

# Flexible Polymers \_ Extrusion coating



# LUCOBIT resins and their use in coating applications

## \_ General

Extrusion coating is when the melted polymer is extruded on to an existing film before passing through the calender rolls. The existing film can be another polymer, cardboard, woven and nonwoven fabrics, metallic foil or paper. Multiple layers may be formed by extrusion coating both sides of the primary film or building a multilayer structure by introducing several extrusion coated layers. Coextrusion can only be used for polymers with similar processing conditions. Where the processing conditions are different, particularly in the

case of substrates that cannot be melted with the polymer, such as metallic foil or paper, then extrusion coating is the only choice.

The following table shows the LUCOBIT products and its main properties fit for use in extrusion coating applications:

Peelable coating   ALU-foil   PET (films / non wovens)   Paper board coating				
Product	Material	Colour	Shore A	MFR <sup>1)</sup> 190 °C / 2.16 kg
Lucofin® 1400MN	EBA (17 % BA)	natural	88	7
Lucofin® 1494	MAh grafted EBA (17 % BA)	natural	92	7
Lucopren® EP 1500M-90 <sup>2)</sup>	PP   EPM	natural	88	8

<sup>1)</sup> average <sup>2)</sup> MFR 230 °C / 2.16 kg

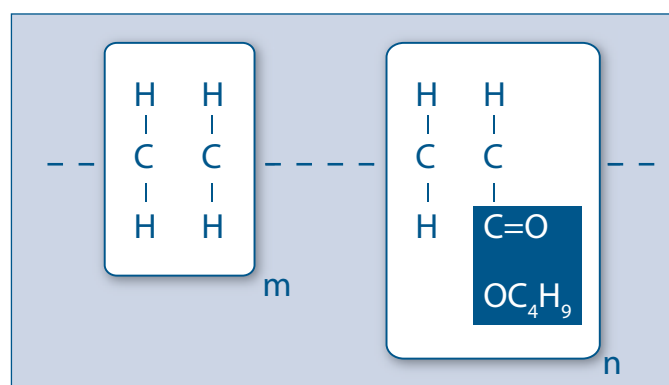


## \_ LUCOBIT products

Paperboard, aluminium foils, textiles, plastic films. No matter what substrate you want to get extrusion coated, LUCOBIT products will be the right choice making sure:

- Extrusion melt temperature up to 300 °C and therefore increased production output
- Excellent adhesion to a variety of different substrates
- Effective Vapour barrier
- Outstanding stress crack resistance

The majority of LUCOBIT products is based on ethylene butyl acrylate copolymer (EBA). The repeat unit of EBA copolymers is shown in the figure. This structure explains many of its unique properties as explained on the next page.



### Our Brands

Lucofin®

Lucopren®

## Products – that makes you successful



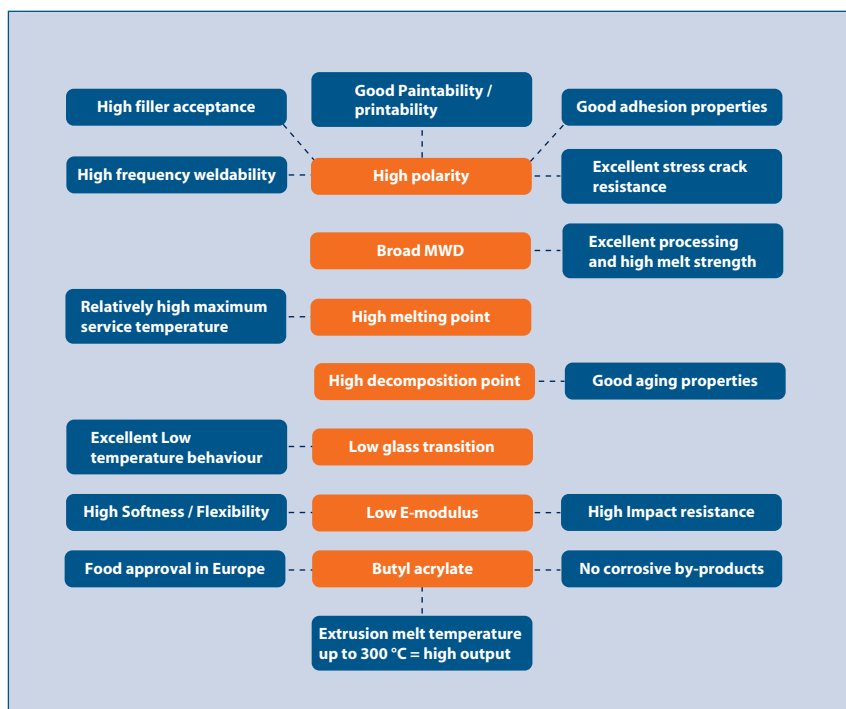
### Advantages of LUCOBIT products compared to plastomers and EVA

The speciality plastics based on flexible polyolefins which are marketed and sold by LUCOBIT AG under the trade names Lucofin® types are doubtless products that you have long known to be quality materials. Particularly with a view to our grafted and non-grafted EBA grades, our distribution partners repeatedly tell us that there is a certain information gap as far as cost-effectiveness is concerned. What may at first glance appear to be more expensive compared with other polymer systems does in fact almost always, on closer

inspection, prove to be the cheapest solution overall and in the long term.

It is essential here not to interpret the performance of a product solely in terms of the price per unit of quantity. You only obtain an objective result if you examine all technical aspects. In terms of our EBA grades competing on both a commercial and technical basis with EVA, plastomers, but also EBA products from other manufacturers, the Lucofin® materials are proving time and time again to be the optimum solution for an increasingly large number of our customers' end applications.

A sustainable assessment must take account not just of the simple formula of „dosage x price“ but also the value attached to the technical advantages afforded from the use of Lucofin® EBA. The following table illustrates the key properties – as marked in orange – and the resulting advantages – as marked in blue – of Lucofin® 1400HN and 1400MN. If all of these factors impacting on cost effectiveness are assessed in an objective and unbiased way, it is ultimately apparent that Lucofin® EBA materials usually constitute the better solution.





## Case Study

### Customer

Leading international paper and packaging group.

### Previous situation

Cardboard coated with LDPE / EVA.

### Solution now

Cardboard coated with Lucofin® 1400MN.

### Benefits to the customer

- Productivity increase of 25 % due to higher extrusion melt temperatures and consequently higher output
- 15 % less machine setting time due to an excellent adhesion on a variety of different substrates from paper board over polymers to aluminium foils
- Productivity increase of 10 % during the form fill seal process due to improved hot tack

## Use of Lucofin® 1400MN and Lucofin® L1494 in extrusion coating applications



Extrusion coated products have widespread industrial and commercial applications, and are found in many industries. They are basically used for decorating, protecting, and providing different functional treatments that enhance the substrates.

LDPE is the most commonly used plastic in extrusion coating. However, the use of polar copolymers is increasing. Among the polar copolymers Ethylenbutylacrylat (EBA) and Ethylenvinylacetate (EVA) are widely used in extrusion coating applications. Compared to LDPE and Ethylenvinylacetate (EVA), Ethylenbutylacrylat (EBA) enjoys a lower heat sealing temperature, improved hot tack and better seal through contamination.

In addition, Etylenbutylacrylat (EBA) shows stronger adhesion to a wider selection of substrates, especially more polar substrates, such as polyester or polyamide. The figure shows the adhesion of LDPE, Lucofin® 1400MN (EBA) and EVA on various substrates.

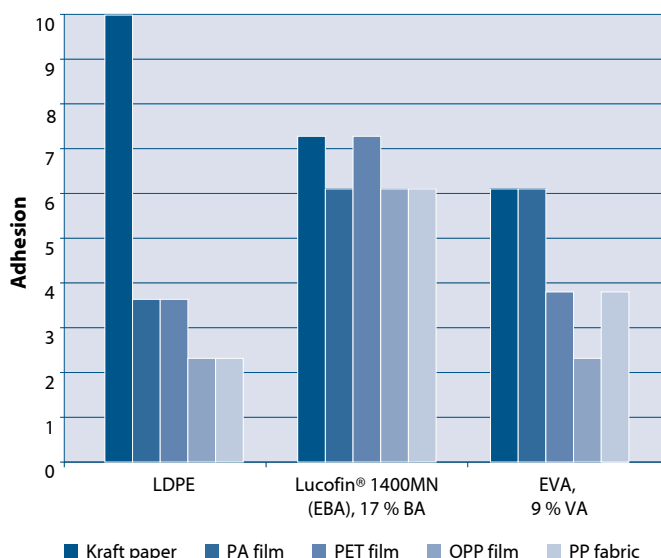
LDPE shows good adhesion only towards kraft paper, whereas other substrates, such as PA film, PET film, OPP film, PP fabric are only weakly bonded. Opposite to that finding, Lucofin® 1400MN (EBA) shows good adhesion to all substrates outperforming also EVA.

Another key factor in extrusion coating is the maximum processing temperature of a polymer confining the output. Whereas EVA cannot be processed above 220 °C due to its thermal decomposition into corrosive by-products, the maximum processing temperature of Lucofin® 1400MN (EBA) is 300 °C yielding no corrosive by-products. Consequently, Lucofin® 1400MN (EBA) guarantees significantly increased output compared to EVA.

If even better adhesion towards polar substrates such as PA, PET, EVOH, PC or aluminium is required, Lucofin 1400MN can be blended with Lucofin 1494.

Lucofin® 1494 is a Maleic anhydride (MAH) grafted variation of Lucofin® 1400MN. Due to the innovative reactive extrusion technology the extremely polar MAH in Lucofin® 1494 is more active than in comparable competition grades. Consequently, the use of Lucofin® 1494 in only relatively moderate concentrations (10 % - 50 %) in blend with Lucofin® 1400MN allows a drastic improvement of adhesion towards polar substrates.

*Adhesion of various polyethylenes towards different substrates*



# Solutions in flexible polyolefins

## — Competence and diversity

LUCOBIT AG develops, produces and sells top quality materials for the plastics processing industry. Our focal area of business is in high-quality speciality plastics based on flexible polyolefins which are used in waterproofing, asphalt and in numerous other segments of flexible polymers. LUCOBIT products are supplied to compounding companies all over the world.

Competence, experience and the specialist knowledge from 40 years of product history are the reasons behind LUCOBIT AG's success as a first class point of reference on the national and international markets. As a flexible and group-independent company, we are present and active in all significant plastics markets around the world – supported by a far-reaching sales networks which offers our customers a direct contact partner wherever they need one. Wherever they can be found, LUCOBIT AG products and services stand for consistently high quality standards, top rate workability and diverse opportunities for use.

## — Thinking and acting

Constant innovation and the willingness to venture into new terrain – this approach is an integral part of the way we think and act. In this way, we not only secure our own future, but also that of our customers. The LUCOBIT materials research is also always using the latest knowledge and methods to further optimize our products. The responsible use of our natural resources is of equal importance to us. Development and production of lasting products and a distinctive environmental awareness are deeply rooted within our company. An ecological approach is top priority for us.

The compliance with international standards is a matter of course. LUCOBIT AG is ISO-certified according to the standards DIN EN 9001 (quality management) and DIN EN 14001 (environment management).

## — Services and solutions

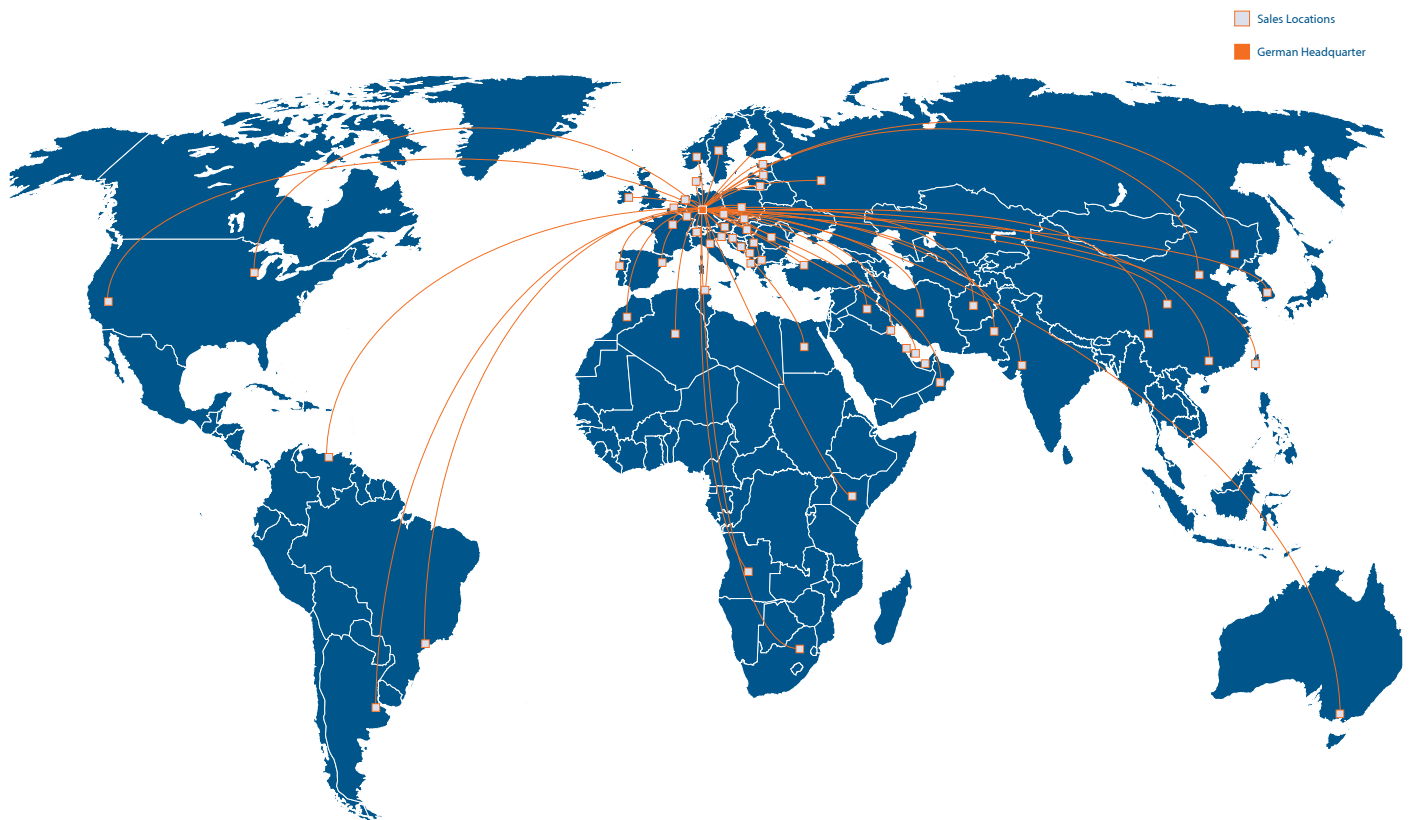
The focal point of our daily work is the task to satisfy our customers and to offer them tailor-made solutions which suit their specific requirements. Customer-oriented service therefore has top priority at LUCOBIT AG. This is reflected in our business processes and organisational structures. Short decision-making processes and reaction times are as much a part of this as binding agreements and the targeted

implementation of agreed arrangements. High qualification demands on our employees are a guarantee for the observation of these principles. Our work is characterised by our reliability, readiness for action and flexibility.

Uncompromising quality and first class services are our trademarks. We offer our customers comprehensive consultancy services and support ranging from product development and the calibration of specialty plastics for their specific production facilities to the optimisation of production processes and concepts for transport and logistics. Your task is our challenge. Together with you, we want to use perspectives in markets of the future and help these grow.



# Locations



## Note

The information provided in this document is based on our product tests and present technical knowledge. It does not release purchasers from the responsibility of carrying out their receiving inspections. Neither does it imply any binding assurance of suitability of our products for a particular purpose. As LUCOBIT cannot anticipate or control the many different conditions under which this product may be processed and used this information does not relieve processors from their own tests and investigations. Any proprietary rights as well as existing legislation shall be observed.



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