

LUCOBIT® 1210A

The Additive to Polymer Modification of Asphalt and Bitumen



THE ADDITIVE TO POLYMER MODIFICATION

Current problems in road construction

The efficiency and utility value of our roads is dependent on various climatic forces and traffic-related developments. The number of motorists increases exponentially and particularly the rise in HGV traffic with higher axle loads is straining roads in a way that one can detect poor resistant of road by ruts and cracks just by looking it. Taking into account the structurally accurate execution, we have to confront the increase in traffic growth with new



Rutting due to HGV traffic and higher axle loads

solutions. Those top layers that are especially strained have to be technically enhanced with regards to their durability. With budgets being tight and natural reserves becoming more rare and therefore more expensive, future approaches will result in recycling and working with increasingly reduced layers of asphalt.

The product

Lucobit 1210A is a grained thermoplastic synthetic material existing of a mixture of premium polyethylene copolymer and a special type of bitumen (ECB). The pure bitumen is homogeneously dispersed into a polymer matrix. Lucobit 1210A can be mixed into common asphaltic surfaces like asphalt concrete, stone mastic or mastic asphalt either by pre-mixing it with bitumen (PmB) or simply by adding it into the mix during the asphalt production (PmA). Lucobit 1210A can also be used for industrial asphalt or binder courses because of high strains. In research and development Lucobit 1210A is viewed as a modern product, which can be employed in various special asphalts for stabilising miscella-

| Examples of surface courses (According to TL Asphalt-Regulation StB 07) | | |
|---|----------------------|---|
| rolled asphalt | | mastic asphalt |
| asphaltic concrete | stone mastic asphalt | |
| <ul style="list-style-type: none"> • higher resistance against mechanical strain • higher resistance against deformation and wear & tear • stronger affinity with grit • higher level of stability • low temperature of flexibility • ageing resistance • reduced thickness of courses | | <ul style="list-style-type: none"> • for support of mounting on inclined surfaces • higher resistance against rutting • higher resistance against dynamic depths of impression • resistance in mixing stays constant • on-site adding possible |

neous concepts thus supporting the idea of enduring quality. To comply with the requirements of

future computer-assisted dimensioning of road surfaces, Lucobit 1210A will be used for the reduction of the thickness of black base as well.

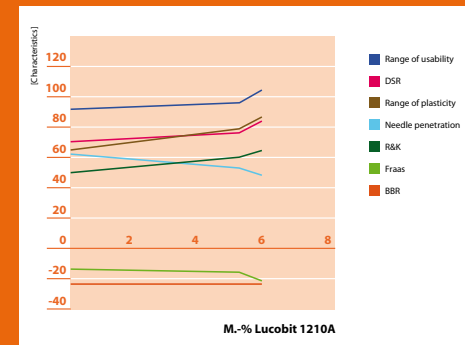
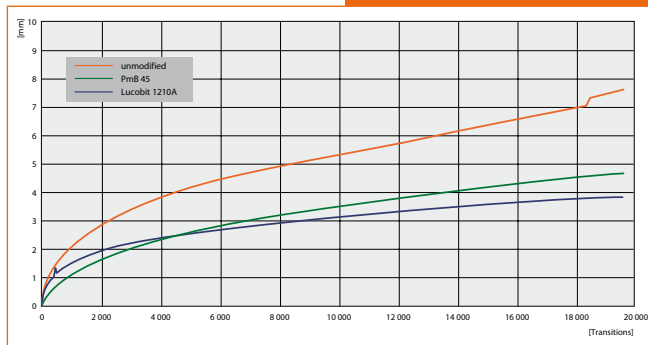


The effects of weather: stresses caused by thermal fluctuations due to exposure to direct sunlight during the days and drastic cooling down in shady areas or at nighttime.

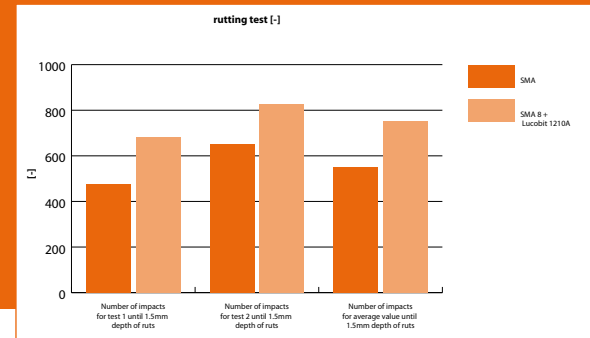
Technical background

The usability of Lucobit 1210A could be confirmed again by scientific research from registered and independent institutions and advantages comparing to the established competitors became evident (cp. Index- research in product file folder LUCOBIT AG). Concerning the constantly growing strain on roads caused by HGV traffic, it was proven that Lucobit 1210A increases the resistance against rutting compared to any other kind of unmodified standard asphalt.

Lucobit 1210A verifiably holds up to the strains of climatic forces like heat or chill by widening the range of plasticity of the bitumen, through a significant rise of the softening point ring and ball and improved Fraass breaking point. The penetration of the bitumen decreases accordingly when adding the Lucobit 1210A.



top right: rheological features of the polymeric modification with Lucobit 1210A; top left and bottom right: exemplification of rutting tests about mastic and stone mastic asphalt



Production and mounting

Lucobit 1210A has a very high thermal stability. At temperatures up to 300°C, it shows no sign of destruction of the polymer matrix which leads to sufficient support for extended production – and transport periods even after hours of high temperature exposure.

When adding it directly into the asphalt mix for the production of PmA, the amount of Lucobit 1210A-granulate is chosen according to the percentage wanted (3.0 to 7.5% by mass based on the percentage of binder while simultaneously reducing the bitumen as to the percent by weight of the polymer

added). The adding can be done before or after apportioning the binder. Extending the duration between 10 and 15 seconds is necessary depending on the composition and batch size (temperature of mixture is due to table 5 in ZTV Asphalt-StB 07).

For producing PmB (C) a homogeneous mixture of common bitumen and Lucobit 1210A is composed at temperatures between 175 and

195°C. Even with a screw-type agitator at a low rotation speed a very thorough mixture of the Lucobit 1210A according to PmB-standards is detectable under an electron microscope. The bitumen incorporated into the polymer matrix guarantees an easy and rapid blending of the polymer into the bitumen or asphalt. For mounting with Lucobit 1210A modified asphalt, there is no further requirement existing.

Long-term results

The German Federal Highway Research Institute (BASt) has completed a study in which it tested modified polymer surfaces on German Federal Highway "A1" and could prove the usability of Lucobit 1210A on a long-term basis.



High-quality surface after 32 years in use under traffic in Cologne.

Application with regards to German rules and regulations

Lucobit 1210A as a composite of bitumen complies with the technical requirements of the TL Bitumen-StB 07 as well as with Index 3 for plastomer modified bitumen (PmB C).

Irrespective of whether the polymer modified asphalt has been mixed with PmB (C) or PmA (C), the quality of the asphalt is increased in a way that does and will comply the requirements

of the TL Asphalt-StB 07 and ZTV Asphalt-StB 07 and exceeds considerably those of any other standard product. This is especially relevant regarding the rutting on roads. For even if so far no regulation concerning a limit of rutting has been implemented, it could well be mandatory in the future for constructors to indicate them under the TL Asphalt-StB 07.

Effect of Lucobit 1210A on the fundamental features of binder

| Properties | Unit | Bitumen 30/45 | Bitumen 30/45 + 5% by mass Lucobit 1210A | Bitumen 50/70 | Bitumen 50/70 + 5% by mass Lucobit 1210A | Test according to |
|---|--------|---------------|--|---------------|--|-------------------|
| Needle Penetration (100g, 5 s, 25°C) | 0,1 mm | 30 - 45 | 10 - 40 | 50 - 70 | 25 - 55 | DIN EN 1426 |
| Softening Point Ring and Ball | °C | 52 - 60 | ≥ 65 | 46 - 54 | ≥ 55 | DIN EN 1427 |
| Fraas Breaking Point (max.) | °C | ≤ -5 | ≤ -5 | ≤ -8 | ≤ -10 | DIN EN 12 593 |

Lucobit 1210A-modified binder complies with the requirements according to TL Bitumen-StB 07, Issue 2007

Amount of Lucobit 1210A depending on the application

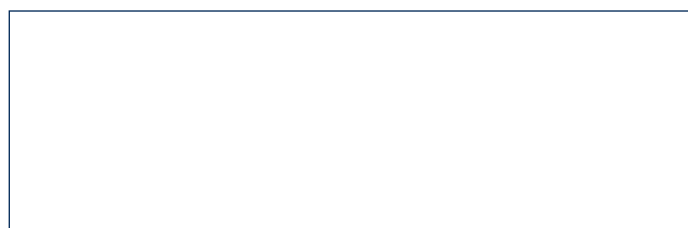
| Application | Amount of Lucobit 1210A regarding the amount of binder [% by mass] |
|--|--|
| Polymer Modification of | |
| Rolled asphalt (top layer, binder course and black base) | 5,0 |
| Mastic asphalt (top layer and coat) | 5,0 |
| Help for paving inclined surfaces | |
| up to 7% | approx. 3,0 |
| up to 10% | approx. 5,0 |
| > 10% | Amount according to advanced suitability tests |



ASK US!

Our service team will be happy to answer your questions.
Just make an appointment.

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Note

The data provided in this document is based on our current level of research and is not legal and binding. When using Lucobit 1210A always consider the particular circumstances especially regarding all aspects of building physics, structural engineering and building laws.



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