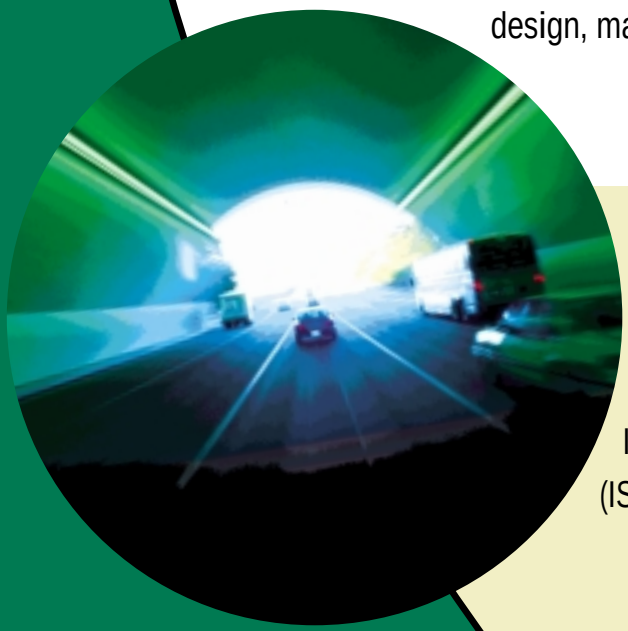
GENERAL CABLE
Ignition Wire
Delivering the Spark

Building a Better Ignition Wire from the Inside Out

The demands on ignition wires are increasing as a result of higher-revving engines, higher operating temperatures, exposure to potentially damaging fuels and chemicals, increased utilization of on-board electronics, and increasing number of miles driven per year. The additional functional requirements of isolating and delivering the 30,000 – 50,000 volts required to reliably provide the spark needed for an internal combustion engine, while not creating Radio Frequency Interference (RFI), all translate to the need for a highly technical ignition wire construction.

At General Cable we are among the pioneers in the development of ignition wire technology. The technology utilized in delivering the spark for an internal combustion engine has evolved from a simple conductor to a component of a highly integrated engine management system. General Cable's vertically integrated manufacturing capabilities and vast knowledge of ignition wire manufacturing and product design technology enable our superiority in the design, manufacture and sale of bulk ignition wire.



General Cable manufactures its ignition wire constructions to meet your specific requirements and in compliance with the Society of Automotive Engineers (SAE) J2031, International Organization for Standardization (ISO) 3801 standards.

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Ignition Wire Design

General Cable offers two primary ignition wire constructions. Most utilize a multi-layer double extrusion design that provides better linear strength, better dielectric properties and better temperature resistance than single extrusion ignition wire. Single extrusion designs are more economical, providing a single layer of insulation over the conductor and no linear strength member.

All of General Cable's ignition wire constructions, both double and single extrusion, are available in standard Original Equipment (OE) wire diameters of 5mm, 7mm and 8mm. Custom diameters are available upon request. Typical OE production colors are black and gray, but a full range of custom jacket colors are available.

The Conductor

The functional requirement of the conductor is to reliably deliver a high voltage charge from the source to the spark plug, but conducting 30,000 – 50,000 volts across a low resistance conductor creates radio frequency interference (RFI). That's why General Cable offers wire wound and suppressor conductors that provide reliable delivery of energy without RFI.

Reactive wire wound (Mag Core) is a highly reliable magnetic suppression conductor with excellent heat-resistant properties. Our standard wire wound core has consistent resistive properties of 500 ohms per foot, but other specific resistive levels of wire wound core are available for custom applications.

The most common and economical conductor is suppressor core. Utilizing non-metallic conductive materials to create a conductive yet resistive conductor, the suppressor core provides resistive qualities between 3,000 and 7,000 ohms per foot, a highly durable conductor and excellent RFI suppression. Silicone extruded core is similar in design to suppressor core, but possesses higher temperature resistance than its non-silicone counterpart.

Stranded copper core wire can also be utilized as a conductor in ignition wire constructions. However, due to the low resistive properties of copper, in-line resistors must be used in vehicle applications.

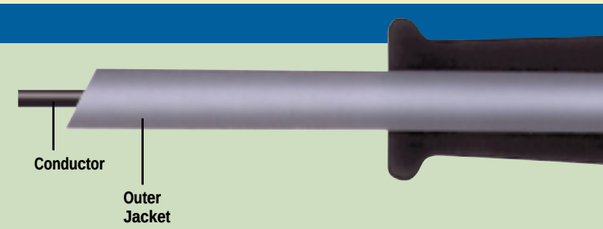
Single Extrusion Wire

The Outer Jacket

Ethylene-Propylene-Diene Monomer rubber (EPDM) provides a cost-effective outer insulation with good heat resistance (180°C). In addition, EPDM offers superior dielectric strength.

Ethyl Vinyl Acetate (EVA) provides better chemical and gas resistance and similar dielectric properties when compared to EPDM.

Silicone rubber jacketed ignition wire provides superior temperature resistance and excellent gasoline, oil and antifreeze resistance. Silicone and EPDM blends are available that offer both dielectric strength and temperature resistance.



Double Extrusion Wire

The Outer Jacket

A CPE outer jacket is to be used in combination with EPDM insulation and offers good heat resistance (155°C).

EVA outer installation provides very good heat resistance (180°C-200°C). It also provides very good gasoline, oil and antifreeze resistance and excellent tear strength.

Silicone, as an outer jacket, offers superior heat resistance (up to 232°C depending on the inner insulation). It provides excellent gasoline, oil and antifreeze resistance.

The Inner Insulation

EPDM inner insulation provides unbeatable dielectric strength, preventing power leaks and improving performance. However, the temperature resistance of EPDM (180°C) is inferior to EVA or Silicone constructions. EPDM is available in a variety of colors.

Ethyl Vinyl Acetate (EVA) offers better temperature resistance (204°C) and linear strength compared to EPDM insulated material.

Silicone offers superior heat resistance (232°C) when used as an inner insulation or outer silicone jacket. It provides superior gasoline, oil and antifreeze resistance and good dielectric properties. Silicone material is offered in a variety colors.

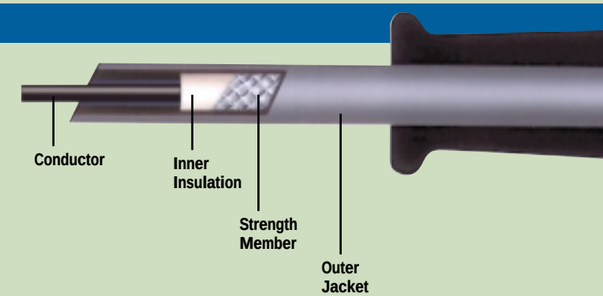
The Strength Member

The function of a strength member is to provide linear strength in the ignition wire construction. This strength equates to terminal retention capabilities of a terminated length of ignition wire. General Cable offers three strength member options in our double extrusion ignition wire constructions—braidless, fiberglass braid and nylon tape.

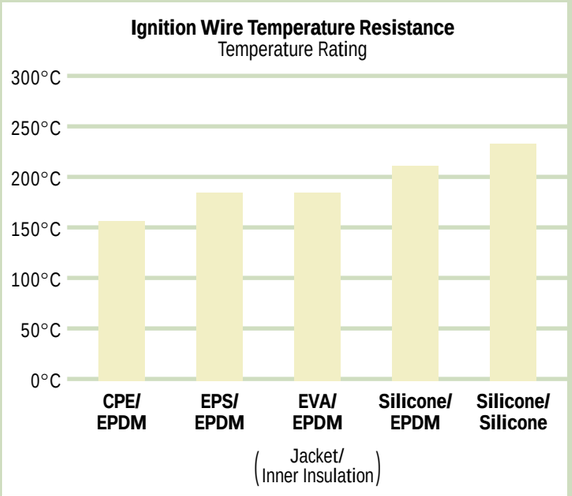
Though a strength member is not required in an ignition wire, the ignition wire design without a strength member is inferior in linear strength compared to both fiberglass braided and nylon tape constructions.

A fiberglass braided strength member provides flexibility, linear stretch support and sheer strength for superior terminal retention. Various degrees of braiding intensity are available by varying the number of picks, or intersections, of the braids per inch on the wire.

General Cable was among the first to introduce a nylon tape material as a strength member for ignition wire. Nylon tape provides unbeatable linear strength that can result in up to a 20% increase in terminal retention values when compared to fiberglass braided material product. Nylon tape aids in providing superior tear strength for the jacket material due to the high bond created between the strength member and jacket material.



	Good	Better	Best
Conductor: Consistent Resistance Level	—	Suppressor Core	Wire Wound Core
Insulating Properties (Dielectric)	Silicone	EVA	EPDM
Strength Member: Linear Strength	Braidless	Fiberglass Braid	Nylon Tape
Outer Jacket Temperature Resistance	EPDM	EVA	Silicone



Performance Rating And Expectation	Wire Design	Jacket Options	Strength Member Options	Inner Insulation Options	Temperature Rating	Available Conductor Options
Best The materials exhibit excellent high temperature and oil resistance characteristics, with high dielectric strength. Terminal retention is improved through the use of Nylon or fiberglass braid separator.	Double Extrusion	Silicone	Nylon Tape	Silicone	F (232°C)	*(choose one)* 1. Wire Wound* 2. Suppressor 3. Copper Core 4. Silicone Extrusion Core
		Silicone	Fiberglass Braid	Silicone	F (232°C)	
		Silicone	Nylon Tape	EPDM	E (210°C)	
		Silicone	Fiberglass Braid	EPDM	E (210°C)	
Better The materials exhibit high temperature resistance, good oil resistance and high dielectric strength. Terminal retention is improved through the use of Nylon or fiberglass braid separator.	Double Extrusion	EVA	Nylon Tape	EVA	E (204°C)	*(choose one)* 1. Wire Wound* 2. Suppressor 3. Copper Core 4. Silicone Extrusion Core
		EVA	Fiberglass Braid	EVA	E (204°C)	
		EVA	Nylon Tape	EPDM	D (180°C)	
		EVA	Fiberglass Braid	EPDM	D (180°C)	
Good The materials exhibit good temperature resistance and excellent dielectric strength. Terminal retention is improved through the use of Nylon or fiberglass braid separator.	Double Extrusion	EVA	None	EPDM	D (180°C)	*(choose one)* 1. Wire Wound* 2. Suppressor 3. Copper Core
		EPS	Nylon Tape	EPDM	D (180°C)	
		EPS	Fiberglass Braid	EPDM	D (180°C)	
		EPS	None	EPDM	D (180°C)	
		EPDM	Nylon Tape	EPDM	D (180°C)	
		EPDM	Fiberglass Braid	EPDM	D (180°C)	
		EPDM	None	EPDM	D (180°C)	
		CPE	Nylon Tape	EPDM	C (155°C)	
		CPE	Fiberglass Braid	EPDM	C (155°C)	
		CPE	None	EPDM	C (155°C)	
Economy The materials exhibit the minimum standard requirements for temperature resistance and linear strength.	Single Extrusion	EVA	None	None	E (204°C)	*(choose one)* 1. Wire Wound* 2. Suppressor 3. Copper Core
		EPS	None	None	D (180°C)	
		EPDM	None	None	D (180°C)	

* Note: Various resistance factors Ferrite or Non-Ferrite

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Form No. AUT-0060-1002

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