

Electron Beam Cross-Linking

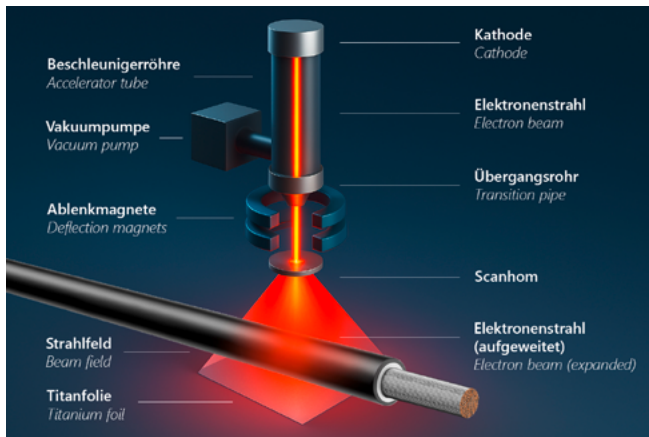
for the Modification of Plastics



By cross-linking the plastic sheath with accelerated electrons, the properties of cables can be specifically improved.

For electron beam cross-linking, Studer Cables uses equipment that accelerates electrons in a high vacuum using voltages of up to 3 million volts, bringing them close to the speed of light. The cables and conductors treated in this way acquire the properties of comparatively higher-grade, often more difficult-to-process high-performance plastics through the cross-linking of polymer molecules.

For example, electron beam irradiation makes the plastic more dimensionally stable under the influence of heat, resistant to chemicals, solvents and high temperatures, harder and more abrasion resistant.



Further methods of cross-linking

The alternative methods of cross-linking such as heat treatment with the addition of reagents (chemical cross-linking), are widely used but have disadvantages – whereas electron beam cross-linking offers particular advantages:

- No thermally unstable reagents need to be added to the compound. This improves long term stability.
- Whilst chemical cross-linking exposes the cables to temperatures of up to 160 – 200 °C, electron beam cross-linking takes place at low temperatures of 40 – 60 °C. This means that ageing behaviour is not adversely affected.
- The release of reaction products that are hazardous to health is low compared to chemical cross-linking.
- The e-beam process is particularly suited for cross-linking flame retardant compounds due to the low thermal stress.
- With appropriately formulated compounds e-Beam cross-linking can convey temperature ratings of 90 °C and above, which can result in a significant increase in service life.

The cross-linking process is complete once the electron beam is switched off. Once achieved, this state is maintained throughout the cable's entire service life, apart from normal ageing. Compared to chemically cross-linked cables, the absence of additional ageing factors results in a longer cable service life.

The use of electron beam cross-linked cables offers a future-proof, environmentally friendly solution.

Studer Cables has a total of six electron beam cross-linking facilities.. Together with other facilities Studer Cables has a very extensive range of equipment for this type of industrial processing.



Electron accelerators cross-link the insulation materials within a few seconds. Homogeneous irradiation and thus homogeneous cross-linking are ensured by specially adapted handling systems. In electron beam cross-linking, no peroxides or silanes are incorporated into the plastic compounds, as is the case with chemical cross-linking.



Further information can be found on our website:
<https://studercables.com/en/services/networking/>

In addition to our own cables, we also cross-link other technical plastic products such as pipes, heat shrink tubing, films, and semi-conductors.