

GORE® MIL-STD-1760 Assemblies

For Defense Aircraft

Proven Safe Operations with High Flex Life



Benefits

- Guaranteed 100 ejected releases
- Superior protection against EMI at 85% minimal optical coverage over wide temps with flexure
- Proven flex life >100,000 for improved pylon installation and extended operation
- Easy installation due to smaller diameters with high flexibility
- Reduced maintenance, downtime, replacement costs due to robust layout
- Qualified to stringent specifications and certified for 500 disconnects
- Variety of connector options — standard shell sizes 25, 17, 15 stores with relevant inserts
- Class I & II standard versions or customized options to meet aircraft integration requirements
- Flight proven on many airborne platforms with 100% successful store releases

Program Heritage

- A-10 Warthog
- B-1B, B-2
- F-15E, F-16, F-35
- Gripen, GR9
- S-3B Viking
- Super Lynx, Wildcat
- Tornado GR4
- Typhoon

Reliable, long-lasting performance is essential for defense airborne platforms that use MIL-STD-1760 umbilicals to ensure the success of any mission. However, standard umbilicals using screw-on lanyard quick-release connectors are stiff and difficult to install. They also have to be replaced frequently due to significant damage during pylon installation and operation. Replacing these umbilicals involves removing many components out of the aircraft that can be time-consuming. These problems can cause additional maintenance, extra cost, and delays in getting the aircraft into operation.

Gore offers the only sealed hybrid solution proven over time to solve all of these common problems. An affordable, easy-to-install umbilical with a connector system that will not fail during installation or operation.



Consistent Disconnect Loads

GORE® MIL-STD-1760 Assemblies with the L3Harris, Field Replacement Connector System™ (FRCS™) are the only solution on the market proven to guarantee safe operations with a low bend force over wide temperature ranges. These assemblies are also proven to provide superior protection against electromagnetic interference (EMI) (Table 1). Additionally, they have a proven life of more than 100,000 flexes in harsh environments without compromising mechanical or electrical integrity.

Gore's assemblies are certified for more than 100 ejected releases and 400 manual disconnects. They were introduced to the North Atlantic Treaty Organization (NATO) in the mid-1990s. For more than 25 years, they have delivered 100% successful store releases on many defense airborne platforms.

Together, improving life



GORE® MIL-STD-1760 Assemblies for Defense Aircraft

Table 1: Cable Properties

Mechanical / Environmental

Property	Value		
	GSC-01-86039-00 Class I (FO)	GSC-01-86038-00 Class I	GSC-01-85806-00 Class II
Outer Jacket Material	Halogen-Free Elastomer	Halogen-free Elastomer	Halogen-free Elastomer
Outer Jacket Color ¹	Black	Black	Black
Conductor Plating ²	Silver-Plated Copper	Silver-Plated Copper	Silver-Plated Copper
Conductor Color-Coding	Individually Coded Primaries	Individually Coded Primaries	Individually Coded Primaries
Dielectric Material	PTFE/Expanded PTFE	PTFE/Expanded PTFE	PTFE/Expanded PTFE
Braid Shielding ²	Silver-Plated Copper	Silver-Plated Copper	Silver-Plated Copper
Braid Optical Coverage ³ %	> 85	> 85	> 85
Outer Diameter mm (in)	18.7 (0.74)	18.7 (0.74)	18.3 (0.72)
Fiber Optic Core Type ²	OM3 (Multi-Mode, Graded Index)	—	—
Fiber Optic Core/Cladding/Coating	50/125/245	—	—
Fiber Optic Buffering System	Expanded PTFE 900 micron	—	—
Minimum Bend Radius mm (in)			
Static	46.8 (1.8)	46.8 (1.8)	45.8 (1.8)
Dynamic	93.5 (3.7)	93.5 (3.7)	91.5 (3.6)
Flex Life Cycles	> 100,000	> 100,000	> 100,000
Temperature Range °C	-60 to +150	-60 to +150	-60 to +150

1. Other colors available upon request.

2. Other options available upon request.

3. Other optical coverages available upon request.

Superior EMI Shielding Protection

As power and frequency requirements increase in today's applications, radiating umbilicals can interfere with mission-critical systems. These systems can also be susceptible to interference due to inadequate shielding effectiveness. Gore utilizes expertise in manipulating polytetrafluoroethylene (PTFE) to offer assemblies with exceptional protection against EMI.

GORE® MIL-STD-1760 Assemblies are proven to provide superior EMI shielding performance at a minimum of 85% optical coverage in temperatures ranging from -60 °C to +150 °C with constant high flexibility (Figures 1 and 2). They ensure reliable installation and ejections while meeting strict industry requirements. We offer bespoke hybrid assemblies available with various shielding techniques and designs to meet your specific application needs and requirements.

Figure 1: Shielding Effectiveness (Screened RG316)

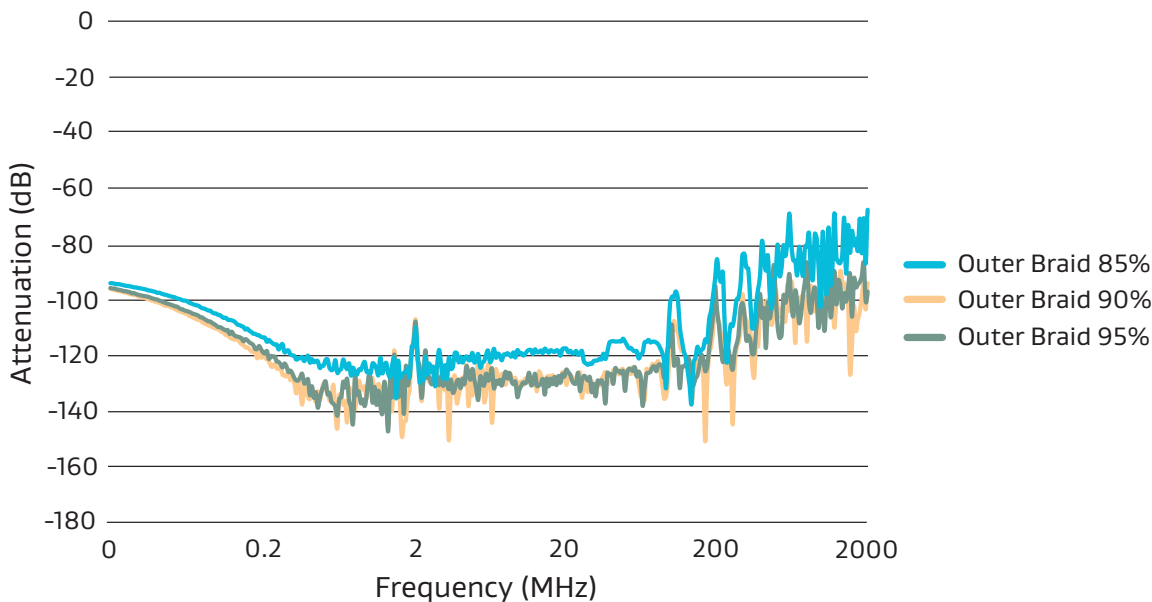
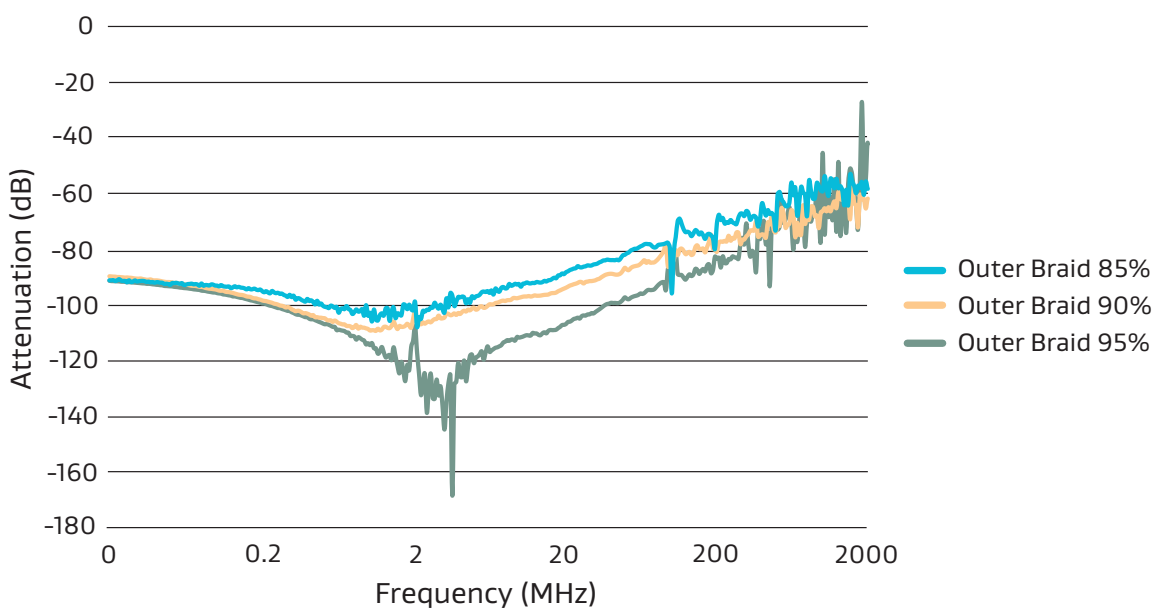


Figure 2: Shielding Effectiveness (Unscreened 16 AWG)



GORE® MIL-STD-1760 Assemblies for Defense Aircraft

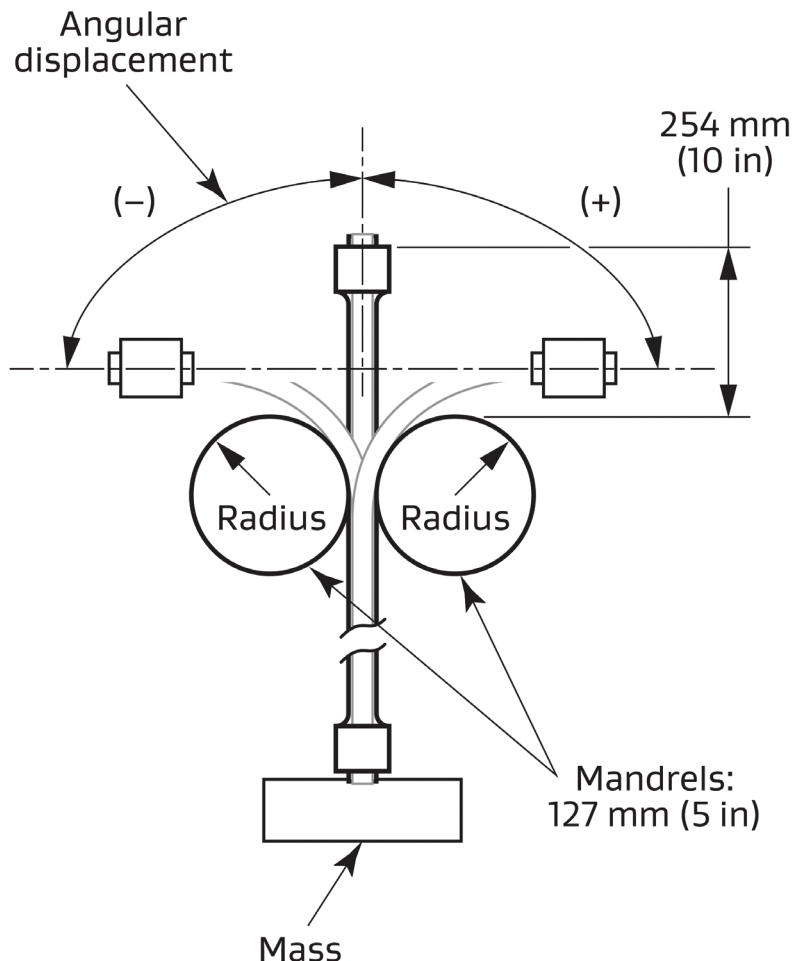
Proven High Flex Life

Constant flexing during installation, maintenance, and operation can fatigue an assembly's components causing performance degradation. Gore performed testing using MIL-STD-810B, Methods 501 and 502, to determine their assembly's ability to withstand repeated flexure over broad temperature ranges encountered during these activities.

Figure 3 shows Gore's assembly positioned in the middle of the simulator at a distance of 254 millimeters (10 inches) from 2 fixed mandrels, each set to a 127-mm (5-in) radius. The test was conducted in temperatures set at -20°C and +60 °C. The assembly was flexed back and forth at a +/- 90-degree rotational angle around the mandrels, and performance was measured.

Results indicated that GORE® MIL-STD-1760 Assemblies withstood more than 100,000 flexes without mechanical or electrical degradation for improved pylon installation and operation.

Figure 3: Test Setup



Easy Pylon Installation

With a robust and highly flexible design, Gore's assemblies are easy to install in limited pylon spaces of aircraft (Figures 4 and 5). They are available in a variety of wire types by protocol with a smaller cross-sectional diameter compared to standard umbilicals (Table 2). Gore's assemblies reduce maintenance, downtime, and life-cycle costs because they withstand rigorous routing and operation — unlike standard umbilicals that typically have to be replaced during installation or after each use.

GORE® MIL-STD-1760 Assemblies can be easily attached to and removed from ASI (Aircraft Store Interface) and MSI (Mission Store Interface) while operating in an NBC (Nuclear Biological Chemical) environment. The technology enables fast and easy connector system replacement while maintaining proven product performance.

Figure 4: Robust, Highly Flexible Layout

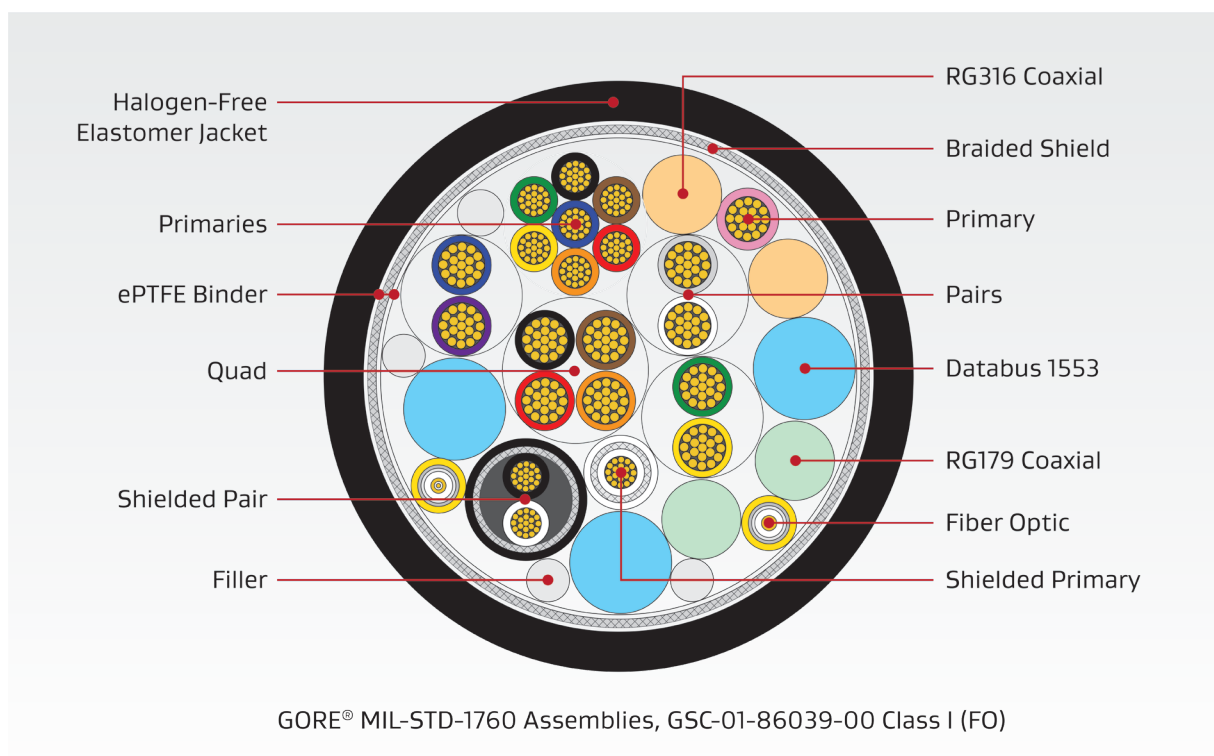
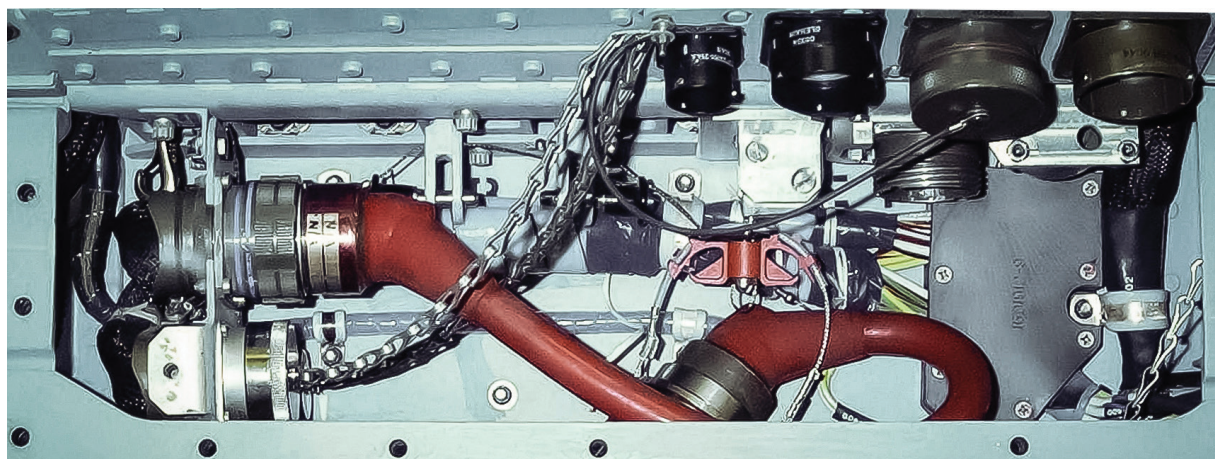


Figure 5: Pylon Installation



GORE® MIL-STD-1760 Assemblies for Defense Aircraft

Table 2: Wire Types

Property	Value		
	GSC-01-86039-00 Class I (FO)	GSC-01-86038-00 Class I	GSC-01-85806-00 Class II
MIL-STD-1760	3 x 77 Ω Databus 1553	3 x 77 Ω Databus 1553	3 x 77 Ω Databus 1553
	2 x 50 Ω Coaxial RG316	2 x 50 Ω Coaxial RG316	1 x 50 Ω Coaxial RG316
	2 x 75 Ω Coaxial RG179	2 x 75 Ω Coaxial RG179	1 x 75 Ω Coaxial RG179
	1 x AWG 16 Quad	1 x AWG 16 Quad	1 x AWG 16 Quad
Aircraft/Store Electrical Interconnection System	3 x AWG 16 Pairs	3 x AWG 16 Pairs	3 x AWG 16 Pairs
	1 x AWG 16 Primary	1 x AWG 16 Primary	1 x AWG 16 Primary
	7 x AWG 20 Primaries	7 x AWG 20 Primaries	7 x AWG 20 Primaries
	1 x AWG 20 Shielded Primary	1 x AWG 20 Shielded Primary	1 x AWG 20 Shielded Primary
	1 x AWG 20 Shielded Pair	1 x AWG 20 Shielded Pair	1 x AWG 20 Shielded Pair
	2 x Fiber Optic ¹ (OM3, MM)	—	—

1. Other options available upon request.

Guaranteed 100 Store Releases

Gore and L3Harris compared the performance of GORE® MIL-STD-1760 Assemblies with the FRCS™ against standard umbilicals that use screw-on MIL-STD-38999/31 lanyard connectors.

Using MIL-STD-810B, Method 501, Procedure II, and Method 502, the simulator was configured on stores with racks adjusted to accurately represent various pylon stations, including retention methods. Data was captured to validate connector loads and store velocity during ejected pit releases.

Results showed that 1 out of 10 new standard umbilicals separated within the specification limit after 100 drops. Also, 50% of the umbilicals were unserviceable after only 3 drops, and 25% failed to disconnect at all and ended up in the pit.

In contrast, results showed that Gore's assemblies delivered consistent disconnect loads and can guarantee 100 fully high-speed instrumental drops. They showed a nominal pull-off force of 51,709 grams (114 pounds) with a variation of less than +/- 20%, and 70% of releases were within +/-10% nominal force, which means the ejection velocity did not affect connector pull-off force. Ultimately, the simulation proved that GORE® MIL-STD-1760 Assemblies with the FRCS® are a more reliable solution to standard umbilicals and connectors.

Standards Compliance

GORE® MIL-STD-1760 Assemblies meet the stringent specification requirements of defense aircraft (Table 3). They have undergone substantial qualification testing to ensure they meet the specifications of the most current standards and our customers' requirements.

Table 3: Qualifications Summary

Examination/Test	Standard
Acoustic Noise	MIL-STD-810D, Method 515.3, Section II, Category C
Continuity	MIL-STD-202F, Method 303
Contamination	DEFSTAN 00-35, Part 3/3, Chapter 4-04
Electrical Interface	MIL-STD-1760 Aircraft/Store Electrical Interconnection System
Electromagnetic Compatibility (EMC)	IEC 96-1, Amendment 2
Explosive Atmosphere	Pan SP-P-90033, Paragraph 6.10.2, Issue 7
Flammability	UL 1581
Flex Life	MIL-STD-810B, Method 501, Procedure II; Method 502
Fungus	MIL-STD-810B, Method 508
Gunfire Vibration	MIL-STD-810D, Method 519.3
Human Engineering Design Criteria	MIL-STD-1472, Paragraph 4.10
Humidity	MIL-STD-810B, Method 507, Procedure II
Icing	BS 3G 100 Part 2, Section 3, Sub-section 3.9, Test C
Insulation Resistance/Dielectric Strength	MIL-STD-202F, Method 302 and 301
Mechanical Shock	MIL-STD-810B, Method 516.1, Figure 516.1-1
Rain and Slush	MIL-STD-810B, Method 506
Resistance to Abrasion by Scraping	SP-P-99301-00P
Salt Fog	MIL-STD-810B, Method 509
Sand and Dust	MIL-STD-810B, Method 510; Method 510.2 Procedure II
Solar Radiation	MIL-STD-810B, Method 505
Temperature Cycling	MIL-STD-810B, Method 501, Procedure II; Method 502
Temperature Shock	MIL-STD-810B, Method 503
Vibration	MIL-STD-810B, Method 514.1, Figure 514.1-2, Curve D

Connector Options

Gore® MIL-STD-1760 Assemblies are designed to fit a variety of connector systems, including the L3Harris, FRCS™ that are jam-resistant with a push/pull, on/off connection, and standard shell sizes 25, 17 and 15 store disconnects. We also have expertise in using alternative designs for other manufacturers such as Amphenol®, Cinch, HiRel, and TE Connectivity.

Bespoke & Custom Assembly Design

Gore offers MIL-STD backshells, custom backshells, and molding designs to meet your specific application requirements (Figure 6).

Figure 6: Molding Designs & Colors



Ordering Information

GORE® MIL-STD-1760 Assemblies for defense aircraft are available in Class I & II standard versions. We also offer customized assembly options to meet aircraft integration requirements. For more information or to discuss specific application needs and assembly design options and place an order, contact a Gore representative today at gore.com/aerospace-defense-contact.

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