



### [ Products ]

Some key properties of EBA based wire and cable compounds

### [ Trade fair ]

Outlook on K 2010

### [ Market ]

Trends in wire and cable market

### [ Partner ]

tasc4polymers GmbH

## New LUCOBIT-polymers for Wire & Cable applications

*In addition to the ethylene butyl acrylate (EBA) based polymers **Lucofin® 1400 HN, Lucofin® 1400 MN and Lucofin® 1492** as already presented in the first news letter, LUCOBIT is happy to announce the introduction of several new grades:*

### **Lucofin® 1470**

>> Lucofin® 1470 is a reactor made terpolymer, contains 7 % butyl acrylate (BA), 4 % acrylic acid (AA) and has a MFI of 7 g/10 min. Due to its chemical composition Lucofin® 1470 has an excellent adhesion and compatibility to a variety of materials, including unpolar polymers, such as low density polyethylene LDPE and ethylene propylene terpolymer rubber EPDM, polar polymers like polyvinyl chloride PVC and polyamide PA and metals, like copper and aluminium. This makes Lucofin® 1470 a prime candidate for a tie layer between different substrates, especially polymers and metals. Applications include the use of Lucofin® 1470 as a tie layer between polyethylene and aluminium, steel or copper – a construction often found in armours for highly stressed cables, such as underground power cables.

### **Lucofin® 1400DF**

Lucofin® 1400DF contains 9 % butyl acrylate and

**Lucofin® 1470  
Lucofin® 1400DF  
Lucofin® 1400FN**

has a MFI of 0,25 g/10 min. Due to its very low MFI Lucofin® 1400DF based formulations offer superior tensile strength and excellent environmental stress crack resistance. Target markets include jacketing and insulation.

### **Lucofin® 1400FN**

Lucofin® 1400FN contains 16 % butyl acrylate and has a MFI of 0,9 g/10 min. Lucofin® 1400FN provides a MFI significantly lower compared to the already established Lucofin® 1400HN with 16 % butyl acrylate and MFI of 1,4 g/10 min. Target markets include jacketing and insulation as well as wire and cable additive masterbatches. All three new Lucofin® grades Lucofin® 1470, Lucofin® 1400DF and Lucofin® 1400FN – in line with other Lucofin® grades Lucofin® 1400 HN, Lucofin® 1400 MN and Lucofin® 1492 – guarantee – among other advantages – very good flexibility and distinguished good low temperature behaviour. Availability of Lucofin 1400FN is expected during second half of 2010. <<

## Some key properties of EBA based wire and cable compounds

### >> Flexibility

One of the most important features of a cable is flexibility. Flexibility requires the polymers constituting the cable to have some elastomeric character. Therefore, rubber based materials like EPDM, EPM and NBR have been being used widely in wire and applications. However, due to its high cost EPDM and other rubbers came under pressure from elastomeric thermoplastics like ethylene butyl acrylate (EBA), ethylene vinyl acetate (EVA) and m-PE plastomers. Among these m-PE plastomers require a premium price due to their elaborate production technology, whereas EBA and EVA are priced relatively low due to their simple production technology. Nowadays, wire and cable formulations based on EBA or EBA/EPDM blends are very common. Lucofin 1400HN, Lucofin 1400MN, Lucofin 1400DF and Lucofin 1400FN as offered by LUCOBIT AG are typical ethylene butyl acrylates (EBA).

### Maximum processing temperature

Another key factor in wire and cable application is the maximum processing temperature of a polymer confining the output of an extrusion line. Whereas EVA cannot be

### Crosslinkability

EPDM and other rubber based materials are vulcanized in order to increase maximum service temperature, enhance chemical

liquid. Typical residence times are from 25 s for thin-walled wire, to several minutes for high-voltage power cable. All these methods involve higher heat than the melt



as well as stress cracking resistance and improve mechanical properties during end usage. Methods of vulcanization or curing include steam, hot liquids (eutectic mixtures), microwave and hot air.

Polyolefinic materials offer a very similar method of upgrading their properties:

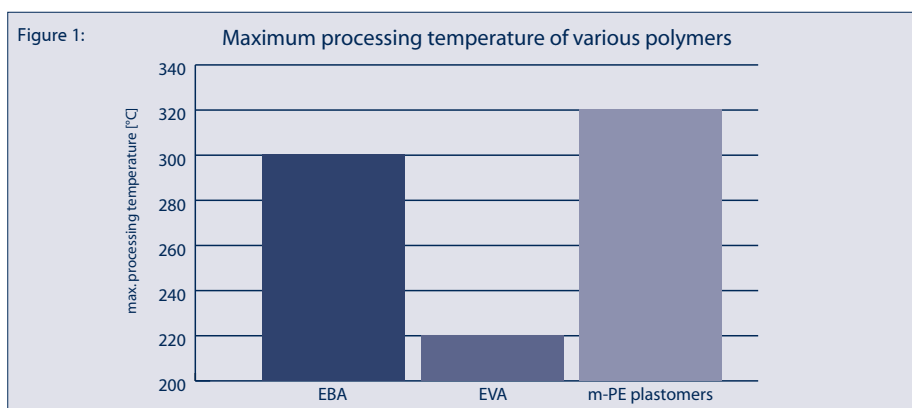
heat to cause the peroxide in the plastic to decompose into a reactive radical and initiate the curing cycle.

Radiation crosslinking is performed by passing the wire or cable through a beam of electron radiation. Usually, the full dosage is not applied in a single pass because of the rapid temperature increase that accompanies electron beam exposure since it would damage the product.

Subsequently, it was found that vinyl or acrylyl organosilanes could be grafted to PE using traces of organic peroxide, typically in an extruder, and the product then crosslinked by contact with warm water, causing hydrolysis of alkoxy groups on silicon. The resultant Si-OH groups could then be condensed to Si-O-Si linkages with catalysts such as dibutyltin dilaurate or diacetate.

As high pressure tubular reactor resins Lucofin 1400HN, Lucofin 1400MN, Lucofin 1400DF, Lucofin 1400FN and Lucofin 1470 as offered by LUCOBIT AG offer excellent crosslinkability in all three crosslinking technologies as described above.

Therefore, crosslinked Lucofin based compounds are challenging vulcanized EPDM based compounds with respect to both technical properties and commercial attractiveness. <<



processed above 220 °C due to its thermal decomposition into corrosive by-products, the maximum processing temperature of EBA is almost as high as the value for purely olefinic polymers such as m-PE plastomers (figure 1). Consequently, wire and cable formulations based on EBA guarantee high output, both in compounding and in wire and cable extrusion, increasing profitability further.

crosslinking. The resulting plastic is called cross-linked PE (XLPE). Two technologies were initially employed: crosslinking started by thermal decomposition of organic peroxides or by electron beam irradiation, both as sources of polymer radicals that combine to form a carbon-carbon bond.

Peroxide crosslinking can be achieved via steam cure, nitrogen cure or pressurized



## Outlook on K 2010

>> LUCOBIT AG will be presenting itself with a stand covering approx. 80 m<sup>2</sup> at the world's largest plastics trade fair, K 2010, in Düsseldorf.

In the period from 27 October up to and including 3 November 2010, the company will be unveiling the products and services from its Flexible Polymers, Asphalt Modification and Waterproofing business units in hall 5, at stand location „D 23“. The affiliated trading company :pegon GmbH will also form part of the team at the trade fair.

LUCOBIT AG's presence at the trade fair will be accompanied by a trade fair lounge available every day at the Lindner Congress Hotel close to the exhibition centre site. The personal vouchers for entry to the LUCOBIT LOUNGE will be sent out in the next few weeks. Each evening during the trade fair, the lounge will offer LUCOBIT AG's business friends the opportunity to hold talks in a convivial atmosphere or simply to enjoy the „get-together“, which only takes place every



three years, over good food and drink away from all the stress of the trade fair.

On some days, the sales partners of LUCOBIT AG from over 30 countries around the world

will be present not just at the company's trade fair stand but also in the LOUNGE.

The Flexible Polymers business unit will form the main focal point of the presentation. It will be represented at the stand at the trade fair by, among other people, the head of the business unit, Dick Wijnia, and the head of R&D, Dr. Sandro Kohn. Presentations will be available at the trade fair stand for the final applications of cables, film, extrusion coating, foams and compounding, and the corresponding technical documentation will be presented.

Visitors will probably be particularly interested to see the new products from LUCOBIT AG which will be presented to the general public for the first time at the trade fair in Düsseldorf. Both amendments to existing products and new products will be unveiled here. The new sales partners of LUCOBIT AG recruited last year and this year will also introduce themselves to business partners at the trade fair stand. <<

## Trends in wire and cable market



>> The growing sensitivity of environmental aspects involves more and more all business activities. The sustainable development is supported by the "green funds" of companies that are socially conscious in their business dealings or directly promote environmental responsibility. The Sustainable Development requires lowering environmental impact across the whole supply chain from raw materials, manufacturing process, transports, operational use

with environmentally friendly materials, non toxic and easily disassembled for disposal and recyclable. Life cycle assessment, carbon foot print (the total set of greenhouse gas emissions caused directly and indirectly by a product expressed as carbon dioxide equivalents, CO<sub>2</sub>) are different tools for measuring the environmental impact of new products and services. Looking at the sustainability reports of the main

and end of life disposal. The European community addressed many business sectors in this direction, both for new products, e.g. the RoHS (Restriction of Hazardous Substances) and for end-of-use management, e.g. WEEE (Waste Electrical and Electronic Equipment) and EoLV (End of Life Vehicle). Most new electronic products on the market place are eco-designed

W & C companies, all the above mentioned issues are more and more frequent. Furthermore, most international federations and associations around Europe are supporting business growth in this direction. ANIE is one of the main Italian Federations, representing the electrotechnical and electronic companies operating in Italy, with 11 Associations. In 2009 all companies represented by ANIE covered 54 bln Euro turnover and 21 bln Euro in export with 390.000 employees. AICE (Wire & Cable industries Italian Association) is one of the 11 Association of ANIE. One of major topics addressed by AICE is "Environment" with the following recommendations:

- production processes: energy savings, scrap reduction and increase of material recovery
- product developments: eco-design in order to facilitate end-of-life recovery
- raw materials: no use of toxic and low environmental impact materials
- packaging: limited and reusable/recycling.

## tasc4polymers GmbH \_ We create values for your success

>> tasc4polymers stands for Technical Approvals and Service Company for Polymers. As an independent provider of services, we advise and support processing companies as well as providers of raw plastic materials in all matters concerning the technical and economical assessment and approval of materials for the plastics-processing industry.

It is our goal to support plastic processors from all fields of molding and extrusion in choosing the best possible material at the best possible cost-benefit ratio. We aim to generate a higher economic value for our clients thus our company slogan is: "We create values for your success".

The range of our services includes material selection and in-house approval processes of raw materials as well as compound devel-

opment projects, consulting, support and coaching.

For our customers from the plastics-processing industry we determine the most suitable materials for each respective project. By way of compiling comprehensive and objective information about the manufacturer's products and providing comprehensive project know-how, we offer new possibilities for the development of new or alternative products.



Axel Rödlich, tasc4polymers

LUCOBIT AG is one of our technology partners and customers in terms of Acrylate PE-Copolymer and Polyolefin elastomer solutions. We serve LUCOBIT AG in the field of product design as well as in Sales and Market support in selected areas.

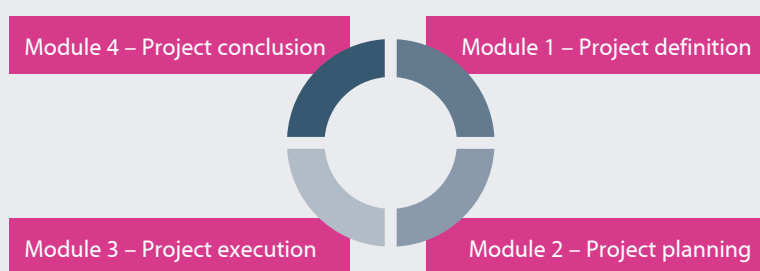
Axel Rödlich, General Manager of tasc4polymers GmbH, has a long term and profound experience in the field of polymer technology and the use of polymer raw materials in a broad range of applications.

He has worked for Borealis as Sales & Marketing manager for almost 10 years in business units "Wire and Cable" and "Moulding" before he joined LUCOBIT AG, MBO where he performed as global Sales and Marketing Manager for 9 years. <<

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### The four tasc4polymers service modules:



#### Module 1 – Project definition

- Description of tasks and requirements
- First assessment and analysis
- Development of a short exposé
- Definition of further steps

#### Module 2 – Project planning

- Detailed planning and coordination with the customer
- Inspection and assessment of the equipment, tools, reference parts etc.
- Development of a detailed requirement profile
- Feasibility study, list of services, schedule, conclusion of contract and confirmation of order

#### Module 3 – Project execution

- Use of relevant service package
- Coordination and agency
- Controlling

#### Module 4 – Project conclusion

- Presentation of results and summary report
- Know-how transfer
- Review

### [ imprint ]



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