GORE® Aerospace

HIGH SPEED DATA CABLES

For Military Applications

Reliable signal transmission in high-density, lightweight constructions

Engineered for demanding aerospace environments, GORE® Aerospace High Speed Data Cables are constructed with uniquely engineered fluoropolymers that deliver reliable signal transmission in a lightweight package. These cables meet the performance requirements of ANSI/NEMA WC 27500 Standard for Aerospace and Industrial Electrical Cable, Type 24. Whether your system architecture requires Ethernet, FireWire, USB, HDMI, high-performance quad, dual gigabit, shielded twisted pair or fiber optic cables, GORE® Aerospace High Speed Data Cables maintain stable communication on avionics networks.

Weight Savings with Gore Cable Technology

GORE® Aerospace High Speed Data Cables can significantly reduce weight while maintaining reliable signal integrity. Jacket weight is reduced by as much as 37 percent when compared to ethylene tetrafluoroethylene (ETFE) materials and 50 percent when compared to fluorinated ethylene propylene (FEP). These lighter-weight materials also result in smaller cable diameters, which ultimately translate to significantly smaller, lighter, and higher-density cable bundles.

The excellent signal integrity of GORE® Aerospace High Speed Data Cables can enable utilization of smaller gauge cables in your system architecture. Because of their electrical performance and long transmission distances, these cables can reduce the need for additional signal amplification — further decreasing weight and power requirements.

Reliable Flight Performance

GORE® Aerospace High Speed Data Cables deliver dependable signal integrity for data transmission in demanding aerospace environments. These cables maintain reliable performance in extreme temperatures ranging from -55°C to 200°C, including rapid changes in temperatures encountered during take-off and landing.

Easier Installation

GORE® Aerospace High Speed Data Cables facilitate easier installation. The small cable diameter increases flexibility with a tight bend radius, which makes initial routing easier.

Benefits of GORE® Aerospace High Speed Cables

- Excellent signal integrity with stable performance in extreme conditions
- High-speed data transmission over longer distances, minimizing the need for additional signal amplification
- Improved installation with smaller, high-density cable bundles
- Easy routing in confined spaces due to small diameter and tight bend radius

GORE® Aerospace

HIGH SPEED DATA CABLES

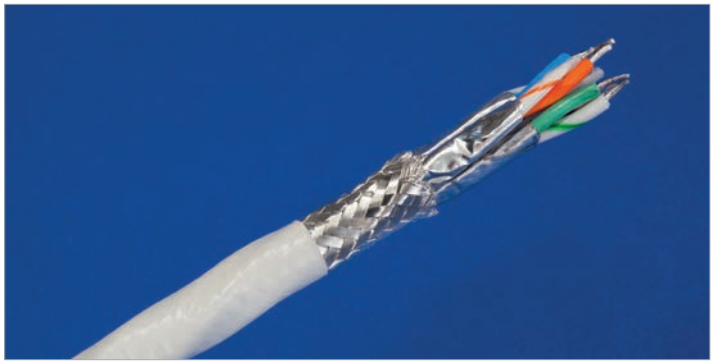
GORE® Aerospace Ethernet Cables

GORE® Aerospace Ethernet Cables are engineered for the increasing data demands of modern airborne digital networks (Figure 1). They exceed Cat6a electrical requirements and deliver reliable signal integrity with sufficient margin for high-speed data transmission up to 10 gigabits over longer distances (Table 1). The unique design of these cables is 24 percent smaller and 25 percent lighter than standard Cat6a cables for greater flexibility and easier installation in challenging environments (Figures 2 and 3). Gore's engineered fluoropolymer materials enable this cable (26 AWG) to fit into a size 8 contact.

Typical Applications

- Avionics networks
- Cabin management systems
- Digital video systems
- Ethernet backbone
- Flight management systems

Figure 1: GORE® Aerospace Ethernet Cables



Standards Compliance

- ANSI/NEMA WC 27500 Performance Requirements: Environmental Testing, Jacket and Marking
- ANSI/TIA 568-C.2: Performance Requirements
- AS4373 Test Methods for Insulated Electric Wire
- BSS7239 and ABD0031 (AITM 3.0005): Toxicity
- FAR Part 25, Appendix F, Part I, BSS7230, and ABD0031 (AITM 2.0005): Flammability
- FAR Part 25, Appendix F, Part V, BSS7238, and ABD0031 (AITM 3.0008B): Smoke Density
- IEEE 802.3 1000BASE-T Gigabit Ethernet Standard
- SAE-AS-6070/5 and SAE-AS-6070/6: Ethernet 1000-Base T (10 G/bit, 100 Ohm)

Table 1: Cable Properties

	Property	Value
Electrical	Standard Impedance (ohms)	100 ±10
	Voltage Rating (V)	500
	Velocity of Propagation (nominal) (%)	80
	Time Delay (nominal) [ns/m (ns/ft)] 24 AWG	4.10 (1.25)
	Capacitance [pF/m (pF/ft)]	42.6 (13)
	Dielectric Withstanding Voltage (Vrms) Conductor-to-Conductor Conductor-to-Shield	 1500 1000
Mechanical / Environmental	Jacket Material	Engineered Fluoropolymer
	Jacket Color	White (Laser Markable)
	Conductor	24 AWG: Silver-Plated Copper 26 AWG: Silver-Plated Copper Alloy
	Conductor Color-Coding	Solid Blue/White with Blue Stripe Solid Orange/White with Orange Stripe Solid Green/White with Green Stripe Solid Brown/White with Brown Stripe
	Dielectric Material	ePTFE/PTFE
	Temperature Range (°C)	-65 to 200

Figure 2: Smaller Cat6a Cable Diameter

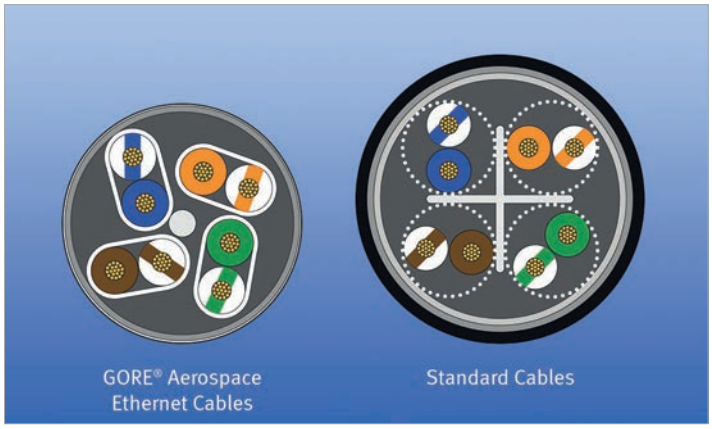


Figure 3: High-Density Construction

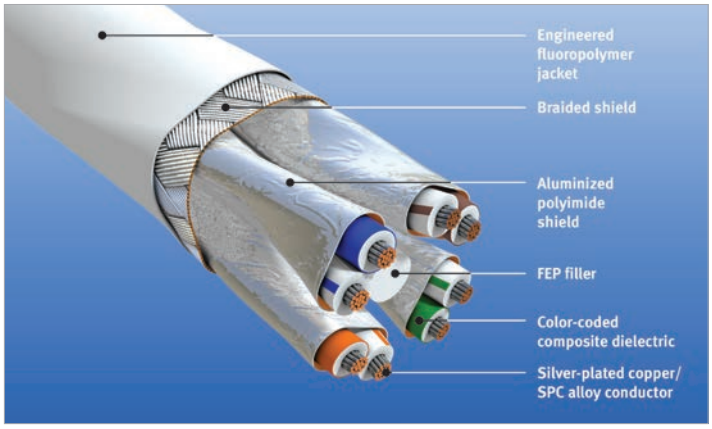


Figure 4: Attenuation Comparison

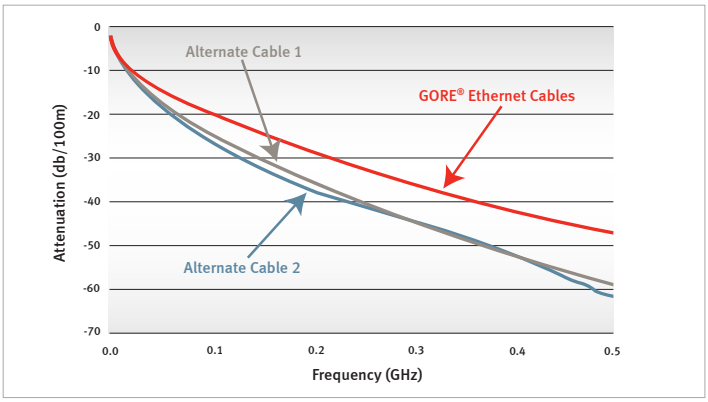
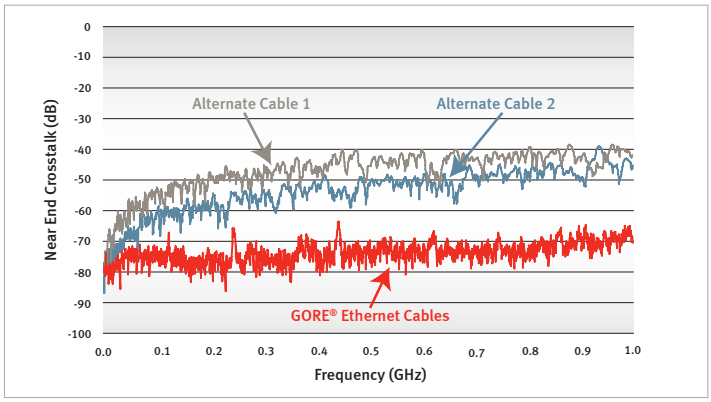


Figure 5: NEXT Comparison



Reliable Signal Integrity

Gore compared its Cat6a cable with several alternative cables. Results showed that GORE® Aerospace Ethernet Cables provided enhanced electrical performance with lower signal attenuation by as much as 10 dB/100 m at 500 MHz (Figure 4). Results also showed that GORE® Aerospace Ethernet Cables can reduce near-end crosstalk (NEXT) by as much as 10 dB at 500 MHz compared to alternative cable designs (Figure 5).

Ordering Information

GORE® Aerospace Ethernet Cables are available through several distributors in two standard sizes (Table 2). Visit gore.com/cable-distributors for the list of distributors.

Gore also offers custom cables and terminated assemblies. For more information, please contact a Gore representative.

Table 2: Product Specifications

Part Number	AWG Size	Maximum Outer Diameter mm (in)	Minimum Bend Radius mm (in)	Nominal Weight kg/km (lbs/1000 ft)	Typical Attenuation[a] 24 AWG: dB/80 m (dB/262 ft) 26 AWG: dB/65 m (dB/213 ft)		
					100 MHz	200 MHz	500 MHz
RCN9034-24	24 (19/36)	6.6 (0.26)	13.7 (0.54)	62 (48)	19.1	27.6	45.3
RCN9047-26	26 (19/38)	5.6 (0.22)	10.2 (0.44)	48 (32)	19.1	27.6	45.3

[a] Typical attenuation values are based on maximum recommended Cat6a use length.

GORE® Aerospace FireWire® Cables

GORE® Aerospace FireWire® Cables are the premier solution for copper-based 1394b FireWire data links (Figure 6). These cables provide high-fidelity signal links for interconnect solutions up to 75 feet at S400 data rates (Table 3). Gore's unique design offers significant size and weight savings when compared to conventional constructions such as twisted pair cables (Figure 7). This quad design is approximately 40 percent smaller than common dual twisted pair constructions and has saved as much as 11.5 pounds per aircraft (Figure 8). GORE® Aerospace FireWire® Cables are available in three standard sizes ranging from 22 AWG to 26 AWG.

Typical Applications

- Avionics electronics
- Flight control
- Mission systems
- Propulsion control

Figure 6: GORE® Aerospace FireWire® Cables

Standards Compliance

- ANSI/NEMA WC 27500 Performance Requirements: Environmental Testing, Jacket and Marking
- BSS7239: Toxicity
- FAR Part 25, Appendix F, Part I and MIL-W-22759: Flammability
- FAR Part 25, Appendix F, Part V: Smoke Density
- SAE-AS-5643: IEEE 1394b Interface Requirements for Military and Aerospace Vehicle Applications

Figure 7: Robust Construction

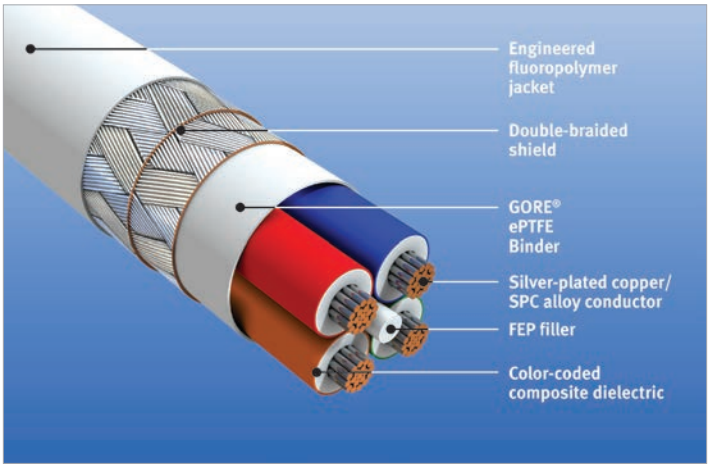


Figure 8: Smaller Quad Cable Diameter

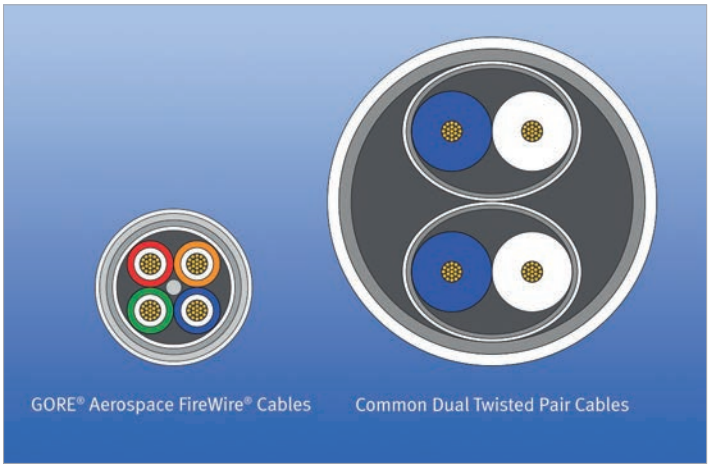


Table 3: Cable Properties

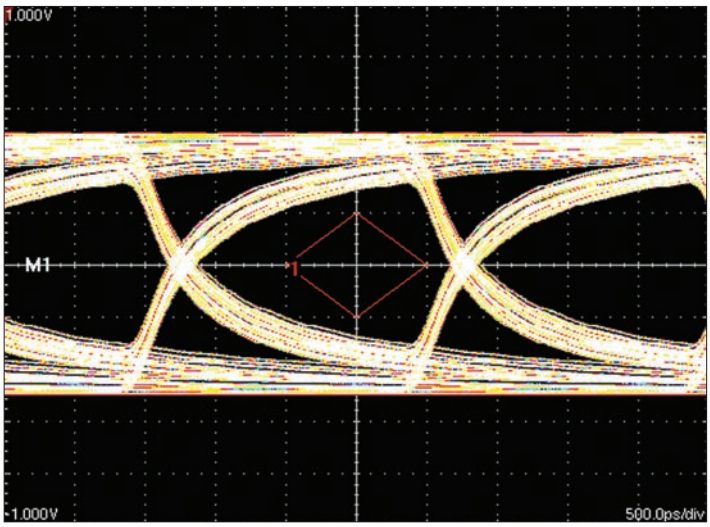
	Property	Value
Electrical	Standard Impedance (ohms)	110 +6/-4
	Voltage Rating (V)	500
	Velocity of Propagation (nominal) (%)	80
	Time Delay (nominal) [ns/m (ns/ft)] 24 AWG	 4.10 (1.25)
	Capacitance [pF/m (pF/ft)]	39.4 (12)
	Skew (ps/ft) (within pair) Typical Maximum	 2.0 4.0
	Dielectric Withstanding Voltage (Vrms) Conductor-to-Conductor Conductor-to-Shield	 1500 1000
Mechanical / Environmental	Jacket Material	Engineered Fluoropolymer
	Jacket Color	White (Laser Markable)
	Conductor	Silver-Plated Copper or Silver-Plated Copper Alloy
	Conductor Color-Coding	Blue/Orange Red/Green
	Dielectric Material	ePTFE/PTFE
	Temperature Range (°C)	-55 to 200

Signal Integrity with Flexure

To ensure signal integrity with flexure of GORE® Aerospace FireWire® Cables, the eye pattern of a 50-ft cable transmitting 500 Mbps of data was evaluated before and during flexure. The diamond-shaped eye mask indicates the minimum receiver sensitivity as specified by IEEE 1394b (Figure 9).

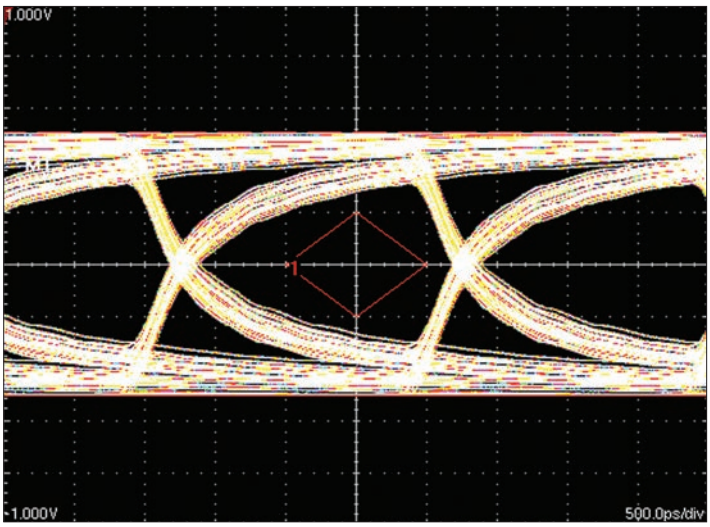
The cable passed the eye mask test with margin, indicating greater transmission length is possible. The eye pattern test was repeated with the 50-ft cable wrapped 20 times around a 0.5-inch radius mandrel. No substantial degradation in signal quality was observed with flexure (Figure 10).

Figure 9: Eye Pattern of 24 AWG



Input Signal: 1.1 V_{p-p}, 2^{7-1} PSRB Pattern

Figure 10: Eye Pattern of 24 AWG with Flexure



Input Signal: 1.1 V_{p-p}, 2^{7-1} PSRB Pattern

Ordering Information

GORE® Aerospace FireWire® Cables are available through several distributors in a variety of standard sizes (Table 4). Visit gore.com/cable-distributors for the list of distributors.

Gore also offers custom cables and terminated assemblies. For more information, please contact a Gore representative.

Table 4: Product Specifications

Part Number	AWG Size	Nominal Outer Diameter mm (in)	Minimum Bend Radius mm (in)	Nominal Weight kg/km (lbs/1000 ft)	Typical Attenuation dB/30 m (dB/100 ft)			
					100 MHz	200 MHz	500 MHz	1 GHz
RCN8645	22	4.95 (0.195)	24.8 (0.98)	61.0 (41.0)	5.5	8.8	12.8	18.2
RCN8647	24	4.47 (0.176)	22.4 (0.88)	46.1 (31.0)	6.8	10.9	15.5	22.5
RCN8652	26	3.51 (0.138)	17.6 (0.69)	33.0 (22.2)	9.0	14.2	20.2	29.5

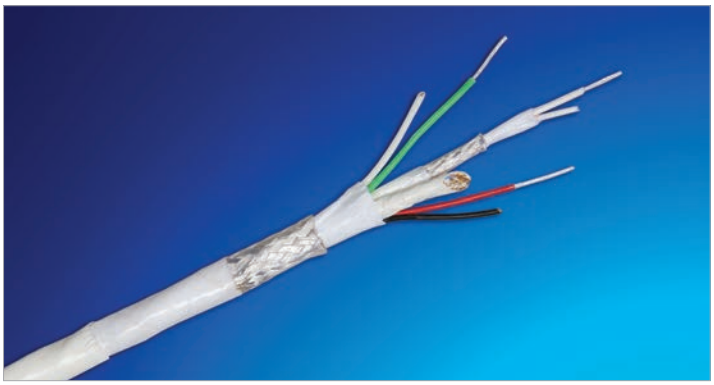
GORE® Aerospace USB 3.1 Cables

GORE® Aerospace USB 3.1 Cables provide reliable signal integrity for high-speed data transmission up to 10 gigabits over longer distances (Figure 11). They support power management from 9-32V systems to ensure passengers can charge their devices quickly and easily. These cables carry more data greater than 5 meters for faster IFE content uploads and downloads (Table 5). In addition, they have a unique construction that provides durable protection to withstand the most challenging aerospace environments for long service life (Figure 12).

Typical Applications

- Content loading
- Data transfer
- Digital video systems
- Electronic flight bag (EFB)
- Portable electronic devices
- Power remote devices

Figure 11: GORE® Aerospace USB 3.1 Cables



Standards Compliance

- ANSI/NEMA WC 27500 Performance Requirements: Environmental Testing, Jacket and Marking
- AS4373 Test Methods for Insulated Electric Wire
- BSS7239 and ABD0031 (AITM 3.0005): Toxicity
- CS/FAR Part 25, Section 25.853, Appendix F, Part I (b)(7): Flammability
- CS/FAR Part 25, Section 25.853(a), Change 5/Amdt.25-72 (DOT/FAA/AR-00/12, Chapter 4)
- FAR Part 25, Appendix F, Part V, BSS7238, and ABD0031 (AITM 3.0008B): Smoke Density

Table 5: Cable Properties

	Property	Value
Electrical	Standard Impedance (ohms) High-Speed Pairs Low-Speed Pair	 90 ± 5 90 ± 10
Electrical	Voltage Rating (V)	‹ 50
Electrical	Capacitance [pF/m (pF/ft)][a]	50 (15)
Electrical	Test Voltage (DC) Conductor-to-Conductor Conductor-to-Shield	 1500
Electrical	Skew[b] (ps/m) (within pair)	‹ 15
Mechanical / Environmental	Jacket Material	Engineered Fluoropolymer
Mechanical / Environmental	Jacket Color	White (Laser Markable)
Mechanical / Environmental	Conductor	Silver-Plated Copper Alloy
Mechanical / Environmental	Conductor Color-Coding	High-Speed Pairs: Blue/Yellow, Orange/Violet Low-Speed Pair: White/Green Power: Red, Black
Mechanical / Environmental	Dielectric Material	ePTFE/PTFE
Mechanical / Environmental	Temperature Range (°C)	-65 to 200

[a] Shielded twisted pairs only.

Ordering Information

GORE® Aerospace USB 3.1 Cables are available through several distributors (Table 6). Visit gore.com/cable-distributors for the list of distributors.

Gore also offers custom cables and terminated assemblies. For more information, please contact a Gore representative.

Figure 12: Long-Lasting Construction

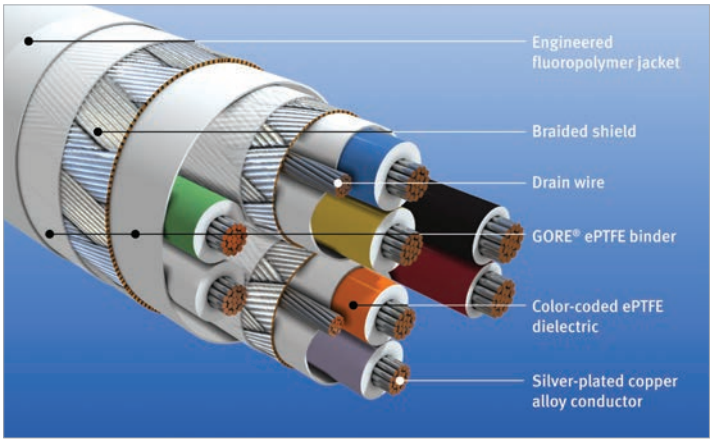


Table 6: Product Specifications

Part Number	AWG Size	Nominal Outer Diameter mm (in)	Minimum Bend Radius mm (in)	Nominal Weight kg/km (lbs/1000 ft)	Typical Attenuation dB/1 m (dB/3.28 ft)
GSC-03-84761-26D	26 (19/38)	5.8 (0.228)	Static (‹20 bends): 15 (0.59) Dynamic: 60 (2.36)	57.0 (38.0)	1.0 @ 625 MHz 1.4 @ 1250 MHz 2.1 @ 2500 MHz 3.1 @ 5000 MHz 4.1 @ 7500 MHz

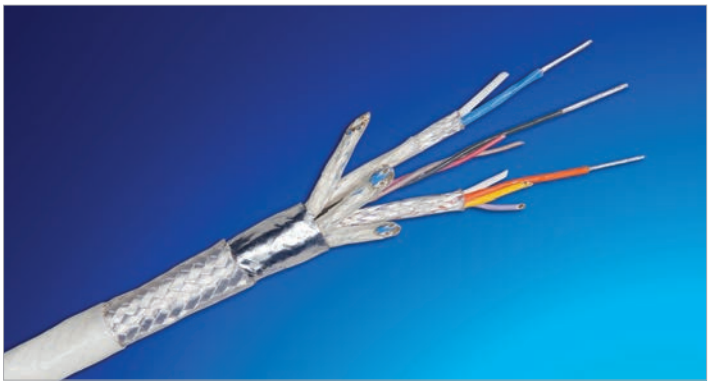
GORE® Aerospace HDMI 2.0 Cables

GORE® Aerospace HDMI 2.0 Cables enable a higher resolution up to 4K at 50/60 (2160p), which is four times the clarity of 1080p/60 video resolution allowing flight crew to experience displays in even higher definition (Figure 13). They also deliver excellent signal integrity for high-speed data transmission up to 18 gigabits per second (Gbps) over longer distances (Table 7). In addition, these lightweight cable bundles have a smaller diameter that increases flexibility with a tighter bend radius making them easier to route in small areas of an aircraft (Figure 14).

Typical Applications

- Electronic flight bag (EFB)
- Flight management systems
- Portable electronic devices
- Weather mapping

Figure 13: GORE® Aerospace HDMI 2.0 Cables



Standards Compliance

- ANSI/NEMA WC 27500 Performance Requirements: Environmental Testing, Jacket and Marking
- AS4373 Test Methods for Insulated Electric Wire
- BSS7239 and ABD0031 (AITM 3.0005): Toxicity
- FAR Part 25, Appendix F, Part I, BSS7230, and ABD0031 (AITM 2.0005): Flammability
- FAR Part 25, Appendix F, Part V, BSS7238, and ABD0031 (AITM 3.0008B): Smoke Density

Table 7: Cable Properties

	Property	Value
Electrical	Standard Impedance (ohms)	100 ± 10
	Voltage Rating (V)	150
	Capacitance [pF/m (pF/ft)][a]	16 (4.9)
Mechanical / Environmental	Jacket Material	Engineered Fluoropolymer
	Jacket Color	White (Laser Markable)
	Conductor	High-Speed Pairs: Silver-Plated Copper Alloy Quad/Triad: Silver-Plated Copper
	Conductor Color-Coding	High-Speed Pairs: Blue/White, Red/White, Green/White, Brown/White Quad: White, Orange, Yellow, Purple Triad: Red, Black, Brown
	Dielectric Material	ePTFE/PTFE
	Temperature Range (°C)	-65 to 200

[a] Twisted quad only.

Ordering Information

GORE® Aerospace HDMI 2.0 Cables are available through several distributors (Table 8). Visit gore.com/cable-distributors for the list of distributors.

Gore also offers custom cables and terminated assemblies. For more information, please contact a Gore representative.

Figure 14: Unique Construction

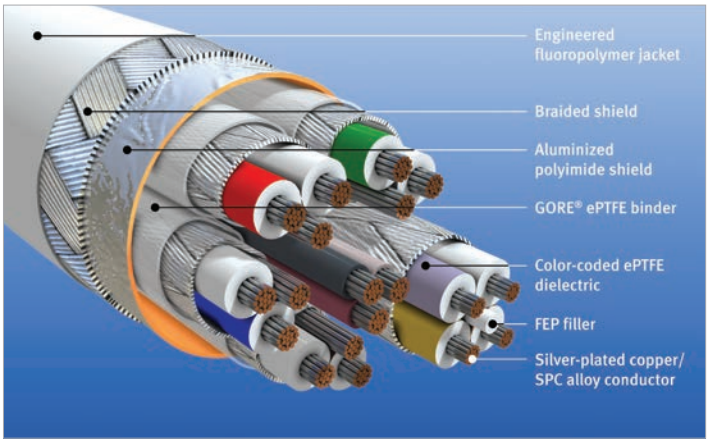


Table 8: Product Specifications

Part Number	AWG Size	Nominal Outer Diameter mm (in)	Minimum Bend Radius mm (in)	Nominal Weight kg/km (lbs/1000 ft)	Typical Attenuation[a] dB/5 m (dB/16.4 ft)
RCN9092	26 (19/38)	6.9 (0.272)	13.8 (0.544)	57.0 (38.0)	5.0 @ 825 MHz 12.0 @ 2475 MHz 20.0 @ 4125 MHz 25.0 @ 5100 MHz

[a] Typical attenuation values are based on maximum recommended use length.

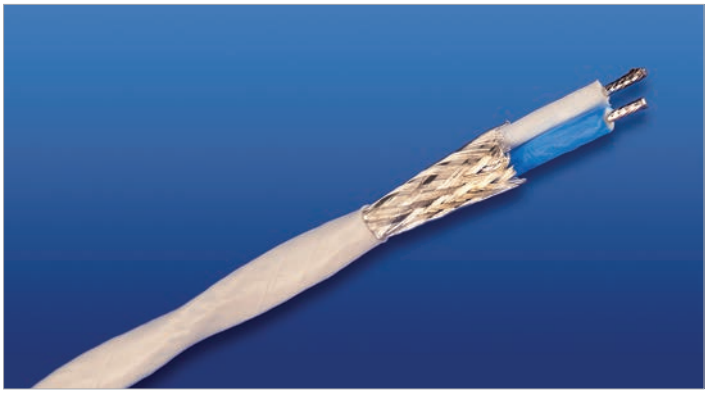
GORE® Shielded Twisted Pair Cables

Well-suited for aerospace harness applications, GORE® Shielded Twisted Pair Cables are highly flexible and easy to route in confined spaces (Figure 15). These cables provide excellent signal integrity while reducing weight by as much as 35 percent when compared to standard cables (Figures 16 and 17). In addition, the combination of materials in this construction supports a wide temperature range to meet the most demanding aerospace environments (Table 9).

Typical Applications

- Avionics electronics
- Cabin management systems
- Digital video systems
- Ethernet networks
- Serial buses

Figure 15: GORE® Shielded Twisted Pair Cables



Standards Compliance

- ANSI/NEMA WC 27500 Performance Requirements: Environmental Testing, Jacket and Marking
- AS4373 Test Methods for Insulated Electric Wire
- BSS7239: Toxicity
- FAR Part 25, Appendix F, Part I and MIL-W-22759: Flammability
- FAR Part 25, Appendix F, Part V: Smoke Density

Table 9: Cable Properties

	Property	Value
Electrical	Standard Impedance[a] (ohms)	100 ±10
	Voltage Rating (V)	500
	Velocity of Propagation (nominal) (%)	80
	Time Delay (nominal) [ns/m (ns/ft)] 24 AWG	4.07 (1.24)
	Capacitance [pF/m (pF/ft)]	42.6 (13)
	Dielectric Withstanding Voltage (Vrms) Conductor-to-Conductor Conductor-to-Shield	 1500 1000
Mechanical / Environmental	Jacket Material	Engineered Fluoropolymer
	Jacket Color	White (Laser Markable)
	Conductor	Silver-Plated Copper or Silver-Plated Copper Alloy
	Conductor Color-Coding	White and Blue
	Dielectric Material	ePTFE/PTFE
	Temperature Range (°C)	-55 to 200

[a] Contact Gore for other impedance options

Figure 16: Smaller, Lighter Cable Design

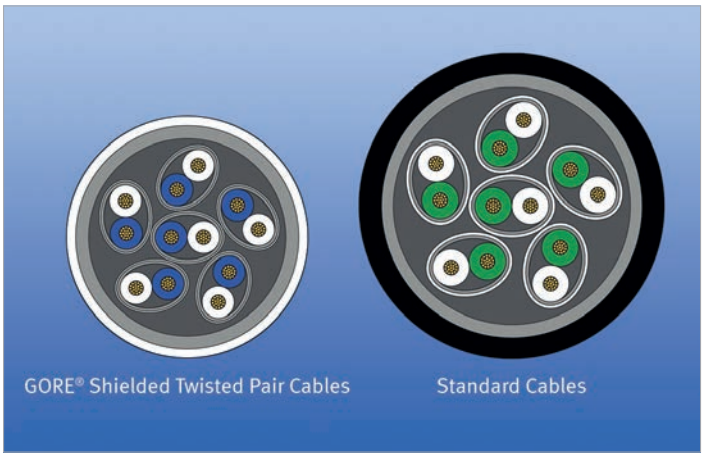
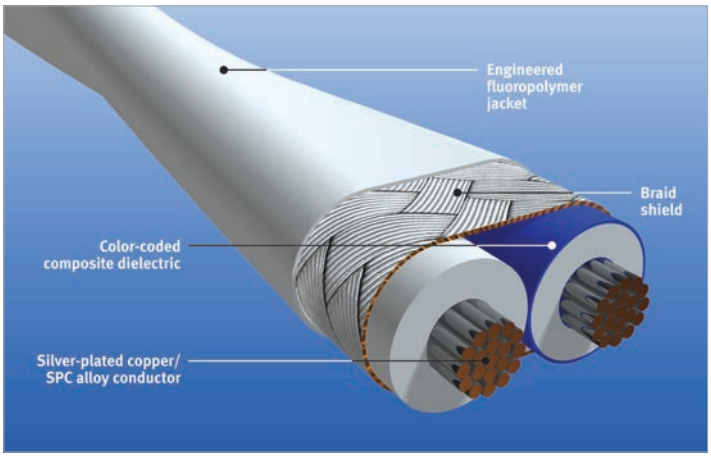


Figure 17: Durable Construction



Ordering Information

GORE® Shielded Twisted Pair Cables are available through several distributors in a variety of standard sizes (Table 10). Visit gore.com/cable-distributors for the list of distributors.

Gore also offers custom cables and terminated assemblies. For more information, please contact a Gore representative.

Table 10: Product Specifications

Part Number	AWG Size	Nominal Outer Diameter Major mm (in)	Nominal Outer Diameter Minor mm (in)	Minimum Bend Radius mm (in)	Nominal Weight kg/km (lbs/1000 ft)	Typical Attenuation dB/30 m (dB/100 ft)			
						100 MHz	200 MHz	500 MHz	1 GHz
DXN2600	20 (19/32)	5.0 (0.20)	3.68 (0.15)	25 (0.98)	31.7 (21.3)	4.8	6.8	11.3	16.4
DXN2601	22 (19/34)	3.81 (0.15)	2.79 (0.11)	19.1 (0.75)	23.2 (15.6)	6.6	9.8	15.7	23.5
DXN2602	24 (19/36)	3.23 (0.13)	2.3 (0.09)	16.2 (0.64)	16.8 (11.3)	7.6	10.7	17.3	25.0
DXN2603	26 (19/38)	2.52 (0.10)	2.1 (0.08)	12.6 (0.49)	12.8 (8.6)	9.4	13.8	21.5	31.2
DXN2604	28 (19/40)	1.98 (0.08)	1.8 (0.07)	9.9 (0.39)	8.6 (5.8)	13.2	19.2	32.0	46.8
DXN2605	30 (19/42)	1.78 (0.07)	1.52 (0.06)	8.9 (0.35)	7.1 (4.8)	20.9	23.6	38.3	56.9

GORE® Aerospace Fiber Optic Cables

Gore has packaged the standard fiber optic cable in a unique construction that improves all aspects of performance to meet ever-increasing data needs (Figure 18).

GORE® Aerospace Fiber Optic Cables withstand the challenging environments they encounter throughout an aircraft's service life. These cables deliver excellent signal integrity for high-speed data transmission in wide temperature ranges (Table 11). In addition, The unique dual buffering system in the construction of these cables resists crushing, kinking and abrasion while maintaining reliable signal integrity before and after installation (Figure 19). The combination of materials in this construction also increases fiber movement under compression that improves termination with standard aerospace connectors.

Typical Applications

- Avionics networks
- Cabin management systems
- Digital video systems
- Ethernet backbone
- Flight management systems
- Transceivers
- Weather radar systems

Figure 18: GORE® Aerospace Fiber Optic Cables

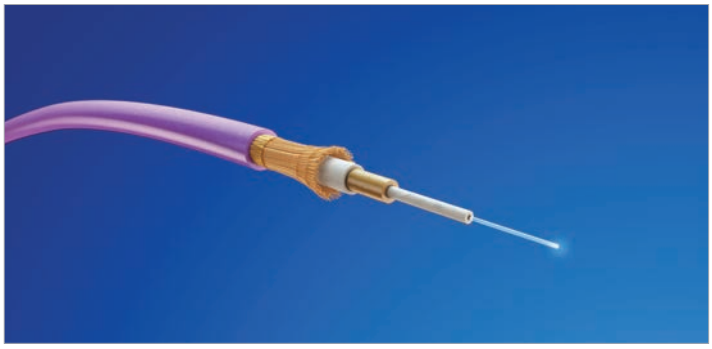
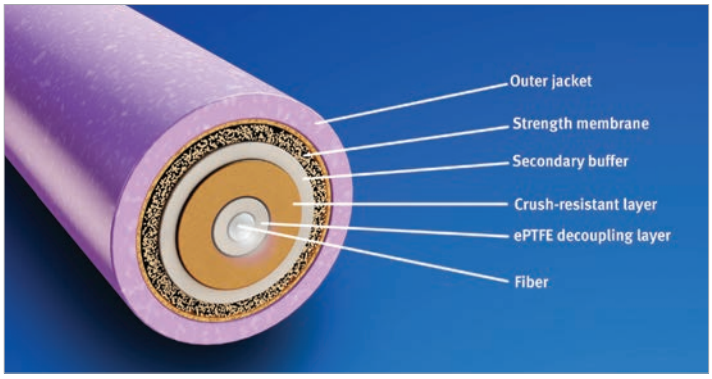


Figure 19: Robust Construction



Standards Compliance

- ANSI/NEMA WC 27500 Performance Requirements: Environmental Testing, Jacket and Marking
- ARINC 802 Performance and Environmental Requirements
- BSS7239 and ABD0031 (AITM 3.0005): Toxicity
- EN4641-301
- FAR Part 25, Appendix F, Part I, BSS7230, and ABD0031 (AITM 2.0005): Flammability
- FAR Part 25, Appendix F, Part V, BSS7238, and ABD0031 (AITM 3.0008B): Smoke Density

Table 11: Cable Properties

	Property	Value
Electrical	Maximum Optical Loss at 850 nm (dB/km)	4.0
	Maximum Optical Loss at 1310 nm (dB/km)	3.0
Mechanical / Environmental	Jacket Material	Engineered Fluoropolymer
	Core Type	Multi-Mode
	Coating Type	High-Temperature Acrylate
	Dielectric Material	ePTFE/PTFE
	Temperature Range (°C)	-60 to 135

Added Durability

Gore evaluated the durability of its cable compared to a leading alternative cable using the EN-4641-301 test method. Results showed that GORE® Aerospace Fiber Optic Cables provided reliable mechanical performance with greater crush resistance for extended service life (Figures 20 and 21). The enhanced durability of these cables allows for lower force to move the fiber under compression while still maintaining excellent signal transmission.

With an exceptional balance of properties, GORE® Aerospace Fiber Optic Cables deliver improved reliability and extended service life in a more robust construction without sacrificing size or weight.

Ordering Information

GORE® Aerospace Fiber Optic Cables are available through several distributors in a variety of standard sizes (Table 12). Visit gore.com/cable-distributors for the list of distributors.

Gore also offers custom cables. For more information, please contact a Gore representative.

Figure 20: Greater Crush Resistance at 850 nm

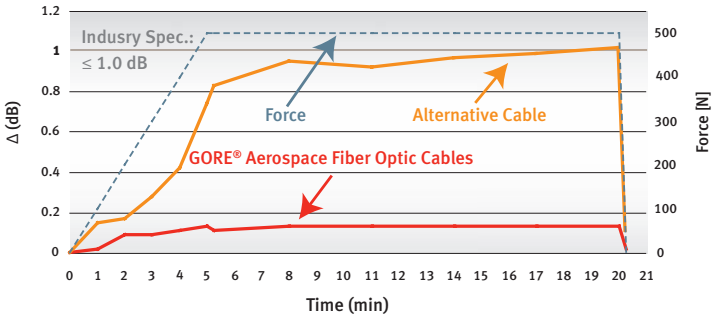


Figure 21: Greater Crush Resistance at 1300 nm

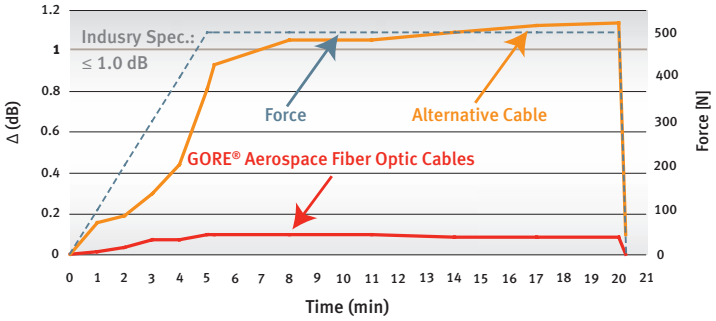


Table 12: Product Specifications

Part Number	Core/ Cladding/ Coating	Jacket Color	Nominal Outer Diameter mm (in)	Minimum Bend Radius mm (in)	Nominal Weight (g/m)	Tensile Strength (N max)
GSC-13-84639-04	50/125/245	Yellow	1.8 (0.07)	18.0 (0.71)	4.0	200
GSC-13-84639-07	50/125/245	Purple	1.8 (0.07)	18.0 (0.71)	4.0	200
GSC-13-84640-04	62.5/125/245	Yellow	1.8 (0.07)	18.0 (0.71)	4.0	200
GSC-13-84640-07	62.5/125/245	Purple	1.8 (0.07)	18.0 (0.71)	4.0	200

GORE® Aerospace

HIGH SPEED DATA CABLES

Application Notes

NOTICE — USE RESTRICTIONS APPLY
Not for use in food, drug, cosmetic or medical device manufacturing, processing, or packaging operations.

W. L. Gore & Associates

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