MINIMUM TO +200 °C MAXIMUM.

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

28.4 OHMS/1000 FEET MAXIMUM.

2.5 CABLE MINIMUM BEND RADIUS

2.70 INCHES.

3.0 PERFORMANCE REQUIREMENTS

PER AS6070 UNLESS OTHERWISE SPECIFIED LIFE CYCLE.

3.1 LIFE CYCLE

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

3.4 COLD BEND

COLD CHAMBER TEMPERATURE: -55 °C $\pm$ 5 °C; MANDREL: TEN TIMES CABLE DIAMETER ($\pm$ 10%). NO CRACKING OF JACKET ALLOWED. JACKET AND COMPONENT WIRES MEET DIELECTRIC WITHSTAND REQUIREMENTS.

3.5 CONDUCTOR ELONGATION AND TENSILE BREAK STRENGTH

IN ACCORDANCE WITH 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 5 SECONDS MAX.

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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

AFTER 15 CYCLES. FOLLOWING THE COMPLETION OF 15 CYCLES OF THE HUMIDITY TEST, THE CABLE SHALL MEET THE DRY DIELECTRIC REQUIREMENTS.

3.11 SPARK TEST ON PRIMARY WIRES

BEFORE SECONDARY PROCESSING, THE PRIMARY WIRES SHALL BE TESTED IN ACCORDANCE WITH AS4373, TEST METHOD 505, METHOD (1). THE SIGNAL AMPLITUDE AND FREQUENCY SHALL BE: 1500 VRMS AND 3 KHZ.

3.12 SPARK TEST ON FINISHED CABLE (MANUFACTURING REQUIREMENT ONLY)

CABLE SHALL BE TESTED IN ACCORDANCE WITH AS4373, TEST METHOD 505, METHOD (1). THE INTERNAL AND OUTER SHIELDS SHALL BE ELECTRICALLY CONNECTED TOGETHER. THE SIGNAL AMPLITUDE AND FREQUENCY SHALL BE: 1500 VRMS AND 3 KHZ).

3.13 SMOKE QUANTITY

MAXIMUM SPECIFIC OPTICAL DENSITY (DS) IS LESS THAN 50 AFTER 4 MINUTES.

3.14 THERMAL SHOCK RESISTANCE

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

3.15 WEIGHT

SEE TABLE 1.

3.16 ATTENUATION

ATTENUATION SHALL MEET THE VALUES DETERMINED BY THE FOLLOWING FORMULA FOR FREQUENCIES FROM 1 TO 100 MHz. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

ATTENUATION $\leq 1.37 \times [1.967 \times \sqrt{f} + .023 \times f + 0.050 / \sqrt{f}]$ dB/100 M

FREQUENCY (MHz)	1.0	4.0	8.0	10.0	16.0	20.0	25.0	31.25	62.5	100.0
ATTENUATION (dB/100 M)	2.7	5.6	7.9	8.9	11.2	12.7	14.2	16.0	23.3	30.0

3.17 CAPACITANCE UNBALANCED PAIR-GROUND

66 PF/100 M MAXIMUM.

3.18 DIFFERENTIAL IMPEDANCE

DIFFERENTIAL IMPEDANCE SHALL BE 100 OHM ± 15 OHM.

3.19 DIRECT CURRENT RESISTANCE (DCR) UNBALANCED

3% MAXIMUM.

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

SHALL MEET THE VALUES DETERMINED BY THE FOLLOWING EQUATIONS FOR FREQUENCIES FROM 1 TO 100 MHz. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

NEXT $\geq$ NEXT (100) – 15 LOG (f / 100) dB
NEXT (100) SHALL BE 35.3 dB

FREQUENCY (MHz)	1.0	4.0	8.0	10.0	16.0	20.0	25.0	31.25	62.5	100.0
NEXT (dB)	65.3	56.3	51.8	50.3	47.2	45.8	44.3	42.9	38.4	35.3

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3.21 POWER SUM NEAR-END CROSS TALK (PSNEXT)

FOR FREQUENCIES FROM 1 TO 100 MHz, PSNEXT SHALL MEET THE VALUES DETERMINED BY THE FOLLOWING EQUATION. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

$$PSNEXT \geq 32.3 - 15 \text{ LOG } (f / 100)$$

FREQUENCY (MHz)	1.0	4.0	8.0	10.0	16.0	20.0	25.0	31.25	62.5	100.0
PSNEXT (dB)	62.3	53.3	48.8	47.3	44.2	42.8	41.3	39.9	35.4	32.3

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

FOR FREQUENCIES FROM 1 TO 100 MHz AND A LENGTH OF 100 M, ELNEXT SHALL MEET VALUES DETERMINED BY THE FOLLOWING EQUATION. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

$$ACR-F \geq 23.8 - 20 \text{ LOG } (f / 100) \text{ dB}$$

FREQUENCY (MHz)	1.0	4.0	8.0	10.0	16.0	20.0	25.0	31.25	62.5	100.0
ACR-F (dB)	63.8	51.8	45.7	43.8	39.7	37.8	35.8	33.9	27.9	23.8

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

FOR FREQUENCIES FROM 1 TO 100 MHz AND A LENGTH OF 100 M, PSELFEXT SHALL MEET VALUES DETERMINED BY THE FOLLOWING EQUATION. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

$$PSACR-F \geq 20.8 - 20 \text{ LOG } (f / 100) \text{ dB}$$

FREQUENCY (MHz)	1.0	4.0	8.0	10.0	16.0	20.0	25.0	31.25	62.5	100.0
PSACR-F (dB)	60.8	48.8	42.7	40.8	36.7	34.8	32.8	30.9	24.9	20.8

3.24 RETURN LOSS (RL)

RETURN LOSS SHALL MEET THE VALUES DETERMINED BY THE FOLLOWING EQUATIONS. TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY.

FREQUENCY (MHz)	RETURN LOSS (dB)
$1 \leq f < 10$	$20 + 5 \text{ LOG } (f)$
$10 \leq f < 20$	25
$20 \leq f < 100$	$25 - 7.0 \text{ LOG } (f / 20)$

FREQUENCY (MHz)	1.0	4.0	8.0	10.0	16.0	20.0	25.0	31.25	62.5	100.0
RETURN LOSS (dB)	20.0	23.0	24.5	25.0	25.0	25.0	24.3	23.6	21.5	20.1

3.25 PROPAGATION DELAY

FREQUENCY (MHz)	PROPAGATION DELAY (NS/100 M)
$1 \leq f < 100$	$(534 + 36/\sqrt{f})$

FREQUENCY (MHz)	1.0	4.0	8.0	10.0	16.0	20.0	25.0	31.25	62.5	100.0
PROPAGATION DELAY (NS/100 M)	570	552	547	545	543	542	541	540	539	538

3.26 PROPAGATION DELAY SKEW

PROPAGATION DELAY SKEW SHALL NOT EXCEED 45 NS/100 M.

3.27 VELOCITY OF PROPAGATION (REFER TO ASTM D4566, PHASE VELOCITY)

VELOCITY OF PROPAGATION SHALL NOT BE LESS THAN 68% AT 31.25 MHz (REFERENCE ONLY).

4.0 CABLE IDENTIFICATION

CABLE SHALL BE MARKED ON EITHER AN INTERNAL MARKER TAPE UNDER THE JACKET OR PRINTED ON THE JACKET SURFACE WITH A CONTRASTING INK COLOR. MINIMUM MARKINGS SHALL BE CABLE PART NUMBER, AND MANUFACTURER'S CAGE CODE.

4.1 DURABILITY OF IDENTIFICATION

THREE SPECIMENS SHALL BE TESTED IN ACCORDANCE WITH AND MEET THE REQUIREMENTS OF AS4373 METHOD 710, USING A WEIGHT .5 POUND AND 250 STROKES.

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