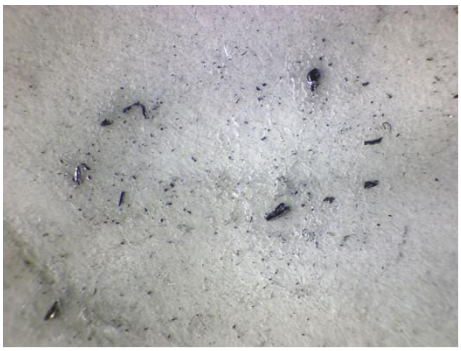
The Formation of Particle Residues on Shielded Cables and Their Removal

When assembling and, especially, when stripping shielded coaxial and high voltage cables (HV-cables), dirt, micro-particles, dust and small metallic oddments fall off. The small metallic chips are particularly unwanted – they may lead to serious malfunctions in subsequent procedures.

The removal of this kind of pollution by means of suitable actions is, therefore, the increasing focus of operational quality assurance and work safety.

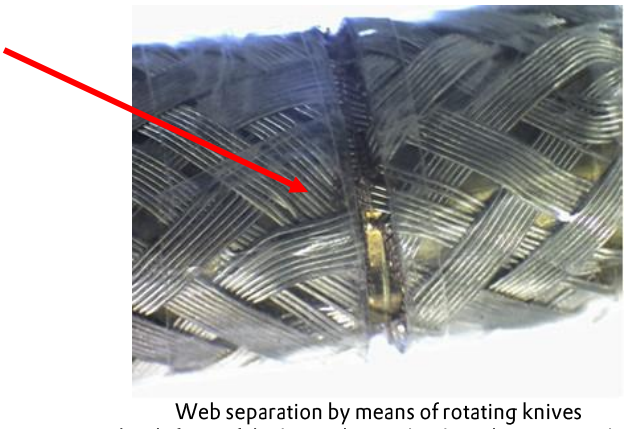


Particle residues after only one shielding braid incision;
Copper shield litz; tinned; Ø 0,15 mm;
max. particle length approx. 0,9 mm



Particle residues after only one shielding braid incision;
Steel shield litz; Ø 0,3 mm;
max. particle length approx. 0,7 mm

Most of the metallic particles result when separating the wire shielding of coaxial and high voltage cables, favoured by the shieldings´ composition: a wire mesh of parallel litzes, intertwined and in multiple layers on top of each other. The mechanical separation of the web leads to considerable shear forces which favour the severing of single particles.



Web separation by means of rotating knives
The shifting of the litzes shows clearly at the cutting edges.

Another source for the formation of particles is the friction of the shield litzes against each other. If a coaxial or HV-cable is bent, pressed hard or if it is exposed to any other deformation, the litzes rub against each other causing adhesive wear or adhesion wear. Adhesive wear occurs with inadequate lubrication. When touching components laying tight on each other at a high surface pressure, the contact surfaces stick together as a result of adhesion. Pieces of the edge layers are sheared off at the sliding. Eruptions form in the litzes and squamous material particles are detached.

The formation of metallic waste in the form of particles at the now commonplace processing possibilities is hardly, if at all, unavoidable. FEINTECHNIK R.Rittmeyer GmbH did some factory-made investigation promoted by the *"Central Innovation Programme Mittelstand – ZIM"* from the Federal Ministry of Economics and Energy. As a result, it can be concluded that no mechanical separating or stripping process works completely waste-free.

During the investigation they also examined, tested and evaluated different procedures and also theoretical approaches to the removal of residues. The most appropriate procedure for industrial application turned out to be an extraction nozzle which works according to the Coandă- or Bernoulli-Effect:

> *"The **Coandă effect** is the tendency of a fluid jet to stay attached to a convex surface. It is named after Romanian inventor Henri Coandă, who described it as "the tendency of a jet of fluid emerging from an orifice to follow an adjacent flat or curved surface and to entrain fluid from the surroundings so that a region of lower pressure develops."".* [Source: Wikipedia]



Meshing of a HV-cable with litz particles



Before and…



…after the cleaning

Such nozzle is the centre piece of the cleaning device for coaxial and high voltage cables -the BERI.CO.CLEAN newly developed by FEINTECHNIK R.Rittmeyer GmbH.



Cleaning device BERI.CO.CLEAN with sensor triggering

Even if not all adhesions existing at the different types of cables can be 100% removed (sticking particles on silicon cables, for example, are hard to be taken off), the new electro-pneumatic device works in a liable and effective way, especially on coaxial and HV-cables.

The running of BERI.CO.CLEAN is a straightforward one: introduce the end of the cable into the machine and activate the suction. The versions available are one with foot valve and another one with sensor triggering. The aspirated particles are filtered out and collected in a waste container.
Airflow, suction duration and the delay of the suction process can be adjusted in the sensor version.
There is also the possibility of using suction nozzles of different diameter and different filters as well.

The BERI.CO.CLEAN is a standard device designed for the processing of cables, catheters and bar-shaped materials with a diameter up to approx.19,0 mm (Nozzle diameter = 20,0 mm) and approx. 270 mm long. Custom sizes are available upon request.

FEINTECHNIK
R.Rittmeyer GmbH
Höltenweg 103
48 155 Münster
www.rittmeyer-beri.de