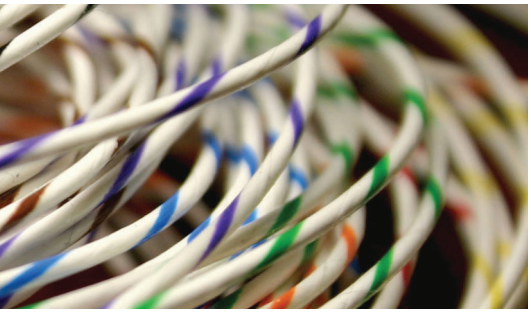
GORE® High Performance Wires
For Defense Land Systems

Ensure EWIS durability & reliability over time with small, light wire bundles



Features & Benefits

- Less risk of wire damage with proven insulation strength that resists chafing, abrasion, and cut-through over wide temperatures
- Chemically inert, non-flammable material resists harsh chemicals/fire for increased vehicle safety and improved system performance
- Longer service life due to hydrophobic, hydrolyzing material with no degradation
- Low-permittivity material ensures higher PDIV/PDEV for improved electrical durability, reducing risk of voltage breakdown over time
- Greater EWIS reliability, increased vehicle availability, improved safety, reduced total costs
- Increased future proofing with wires that can withstand higher voltage requirements

The military is considering electrifying ground vehicles to simplify maintenance and reduce logistical problems associated with fossil fuels. But, electrification means increasing voltages to avoid weight gain in electric vehicle (EV) wiring systems. These higher voltages put more electrical stress on wiring and increase the risk of physical damage. Therefore, wire insulation becomes more critical to ensure system reliability, function, and safety.

However, current insulation materials can be limited in electrical or mechanical durability and degrade over time when exposed to extreme conditions, such as high temperatures or abrasion. These limitations can potentially compromise the integrity and reliability of EWIS (electrical wire interconnection systems). The traditional solution for adding more durability is increasing the amount of insulation used in wiring. But, adding more insulation increases wire bundle size and weight, which increases vehicle weight.

Gore solves all of these challenges by offering one solution that OEMs (original equipment manufacturers) and program managers want and need for future vehicle electrification.

Best Combination of Durability & Long-Term Stability

GORE® High Performance Wires deliver the best combination of superior mechanical strength and outstanding electrical reliability for optimal performance over time without increasing wire bundle size or weight. They meet higher electrical and mechanical durability levels for wire bundles operating in severe land and in-vehicle conditions (Table 1).

The engineered fluoropolymer insulation in our wires has higher PDIV/PDEV while exhibiting higher voltage breakdown and voltage endurance compared to other materials (Figure 1). Our proprietary insulation is chemically inert and does not degrade when exposed to harsh chemicals or humidity. This durable insulation also reduces the risk of chafing, abrasion, and cut-through failures while combating extreme temperatures (Figures 2–4). Unlike current insulation materials, our insulation meets mechanical, electrical, and material stability needs in one solution for current and next-generation vehicles (Table 2).

With proven durability and long-term stability, GORE® High Performance Wires ensure EWIS reliability, increase EV availability, improve safety, and reduce total lifetime costs.

GORE® High Performance Wires For Defense Land Systems

Table 1: Qualifications Summary

Property	Requirement	Standard	Status
Nominal Insulation Wall Thickness	8 mils for engineered fluoropolymer	—	Compliant
Test Voltage	Impulse: 8 kV (peak) High-frequency test voltage: 5 kV (RMS)	—	Compliant
Partial Discharge Inception Voltage	Minimum 900 V	ASTM D3032, Section 25*	Compliant
Partial Discharge Extinction Voltage	Minimum 1900 V	ASTM D3032, Section 25*	Compliant
Dry Arc Propagation	70 out of 75 wires pass dielectric withstand post-test	SAE AS4373, Method 508	Compliant
Wet Arc Propagation	70 out of 75 wires pass dielectric withstand post-test	SAE AS4373, Method 509	Compliant
Flammability	No incendiary particles; burn <3.0 mm (1.18 in); self-extinguish in 3 seconds	SAE AS4373, Method 801	Compliant
Humidity resistance	5000 m per ohms / 1000 ft after exposure	SAE AS4373, Method 603	Compliant
Dynamic Cut-Through Resistance	23°C, 30 lb 150°C, 25 lb 200°C, 25 lb 260°C, 10 lb	SAE AS4373, Method 703	Compliant
Abrasion Resistance	23°C, >20,000 cycles 70°C, >3,000 cycles 150°C, >1,000 cycles	SAE AS4373, Method 301	Compliant
Tensile Strength	Average >60 lb	SAE AS4373, Method 705	Compliant
Wrap Back	No cracks after wrapping	SAE AS4373, Method 714	Compliant

* Test carried out in dielectric fluid.

Gore completed all testing according to SAE AS4373™ methods using size 20 AWG. Also, Gore compared performance results for part number, GWN3001-20-NCC-U-9, against commonly used wire types.

Figure 1: Short-Term Voltage Breakdown

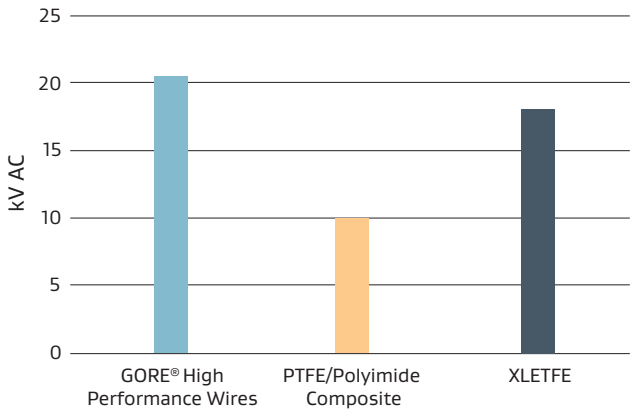


Figure 2: Tensile Strength

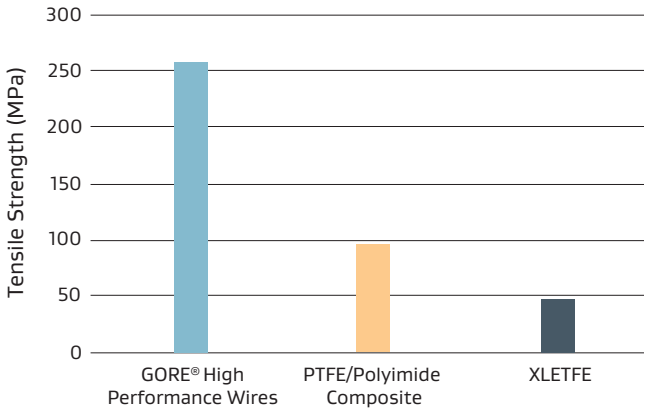


Figure 3: Abrasion Resistance

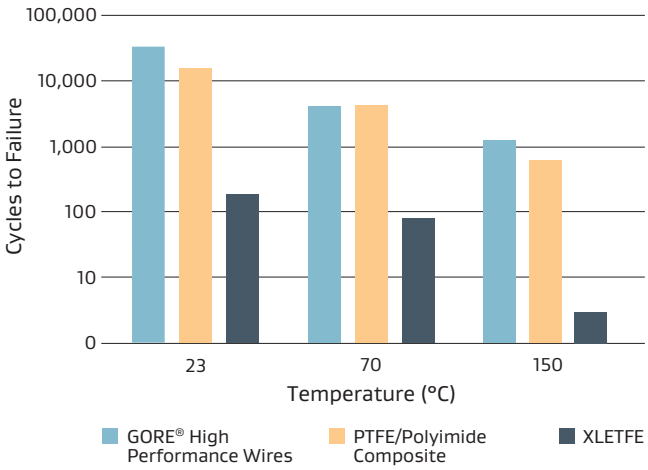
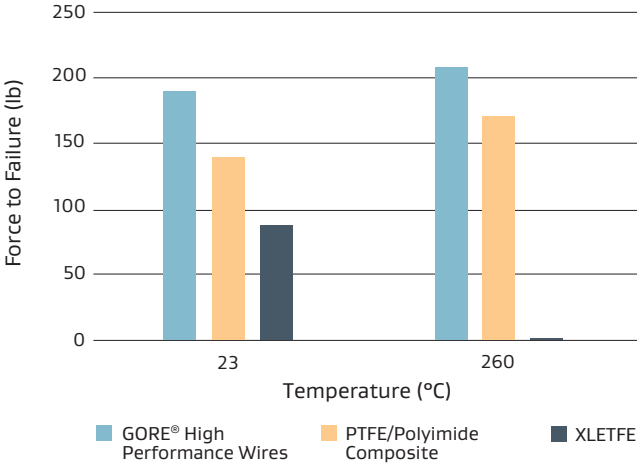


Figure 4: Cut-Through Resistance



GORE® High Performance Wires For Defense Land Systems

Table 2: Material Performance Comparison

Critical Attributes	Extruded Fluoropolymer (XLETFE)	PTFE/Polyimide Composite	Gore Engineered Fluoropolymer (EFP)
Mechanical Durability	🔴	🟡	🟢
Electrical Durability	🟢	🟡	🟢
Long-Term Material Stability	🟢	🔴	🟢

Green = Acceptable/Good
Yellow = Concern/Uncertainty
Red = Unacceptable/Low Performance

Ordering Information

GORE® High Performance Wires for defense land systems are available in standard sizes with short lead times for prototyping and evaluation. Visit **gore.com/cable-distributors** for the list of distributors.

For more information or to discuss your specific characteristic limits and application needs, please contact a Gore representative at **gore.com/contact**.

GWN300X	XX	YY	Z	CC
Construction Type	Wire Size	Conductor Type	Screen Type	Color Coding

Position X: The one-character identifier in the series to determine the construction type.

1 = Single
2 = Pair
3 = Triple
4 = Quad

Position XX: Identifier to determine the specific wire size (Table 3).

Position YY: Identifier to determine the specific conductor type (Table 4).

Position Z: Identifier to determine the specific screen type.

U = Unscreened
S = Screened (Braided)

Position CC: Identifier to determine the specific insulation color coding (Figure 5). Standard insulation color is white. Optional colors are available in white and stripes as defined below. For other colors to meet MIL-STD-104 Class 2 requirements, please contact a Gore representative at **gore.com/contact**.

9 = White
3 = White with Orange Stripe
5 = White with Green Stripe
6 = White with Blue Stripe

GORE® High Performance Wires offer the best combination of durability and long-term stability for optimal performance over time without increasing wire bundle size and weight.

Figure 5: Standard Color-Coding (CC) Configurations

Table 3: Wire Size

Details for additional wire and conductor dimensions are available in the SAE AS22759™/70-75 standard.

AWG Size	Stranding	Minimum Insulation Wall Thicknes in (mm)	Finished Wire Nominal Diameter in (mm)	Finished Wire Maximum Weight lb/1000 ft (kg/km)
30	7	0.007 (0.18)	0.028 (0.71)	0.85 (1.26)
28	7	0.007 (0.18)	0.031 (0.79)	1.01 (1.50)
26	19	0.007 (0.18)	0.035 (0.89)	1.55 (2.31)
24	19	0.007 (0.18)	0.040 (1.02)	2.2 (3.27)
22	19	0.007 (0.18)	0.046 (1.17)	3.1 (4.61)
20	19	0.007 (0.18)	0.054 (1.37)	4.7 (6.99)
18	19	0.007 (0.18)	0.063 (1.60)	7.2 (10.71)
16	19	0.008 (0.20)	0.072 (1.83)	9.1 (13.54)
14	19	0.008 (0.20)	0.085 (2.06)	14 (20.83)
12	37	0.009 (0.23)	0.107 (2.72)	21.9 (32.58)
10	37	0.011 (0.28)	0.132 (3.35)	32.8 (48.79)
8	133	0.012 (0.30)	0.187 (4.75)	59.4 (88.36)

Table 4: Conductor Type

Conductor Type	Description	Plating	Temperature Range °C	Wire Size Range	SAE Standard
SCC	ETP Copper	Silver	200	26 to 8	AS22759/70, AS29606™
NCC	ETP Copper	Nickel	260	26 to 8	AS22759/71, AS29606
SCA	High-Strength Copper Alloy	Silver	200	26 to 20	AS22759/72, AS29606
NCA	High-Strength Copper Alloy	Nickel	260	26 to 20	AS22759/73, AS29606
SCS	Extra High-Strength Copper	Silver	200	26 to 20	AS22759/74, AS29606
NCS	Extra High-Strength Copper	Nickel	260	26 to 20	AS22759/75, AS29606

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