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The continuing evolution of semiconductive screening materials for power cable applications

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Numerous tests, on cables at all voltages (MV – EHV), have clearly shown that the semiconductive screening layer plays a very important role in the successful operation of a power cable. The semiconductive compounds has been the subject of tremendous development over the last two decades and have kept pace with the advances in cable technology. The guiding principles in these developments have been:

1. Improved electrical performance enabling higher stresses to be used
2. Extension of cable endurance, thereby increasing the longevity of cables
3. Easier processing

In order to realise these improvements in cable performance it has been necessary to focus attention on some key material attributes.

- Measurement techniques (smoothness, scorch etc)
- Reduction of pips
- Increased cleanliness
- Resistance to scorch
- Increased productivity

This paper will review the progress that has been made in the development of semiconductive materials for peroxide and moisture cure applications. Furthermore it will indicate further trends in development in terms of both measurement methods and materials technology.

As an example figure 1 shows the evolution of pip frequency and demonstrates the successful improvement of smoothness. It is interesting to note that during the 1980's the focus was on pips bigger than 500 microns rather than the 200 microns considered today. In the future the focus is likely to move to the 150 micron level. The difference between supersmooth and standard (furnace black based) semicons is getting smaller; yet the present body of evidence still shows that acetylene black makes the smoothest semicons.

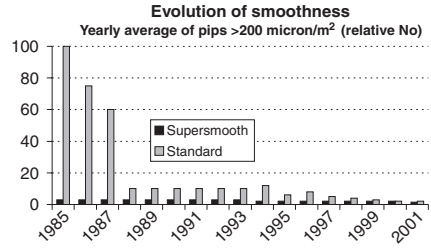

Fig. 1. The evolution of pips with a half height width bigger than 0,2 mm

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