

原文地址: http://nepp.nasa.gov/npsl/Wire/insulation_guide.htm

Wire Insulation Selection Guidelines (NASA)

电线绝缘材料选择指南 (NASA)

Insulation Types 绝缘类别	Advantages 优点	Disadvantages 缺点
<p>FEP and PTFE (Dupont™ Teflon) 聚全氟乙丙烯和聚四氟乙烯 杜邦的特氟龙</p>	<ul style="list-style-type: none">• Excellent high temperature properties. PTFE Teflon is preferred for solder applications. FEP is preferred for jacket material.• 优异的高温特性, PTFE 一般用在可锡焊场合, FEP 一般用于作为护套材料。• Non-flammable 不易燃的。• Good outgassing characteristics 好的逸气性• Most flexible of all insulations, 全部都有柔软性• Good weatherability, resists moisture absorption and atomic oxygen erosion, 好的耐气候性, 抗吸潮性好, 抗原子氧腐蚀指标好。	<ul style="list-style-type: none">• Susceptible to cold flow when stressed (bent) over tight radius or when laced too tightly.• 当在小直径弯曲或紧绑时的冷流性不好。• Degraded by solar radiation above 5×10^5 RADS.• 太阳辐射超过 5×10^5 RADS 会退化。• FEP has poor cut through resistance 抗切通性差。• Heaviest insulation 重量重! !
<p>ETFE 聚四氟乙烯-乙烯共聚物 (Dupont™ Tefzel) 杜邦</p>	<ul style="list-style-type: none">• Withstands physical abuse during and after installation• 在安装时或以后的实际使用效果好• Good high and low temperature properties 好的高低温特性。• High flex life 高弯折寿命。• Good outgassing characteristics 好的逸气性• Fair cold flow properties 不错的冷流性。	<ul style="list-style-type: none">• Some ETFE insulations fail flammability in a 30% oxygen environment 在 30% 的氧含量环境下会部分不通过燃烧测试。• Insulation tends to soften at high temperature• 高温下会变软。• Degraded by gamma radiation above 10^6 RADS• 超过 10^6 RADS 的伽玛辐射时会退化。

<p>Crosslinked ETFE 交联聚四氟乙烯-乙烯共聚物 (Dupont TM Tefzel) 杜邦</p>	<ul style="list-style-type: none"> • Higher strength than normal ETFE 比通常 ETFE 更高的强度。 • Resistant to cold flow and abrasion 好的抗冷流和磨损。 • More resistant to radiation effects (to 5×10^7 RADS) • 更高的抗辐射性 (能到 5×10^7 RADS) • Higher maximum temperature than normal ETFE • 比通常 ETFE 有更高的耐高温性能。 <ul style="list-style-type: none"> ○ Tin Coating (镀锡) = 150°C Max. ○ Silver Coating (镀银) = 200°C Max. • Good outgassing characteristics 好的逸气性 	<ul style="list-style-type: none"> • Some ETFE insulations fail flammability in a 30% oxygen environment 在 30%的氧含量环境下会部分不通过燃烧测试。 • Less flexible than extruded ETFE, 比挤出 ETFE 的柔软性差 • More difficult to work with than PTFE Teflon • 比 PTFE 难使用。
<p>Aromatic Polyimide 聚酰亚胺 (Dupont TM Kapton) 杜邦的 Kapton</p>	<ul style="list-style-type: none"> • Lightest weight wire insulation material. Commonly used with FEP or PTFE Teflon to form layered insulation tapes • 和通常的 FEP, PTFE 比, Kapton 是最轻的绝缘材料。 • Excellent physical thermal and electric properties. Excellent cut-through resistance and cold flow resistance • 优异的物理温度和电性能, 优异的抗切通性和抗冷流性。 • Excellent radiation resistance (to 5×10^9 RADS) • 优异的抗辐射性 (能到 5×10^9 RADS) • Good outgassing characteristics, 好的逸气性 	<ul style="list-style-type: none"> • Inflexibility - difficult to strip. 不柔软, 难剥离。 • Absorbs moisture. Degraded by atomic oxygen. Poor weatherability, 吸潮, 原子氧退化, 差的耐环境性。 • Prone to wet-arc and dry-arc tracking from abrasions and cuts • More difficult to flex 难弯曲。 • Not stable to ultraviolet radiation 紫外线辐射下不稳定。
<p>Crosslinked Polyalkene 交联聚烯烃</p>	<ul style="list-style-type: none"> • Dual extrusion which is fused by sintering. Combines excellent abrasion and cut through resistance of Polyvinylidene Fluoride (PVDF, PVF₂-Penwalt Corp.™ Kynar) with Polyolefin for greater flexibility and improved heat resistance. Polyalkene is used mainly as a primary insulation under an outer jacket such as crosslinked ETFE or crosslinked PVDF/PVF₂ • High dielectric constant, used in high voltage applications 	<ul style="list-style-type: none"> • Lower maximum conductor temperature rating 降低了导体的温度等级。 <ul style="list-style-type: none"> ○ (135°C for GSFC S-311-P-13) ○ (150°C for MIL-W-81044) • Reduced flexibility 柔软性降低。

	<ul style="list-style-type: none">• 高的介电强度，适合高电压使用。• PVDF has good radiation resistance (to 10⁸ RADS)• PVDF 有好的抗辐射性（能到 10⁸ RADS)• More resistant to cold flow, 更好的抗冷流性。• Good outgassing characteristics 好的逸气性	
<p>Silicon Rubber 硅橡胶</p>	<ul style="list-style-type: none">• Excellent flexibility at low temperatures, 低温下优异的柔软性。• Excellent high voltage corona resistance 优异的的高压电晕阻抗。• Good radiation resistance (to 10⁸ RADS)• 好的抗辐射性（能到 10⁸ RADS)• Good cold flow resistance, 好的抗冷流性。	<ul style="list-style-type: none">• Poor cut through resistance, mechanical toughness, and fluid resistance, 差的抗切通性，机械韧性和抗流动性。• Must be processed for outgassing control 必须做好逸气性的处理。• Flammable, 可燃。• No standard silicon rubber insulated wire or cable• 无标准的硅橡胶绝缘电线电缆。