



**AUTOMOTIVE
ELECTRONIC COMMUNICATIONS
INDUSTRIAL**

Inventing *the Future* of Wire and Cable

Irradiation Cross Linking of Polymers Exar Family of Compounds

Champlain Cable is a world leader of irradiation cross-link technology in the wire and cable industry. Our three irradiation units are capable of cross-linking wire as from 4/0 - 30 awg and cables with diameters up to 1.5 inches. Irradiation technology allows for the cross-linking of a wide variety of materials and enhances insulation performance. Unlike other cross-link technologies, irradiation cross-link products are easy to cut and stripped and cable design and size is not limited.

Benefits and Features

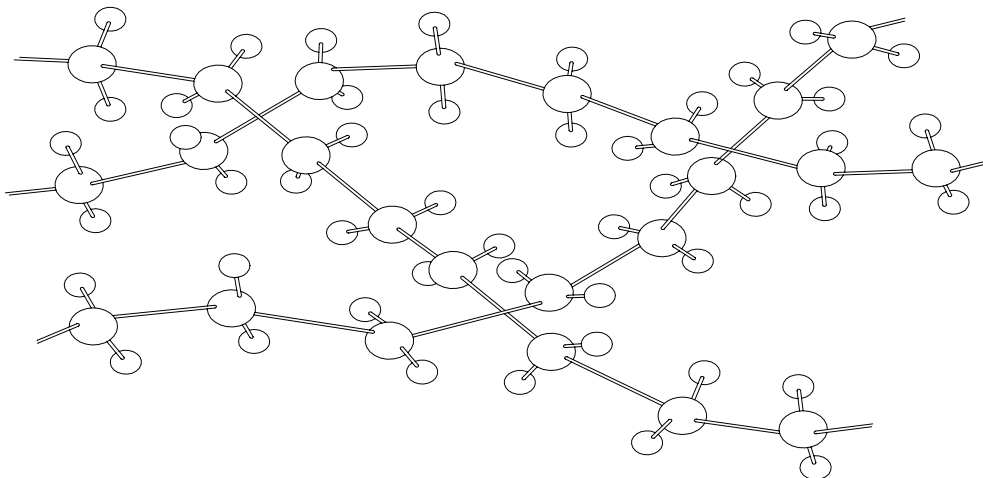
- Higher temperature resistance
- Thermoset, will not melt
- Increased tensile strength
- Increased abrasion and cut through resistance
- Increased crush resistance
- Increased chemical and oil resistance
- Increased shear and compressive strength

Cross-Linkable Compounds

Including but not limited to:

EPDM	Halar	Hypalon
Kynar	Neoprene	Nordel
Nylon	Polyethylene	Polyurethane
PVC	Silicone	Tefzel
Tyvin	Vamac	Viton

Polymers are long chains of molecules. Each molecule is a specific chemical group. The simplest polymer is polyethylene consisting of a carbon and two hydrogen atoms i.e. CH_2 . The figure below is a representation of polyethylene. The chains intermesh in a random manner. Polyethylene is used commonly as plastic food containers. It is tough, flexible and relatively inexpensive. When heat is applied the chains are free to slip and slide. The polyethylene will soften and melt when heat is applied.



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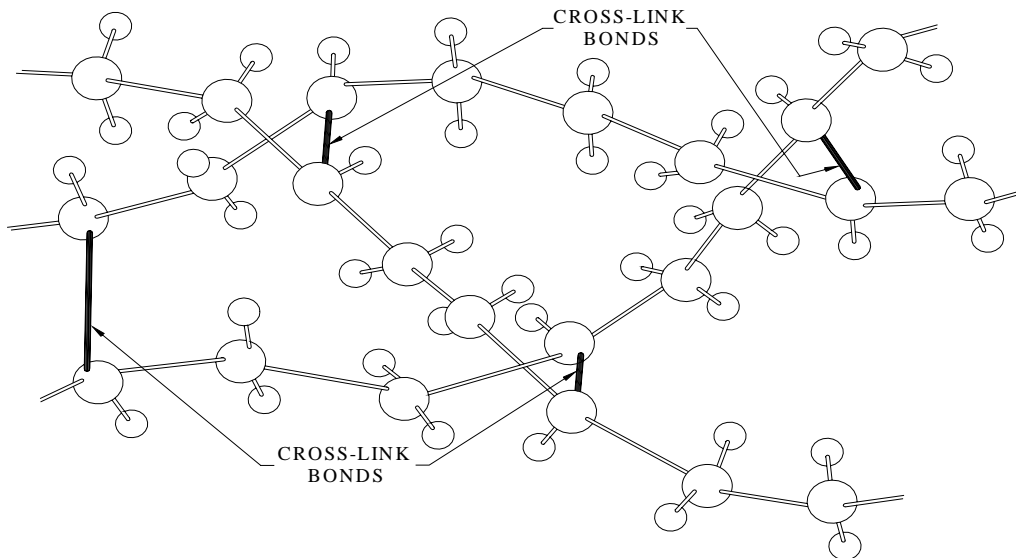


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Irradiation cross-linking provides an alternative method that does not require heat, pressure or moisture and with a wider range of compounds can produce superior products than chemical cross-linking. Irradiation leaves no unreacted curing agents that can create harmful acids at elevated temperatures. Superior cut and stripping is possible because irradiation cross-linking does not require heat and pressure that can force compound between the wire strands.

The primary object of irradiation cross-linking is to reduce molecular slipping by introducing cross-linking bonds between nearby chains. Cross-linking improves the rigidity and increases the temperature resistance. Irradiation cross-linking uses a stream of fast moving electrons produced from an electron accelerator. The electrons possess sufficient energy to remove a hydrogen atom from its position along a chain leaving a highly reactive site or vacancy. This site, called a free radical, may combine with another such site to form a cross-link as shown in the figure below. The formation of a sufficient number of these cross-links results in transforming a thermal plastic material (one that melts) to a thermoset material (does not melt).



Irradiation cross-linking economically enhances insulation material performance. Our family of cross-linkable compounds have replaced much more expensive fluoropolymer insulation's such as FEP, TFE, Tefzel, Kynar and silicone rubber and EPDM. Champlain Cables irradiation cross-linked compound process better than other cross-linked products, reducing scrap, and rework cost.

Exar Family of Compounds

Exar IPVC
Exar 125

Exar 150
Exar 150 LT

Exar 150 UT
Exar FX

Exar SFX
Exar Plus

Exar 400
Exar 180

We cannot anticipate all conditions under which this information and our products or the products of other manufacturers in combination with our products may be used. We accept no responsibility for results obtained by the application of this information or the safety and suitability of our products alone or in combination with other products. Users are advised to make their own tests to determine the safety and suitability of each such product combination for their own purpose. Unless otherwise agreed in writing, we sell the products without warranty, and buyers and users assume all responsibility and liability for loss and damage arising from the handling and use of our products whether used alone or in combination with other products

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