



GORE® High Flex

FLAT CABLE

For Cleanroom Applications

Improve Cable Reliability in Cleanrooms

Particulation and outgassing of materials used in cleanrooms are complex issues. As cables move, flex, and rub against cable chains, the cable jackets can shed particles. In addition, the materials used in constructing cables and assemblies can outgas and contaminate in a cleanroom.

Certified for ISO Class 1 Cleanrooms and low pressure vacuum environments, GORE® High Flex Flat Cables provide a cost-effective solution for cleanroom cable systems. The unique construction of these cables provides consistent reliability and excellent signal integrity. Gore's cables reduce particulation with fewer points of friction in the cable chain and lower coefficient of friction in the jacket. Outgassing is reduced because of the inert characteristics of the jacketing and shielding materials.

REDUCE PARTICULATION

GORE® High Flex Flat Cables can be reliably used in cleanroom environments with consistently low particulation. Using calculations set forth in VDI Guideline 2083 and ISO 14644-1, the Fraunhofer Institute in Germany determined these cables had less than 0.1 percent probability of emitting particulates. GORE® Trackless High Flex Cables, which are appropriate for applications with stroke lengths up to 1.5 meters, reduce the weight and stress of cable systems by eliminating the need for cable chains, dividers, and shelves. GORE® High Flex Cables maintain the lowest particulation levels for repeated flexing in cable chains. Complete details on the Fraunhofer Institute's study are available at gore.com/particulation.

REDUCE OUTGASSING

Requirements for higher integration on chips make it necessary to use light sources such as extreme ultraviolet or electron beam for lithography and related processes with extreme short wavelength. This kind of light is absorbed in the regular atmosphere, so it must be handled in a vacuum environment without using optic lenses. Parabolic mirrors are the latest technology used to focus the light beam. This demanding environment requires cables made of polymers that repel hydrocarbons (C_xH_y) and water (H₂O). GORE® High Flex Flat Cables are the ideal cable choice for this environment because they are constructed of expanded polytetrafluoroethylene (ePTFE), a very flexible, low outgassing polymer (Table 1). Independent tests have proven that these cables consistently have the lowest possible outgassing values of water and hydrocarbons in a vacuum (Table 2).



REALIZE THE BENEFITS OF GORE® HIGH FLEX CABLES

- **Reduce particulation** because of the unique low-friction ePTFE jacket
- **Reduce outgassing** from chemically inert, additive-free, pure PTFE materials
- **Improve signal integrity** from the low dielectric constant and loss tangent of ePTFE
- **Eliminate cable track or chain altogether** with self-supported GORE® Trackless High Flex Cable
- **Decrease downtime and maintenance costs** from proven flex life and excellent data transmission



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TABLE 1: OUTGASSING SPECIFICATIONS FOR GORE® CABLE

Compound	Gas Leakage Rate
H ₂ O	<3.5x10 ⁻⁶ mBar liter/sec cm ²
CxHyv	<6.6e ⁻⁹ mBar liter/sec cm ² (<100 AMU)
CxHynv	<6.6e ⁻¹⁰ mBar liter/sec cm ² (<100 AMU)

AMU=Atomic Mass Units

TABLE 2: NASA AND ESA TEST RESULTS* FOR GORE® CABLE

Material	TML (%) Limit <1.0%	CVCM (%) Limit 0.1%
GORE® PTFE and ePTFE Insulated Wire	0.03	0.0
Shield Wires	0.01	0.01
GORE® PTFE Cable Jacket	0.01	0.01

*Per ASTM E595-07 Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment.

IMPROVE CABLE MANAGEMENT WITH SUBSTANTIAL COST SAVINGS

Using GORE® High Flex Flat Cables can substantially reduce costs in several ways. First, flat construction eliminates the need for dividers and shelves in cable chains, which decreases the total weight of the cable system. Second, the lightweight ePTFE used in jacket constructions is 1/2 to 1/3 the thickness of most round cable jackets and meets UL requirements for safety and flame resistance. A smaller cable chain can often be used — or even eliminated completely — further reducing the overall cost of the moving cable system. In addition, the unique construction of these cables delivers a higher flex life and smaller bend radius without compromising signal integrity — reliable performance that cannot be matched.

THE ADVANTAGES OF GORE® CABLES

Gore has conducted extensive research on cable construction and applications to understand the environmental conditions where these products are used. Combining this research with over 50 years of expertise in developing high-performance ePTFE membranes, Gore has developed a full line of cables and cable assemblies to meet your application needs. These cables are currently being used in photolithography and semiconductor equipment applications. GORE® High Flex Cables can be configured using our online design tool (gore.com/designacable) For Customized cables engineered in collaboration with Gore technical specialists for use in low particulation and vacuum flex cable systems contact Gore.

GORE® HIGH FLEX FLAT CABLE

GORE® High Flex Flat Cable provides a simple cable management system in applications where flex-life reliability is critical. These cables reduce particulation, eliminate the need for dividers, and can be used in any energy chain or cable track. GORE® High Flex Flat Cables have a proven flex life of greater than 20 million cycles at 50-millimeter (two-inch) bend radius.

GORE® TRACKLESS CABLE

GORE® Trackless High Flex Cable allows automated equipment manufacturers to eliminate cable track. GORE® Trackless High Flex Cable is ISO Class 1 cleanroom certified and provides smaller size, lighter weight, and lower vibration compared to traditional cable chains or tracks. With a proven flex life greater than 10 million cycles at 50-millimeter (two-inch) bend radius, these cables improve reliability and decrease downtime.

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