Electron-beam cross-linking

Byson cable use electron-beam cross-linking to increase the performance of solar cables. Since the solar cable has a particular requirement in its elongation, tensile strength and aging performance, cross-linking is very important. Cross-linking has two methods: physical and chemical. The electron-beam is the physical method and it is the first choice in the solar cable industry. If you want to know more about electron-beam cross-linking, please download the full report.

Electron irradiation：This refers to the electronic line (β-Ray) produced by the electron accelerator (0.2 MeV ~ 10 MeV) irradiating polymer materials andtransferring energy to a polymer material, by controlling the radiation condition, so that the chemical composition of the polymer materials change to become cross-linking materials.

Cross-linking: Type linear or branched polymer chains formed by a covalent bond connection between reticulate or other size of polymer process.

Through irradiation, photovoltaic cable material – through a form of chemical bond between the long linear macromolecules connection – form a mesh structure. After cross-linking, this can lead to the forced binding between polymers increasing greatly, as well as the reinforced materials and thermal stability, flame retardancy, chemical stability, resistance to ultraviolet light, stress cracking resistance and so on

The machinery and environment aging resistance performance of the PV cable has improved after irradiation.

The competitive aspect of Byson cables after irradiation

A 2.0 ~ 2.5 MeV electron irradiation accelerator can ensure the photovoltaic cable achieve adequate and complete electron beam irradiation requirements;

After irradiation Byson cables have excellent properties in UL/TUV standards:

Performance Index	**UL Requirement**	**TUV Requirement**	**Byson cable test results**
Elongation	>=150%	>=125%	>=170%
Tensile Strength	>=10.3Mpa	>=8.0Mpa	>=10.9Mpa
Aging test 7days x 150℃	/	Elongation Rate <=-30% Tensile Strength Rate<=-30%	Elongation Rate <=-7% Tensile Strength Rate <= -2%
Aging test 7days x 136℃	Elongation retention >=70%	/	Elongation retention >= 85% Tensile strength retention rate >= 95%

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	Tensile strength retention rate >=70%		
Flame test IEC60332-1-2	/	1.The distance of lower edge of upper bracket is more than 50mm from upper starting point of carbonization part 2. The distance of lower edge of upper bracket is less than 540 mm from lower starting point of carbonization part	1. Distance 1>=300mm 2.Distance 2<=400mm
Flame test VW or VW-1	The 5th burning time<=60S, Indication flag burning <=25%; cotton is not ignited	/	The 5th burning time<=10S, No flag burning No cotton ignited
Weathering/UV-resistance (720h)	/	No cracks	No cracks
	Elongation retention >=80% Tensile strength retention rate >=80%	/	Elongation retention >=95% Tensile strength retention rate >=95%