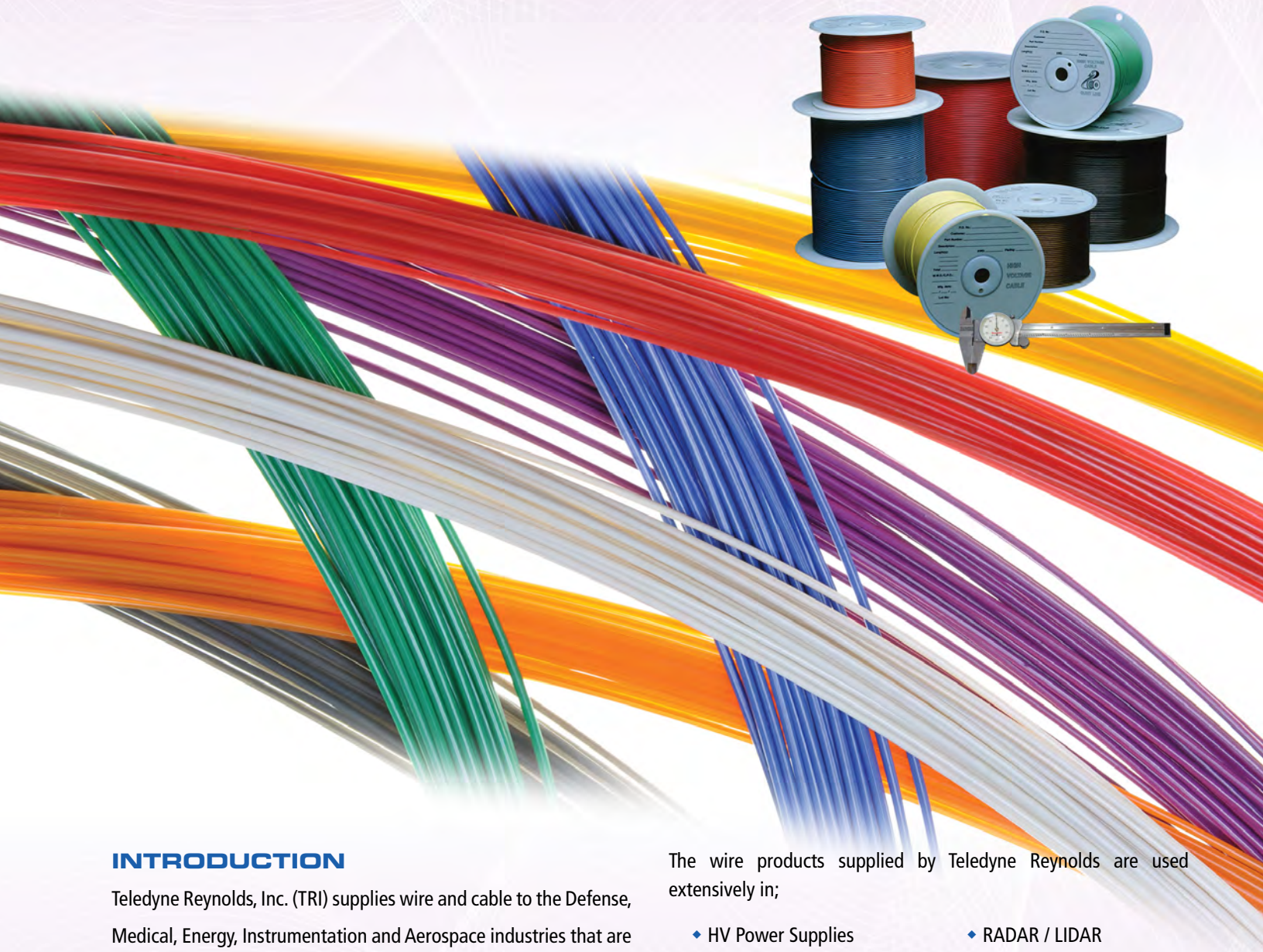
HIGH VOLTAGE
WIRE AND CABLE PRODUCTS



INTRODUCTION

Teledyne Reynolds, Inc. (TRI) supplies wire and cable to the Defense, Medical, Energy, Instrumentation and Aerospace industries that are designed to reliably operate at voltages up to 60 kVDC. Taking advantage of our six decades of experience working in areas such as high voltage induced electric fields, high dielectric strength materials and low partial discharge interconnect design to create products far superior to the traditional wire market. TRI has also continued to meet customer demands to design and manufacture high performance cables that are lighter, smaller and more flexible.

The wire products supplied by Teledyne Reynolds are used extensively in;

- HV Power Supplies
- Satellite Propulsion
- High Energy Physics
- Electron Multipliers
- Traveling Wave Tubes (TWT)
- Electronic Countermeasures
- RADAR / LIDAR
- Photomultiplier Tubes
- Ordinance Systems
- Magnetrons
- Klystrons
- Lasers

TRI welcomes the opportunity to work with you on your current wire and cable requirements and to assist you in developing interconnect products for your next generation high reliability systems.

The Heritage of Teledyne Reynolds, Inc.

Teledyne Reynolds was founded in 1948 as Reynolds Industries in Culver City, California. The company started as a precision machine shop serving the aircraft industry. In 1949 the company added a plastic molding capability and began molding insulators for electrical connectors.

The 1960s proved to be a significant decade in the design and production of high voltage connectors and cable assemblies. The Series 31 connectors and their incorporation into cable assemblies had an impact on the future of the company. This series, and variations of it, are still produced today.

Over the next few decades, Teledyne Reynolds continued to grow in size, product offerings and manufacturing capabilities, quickly becoming the worldwide leader within the high voltage interconnect industry.

Teledyne Reynolds has grown to include four product groups in the U.S. with a manufacturing and design subsidiary in Great Britain to support the E.U. market.

Teledyne Reynolds' products include:

Connector Products

- High voltage connectors and cable assemblies
- Standard and specialized high voltage wire and cable
- Hybrid multi-pin connectors with fiber optic, RF and high voltage compatibility
- Instrumentation and control cable assemblies for nuclear reactors

Electro-Ceramic Products

- Ceramic-to-metal brazed connectors

High Energy Devices

- High current, triggered vacuum switches for electronic safe and arm devices
- Over voltage gas discharge tubes
- High voltage capacitors and voltage multipliers

Special Products

- Helmet-mounted display (HMD) components
- Design, qualification and production of human-to-vehicle interface systems
- LED aircraft lighting products and systems

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Performance

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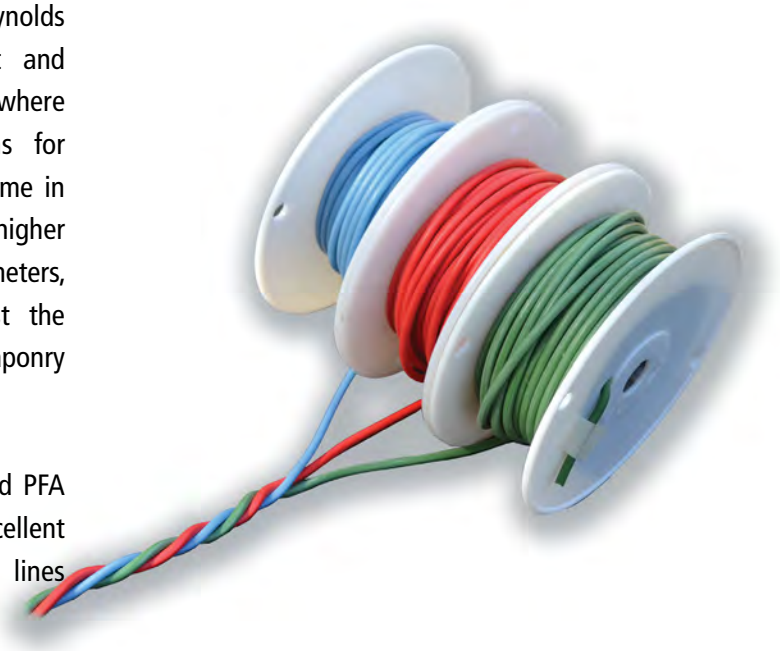
TELEDYNE REYNOLDS
Everywhereyoulook™

The wire products supplied by Teledyne Reynolds are used extensively in the Aerospace, Test and Measurement, Medical, and Defense industries where components are being designed into systems for use well into the 21st century. The recurring theme in these industries is the need for cables with higher performance characteristics but smaller diameters, lower weight, and greater flexibility to assist the payload factor whether in terms of fuel, weaponry or passengers.



Our standard wire products use Silicone, FEP, and PFA insulating materials to produce wire with excellent corona-resistant characteristics. These product lines are complemented by;

Micro Flex™ - A highly flexible wire for high and low voltage applications

Quiet Line™ - A high voltage, distributed loss, RF attenuation cable

Semi/Con™ - A unique wire that is specially designed to reduce or eliminate partial discharges

Hi/Pure™ - high purity wire that is 100% partial discharge tested and optically inspected

ABBREVIATIONS

ETFE	Ethylene Tetrafluoroethylene
FEP	Fluorinated Ethylene Propylene
FG	Fiberglass
PE	Polyethylene
PFA	Perfluoroalkoxy
PO	Polyolefin
PTFE	Polytetrafluoroethylene
SIL	Silicone
SPC	Silver Plated Copper
TPC	Tin Plated Copper

The high voltage wire and cable specified in this catalog are commonly used in a wide spectrum of applications:

- Traveling wave tubes, magnetrons and klystrons
- Photomultiplier tubes
- Mass spectrometers
- Semiconductor wafer inspection equipment
- Laser systems: rangefinders, LIDAR and ring laser gyroscopes
- Night vision systems
- High energy physics research
- High voltage power supplies
- RADAR
- Electronic Countermeasures (ECM)
- Spacecraft propulsion

Design Considerations for High Voltage Wire

There are three primary mechanisms for dielectric failure in a cable or cable assembly: thermal degradation, gradual degradation of the material by partial discharge, and mechanical stress. To minimize these effects, Teledyne Reynolds recommends the following:

- Select a wire with a specified operating temperature range that is greater than the thermal environment that the device will operate in.
- Select a wire with a voltage rating higher than the operating voltage to insure that the wire operates below a voltage that sustains partial discharge.
- Consider higher conductor strand counts for greater flexibility, insulator material for wear resistance or flexibility, and the wire diameter as it relates to bend radius.

If the wire or cable is to be terminated to a connector then the connector's insulation components and assembly techniques need to be considered to ensure the reliability of the high voltage cable assembly design. For that reason, Teledyne Reynolds encourages customers to take advantage of our unique and reliable fabrication methods, encapsulating processes, and bonding techniques, that include complete verification testing of all cable assemblies under simulated aerospace environments.

Quality Control

All the wire and cable presented in this catalog have a recommended steady state DC voltage ratings which are applicable within the altitude and temperature ranges specified. These ranges, unless otherwise noted, are typically at altitudes from sea level to 70,000 feet (21,336 meters) and at temperatures of -55° to 125°C.

As a quality control procedure, each of Teledyne Reynolds' products are, at a minimum, subjected to a dielectric strength test. The purpose of this test is to subject the wire product to a voltage greater than the designed operating voltage. The dielectric strength test value used by Teledyne Reynolds is determined by the scale shown below:

Dielectric Strength Test Voltage Rating	
0 to 12 kVDC	150% of rated voltage
12.1 to 20.0 kVDC	140% of rated voltage
20.1 to 30.0 kVDC	130% of rated voltage
30.1 kVDC and up	120% of rated voltage

AC and Pulsed DC Ratings

Teledyne Reynolds' products, including wire and cable, are solely rated for use at DC. For customers wanting to use these products with an AC component or at pulsed DC, it is recommended that the customer consult with the Teledyne Reynolds' Engineering Department or conduct tests on samples of the product to verify that it meets their specific requirements before final selection of a wire, connector or cable assembly is made.

Corona or Partial Discharge

Customers with concerns about partial discharge, also known as corona, should consult the Teledyne Reynolds Engineering Department before selecting a high voltage wire product. Teledyne Reynolds is extremely knowledgeable concerning the origins of corona, how it effects the reliability of a product and can apply design driven remedies to prevent its inception. Teledyne Reynolds is noted in the industry for its corona detection equipment and technical competence in analyzing the existence and level of corona in wire or connector products. Teledyne Reynolds makes no claim to manufacturing "partial discharge free" connectors, cable or cable assemblies and anyone in the industry that does is mistaken in doing so. Teledyne Reynolds does, however, maintain extensive corona research and test data on its products with the objective of manufacturing products as resistant to the effects of corona as possible.

Operating Temperature Range

For FEP, PFA and silicone rubber wire products, Teledyne Reynolds recommends an operating temperature range of -55° to 125°C, which, although very conservative, is in line with the specified requirements of most military applications. The majority of Teledyne Reynolds' testing and historical data is based on this range.

If the customer's application requires the operation of the product outside of this temperature range, additional testing can be done to verify the reliability of the product in that specific environment.

Cable Routing and Bend Radius

In routing cable, the user should take care to avoid making sharp bends. Sharp bends put added stress on the wire strands and can create a high electric field leading to a corona stress point. Also, sharp or rough metal edges in the routing area should be avoided, especially when using silicone cable.

Bend Radius Formulas

20x cable diameter if cable is to be flexed
10x cable diameter if cable is to be strapped down or in conductor trays
8x cable diameter if cable is potted

Ready-to-Bond™ – FEP/PFA Wire and Cable Etching or Coating

Teledyne Reynolds has a proprietary process of etching or coating the surface of FEP and PFA wire with silicone rubber to enable a cohesive bond when encapsulation with silicone rubber compounds or bonding to molded silicone rubber components using approved elastomeric bonding materials. FEP/PFA wire that has been etched, but not silicone coated, can also be used for encapsulation or bonding to most epoxy materials. These processes give the wires a versatility found in no other high voltage wire or cable and make them an excellent choice for most high voltage applications.

Space Use

Teledyne Reynolds supplies wire and cable for use in Space applications. These products receive stringent cleaning, are 100% hi-pot tested, 100% reel-to-reel corona tested and are 100% reel-to-reel optically inspected using the proprietary TRIvision™ system.

These wires also meet the Space community's outgassing requirements of TML< 1% and CVCM <0.1%. Also, upon special request, the wire or cable can be manufactured using Red Plague resistant conductors.

Liquid Dielectrics

Silicone rubber cable is not compatible with many dielectric oils , including Coolanol® and Fluorinert™. While these are excellent dielectric mediums, they can cause silicone rubber to swell and lose its mechanical properties. Some of Teledyne Reynolds' connectors offer fluorsilicone seals and/or insulators for use with these dielectrics, but only uncoated FEP or PFA cable should be used where these dielectrics are present.

Loss Line Cable

Teledyne Reynolds manufactures a complete line of high voltage, loss line or distributed loss, R.F. attenuation cable called Quiet Line™. Customers requiring R.F. attenuation in their circuits should consider using Quiet Line™. Teledyne Reynolds' engineers are available for application consultation.

Properties of Insulation and Jacket Materials

Material	Specific Gravity (Nominal)	Volume Resistivity (ohm-cm)	Dielectric Strength (kV/mm)	Dielectric Constant (nominal) (ASTM D150)	Resistance to Abrasion	Resistance to Cold Flow	Flame Retardant Properties	Flexibility	Weatherability	Temperature Range (°C nominal)	De-Icing Fluids	Fuel/Oil Resistance	Cleaning Fluids
FLOUROSILICONE	1.40	10^{14}	13.4	7.0	Excellent	Good	Excellent	Excellent	Excellent	-60 to 200	Excellent	Excellent	Excellent
HYTREL®	1.20	10^{18}	33.8	6.0	Excellent	Good	Fair	Fair	Excellent	-50 to 105	Good	Good	Good
NYLON	1.07	10^{14}	17.7	4.0	Excellent	Good	Poor	Poor	Excellent	-40 to 120	Excellent	Good	Excellent
POLYETHYLENE SOLID	0.95	10^{18}	23.6	2.3	Poor	Poor	Poor	Fair	Excellent	-60 to 80	Good	Good	Good
POLYETHYLENE FOAM	0.50	10^{18}	N/A	1.5	Poor	Poor	Poor	Good	Excellent	-60 to 80	Poor	Poor	Poor
POLYPROPYLENE	0.91	10^{15}	25.6	2.2	Excellent	Good	Poor	Poor	Excellent	-40 to 105	Good	Good	Good
POLYURETHANE	1.10	10^{14}	19.7	7.0	Excellent	Good	Poor	Excellent	Excellent	-50 to 80	Good	Good	Good
POLYVINYL CHLORIDE (PVC)	1.37	10^{12}	19.7	5.8	Good	Fair	Excellent	Good	Excellent	-55 to 105	Poor	Poor	Fair
SILICONE RUBBER	1.32	10^{14}	23.6	3.0	Fair	Good	Fair	Excellent	Excellent	-65 to 200	Good	Good	Fair
TEFLON® FEP	2.20	10^{18}	23.6	2.1	Excellent	Fair	Excellent	Fair	Excellent	-70 to 250	Excellent	Excellent	Excellent
TEFLON® PFA	2.10	10^{18}	23.6	2.1	Excellent	Good	Excellent	Fair	Excellent	-70 to 250	Excellent	Excellent	Excellent
TEFZEL®	1.70	10^{16}	15.7	2.6	Excellent	Good	Excellent	Fair	Excellent	-70 to 180	Excellent	Excellent	Excellent
THERMOPLASTIC ELASTOMETER (TPE)	1.00	10^{17}	25.6	2.4	Excellent	Good	Good	Good	Excellent	-75 to 140	Fair	Poor	Fair

Hytrel® and Polyurethane are only recommended for outer jackets.

TPE materials vary widely, data given is for insulation.

Teflon® resins are listed 94 V-O by the Underwriters' Laboratories Inc. in their burning test classification for polymetric materials and they pass the UL 83 vertical flame test.

Characteristics of Shield Materials

Shield Method	Shield Effectiveness (Low Frequency)	Shield Effectiveness (High Frequency)	Percent Coverage	Flex Life	EMI/RFI EMP
COPPER BRAID	Excellent	Excellent	60-95%	Fair	Fair
ALUMINUM MYLAR	Poor	Excellent	100%	Poor	Poor
SPIRAL COPPER	Good	Fair	80-98%	Good	Poor
SEMI-CONDUCTIVE	Fair	Poor	100%	Good	Poor
STEEL BRAID	Excellent	Excellent	60-95%	Fair	Excellent

Extruded, FEP insulated, high voltage wire and cable offers exceptional dielectric strength without the disadvantages common to equally rated silicone rubber insulated cables. As a result, cable assemblies or cable bundles are smaller in diameter, volume and in bend radius thus allowing the system designer to better utilize space within their system. Also, its molecular structure gives it excellent durability and resistance to dielectric/ cooling fluid degradation.

FEP insulation, being a harder material than silicone rubber, is not prone to "pin-holing" and high voltage "punch-thru" when the cable surface is abraded or when strands break during in-field servicing. FEP is also more resistant to damage when making contact with sharp edges. Even so, sharp edges should always be avoided.

Although FEP is generally difficult to bond to, Teledyne Reynolds, has developed a Ready-to-Bond™ product line that is manufactured using proprietary abrading and surface preparation techniques that enable excellent silastic bonds. Teflon® tape wrapped cable, which is similar to FEP in dielectric strength and corona inception, is difficult to bond to because of its multiple spiral cross section, irregular surface and variations in diameter. Therefore, FEP cable should not only be considered for use in cable assemblies, but as high voltage hook-up wire within encapsulated high voltage power supplies, TWTs and transformers.

Properties of FEP Fluorocarbon Resin

Physical, Thermal and Electrical Properties	Typical Values
Specific Gravity	2.14
Tensile Strength (PSI)	3500
Elongation (%)	.325
Flexual Modules (PSI)	90,000
Thermal Conductivity (cal/sec-cm °F)	$6x10^{-4}$
Thermal Expansion (in/in/ °F)	7.5×10^{-5}
Continuous Use Temperature (°C)	204
Melt Temperature (°C)	255-265
Low Temperature Limit (°C)	-240
Hardness Durometer	D56
Water Absorption (%)	<01
Flame Resistance	Excellent
Dieletric Constant, 60-10^6 Hz	2.1
Dissipation Factor, 60-10^6 Hz	<.0007
Volume Resistivity (Ohms-cm)	$<10^{18}$
Surface Resistivity (Ohm/square)	$<10^{16}$
Resistance to:	Rating
Cold Flow or Cut Through	Fair
Ultraviolet Radiation	Excellent
Electro-Mechanical Stress Cracking	Excellent
Chemical-Mechanical Stress Cracking	Excellent

Conductor Material: Copper

Conductor Finish: Silver plated per test requirements of ASTM B298. Meets solderability per MIL-STD-202.

Note: Pre-conditioning of FEP cable after cutting to length is recommended because FEP cable will shrink when exposed to temperature cycling. Pre-conditioning should be conducted in an air circulating oven at 204°C (400°F) for one hour. No attempt should be made to condition wire or cable in bulk form or while spooled.

Teflon® is a registered trademark of Dupont

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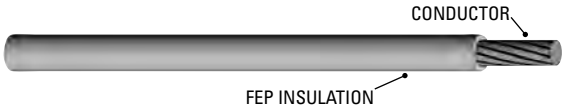
FEP
High Voltage Wire

70,000 ft (21.3km)
-55° to 125°C



FEP Wire Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Conductor Diameter	Diameter over Insulation
		AWG	Strands		in/mm	in/mm
178-9907	5	29	51/46	SPC	.013 / 0.35	.025 / 0.64
178-9912	5	28	19/40	SPC	.015 / 0.40	.040 / 1.02
178-9560	10	20	19/32	SPC	.039 / 1.01	.060 / 1.52
178-5626	12	16	19/29	SPC	.056 / 1.43	.080 / 2.00
178-5079	13.5	28	41/44	SPC	.014 / 0.36	.042 / 1.07
178-5790	18	28	19/40	SPC	.015 / 0.40	.040 / 1.02
178-8751	18	28	19/40	SPC	.015 / 0.40	.050 / 1.27
178-5792	18	26	19/38	SPC	.019 / 0.50	.045 / 1.14
178-7680	18	26	19/38	SPC	.019 / 0.50	.050 / 1.27
178-8072	18	24	19/36	SPC	.025 / 0.64	.050 / 1.27
178-8523	18	24	19/36	SPC	.025 / 0.64	.060 / 1.52
178-8073	18	22	19/34	SPC	.031 / 0.80	.055 / 1.40
178-8679	20	22	19/34	SPC	.031 / 0.80	.055 / 1.40
178-7435	21	20	19/32	SPC	. 031 / 0.80	.080 / 2.00
178-8316	22	20	19/32	SPC	.039 / 1.01	.080 / 2.00
178-8883	22	22	19/34	SPC	.039 / 1.01	.090 / 2.29
178-8545	22	14	19/26	TPC	.070 / 1.80	.150 / 3.81
178-9490	25	26	19/38	SPC	.019 / 0.50	.080 / 2.00
178-9824	25	16	41/32	SPC	.059 / 1.50	.125 / 3.17
167-7628	30	20	19/32	SPC	.039 / 1.01	.100 / 2.54
167-9611	30	16	19/29	SPC	.056 / 1.43	.180 / 4.57

When ordering, use part number and specify length in feet.
The standard color is Natural. Other colors are available on special order. Contact factory for color options and availability, or please specify color requested when ordering.

Note: Pre-conditioning of FEP wire or cable is recommended because FEP insulation will shrink when exposed to temperature cycling. Pre-conditioning should be conducted in an air circulating oven at 204°C (400°F) for one hour. Pre-conditioning should only be performed on cut lengths prior to stripping and any termination procedure. No attempt should be made to condition wire or cable in bulk form or while spooled.

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TELEDYNE REYNOLDS
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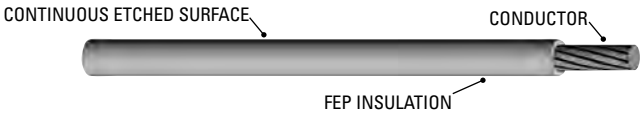
READY-TO-BOND™ ETCHED FEP
High Voltage Wire

70,000 ft (21.3km)
-55° to 125°C



Etched FEP Wire Attributes

Etched Part Number	Operating Voltage (kVDC)	Conductor		Plating	Conductor Diameter	Diameter over Insulation
		AWG	Strands		in/mm	in/mm
178-9908	5	29	51/46	SPC	.013 / 0.35	.025 / 0.64
178-9913	5	28	19/40	SPC	.015 / 0.40	.040 / 1.02
178-9559	10	20	19/32	SPC	.039 / 1.01	.060 / 1.52
700357	12	16	19/29	SPC	.056 / 1.43	.080 / 2.00
700358	13.5	28	41/44	SPC	.014 / 0.36	.042 / 1.07
178-5791	18	28	19/40	SPC	.015 / 0.40	.040 / 1.02
700359	18	28	19/40	SPC	.015 / 0.40	.050 / 1.27
178-5793	18	26	19/38	SPC	.019 / 0.50	.045 / 1.14
178-9556	18	26	19/38	SPC	.019 / 0.50	.050 / 1.27
178-8111	18	24	19/36	SPC	.025 / 0.64	.050 / 1.27
178-8524	18	24	19/36	SPC	.025 / 0.64	.060 / 1.52
700360	18	22	19/34	SPC	.031 / 0.80	.055 / 1.40
178-9122	20	22	19/34	SPC	.031 / 0.80	.055 / 1.40
178-8914	21	20	19/32	SPC	.039 / 1.01	.090 / 2.29
178-9035	22	22	19/34	SPC	.031 / 0.80	.080 / 2.00
178-9123	22	20	19/32	SPC	.039 / 1.01	.080 / 2.00
700361	22	14	19/26	TPC	.070 / 1.80	.150 / 3.81
178-9473	25	26	19/38	SPC	.019 / 0.50	.080 / 2.00
700362	25	16	41/32	SPC	.059 / 1.50	.125 / 3.17
178-8780	30	20	19/32	SPC	.039 / 1.01	.100 / 2.54
178-9119	30	16	19/29	SPC	.056 / 1.43	.180 / 4.57

When ordering, use part number and specify length in feet.
The standard color is Natural. Other colors are available on special order. Contact factory for color options and availability, or please specify color requested when ordering.

Note: Pre-conditioning of FEP wire or cable is recommended because FEP insulation will shrink when exposed to temperature cycling. Pre-conditioning should be conducted in an air circulating oven at 204°C (400°F) for one hour. Pre-conditioning should only be performed on cut lengths prior to stripping and any termination procedure. No attempt should be made to condition wire or cable in bulk form or while spooled.

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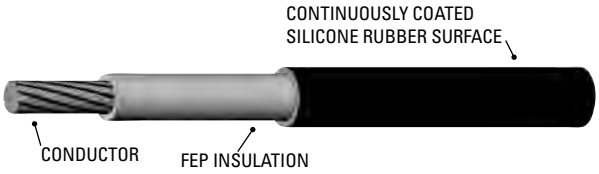
READY-TO-BOND™ SILICONE COATED FEP
High Voltage Wire

70,000 ft (21.3km)
-55° to 125°C

Ready-to-Bond™ silicone coated FEP wire is processed with a uniform silicone rubber coating applied to a prepared surface in the form of a thin wall. This continuous coating provides potting characteristics similar to silicone rubber wire and allows the user to achieve a superior dielectric bond when using silicone rubber potting materials or adhesives. Primer should be applied to the cable as required by the bonding or potting material manufacturer.



Silicone Coated FEP Wire Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Conductor Diameter	Diameter over Silicone Coating
		AWG	Strands		in/mm	in/mm
178-9334	12	26	19/38	SPC	.019 / 0.50	.055 / 1.40
178-5627	12	16	19/29	SPC	.056 / 1.43	.095 / 2.41
178-5186	13	28	41/44	SPC	.014 / 0.37	.048 / 1.22
178-8074	18	26	19/38	SPC	.019 / 0.50	.060 / 1.52
178-8066	18	24	19/36	SPC	.025 / 0.64	.060 / 1.52
178-8067	18	22	19/34	SPC	.031 / 0.80	.065 / 1.65
178-9277	18	22	19/34	SPC	.031 / 0.80	.070 / 1.78
178-9036	21	22	19/34	SPC	.031 / 0.80	.090 / 2.29
178-8884	22	20	19/32	SPC	.039 / 1.01	.100 / 2.54
178-8315	22	20	19/32	SPC	.039 / 1.01	.090 / 2.29
178-8781	30	20	19/32	SPC	.039 / 1.01	.110 / 2.79

When ordering, use part number and specify length in feet.
The standard color is Natural. Other colors are available on special order. Contact factory for color options and availability, or please specify color requested when ordering.

Note: Pre-conditioning of FEP wire or cable is recommended because FEP insulation will shrink when exposed to temperature cycling. Pre-conditioning should be conducted in an air circulating oven at 204°C (400°F) for one hour. Pre-conditioning should only be performed on cut lengths prior to stripping and any termination procedure. No attempt should be made to condition wire or cable in bulk form or while spooled.

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TELEDYNE REYNOLDS
Everywhereyoulook™

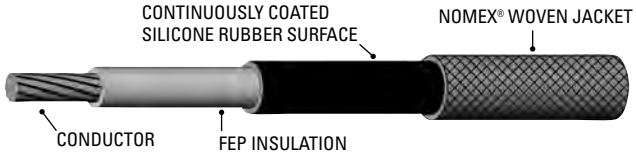
READY-TO-BOND™ SILICONE COATED FEP

with Nomex® Woven Protective Jacket

70,000 ft (21.3km)
-55° to 125°C

Ready-to-Bond™ silicone coated FEP is processed with a silicone rubber coating applied to a prepared surface in the form of a thin wall. This continuous coating provides potting characteristics similar to silicone rubber wire and allows the user to achieve a superior dielectric bond when using silicone rubber potting or adhesives. Primer should be applied to the cable as required by the bonding or potting material manufacturer.

The addition of a Nomex® woven jacket over the silicone coated surface of the FEP insulation provides excellent abrasion resistance.



Silicone Coated FEP Wire with Nomex® Jacket Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Conductor Diameter	Diameter over Insulation	Diameter over Silicone Coating	Diameter over Nomex™ Jacket
		AWG	Strands		in/mm	in/mm	in/mm	in/mm
178-5597	12	16	19/29	SPC	.056 / 1.43	.080 / 2.03	.095 / 2.41	.120 / 3.05
178-5789	18	24	19/36	SPC	.025 / 0.64	.050 / 1.27	.060 / 1.52	.085 / 2.16
178-5724	20	22	19/34	SPC	.031 / 0.80	.060 / 1.52	.070 / 1.78	.095 / 2.41
178-8881	25	20	19/32	SPC	.039 / 1.01	.080 / 2.03	.090 / 2.29	.115 / 2.92
178-9554	30	20	19/32	SPC	.039 / 1.01	.100 / 2.54	.110 / 2.79	.135 / 3.43

When ordering, use part number and specify length in feet.
The standard color is Natural. Other colors are available on special order. Contact factory for color options and availability, or please specify color requested when ordering.

Notes

To prevent fraying of the Nomex® jacket, apply a small band of epoxy resin about 1 inch from the end of the Nomex® jacket. Allow to cure and trim back the Nomex® to the leading edge of the cured epoxy. Alternative methods are shrink sleeving or silicone rubber sleeving in place of the epoxy resin.

Pre-conditioning of FEP wire or cable is recommended because FEP insulation will shrink when exposed to temperature cycling. Pre-conditioning should be conducted in an air circulating oven at 204°C (400°F) for one hour. Pre-conditioning should only be performed on cut lengths prior to stripping and any termination procedure. No attempt should be made to condition wire or cable in bulk form or while spooled.

Product numbers and specs subject to change without notice. Products listed represent only a small selection of Teledyne Reynolds' products.
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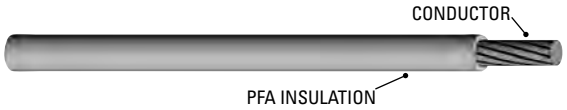
TELEDYNE REYNOLDS
Everywhereyoulook™

READY-TO-BOND™ PFA
High Voltage Wire

70,000 ft (21.3km)
-55° to 125°C



PFA Wire Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Overall Diameter
		AWG	Strands		in/mm
178-5765	15	20	19/32	SPC	.070 / 1.78
178-5764	15	18	19/30	SPC	.080 / 2.03
178-5763	15	16	19/29	SPC	.090 / 2.29
178-7668	18	26	19/38	SPC	.050 / 1.27
178-7669	20	22	19/34	SPC	.060 / 1.52
178-7670	25	20	19/32	SPC	.080 / 2.03
178-8790	25	20	19/32	TPC	.080 / 2.03

Etched PFA Wire Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Overall Diameter
		AWG	Strands		in/mm
178-8791	25	20	19/32	TPC	.080 / 2.03

Silicone Coated PFA Wire Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Overall Diameter
		AWG	Strands		in/mm
178-8792	25	20	19/32	TPC	.090 / 2.29

When ordering, use part number and specify length in feet.
The standard color is Natural. Other colors are available on special order. Contact factory for color options and availability, or please specify color requested when ordering.

Note: Pre-conditioning of PFA wire or cable is recommended because PFA insulation will shrink when exposed to temperature cycling. Pre-conditioning should be conducted in an air circulating oven at 204°C (400°F) for one hour. Pre-conditioning should only be performed on cut lengths prior to stripping and any termination procedure. No attempt should be made to condition wire or cable in bulk form or while spooled.

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TELEDYNE REYNOLDS
Everywhereyoulook™

READY-TO-BOND™ PTFE AND ETFE
High Voltage Wire

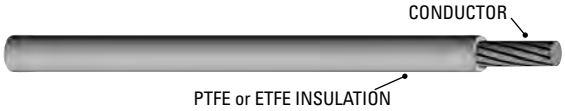
70,000 ft (21.3km)
-55° to 125°C

Properties and Features of PTFE and ETFE

- High dielectric strength
- Excellent chemical resistance
- Excellent high temperature properties
- Good outgassing characteristics
- Resists moisture absorption

Applications

- Military harnessing
- Power supply leads
- Telecommunications
- Medical electronics



PTFE and Etched PTFE Wire Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Overall Diameter	Etched Part Number
		AWG	Strands		in/mm	
167-9899	14.7	20	19/32	SPC	.150 / 3.81	**178-9120**

ETFE and Etched ETFE Wire Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Overall Diameter	Etched Part Number
		AWG	Strands		in/mm	
178-5473	5	29	51/46	SPC	.025 / .635	**178-5474**
178-5509	5	28	41/44	SPC	.030 / .762	**178-5510**
178-5568	5	26	66/44	SPC	.035 / .889	**178-5569**
178-5511	5	24	41/40	SPC	.040 / 1.02	**178-5512**

When ordering, use part number and specify length in feet.
The standard color is Natural. Other colors are available on special order. Contact factory for color options and availability, or please specify color requested when ordering.

Note: Pre-conditioning of PTFE and ETFE wire or cable is recommended because these insulations will shrink when exposed to temperature cycling. Pre-conditioning should be conducted in an air circulating oven at 204°C (400°F) for one hour. Pre-conditioning should only be performed on cut lengths prior to stripping and any termination procedure.
No attempt should be made to condition wire or cable in bulk form or while spooled.

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TELEDYNE REYNOLDS
Everywhereyoulook™

SILICONE RUBBER
High Voltage Wire

70,000 ft (21.3km)
-55° to 125°C

Silicone rubber insulated high voltage wire and cable offer excellent dielectric strength and flexibility. Operation over a wide temperature range and ease of silastic bonding are other outstanding characteristics of silicone rubber cable. Due to the relatively softer nature of silicone insulation when compared to other insulation materials, these wires are more susceptible to "pin-hole" breakdown, abrasion, and some dielectric/coolant fluid incapabilities exist.

Silicone Rubber Wire Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Conductor Diameter	Diameter over Insulation
		AWG	Strands		in/mm	in/mm
167-9634	10	20	19/32	SPC	.037 / 0.94	.100 / 2.54
167-8653	13	20	19/32	SPC	.037 / 0.94	.125 / 3.17
167-9193	17	18	19/30	SPC	.049 / 1.25	.150 / 3.81
178-7200	20	16	41/32	SPC	.060 / 1.52	.165 / 4.19
167-9169	20	16	19/29	SPC	.058 / 1.47	.180 / 4.57
178-6195	35	16	26/30	TPC	.060 / 1.52	.266 / 6.76
167-9180	45	16	19/29	SPC	.058 / 1.47	.280 / 7.11
178-6181	60	14	19/27	TPC	.067 / 1.70	.390 / 9.90

When ordering, use part number and specify length in feet. Contact factory for color options and availability, or please specify color requested when ordering.

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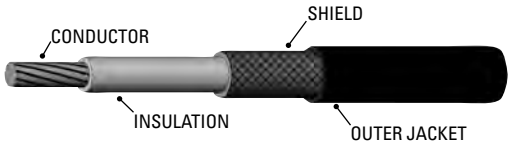
TELEDYNE REYNOLDS
Everywhereyoulook™

COAXIAL/SHIELDED
High Voltage Cable

70,000 ft (21.3km)
-55° to 125°C

Coaxial and shielded cables offered by Teledyne Reynolds have been used in space, military, medical and industrial high voltage applications including radar, electronic countermeasure (ECM) systems, power supplies and instrumentation. Many of the cables have controlled impedance.

- Cables 167-2669 and 178-8793 have **controlled impedance, inductance and capacitance** for fast response times and are used extensively to connect Exploding Bridgewire Detonators (EBW) to a Capacitor Discharge Unit (CDU).



- Cable 178-5065 has **foam insulation**, giving **lower capacitance and higher impedance**. It has been used in cockpit displays.

Silicone rubber insulated high voltage wire and cable offer excellent dielectric strength, flexibility and ease of silastic bonding. Due to the relatively softer nature of silicone insulation, when compared to other insulation materials, these wires are more susceptible to "pin-hole" breakdown, abrasion and some dielectric/coolant fluid incapabilities exist.

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High Voltage Coaxial/Shielded Cable Attributes

Part Number	Operating Voltage (kVDC)	Conductor			Insulation		Shielding			Jacket		Imp. (Ohms)	Atten. dB/100 ft @ 400 MHz	Cap. pF/ft @ 1 kHz
		AWG	Strands	Plating	Material	Diameter in/mm	AWG	Plating	Diameter in/mm	Material	Diameter in/mm			
178-5065	0.60	30	7/38	SPC	FEP	.072 / 1.82	38	SPC	.089 / 2.26	FEP	.103 / 2.61	95	†	13.5
178-8022[1]	5	26	19/38	SPC	PO	.050 / 1.27	36	SPC	.075 / 1.90	PO	.095 / 2.41	46	25.0	33.7
178-6653	6	22	65/40	SPC	PFA	.041 / 1.04	42	SPC	.053 / 1.35	PFA	.070 / 1.78	12	25.0	76.0
167-2896[2]	18	26	19/38	SPC	FEP	.050 / 1.27	36	SPC	.075 / 1.90	FEP	.095 / 2.41	46	25.0	33.7
167-2669[3]	20	16	19/29	TPC	PE	.118 / 2.99	36	TPC	.150 / 3.51	PE	.195 / 4.95	31	16.0	48.0
178-6053[4]	20	16	19/29	SPC	PFA	.118 / 2.99	36	SPC	.150 / 3.51	PFA	.195 / 4.95	35	13.0	40.4
178-8793	20	16	19/29	SPC	PFA	.118 / 2.99	36	TPC	.150 / 3.51	PE	.195 / 4.95	31	16.0	48.0
167-9346	21	22	19/34	SPC	FEP	.080 / 2.03	36	SPC	.100 / 2.54	FEP	.125 / 3.17	43	10.6	31.0
167-9596	22	18	19/30	SPC	SIL	.150 / 3.81	36	SPC	.180 / 4.57	SIL	.250 / 6.35	†	†	†
178-7201	22	16	41/32	SPC	SIL	.165 / 4.19	34	SPC	.197 / 5.00	FG	.306 / 7.77*	†	†	†
167-8726	26	22	19/34	SPC	FEP	.100 / 2.54	36	SPC	.120 / 3.04	FEP	.145 / 3.68	50	8.1	29.3
167-9785	40	20	19/32	TPC	FEP	.150 / 3.81	36	TPC	.180 / 4.57	FEP	.220 / 5.58	50	12.2	26.0
167-8556	40	20	19/32	SPC	FEP	.150 / 3.81	2x36	SPC	.200 / 5.08	FEP	.230 / 5.84	50	12.2	26.0
167-9470	50	16	19/29	SPC	SIL	.280 / 7.11	34	SPC	.304 / 7.72	FG	.340 / 8.64*	†	†	†
178-7221	50	16	41/32	SPC	SIL	.280 / 7.11	34	SPC	.304 / 7.72	FG	.340 / 8.64*	†	†	†
178-6795	60	14	19/27	SPC	FEP	.180 / 4.57	36	SPC	.202 / 5.13	FEP	.255 / 6.47	40	5.56	36.0

[1] Irradiated, cross-linked, polyolefin insulation and jacket rated for use in high radiation from -65° to 110°C
[2] Type "L" cable
[3] Type "C" cable. Rated for use to 85°C
[4] Rated for use to 150°C

† TBD

* Braided jacket

FEP (Fluorinated Ethylene Propylene)
FG (Fiberglass)
PE (Polyethylene)
PFA (Perfluoroalkoxy)
PO (Polyolefin)
SIL (Silicone)

Notes:

When ordering, use part number and specify length in feet.

Colors: 167-2896 standard cable jacket is white. 167-2669 standard cable jacket is red. 178-6053 standard color is yellow. All other cable jackets are black. Contact factory for color options and availability or please specify color needed when ordering.

Pre-conditioning of FEP and PFA wire or cable is recommended because these insulations will shrink when exposed to temperature cycling. Pre-conditioning should be conducted in an air circulating oven at 204°C (400°F) for one hour. Pre-conditioning should only be performed on cut lengths prior to stripping and any termination procedure. No attempt should be made to condition wire or cable in bulk form or while spooled.

MICRO FLEX™
Wire and Cable

Heritage
Quality
Performance

Teledyne Reynolds has developed a range of highly flexible cables that are particularly suitable to the aircraft environment. This technology is a direct result of our research into light weight, durable and flexible cable assemblies needed for Helmet Mounted Display (HMD) systems. These wires have a PFA insulation and high strand count of silver plated copper conductors that enable the wire to have high tolerance to work hardening environments. They have been designed to operate over a wide temperature range of -55° to 125°C at their rated voltages and at altitudes up to 70,000 feet (21,336 meters). Micro Flex™ is available as single wire, twisted pairs or as multi-core cable with or without shielding.

Teledyne Reynolds' unique capability to manufacture Micro Flex™ cable bundles involves the use of special winding tooling to take advantage of the flexibility of the individual wire when laying up a bundle.

Features

- Flexible
- Standard designs up to 18 kVDC operation
- PFA insulation
- Small and lightweight
- Durable
- Reliable
- Non-combustible, low smoke rating
- -55° to 125°C temperature rating

Micro Flex™ Testing

The following tests have been performed to MIL-W-22759 Guidelines:

- Wrap test
- Life cycle
- Low temperature (cold bend)
- Insulation resistance
- Bend test
- Thermal shock
- Blocking
- Dielectric test
- Humidity

Typical Applications

- Helmet Mounted Display CRT cabling
- Night vision system
- Ejection safe Quick Disconnect Connector cabling
- Transformer winding
- Aerostat and UAV tethers
- High vibration aircraft cabling
- Medical instrumentation cabling
- Electrostatic chuck cabling

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TELEDYNE REYNOLDS
Everywhereyoulook™

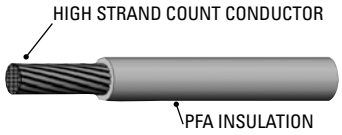
HIGH VOLTAGE
Micro Flex™ Wire and Cable

70,000 ft (21.3km)
-55° to 125°C

Micro Flex™ wire and cable is available uncoated or with a silicone rubber coating over the PFA insulation. The coated cable is processed with a silicone rubber coating continuously applied to the etched surface of the cable. The coated cable has characteristics similar to silicone rubber cable and a superior dielectric bond to silicone rubber potting or bonding material can be achieved.

High Voltage Micro Flex™ Attributes

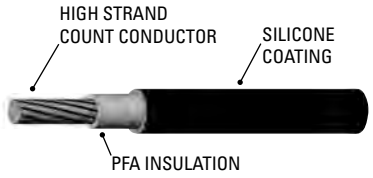
Part Number	Operating Voltage (kVDC)	Conductor		Plating	Conductor Diamater	Diameter over Insulation
		AWG	Strands		in/mm	in/mm
178-5132	3	29	51/46	SPC	.012 / 0.33	.019 / 0.48
178-5135	5	29	51/46	SPC	.012 / 0.33	.025 / 0.64
178-5138	13.5	28	41/44	SPC	.014 / 0.37	.042 / 1.07
178-5141	18	24	41/40	SPC	.022 / 0.58	.050 / 1.27
178-5577	25	16	41/32	SPC	.059 / 1.50	.125 / 3.17



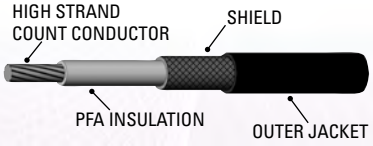
Micro Flex™

Silicone Coated High Voltage Micro Flex™ Attributes

Part Number	Operating Voltage (kVDC)	Conductor		Plating	Conductor Diameter	Diameter over Silicone Coating
		AWG	Strands		in/mm	in/mm
178-5134	3	29	51/46	SPC	.012 / 0.33	.029 / 0.79
178-5137	5	29	51/46	SPC	.012 / 0.33	.035 / 0.89
178-5140	13.5	28	41/44	SPC	.014 / 0.37	.052 / 1.32
178-5143	18	24	41/40	SPC	.022 / 0.58	.060 / 1.52



Silicone Coated Micro Flex™



Shielded Micro Flex™

Shielded High Voltage Micro Flex™ Attributes

Part Number	Operating Voltage (kVDC)	Conductor			Insulation		Shielding			Jacket		Imp. (Ohms)	Atten. dB/100 ft @ 400 MHz	Cap. pF/ft @ 1 kHz
		AWG	Strands	Plating	Material	Diameter in/mm	AWG	Plating	Diameter in/mm	Material	Diameter in/mm			
178-6653	6	22	65/40	SPC	PFA	.041 / 1.04	42	SPC	.053 /1.35	PFA	.070 / 1.78	12	†	76.0

† Not applicable

Contact factory for color options and availability, or please specify color requested when ordering.

Note: Pre-conditioning of PFA wire or cable is recommended because PFA insulation will shrink when exposed to temperature cycling. Pre-conditioning should be conducted in an air circulating oven at 204°C (400°F) for one hour. Pre-conditioning should only be performed on cut lengths prior to stripping and any termination procedure. No attempt should be made to condition wire or cable in bulk form or while spooled.

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TELEDYNE REYNOLDS
Everywhereyoulook™

Teledyne Reynolds' (TRI) Quiet Line™ is a continuously extruded, distributed loss, low-pass filter cable for use in high voltage applications. The stranded center conductor is surrounded with a "lossy" insulation material comprised of ferrite-powder filled silicone. This cable functions much like an inductive low-pass filter, where magnetic losses are dissipated and EMI absorbed. The ferrite in the insulation increases the cable's inductance by concentrating the magnetic field. The increase in inductance, in turn, increases reactance which filters out high frequency noise. The cable's attenuation characteristics increase with frequency and are directly proportional to cable length.

TRI's Quiet Line™ is excellent for use in any high frequency, high voltage application requiring the suppression of undesired RF interference or EMI noise. In addition, use of Quiet Line™ alleviates the need for a traditional low-pass filter circuit with standalone inductors and resistors that increase the mass and take up volume in the system. These attributes make Quiet Line™ an ideal solution in radar, telecommunications, and electronic countermeasures. Other applications include filtering capacitive or inductive coupled noise.

Furthermore, Quiet Line™ has all the added benefits of TRI's high voltage cables and wire:

- Lightweight with small overall diameter requiring minimal volume
- Compatibility with TRI's high performance, high voltage connectors
- Operating altitude: sea level through 70,000 feet (21 km)
- Space rated version available
- Custom designs available upon request

Quiet Line™ is available in a variety of configurations: with Ready-to-Bond™ silicone coating, shielding, and/or an outer jacket. In addition, six standard loss core diameters are offered providing a range of rated voltages and RF insertion loss characteristics. The configurations and attributes of each are shown on the following page. If the standard products listed do not happen to meet your specific requirements, Teledyne Reynolds welcomes the opportunity to offer a custom solution. Please contact a TRI Application Engineer to discuss your needs further.

General Specifications

Conductor and braid	Copper, silver plated
Insulation	Extruded PFA or FEP
Jacket	PFA or FEP
Operating temperature	-55° to 125°C at 70,000 feet altitude
Voltage stress testing	100% test at 140% of rated voltage (room ambient)
Insertion loss testing	100% insertion loss verification performed on each extrusion lot. The swept frequency insertion loss technique is used within the specified frequency range per MIL-C-17F. Test specimens are shielded with a BNC termination.

Quiet Line™ Bulk Cable Ordering Information

EXAMPLE: Part Number 178-8051-100F is a 12 kVDC, extruded PFA Quiet Line™ cable on a 100-foot reel.

Contact factory for color options and availability, or please specify color requested when ordering.

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TELEDYNE REYNOLDS
Everywhereyoulook™

QUIET LINE™
Distributed Loss RF Attenuation Cable

70,000 ft (21.3km)
-55° to 125°C

Quiet Line™ Attributes

Part Number	Operating Voltage (kVDC)	Attenuation (dB/FT nom)		Inner Conductor		Plating	Overall Diameter
		480 MHz	2.4 GHz	AWG	Strands		in/mm
FIGURE 1							
178-8051	12	11	90	22	19/34	SPC	.085 / 2.16
178-8301	15	15	60	24	19/36	SPC	.073 / 1.85
178-8053	20	21	140	22	19/34	SPC	.150 / 3.81
178-8050	20	21	130	22	19/34	SPC	.130 / 3.30
178-8382	20	15	90	22	19/34	SPC	.110 / 2.79
178-8104	20	21	130	22	19/34	SPC	.140 / 3.55
178-8055	20	21	130	22	19/34	SPC	.150 / 3.81
178-8253	20	21	130	20	19/32	SPC	.140 / 3.55
178-8054	20	21	130	20	19/32	SPC	.150 / 3.81
FIGURE 2							
178-8024	12	11	90	22	19/34	SPC	.095 / 2.41
178-8302	15	15	60	24	19/36	SPC	.080 / 2.00
178-7968	20	21	140	22	19/34	SPC	.160 / 4.06
178-8025	20	21	130	22	19/34	SPC	.140 / 3.55
178-8381	20	15	90	22	19/34	SPC	.120 / 3.04
178-8105	20	21	130	22	19/34	SPC	.150 / 3.81
178-7952	20	21	130	22	19/34	SPC	.160 / 4.06
178-8254	20	21	130	20	19/32	SPC	.150 / 3.81
178-7953	20	21	130	20	19/32	SPC	.160 / 4.06
FIGURE 3							
178-8069	12	11	90	22	19/34	SPC	.135 / 3.42
178-8772	20	21	130	22	19/34	SPC	.250 / 6.35
FIGURE 4							
178-8064	12	11	90	22	19/34	SPC	.145 / 3.68
178-8063	20	21	130	22	19/34	SPC	.200 / 5.08
178-8337	20	15	90	22	19/34	SPC	.170 / 4.32
178-8106	20	21	130	22	19/34	SPC	.195 / 4.95
178-8265	20	21	130	20	19/32	SPC	.200 / 5.08
FIGURE 5							
178-8306	12	11	90	22	19/34	SPC	.155 / 3.93

Figure 1

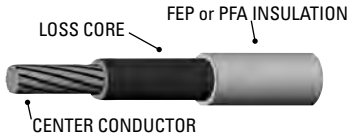


Figure 2

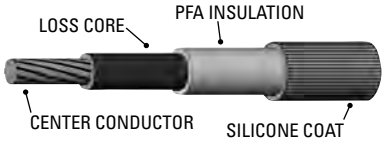


Figure 3

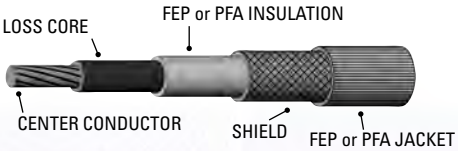
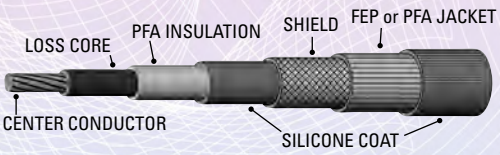


Figure 4

Figure 5



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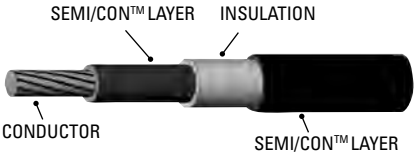
TELEDYNE REYNOLDS
Everywhereyoulook™

Semi/Con™ high voltage (HV), semi-conductive (semicon) silicone cables have a distinct advantage over standard HV cables in that they are more resistant to electrical stress and exhibit very little to no corona at the rated voltage. Corona is an ionization of gas molecules that occur in voids of a cable and along the outside of the cable insulation when near a ground plane. The damage to the wire insulation from corona is proportional to the number of discharges per unit time and the energy of each discharge.



Reducing or eliminating these discharges, commonly referred to as partial discharge, should be a design goal in any high voltage system design. Standard high voltage cables are very reliable in service when installed in equipment and physically separated from grounded structures, especially sharp edges. When these requirements cannot be met, and the need is still present for a high voltage cable that exhibits little to no corona discharge, along with a long operating life, **Semi/Con™ cable is the solution**.

Semi/Con™ cable's high performance attributes stem from the fact that air voids are eliminated along the inner conductor and the semi-conductive outside surface prevents the occurrence of external discharges. Also, the electro-static field within the insulation of the cable is more evenly distributed thus eliminating non-uniform voltage gradients. For comparison, we will consider two types of cable configurations: unshielded cable and shielded cable.

Unshielded Cable

Figures 1 and 2 illustrate the difference in construction between an unshielded cable and a Semi/Con™ cable construction. When the voltage is high enough, corona can be initiated in air pockets between the stranded conductor and insulation, as well as on the outside surface of the wire insulation in regions close to ground. To help prevent this, the cable needs to be physically separated from the ground plane at a distance where corona will not initiate on the surface or around the conductor. This distance can be several inches depending on the voltage and cable construction.

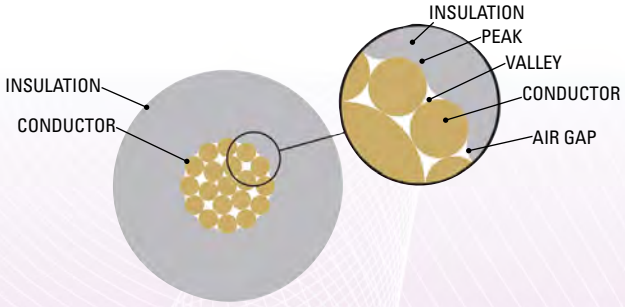


Figure 1 – Unshielded Cable Adjacent to a Ground

An alternate solution is to have a semi-conductive layer around the conductor and the outside surface of the cable, as illustrated in Figure 2.

The semi-conductive layers do two things. The inner layer of semicon eliminates the effect of the air gap around the inner conductor and the outer layer of semicon minimizes the effect of making contact with a ground plane; eliminating the primary sources of corona. A second benefit is that the electrostatic field is more evenly distributed thus lowering the voltage stress within the cable, as shown in Figures 5b and 6.

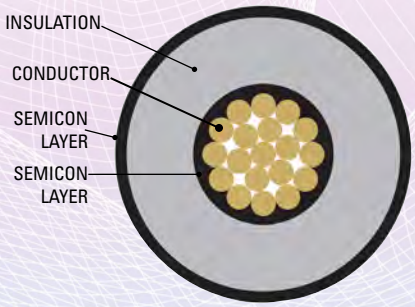


Figure 2 – Semi/Con™ Cable

Shielded Cable

Basic shielded HV cables are made up of a conductor, core insulation, a braided shield over the outside surface of the insulation and an overall jacket. Figure 3 illustrates the construction of a shielded cable. In addition to the air gaps found between the center conductor strands and insulation, the shielded construction introduces additional air gaps between the outer diameter of the insulation and the inner surface of the metal shield.

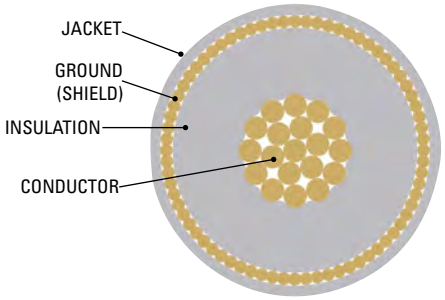


Figure 3 – Basic shielded silicone cable

It is within these air gaps that corona can initiate depending on the voltage, geometry and the operating environment of the cable. Along the inner conductor gap, the voltage gradient is the highest and in turn, so is the amount and amplitude of partial discharges. In the air gap between the insulation and shield, the gradient is not as high, but is a source of discharges nonetheless.

Figure 4 depicts a shielded cable, this time, with a semi-conductive layer around the inner conductor and around the outer diameter of the insulation. As in the preceding non-shielded example, the air gap around the conductor is eliminated, as well as the gap between the insulation and the shield. Again, the electrostatic field is more evenly distributed thus lowering the voltage stress within the cable.

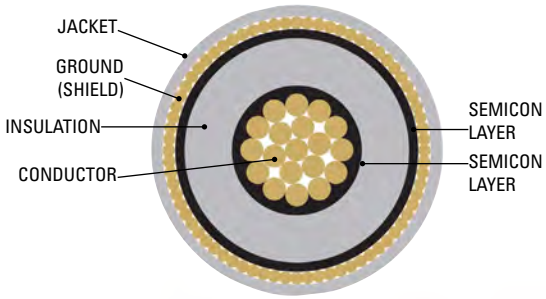


Figure 4 – Shielded Semi/Con™ cable

SEMI/CON™ SILICONE RUBBER WIRE ATTRIBUTES

Part Number	Operating Voltage (kVDC)	Conductor			Insulation		Outer Semicon Layer
		AWG	Strands	Plating	Material	Diameter in/mm	Diameter in/mm
178-6529	25	22	19/34	SPC	SIL	.180 / 4.57	.200 / 5.10
178-6300	40	16	19/29	SPC	SIL	.295 / 7.49	.365 / 9.27
178-6427	50	16	19/29	SPC	SIL	0.30/7.62	N/A
178-6301	55	12	19/25	SPC	SIL	.375 / 9.62	.465 / 11.81

SHIELDED SEMI/CON™ SILICONE RUBBER WIRE ATTRIBUTES

Part Number	Operating Voltage (kVDC)	Conductor			Insulation		Shielding			Jacket		Imp. (Ohms)	Atten. dB/100 ft @ 400 MHz	Cap. pF/ft @ 1 kHz
		AWG	Strands	Plating	Material	Diameter in/mm	AWG	Plating	Diameter in/mm	Material	Diameter in/mm			
178-6236	30	18	19/.010*	SPC	SIL	.235 / 5.96	34	TPC	.332 / 8.43	SIL	.420 / 10.66	45	N/A	60

* Consists of 19 strands of ø .010 inch nominal diameter conductor.

When ordering, use part number and specify length in feet.

Product numbers and specs subject to change without notice. Products listed represent only a small selection of Teledyne Reynolds' products.
Please visit www.teledynereynolds.com for the most up to date product information. Contact Teledyne Reynolds' Engineering to discuss custom designs.

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Shielded Cable (continued)

Figures 5a and 5b show the electrostatic field in a shielded cable with and without semi-conductive layers. Note the even field distribution of the Semi/Con™ cable as compared to a shielded cable without the semi-conductive layers.

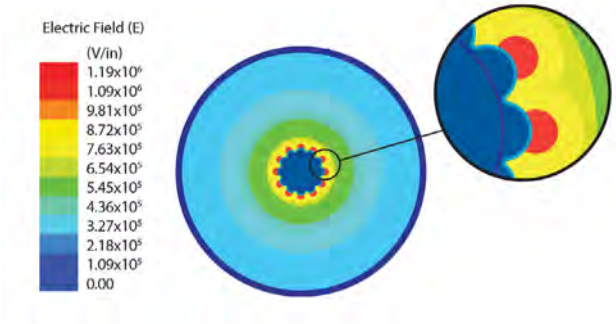

Figure 5a – E-field in a basic coaxial silicone cable

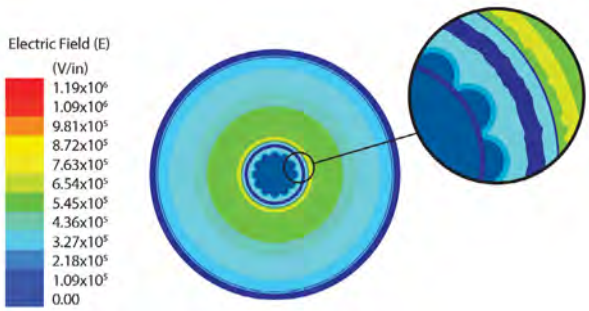

Figure 5b – E-field in a Semi/Con™ cable

Figure 6 shows the electrical stress comparison between standard coax wire and Semi/Con™ wire. As depicted in Figure 1, what's being referred to as a "valley" is the area between conductors and "peak" is the individual conductor peaks.

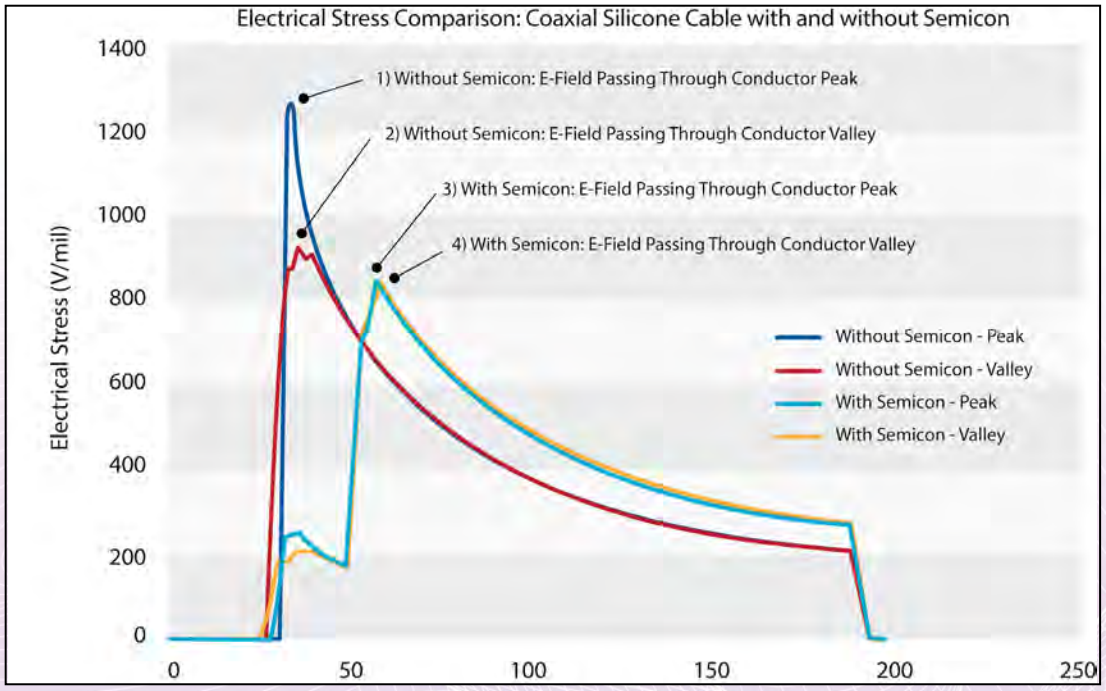

Figure 6 – E-field comparison of basic coax cable and Semi/Con™ cable

For a more detailed white paper on the comparison of the performance of standard wire construction and Semi/Con™, please contact Teledyne Reynolds' Customer Service department.

Recommendation: It is essential that corona resistant cable be combined with compatable termination processes and connectors, so that a high reliability corona resistant cable assembly will result.

Product numbers and specs subject to change without notice. Products listed represent only a small selection of Teledyne Reynolds' products.
Please visit www.teledynereynolds.com for the most up to date product information. Contact Teledyne Reynolds' Engineering to discuss custom designs.

Teledyne Reynolds can apply the Hi/Pure™ Low Corona Discharge Option to any new or existing PFA wire designs. The end products are ultra pure high voltage wires that are designed to operate in high vacuum applications requiring thousands of hours of reliability. These cables can be supplied on reels or as leads in connectorized high voltage cable assemblies. These wires are designed to meet the general requirements of specifications such as MIL-DTL-16878, MIL-W-22759, MIL-C-17, but in addition meet "higher level" performance required for low corona, high voltage applications. Unique processing and testing of these wires enables them to be used in low pressure applications such as in spacecraft or other vacuum systems.

Features

Materials: The cable utilizes a High Purity (HP) Perfluoroalkoxy (PFA) insulation with less contamination within the cable insulation providing little or no internal discharges. The enhanced purity and thermal stability reduces the occurrence of voids within the insulation which are sites for the onset of corona during operation.

Corona Detection: Through the use of our continuous corona detection system the wire is subjected to 100% partial discharge (corona) testing at AC voltages designed to detect defects in the wire insulation. Any sections in which discharges are detected are removed.

Applications for Hi/Pure™

- Traveling wave tubes, magnetrons and klystrons used in Space
- High voltage power supplies
- Semiconductor wafer inspection equipment
- High energy physics research
- General Space use

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CABLE CONDUCTOR DATA

SIZE • STRANDING • CURRENT RATING

Heritage Quality Performance

AWG	Stranding	Approximate Diameter		Cross Section	DC Resistance	Current Rating
		inches	mm	mm	Ohms/1000 m	(amps) 70kft free air at 80° C*
30	Solid	.010	0.25	0.051	338.6	2.5
30	7/38	.012	0.30	0.056	309.1	2.5
30	19/42	.013	0.32	0.060	288.1	2.5
30	41/46	.012	0.30	0.051	337.3	2.5
29	Solid	.011	0.29	0.064	268.4	2.9
29	51/46	.014	0.35	0.064	271.3	2.9
28	Solid	.013	0.32	0.081	212.9	3.3
28	7/36	.015	0.38	0.089	194.6	3.3
28	19/40	.016	0.40	0.095	181.1	3.3
28	41/44	.015	0.37	0.081	212.3	3.3
28	65/46	.015	0.39	0.081	212.9	3.3
26	Solid	.016	0.40	0.130	133.9	4.3
26	7/34	.019	0.48	0.141	122.4	4.3
26	10/36	.020	0.51	0.130	136.2	4.3
26	19/38	.020	0.50	0.151	113.8	4.3
26	51/42	.022	0.56	0.160	107.3	4.3
26	66/44	.019	0.48	0.131	131.9	4.3
24	Solid	.020	0.51	0.205	84.3	5.7
24	7/32	.024	0.61	0.224	76.8	5.7
24	10/34	.025	0.64	0.201	85.6	5.7
24	16/36	.024	0.61	0.201	85.0	5.7
24	19/36	.025	0.64	2.441	71.5	5.7
24	41/40	.023	0.59	0.205	84.0	5.7
22	Soid	.025	0.64	0.326	52.8	7.5
22	7/30	.030	0.76	0.356	48.2	7.5
22	19/34	.032	0.80	0.383	44.9	7.5
22	26/36	.030	0.75	0.329	52.5	7.5
22	65/40	.031	0.78	0.326	52.5	7.5
20	Solid	.032	0.81	0.518	33.5	9.9
20	7/28	.038	0.96	0.567	30.5	9.9
20	10/30	.040	1.02	0.509	33.8	9.9
20	19/32	.040	1.01	0.609	28.2	9.9
20	26/34	.037	0.94	0.524	32.8	9.9
20	105/40	.039	0.99	0.526	32.8	9.9
18	Solid	.040	1.02	0.823	21.0	13.1
18	7/26	.048	1.21	0.901	19.0	13.1
18	16/30	.048	1.23	0.815	21.0	13.1
18	19/30	.050	1.27	0.968	17.7	13.1
18	41/34	.047	1.19	0.826	21.0	13.1
18	65/36	.049	1.25	0.823	21.0	13.1
18	168/40	.053	1.34	0.824	20.3	13.1
16	Solid	.051	1.29	1.309	14.1	15.0
16	7/24	.060	1.53	1.433	12.1	15.0
16	19/29	.056	1.43	1.220	14.1	15.0
16	26/30	.059	1.50	1.220	14.1	15.0
16	41/32	.059	1.50	1.326	13.3	15.0
16	65/34	.062	1.57	1.309	13.3	15.0
16	260/40	.068	1.73	1.303	13.3	15.0
14	Solid	.064	1.63	2.081	8.2	20.0
14	7/22	.073	1.85	2.285	7.6	20.0
14	19/27	.071	1.80	1.940	8.9	20.0
14	41/30	.075	1.89	2.088	8.2	20.0
12	7/20	.096	2.44	3.660	4.9	27.3
12	19/25	.090	2.27	3.085	5.6	27.3
12	65/30	.098	2.50	3.310	5.2	27.3

*Ratings based on MIL-W-5088 for a single wire with maximum rated operating temperature of 125°C.

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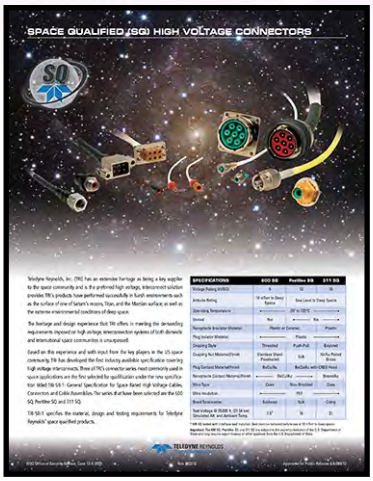
INDEX BY PART NUMBER

Heritage
Quality
Performance



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Quality Policy

Teledyne Reynolds, Inc. strives to satisfy customer expectations by providing quality products, on time, and in compliance with customer requirements.

As an organization, we are committed to continual process improvement and employee development.

In support of these objectives, quality objectives are established, measured, reported, and periodically reviewed for continuing suitability.

Teledyne Reynolds, Inc. holds quality certifications for the following:

- ISO9001:2008
- AS9100C
- IPC 610/620
- J-STD-001

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