Insulated Wires for Oil and Gas Industry

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INSULATED WIRES FOR OIL AND GAS INDUSTRY

Overview

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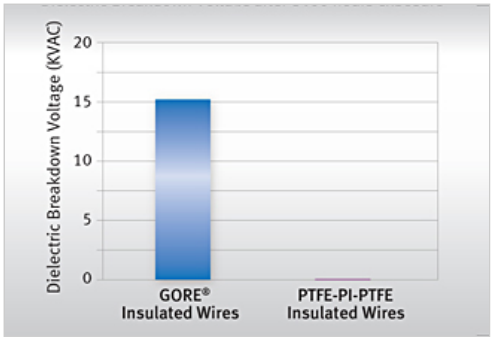
Unsurpassed Performance in Harsh Conditions

GORE® Insulated Wires have an enhanced tensile strength of up to 39,530 psi (272 MPa), which reduces wire breakage during winding and handling operations (Table 1). These wires are engineered to withstand continuous exposure to hazardous environmental contaminants such as acid, water, steam, synthetic oil, methane, and hydrogen sulfide at extreme temperatures, while still providing electrical and mechanical stability for delivering power and data. The thin wall insulation of GORE® Insulated Wires results in smaller solutions with increased durability.

GORE® Insulated Wires were tested per ASTM D2307 and achieved thermal class rating of 300° C (572° F).

Figure 1: Dielectric Breakdown Voltage After 1500 Hours Exposure to Hydrolysis @ 98° C (208° F)

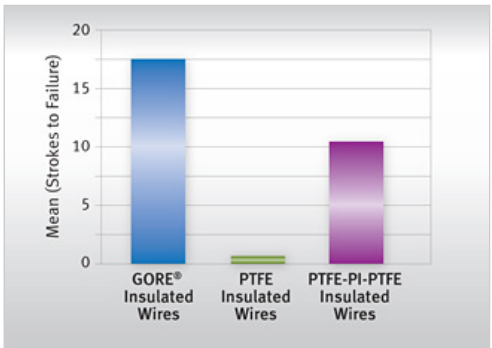


Note: PTFE was not tested.

Outstanding Abrasion Resistance

Gore's unique engineered fluoropolymers are the preferred insulation material for wires used in extremely harsh applications. These insulated wires maintain the excellent chemical resistance of PTFE, while also improving durability and mechanical performance. Testing has shown that GORE® Insulated Wires are more resistant to scrape abrasion, which results in longer and more reliable performance in the application.

Figure 2: Scrape Abrasion



Benefits and Features

- Excellent chemical and hydrolysis resistance resulting in improved equipment life and reliability in extreme temperatures
- Enhanced tensile strength decreasing wire breakage during winding and handling operations
- Improved abrasion resistance that reduces damage during field installations
- Increased power density in extreme temperatures from high dielectric strength

Typical Applications

Oil and gas downhole motors/windings used in:

- Solenoids
- Transformers
- Motors
- Generators

Oil and gas high temperature cable systems:

- ESP or downhole preheating power cables
- Sensor cables, thermocouple wires
- High temperature hook-up wires

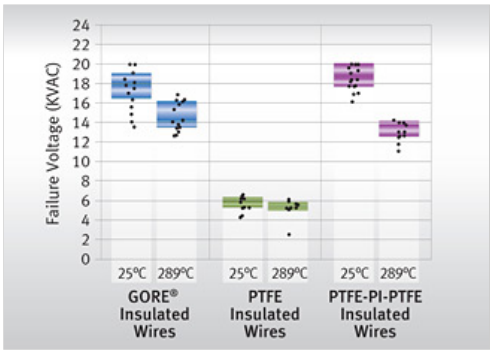
Table 1: Insulation Specifications Comparing GORE® Insulated Wires to Conventional PTFE and PTFE-PI-PTFE Insulated Wires

	Test Method	GORE® Insulated Wires	Conventional PTFE Insulated Wires	PTFE-PI-PTFE Insulated Wires
Tensile Strength (psi/MPa)	Gore test based on ASTM D883-12	39,530 psi 272.55 MPa	2,253psi 15.5 MPa	17,589 psi 121.27 MPa
Dielectric Constant @ 23ºC (73ºF)	ASTMD150	2.1	2.1	2.85
Dielectric Breakdown Voltage @ 23ºC (73ºF)	Gore test based on NEMA MW-1000,3.8.2	17 kVAC	5.8 kVAC	18.2 kVAC
Dielectric Breakdown Voltage @ 289°C (552°F)	Gore test based on NEMA MW-1000,3.8.2	14.5 kVAC	4.9 kVAC	13.2 kVAC
Dielectric Breakdown Voltage after 1500 hrs exposure to Hydrolysis @ 98°C (208°F)	Gore test based on NEMA MW-1000,3.8.2	15.4 kVAC	Not Tested	0 kVAC
Scrape Abrasion	Gore test based on ASTM D1676, Sec.170	17.6 cycles	0.7 cycles	10.4 cycles

The data in this table is based on bare copper wires that are insulated with 6 mil-wall insulation material, with the exception of tensile strength and dielectric constant, which were based on the film material. All noted Gore tests are modified to achieve better accuracy in assessing the insulation materials. For more information or details, contact Gore.

Note: PTFE= polytetrafluoroethylene and PI= polyimide

Figure 3: Dielectric Breakdown Voltage Comparison at Room Temperature and High Temperature



Note: For Dielectric Breakdown Voltage after 1500 hrs exposure to Hydrolysis at 98°C (208°F) specifications, see Table 1