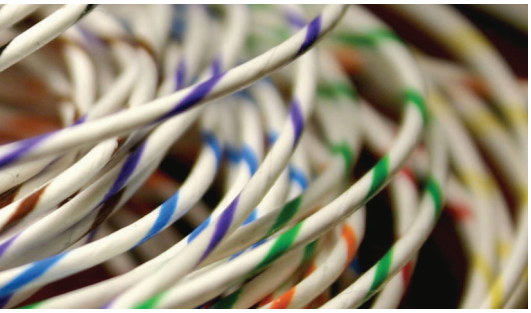
GORE® High Performance Wires
For Defense Land Systems

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, stable insulation improves PDIV performance with higher inception voltages and low PD risk with aging
- Enhanced mechanical durability and high voltage breakdown reduce risk of failure 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 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.

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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.

Table 1: Qualifications Summary

Property	Requirement	Standard	Status
Test Voltage	Impulse: 8 kV (peak) High-frequency test voltage: 5 kV (RMS)	—	Compliant
Partial Discharge Inception Voltage	Minimum 900 V	ASTM D3032, Section 24*	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
Insulated Wire Break 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 to evaluate the insulation's void-free content and quality. Results do not apply for PD in air.

Figure 1: Short-Term Voltage Breakdown

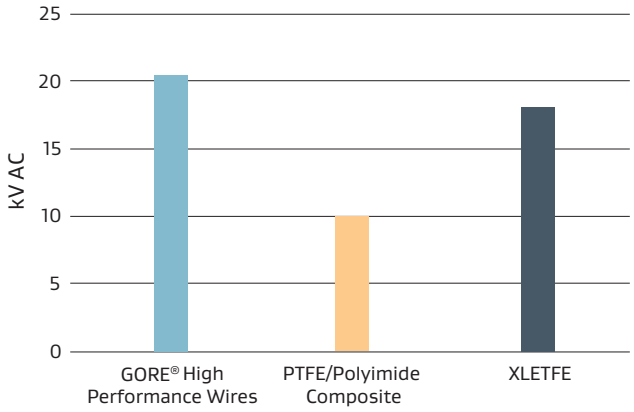

Figure 2: Tensile Strength

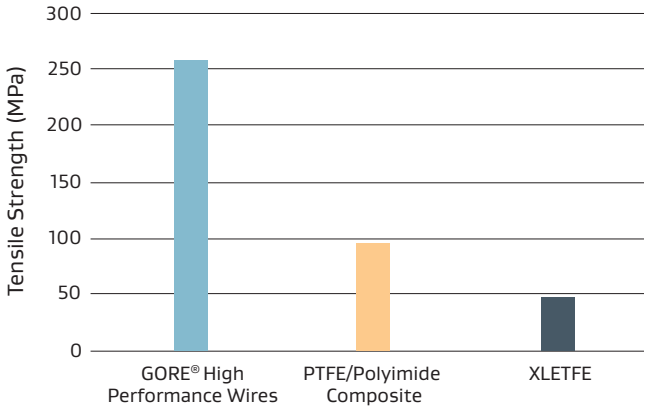

Figure 3: Abrasion Resistance

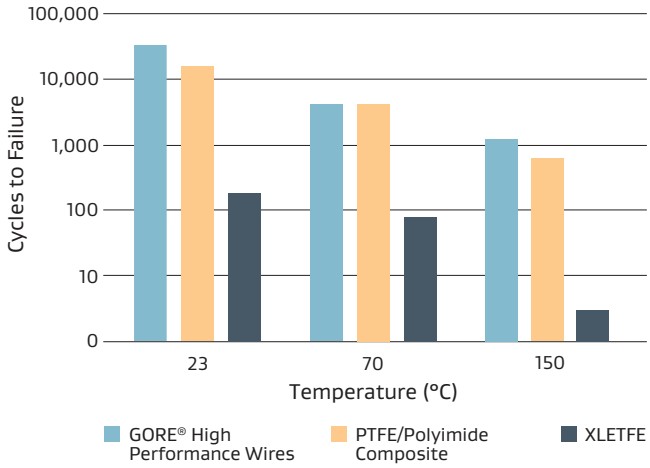

Figure 4: Cut-Through Resistance

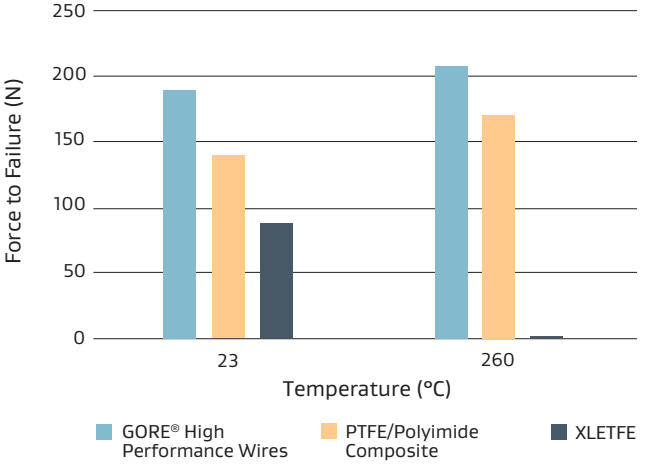

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Table 2: Material Performance Comparison

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

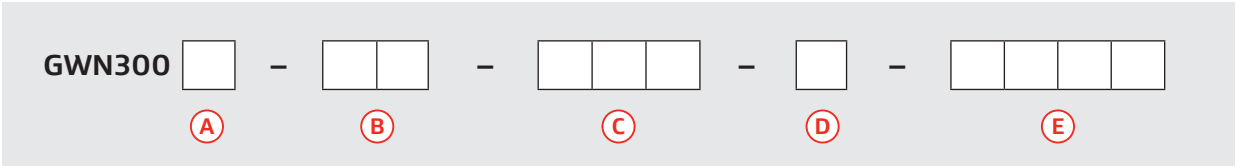
Green = Acceptable/Good
Yellow = Concern/Uncertainty
Red = Unacceptable/Low Performance

Samples & Ordering Information

GORE® High Performance Wires for defense land systems are identified by an 11-character part number. This number designates the construction type, wire size, conductor and shield types, and color coding.

We also offer complimentary samples for prototyping and evaluation. To request samples or place an order, contact an authorized distributor for in-stock availability at **gore.com/cable-distributors.** Alternatively, fill out a short form to request samples at **gore.com/hipawsample.**

For more information or to discuss your specific characteristic limits and application needs, including color coding that meets MIL-STD-104 Class 2 requirements, contact a Gore representative today at **gore.com/aerospace-defense-contact.**



A **Construction Type**
1 = Single
2 = Pair
3 = Triple
4 = Quad

B **Wire Size** (Table 3)

C **Conductor Type** (Table 4)

D **Shield Type**
U = Unshielded
S = Shielded. Standard braided shield (92%) in size 38 AWG.
L = Weight optimized using standard shield (85%) in size 40 AWG (non-compliant to NEMA WC27500)

E **Color Coding** (Figure 5)
9 = White
6 = White with Blue Stripe
3 = White with Orange Stripe
5 = White with Green Stripe

Gore's part number GWN3002-20-NCC-S-96 is an example that meets MIL-STD-104 Class 2 requirements. It includes a standard shielded twisted pair in size 20 AWG with solid white and white with blue stripe color coding and ETP copper nickel-plated conductors (Figure 5).

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

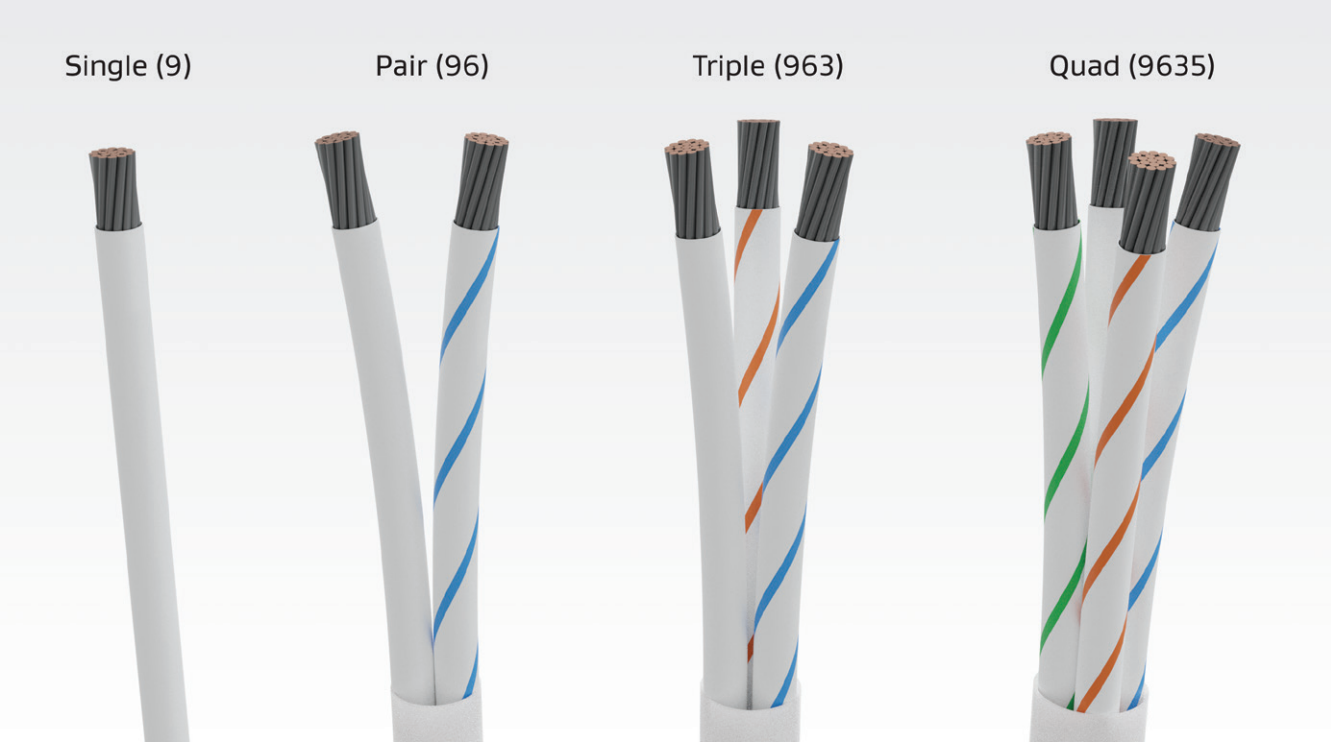


Table 3: Wire Size

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)	0.027 (0.70)	0.86 (1.28)
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)

Table 4: Conductor Type

Conductor Type	Description	Plating	Temperature Range °C	Wire Size Range	SAE Standard
SCC	ETP Copper	Silver	200	24 to 10	AS29606™
NCC	ETP Copper	Nickel	260	24 to 10	AS29606
SCA	High-Strength Copper Alloy	Silver	200	30 to 24	AS29606
NCA	High-Strength Copper Alloy	Nickel	260	28 to 24	AS29606
SCS	Extra High-Strength Copper	Silver	200	30 to 24	AS29606
NCS	Extra High-Strength Copper	Nickel	260	28 to 24	AS29606

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