

RATIONALE

REVISION REQUIRED TO CLARIFY CABLE PERFORMANCE AND EXAMINATION AND TEST REQUIREMENTS, AND UPDATE ATTENUATION FACTOR.

NOTICE

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

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AS6070™/1

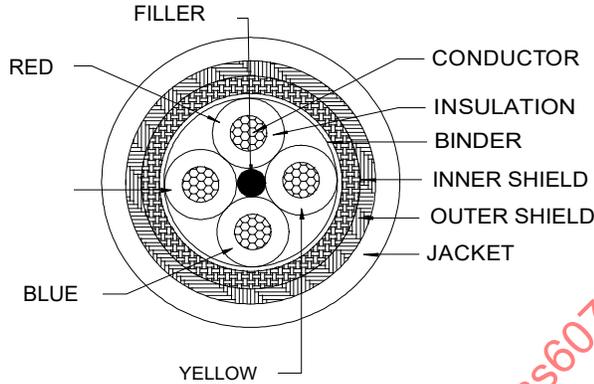


FIGURE 1 - QUAD CONFIGURATION. (DESIGN SHOWN IS NOTIONAL)

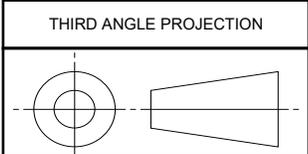
1.0 CONSTRUCTION DETAILS

TABLE 1- CONSTRUCTION DETAILS

COMPONENT	MATERIAL	REQUIREMENT
CONDUCTOR 1/	24 AWG-19X36 SILVER PLATED COPPER ALLOY	.572 MM (.0225 IN) MIN/.645 MM (.0254 IN) MAX
	26 AWG 19X38 SILVER PLATED COPPER ALLOY	.444 MM (.0175 IN) MIN/.518 MM (.0204 IN) MAX
INSULATION	FLUOROPOLYMER 24 AWG 26 AWG	1.17 MM ±.075 MM (.046 IN ± .003 IN) 1.041 MM MAX (.041 IN MAX)
INSULATED CONDUCTOR COLOR	PAIR 1: RED AND BLUE OR WHITE/RED AND WHITE/BLUE 2/ PAIR 2: YELLOW AND GREEN OR WHITE/YELLOW AND WHITE/GREEN 2/	
BINDER	PTFE TAPE	
INNER SHIELD	FLAT OR ROUND SILVER PLATED COPPER BRAID	92% MINIMUM COVERAGE
OUTER SHIELD	ROUND SILVER PLATED COPPER BRAID	85% MINIMUM COVERAGE
JACKET	FEP, OR PTFE 24 AWG	4.32 MM MAX (.170 IN MAX)
	26 AWG	3.76 MM MAX (.148 IN MAX)
COLOR	SEE TABLE 3	
FILLER	FLUOROPOLYMER	
CABLE WEIGHT	24 AWG	38.7 KG/KM (26.0 LBS./1000 FT) MAX
	26 AWG	29.8 KG/KM (20.0 LBS./1000 FT) MAX

1/ SIZES 24 AND 26 CONDUCTOR SHALL BE IN ACCORDANCE WITH TYPE SCA OF AS29606 TABLE 4C OR 5C.
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/AS6070/1B/>



CUSTODIAN: AE-8/AE-8D

PROCUREMENT SPECIFICATION: AS6070



AEROSPACE STANDARD

(R) CABLE, HIGH SPEED DATA QUAD,
COPPER ALLOY, 100 OHM, 200 °C,
ETHERNET 10/100 BASE T

AS6070™/1
SHEET 1 OF 5

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

- 2.1 CONTINUOUS WORKING VOLTAGE: 60 VDC
- 2.2 OPERATING FREQUENCY: 1 TO 100 MHz
- 2.3 OPERATING TEMP RANGE: -55 TO +200 °C (-67 TO +392 °F)
- 2.4 CONDUCTOR DCR (PRIOR TO INSULATING) @ 20 °C: 24 AWG - 93.2 OHMS/KM (28.4 OHMS/1000 FEET) MAXIMUM
26 AWG - 147 OHMS/KM (44.8 OHMS/1000 FEET) MAXIMUM
- 2.5 CABLE MINIMUM BEND RADIUS: 24 AWG = 43,2 MM (1.70 INCHES) (10 TIMES CABLE DIAMETER)
26 AWG - 37.6 MM (1.48 INCHES) (10 TIMES CABLE DIAMETER)
- 2.6 MAXIMUM CABLE LENGTH RATING:
24 AWG - 73 M (240 FEET)
26 AWG - 61 M (200 FEET)

NOTE: THESE ARE THE RECOMMENDED MAXIMUM CABLE LENGTHS. CABLE LENGTHS THAT EXTEND BEYOND THESE LENGTHS RUN THE RISK OF DIMINISHED PERFORMANCE. TRANSMISSIONS ERRORS ALSO BECOME MORE LIKELY AS CABLE LENGTH EXTENDS BEYOND THE MAXIMUM. IF SYSTEM LENGTHS BEYOND THESE MAXIMUM LENGTHS ARE REQUIRED, CONSIDER ADDING REPEATER DEVICES.

3.0 PERFORMANCE REQUIREMENTS IN ACCORDANCE WITH TABLE 2 AND AS6070 UNLESS OTHERWISE SPECIFIED:

TABLE 2 - PERFORMANCE AND TESTING REQUIREMENTS

TEST	APPLICABLE	N/A	REQUIREMENT	ADDITIONAL TEST DETAILS
ATTENUATION 3/ 4/ 5/	X		FREQUENCIES FROM 1 TO 100 MHz $1.967 \times \sqrt{f} + .023 \times f + 0.050 / \sqrt{f}$ (f in MHz) (MAXIMUM)	CONDUCT TEST PER SECTION 24 OF ASTM D4566, AND SCALE RESULTS TO THE MAX CABLE LENGTH RATING (SEE 2.6). VERIFY ATTENUATION AT 20 °C, 40 °C, AND 60 °C. TESTS AT 40 °C AND 60 °C ARE FOR INITIAL QUALIFICATION ONLY, AND RESULTS SHALL BE ADJUSTED USING A FACTOR OF 0.2% PER °C. ABOVE 20 °C
CHARACTERISTIC IMPEDANCE		X	—	—
DIFFERENTIAL IMPEDANCE	X		100 OHMS ± 15 OHMS	NONE
CAPACITANCE, MUTUAL		X	—	—
CAPACITANCE, UNBALANCE (PR-GROUND)		X	—	—
DCR UNBALANCE		X	—	—
NEXT 3/ 4/ 5/	X		FREQUENCIES FROM 1 TO 100 MHz 35.3 – 15 LOG (f / 100) dB (f in MHz) (MINIMUM)	CONDUCT TEST PER SECTION 25 OF ASTM D4566, AND SCALE RESULTS TO THE 100-M (328-FOOT) CABLE LENGTH.
NEXT ON MANDREL 3/ 4/ 5/	X		FREQUENCIES FROM 1 TO 100 MHz 35.3 – 15 LOG (f / 100) dB (f in MHz) (MIN)	CONDUCT TEST PER SECTION 25 OF ASTM D4566, AND SCALE RESULTS TO THE 100-M (328-FOOT) CABLE LENGTH. SEE AS6070 FOR CABLE WRAP DETAILS.
PS-NEXT		X	—	—
ACR-F		X	—	—
PSACR-F		X	—	—
RETURN LOSS (RL) 3/ 4/ 5/	X		FREQ. (f) in MHz RL (dB) (MIN) 1 ≤ f < 10 20 + 5 log (f) 10 ≤ f < 20 25 20 ≤ f < 100 25 - 8.6 log (f / 20)	CONDUCT TEST PER SECTION 50 OF ASTM D4566, AND SCALE RESULTS TO THE 100-M (328-FOOT) CABLE LENGTH.
PROPAGATION DELAY		X	—	—
PROPAGATION DELAY SKEW		X	—	—
VELOCITY OF PROPAGATION	X		75% AT 31.25 MHz (REF ONLY)	NONE
DIELECTRIC WITHSTAND-DRY	X		NO WIRE INSULATION DAMAGE	1000 V RMS FOR 1 MINUTE; TEST CONDUCTOR-CONDUCTOR AND CONDUCTOR-SHIELD

	AEROSPACE STANDARD	AS6070™/1 SHEET 2 OF 5	REV. B
	(R) CABLE, HIGH SPEED DATA QUAD COPPER ALLOY, 100 OHM, 200 °C, ETHERNET 10/100 BASE T		

TABLE 2 - PERFORMANCE AND TESTING REQUIREMENTS (CONTINUED)

TEST	APPLICABLE	N/A	REQUIREMENT	ADDITIONAL TEST DETAILS
DIELECTRIC WITHSTAND-WET (POST ENVIRONMENTAL)	X		NO CABLE JACKET DAMAGE	1000 V RMS FOR 1 MINUTE; STRIP 25 MM (1 INCH) OF JACKET FROM EACH END OF SPECIMEN AND IMMERSIVE TO WITHIN 51 MM (2 INCHES) OF OUTER SHIELD. TEST OUTER SHIELD TO WATER.
SPARK TEST (PRIMARY WIRE)	X		NO WIRE INSULATION DAMAGE	1500 V RMS AND 3 kHz
SPARK TEST (FINISHED CABLE)	X		NO CABLE JACKET DAMAGE	1500 V RMS AND 3 kHz, WITH SHIELDS ELECTRICALLY CONNECTED TOGETHER
LIFE CYCLE	X		WIRE INSULATION SHRINKAGE = 2.29 MM (0.090 INCH) (MAX); CABLE JACKET SHRINKAGE = 3.8 MM (0.150 INCH) (MAX); NO CRACKING AFTER BEND TEST; NO INSULATION OR JACKET DAMAGE AFTER VOLTAGE TESTS	200 °C ± 5 °C (392 °F ± 9 °F); NO MANDREL OR WEIGHTS ARE REQUIRED FOR LIFE CYCLE TEST. AFTER AGING AND SHRINKAGE MEASUREMENTS, CONDUCT BEND TEST FOLLOWED BY DIELECTRIC WITHSTAND-DRY AND -WET TESTS.
FLUID IMMERSION	X		5% (MAX) CHANGE IN CABLE DIAMETER; NO CRACKING AFTER BEND TEST; NO INSULATION OR JACKET DAMAGE AFTER VOLTAGE TESTS	AFTER DIAMETER MEASUREMENTS, CONDUCT BEND TEST FOLLOWED BY DIELECTRIC WITHSTAND-DRY AND DIELECTRIC WITHSTAND-WET TESTS.
HUMIDITY RESISTANCE	X		NO WIRE INSULATION DAMAGE	CONDUCT 15 CYCLES OF HUMIDITY TEST, THEN CONDUCT THE DIELECTRIC WITHSTAND-DRY TEST
BLOCKING	X		NO BLOCKING BETWEEN ADJACENT JACKET LAYERS; NO INSULATION OR JACKET DAMAGE AFTER VOLTAGE TESTS	200 °C ± 5 °C (392 °F ± 9 °F); USE MANDREL SIZE 10 X CABLE DIAMETER (±10%). AFTER BLOCKING, CONDUCT DIELECTRIC WITHSTAND-DRY AND DIELECTRIC WITHSTAND-WET TESTS.
COLD BEND	X		NO JACKET CRACKING; NO INSULATION OR JACKET DAMAGE AFTER VOLTAGE TESTS	-55 °C ± 5 °C (-67 °F ± 9 °F); USE MANDREL SIZE 10 X CABLE DIAMETER (±10%). AFTER COLD BEND, CONDUCT DIELECTRIC WITHSTAND-DRY AND DIELECTRIC WITHSTAND-WET TESTS.
CONDUCTOR	X		PER TABLE 4C IN AS29606	NONE
WRINKLE	X		NO EVIDENCE OF WRINKLES ON INNER RADIUS OF CABLE JACKET	USE MANDREL SIZE WITH RADIUS OF 10 X CABLE DIAMETER (±10%).
BEND TEST (POST ENVIRONMENTAL)	X		NO JACKET CRACKING	USE MANDREL SIZE 10 X CABLE DIAMETER (±10%). NO WEIGHTS ARE REQUIRED. WRAP CABLE BY HAND AROUND MANDREL WITH ENOUGH TENSION TO HOLD CABLE FIRMLY AGAINST MANDREL.
INSULATION STRIPPING	X		PER AS6070	NONE
STRIPPABILITY (JACKET)	X		PER AS6070	NONE
FLAMMABILITY	X		FLAME TRAVEL = 76.2 MM (3 INCHES) (MAX), FLAME EXTINGUISH TIME = 5 SECONDS (MAX), NO EVIDENCE OF FLAMING PARTICLES	NONE
THERMAL SHOCK	X		WIRE INSULATION SHRINKAGE OR EXPANSION = 6.4 MM (0.25 INCH) (MAX); NO INSULATION OR JACKET DAMAGE AFTER VOLTAGE TESTS	200 °C ± 5 °C (392 °F ± 9 °F); AFTER THERMAL SHOCK MEASUREMENTS, CONDUCT DIELECTRIC WITHSTAND-DRY AND -WET TESTS.
SMOKE QUANTITY	X		SPECIFIC OPTICAL DENSITY (DS) = 50 (MAX) AFTER 4 MINUTES	NONE

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TABLE 2 - PERFORMANCE AND TESTING REQUIREMENTS (CONTINUED)

TEST	APPLICABLE	N/A	REQUIREMENT	ADDITIONAL TEST DETAILS
IDENTIFICATION MARKING	X		SEE 4.0. CONSTRUCTION OPTIONS (PART NUMBER EXAMPLE AND TABLE 3) MINIMUM MARKINGS = CABLE PART NUMBER, MANUFACTURER'S CAGE CODE, AND THE SYMBOLS "A - B". ORIENT THE MARK SO THAT THE "A" IS LOCATED TOWARDS THE CABLE END WHERE THE INNER WIRE COLORS ARE RED, GREEN, BLUE, AND YELLOW IN A CLOCKWISE ROTATION.	PRINT IDENTIFICATION ON EITHER AN INTERNAL MARKER TAPE UNDER THE JACKET OR ON JACKET SURFACE WITH A CONTRASTING INK COLOR.
DURABILITY OF MARKING <u>6/</u>	X		NO FAILURE	TEST 3 SPECIMENS USING A 0.227-KG (0.5-POUND) WEIGHT AND 250 STROKES
CONTRAST (JACKET) <u>7/</u>	X		50% (MIN)	NONE
DYNAMIC CUT-THROUGH <u>8/</u>	X		22.7 KG (50 POUNDS) (MIN AVG)	TEST TEN 457-MM (18-INCH) SPECIMENS PER AS4373 METHOD 703. CROSS-HEAD TRAVEL SHALL BE STOPPED WHEN CUTTING EDGE MAKES CONTACT WITH THE OUTER SHIELD. DISCARD HIGH AND LOW RESULTS AND AVERAGE THE REMAINING TEST RESULTS.

3/ FOR INITIAL QUALIFICATION AND RETENTION OF QUALIFICATION TESTING ONLY, USE THE FOLLOWING CABLE LENGTHS:

- ATTENUATION - USE THE MAXIMUM RATED CABLE LENGTHS (SEE 2.6)
- NEXT, AND NEXT ON MANDREL - USE A 100-M (328-FOOT) CABLE LENGTH
- RETURN LOSS - USE A 100-M (328-FOOT) CABLE LENGTH

4/ INITIAL QUALIFICATION AND RETENTION OF QUALIFICATION TESTING ONLY, TEST RESULTS SHALL BE PROVIDED AS RAW DATA AND A CONTINUOUS PLOT OF AMPLITUDE (FOR THE TEST) VERSUS FREQUENCY PROFILES ON X-Y AXIS. MANUALLY GATHERED DATA IS NOT ACCEPTABLE EXCEPT FOR PLOT VERIFICATION. TEST LIMITS SHALL BE DISPLAYED ON EACH PLOT. RAW DATA AND PLOTS FOR BOTH THE MEASUREMENT AND SYSTEM CHECK PORTIONS OF THE TEST PROCEDURE SHALL BE PROVIDED.

5/ THE FOLLOWING TABULATED VALUES ARE GIVEN FOR INFORMATION ONLY:

ATTENUATION:

FREQUENCY (MHz)	1.0	4.0	8.0	10.0	16.0	20.0	25.0	31.25	62.5	100.0
24 AWG ATTENUATION (dB at 73 M (240 FEET))	2.0	4.1	5.8	6.5	8.2	9.3	10.4	11.7	17.0	22.0
26 AWG ATTENUATION (dB at 61 M (200 FEET))	2.0	4.1	5.8	6.5	8.2	9.3	10.4	11.7	17.0	22.0

NEXT:

FREQUENCY (MHz)	1.0	4.0	8.0	10.0	16.0	20.0	25.0	31.25	62.5	100.0
NEXT (dB) 24 & 26 AWG	65.3	56.3	51.8	50.3	47.2	45.8	44.3	42.9	38.4	35.3

RETURN LOSS:

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) 24 & 26 AWG	20.0	23.0	24.5	25.0	25.0	25.0	24.3	23.6	21.5	20.1

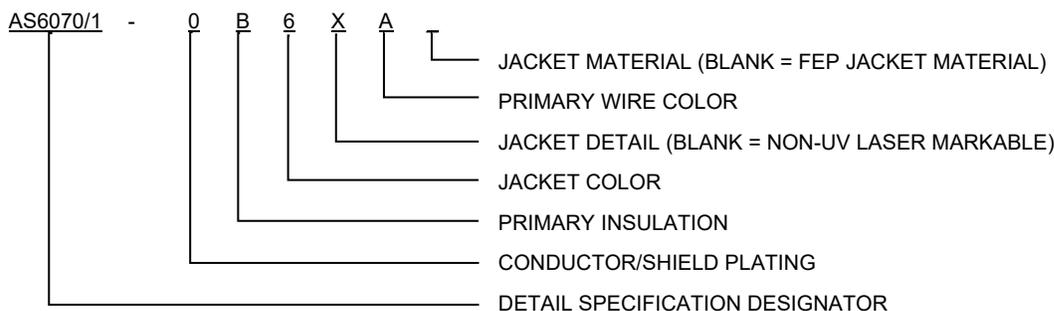
6/ NOT APPLICABLE FOR IDENTIFICATION ON MARKER TAPE.

7/ FOR UV LASER MARKABLE JACKETS ONLY (E.G., AS6070/1-0B6UA).

8/ INITIAL QUALIFICATION TEST ONLY.

4.0 CONSTRUCTION OPTIONS:

PART NUMBER EXAMPLE:



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	(R) CABLE, HIGH SPEED DATA QUAD COPPER ALLOY, 100 OHM, 200 °C, ETHERNET 10/100 BASE T		