

TECHNICAL INFORMATION  
LIMBOROUTE K833



# LIMBOROUTE K833

Art.-No.: 14833, white airspray

Art.-No.: 14833A, white airless

Version: 2020-05-12

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## Important Information:

Please consider our General Terms and Conditions and the general notes of the Technical Information Sheet! No liability is accepted for any errors! The information is provided to our best knowledge and experience. This information is, however, no warranty for any properties of the material. We provide this information without obligation, also regarding the rights of third parties. The user has to make sure that the material is appropriate for the respective application.

# 1 Main characteristics / Fields of application

## LIMBOROUTE K833...

- is a low solvent, aromatic-free, one-component, high-solid paint on the basis of styrene-acrylate
- is a well-proven, thin layer marking material with outstanding technical properties
- has been tested on the turntable simulator of the German Road Institute (BASt) and is approved as TYPE I and TYPE II marking with different drop-on materials
- is suitable for both bituminous surfaces (e.g. mastic asphalt, asphaltic concrete) and concrete surfaces
- can be applied with any application machine
- is available for airless and aerosol application

## 2 Technical Data

<b>Colour</b>	white																				
<b>Density</b>	approx. 1.53 kg/l +/- 0.04																				
<b>Solid content</b>	min. 75%																				
<b>Volume solid content</b>	approx. 57.71%																				
<b>Solvent content</b>	max. 25%																				
<b>Thinner</b>	If required add 2% thinner for high solid paint (Art. No.: 3080) for optimizing spray properties or add 2% thinner for high temperatures (Art. No.: 3160) to optimize bead embedment																				
<b>Cleaning thinner</b>	special cleaner for marking machines Art.-No.: 3086																				
<b>Storage stability</b>	1 year in unmixed, sealed, original packaging and sheltered from frost and direct sun exposure																				
<b>Drying time / Trafficability</b>	The drying times stated in the BASt test reports are laboratory values that may differ from field conditions depending on climate (temperature, humidity, wind), material, layer thickness and road surface. In general the marking's trafficability must be checked before exposing it to traffic.																				
<b>Standard packaging</b>	tin foil containers of 6 / 15 / 40 kg filling weight container on request Drop-on material: paper bags with PE-inlay – 25 kg filling weight																				
<b>Identification</b>	The regulations and instructions concerning appropriate transport, handling, storage, first aid measures, toxicology and ecology are stated in our material safety data sheets! The instructions stated on the product label and in the MSDS must be followed.																				
<b>Processing temperature</b>	min. +5°C																				
<b>Surface temperature</b>	+ 5°C to + 45°C																				
<b>Relative humidity</b>	max. 75 % (dew point spreadsheet has to be regarded)																				
<b>Layer thickness / Theoretical consumption</b>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Wet film thickness</td> <td style="width: 33%;">=</td> <td style="width: 33%;">Dry film thickness</td> <td style="width: 33%;">=</td> <td style="width: 33%;">Theoretical consumption</td> </tr> <tr> <td>300 µm</td> <td>=</td> <td>173 µm</td> <td>=</td> <td>ca. 0.459 kg/m<sup>2</sup> (0.3 l/m<sup>2</sup>)</td> </tr> <tr> <td>400 µm</td> <td>=</td> <td>230 µm</td> <td>=</td> <td>ca. 0.612 kg/m<sup>2</sup> (0.4 l/m<sup>2</sup>)</td> </tr> <tr> <td>600 µm</td> <td>=</td> <td>346 µm</td> <td>=</td> <td>ca. 0.918 kg/m<sup>2</sup> (0.6 l/m<sup>2</sup>)</td> </tr> </table> <p>The actual consumption depends on the applied layer thickness and the type and state of the surface.</p>	Wet film thickness	=	Dry film thickness	=	Theoretical consumption	300 µm	=	173 µm	=	ca. 0.459 kg/m <sup>2</sup> (0.3 l/m <sup>2</sup> )	400 µm	=	230 µm	=	ca. 0.612 kg/m <sup>2</sup> (0.4 l/m <sup>2</sup> )	600 µm	=	346 µm	=	ca. 0.918 kg/m <sup>2</sup> (0.6 l/m <sup>2</sup> )
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## 3 Processing instructions

### 3.1 Preparation of material and application techniques

Before processing LIMBOROUTE K833 must be homogeneously stirred in its original container. The exact machine adjustments depend on the application conditions, type of machine, required wet film thickness, type and quantity of drop-on material and need to be made according to the machine manufacturer's instructions.

The uniform distribution of marking material and drop-on material over the entire application surface must be observed. Losses of drop-on material can be reduced by adjusting bead pistol or bead dispenser.

The theoretical consumption of paint and drop-on material (in kg/m<sup>2</sup>) is listed in the BASt test report and in the table "Theoretical consumption of material and drop-on materials" on our homepage.

Cleaning of machine (paint tank and hoses) and tools must be done before the curing process is finished with special cleaner for marking machines (Art. No.: 3086) or with thinner for high solid paint (Art. No.: 3080).

### 3.2 Optimizing of application properties

The paint LIMBOROUTE K833 in its delivery state is ready for processing. In general, it is not necessary to add thinner but for optimizing the material's spray properties approx. 2 % Thinner for High Solid Paints (Art. No.: 3080) can be added. When processing LIMBOROUTE K833 at temperatures exceeding 25°C it is recommended to add approx. 2 % thinner for high temperatures (Art. No.: 3160). Only thinner recommended by the manufacturer must be used.

## 4 Road surfaces / pretreatment

### 4.1 General information

The surface must be dry, clean free from grease, oil and loose gravel and other contaminations. The surface and potentially existing old markings must be checked for their carrying capacity and compatibility with the material to be applied. In case of doubt, test applications and adhesion tests are required. Ideally, old markings should be removed with appropriate mechanical procedures.

**Attention:** LIMBOROUTE K833 is not suitable for large scale asphalt markings (bicycle lanes, sports fields, children's playgrounds).

### 4.2 Concrete or cement-bound surfaces

The pavement components that prevent good bonding, especially on new concrete, such as fine mortar layers, concrete slurries, concrete after-treatments used as setting retarders, paraffins, impregnations on silicate basis, etc. must be appropriately removed (e.g. with high pressure waterjet, fine millcut or similar). We recommend conducting test applications. In case of doubt contact us in written form.

On new washed concrete surfaces (with grit) poor bonding properties may occur, not caused by marking paint quality. Therefore we recommend applying test markings.

When applying the paint on concrete or cement-bound surfaces, the formation of bubbles is likely to occur. In order to prevent bubble formation the concrete should be pretreated with LIMBOROUTE K833, blended 1 : 1 with Thinner for HS-Paints (Art.-No.: 3080) and sprayed with approx. 200 µm wet film thickness. Once dried, a second, undiluted layer can be applied. The humidity of concrete must not exceed 4% during the marking job.

When applying a temporary marking instead of conducting a pretreatment, the carrying capacity of the surface has to be checked. If necessary pretreatment has to be conducted or the temporary marking must be removed.

### **4.3 Bituminous surfaces**

Any loose components such as chippings must be removed. On new asphalt surfaces, additives (fluxoils, adherents etc.) are detrimental to good bonding of markings and can cause discoloration. Before application test markings / bounding checks are necessary. Since a mechanical removal is hardly possible, the surface should be exposed to traffic for 4 - 6 weeks.

### **4.4 Cobbled pavement**

Natural, artificial and compound stone pavements are non-static surfaces and not suitable for bicycle lane markings with thick layers. No guarantee is given in cases of: crack formation, chippings caused by the movement of pavement parts, poor bonding (e.g. natural or artificial stones), penetration of moisture, wear of marking. It is assumed that marking bonding is sufficient. In case of doubt test markings / bounding checks are necessary.

### **4.5 Floor coatings**

For markings on floor coatings resp. special indoor- and industrial floors our indoor marking products should be used. LIMBOROUTE K833 is not suitable therefor.

## **5 Application techniques**

With conventional marking machines (airless or atomizing technique); manually with brush or roller. The marking paint must be homogeneously stirred in the original container before processing! The exact machine adjustments depend on the application conditions and the machine type and should be made according to the machine manufacturer's instructions. The uniform spread of marking material and drop-on material over the entire application surface must be observed. Layer thicknesses and drop-on material quantities must be respected. Only use airless LIMBOROUTE K833 quality for airless machines.

An immediate broadcasting of drop-on material is absolutely necessary. Otherwise the drop-on material will not be embedded properly, which leads to poor traffic technological properties. Two layer application is an option (first layer + drop-on materials, second layer + drop-on material). Well embedded drop-on beads from the first layer get visible when the second layer is worn.

## 6 Test reports / Field test reports

### 6.1 Table 1: RPA – test reports by BASt (German Road Institute)

Test report –no.	Layer thick-ness	Consumption		Drop-on material (DOM)	Traffic technological properties	
	mm	Material	DOM	Identification	New condition	Used condition
		kg/m <sup>2</sup>	kg/m <sup>2</sup>	(divergent identification possible - see relevant test report)		
<b>Type I marking</b>						
<b>2001 1DS 07.10</b>	0.3	0.46	0.24	SWARCOLUX P21 T14 M25	P5, S1, R4, Q5, T3	P5, S1, R4, Q5
<b>2000 1DS 04.17</b>	0.4	0.61	0.32	SWARCOLUX P21 T14 M25	P5, S2, R5, Q5, T2	P5, S1, R3, Q5
<b>2000 1DS 04.11</b>	0.6	0.92	0.48	SWARCOLUX P21 T14 M25	P5, S1, R5, Q5, T3	P5, S1, R4, Q5
<b>Type II marking</b>						
<b>2000 1DS 03.08</b>	0.6	0.92	0.60	MEGALUX-BEADS 600-1400 T14 K25	P6, S2, R5,RW5, Q5,T2	P6,S1, R5,RW5,Q5

### 6.2 Table 2: Field test reports by DSGS (German Road Society)

Report – No.	Stretch	Traffic exposure	Layer thickness	Bead type	Traffic technological properties
5592	B12	11 month	0.4 mm edge	Swarcolux P21	Q4; B3; R3
5594	B310	10 month	0.4 mm chevron area	Swarcolux P21	Q4; B2; R4; S3
5596	A93	12 month	0.4 mm edge	Potters Ballotini 3D AC 05	Q4; B2; R3; S1
5621	L3134	14 month	2 x 0.3 mm edge	Swarcolux P21	Q4; B3; R3; S4
5628	L572	12 month	0.3 mm edge	Swarcolux P21	Q4; B3; R4; S1
5628.1	B54	12 month	0.3 mm edge	Swarcolux P21	Q4; B3; R3; S2
6522	B16	14 month	0.6 mm edge	Swarcolux P21	Q2; R3; S3
6541	B189	12 month	0.6 mm edge	Meg. 600-1500 T14 K25	Q3; R5; RW3; S2
6542.2	L2	22 month	0.6 mm edge	Meg. 600-1500 T14 K25	Q3; R4; RW3; S2
7112	B27	12 month	0.4 mm edge	Swarcolux P21	Q4; R3; S2