

TECHNICAL INFORMATION
LIMBOROUTE K833



LIMBOROUTE K833

Art.-No.: 14833, white air spray

Art.-No.: 14833A, white airless

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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 air spray application

2 Technical Data

Colour	white																				
Density	approx. 1.53 kg/l +/- 0.04																				
Solid content	min. 75%																				
Volume solid content	approx. 57.71%																				
Solvent content	max. 25%																				
Thinner	If required add max. 2% thinner for high solid paint (Art. No.: 3080) for optimizing spray properties or add max. 2% thinner for high temperatures (Art. No.: 3160) to optimize bead embedment																				
Cleaning thinner	special cleaner for marking machines Art.-No.: 3086																				
Storage stability	1 year in sealed original packaging; protect from frost and direct sun light																				
Drying time / Trafficability	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.																				
Standard packaging	tin containers of 6/15/25/40 kg filling weight larger container on request Other tin container / filling weights on request Drop-on material: paper bags with PE-inlay – 25 kg filling weight																				
Identification	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.																				
Processing temperature	min. +5°C																				
Surface temperature	+5°C to +45°C																				
Relative humidity	max. 75 % (dew point spreadsheet has to be regarded)																				
Layer thickness / Theoretical consumption	<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/m² (0.3 l/m²)</td> </tr> <tr> <td>400 µm</td> <td>=</td> <td>230 µm</td> <td>=</td> <td>ca. 0.612 kg/m² (0.4 l/m²)</td> </tr> <tr> <td>600 µm</td> <td>=</td> <td>346 µm</td> <td>=</td> <td>ca. 0.918 kg/m² (0.6 l/m²)</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 ² (0.3 l/m ²)	400 µm	=	230 µm	=	ca. 0.612 kg/m ² (0.4 l/m ²)	600 µm	=	346 µm	=	ca. 0.918 kg/m ² (0.6 l/m ²)
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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/m²) is listed in the BAST test report and in the table "Theoretical consumption of material and drop-on materials" on our website.

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 max. 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 max. 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 appropriate for large area applications on bituminous surfaces (e. g. playground, sportsground, cycle path or similar).

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 "SWARCO SAFETY-LINE" 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 ²	kg/m ²	(divergent identification possible - see relevant test report)		
Type I marking						
2001 1DS 07.10	0.3	0.46	0.24	SWARCOLUX P21 T14 M25	P5, S1, R4, Q5, T3	P5, S1, R4, Q5
2022 1DS 01.09	0.3	0.46	0.24	SWARCOFLEX 100-600 T14 M25	P5, S1, R5, Q5, T2	P5, S1, R5, Q5
2000 1DS 04.17	0.4	0.61	0.32	SWARCOLUX P21 T14 M25	P5, S2, R5, Q5, T2	P5, S1, R3, Q5
2022 1DS 01.10	0,4	0,61	0,275	SWARCOFLEX 100-600 T14 M25	P5, S1, R4, Q5, T2*	P5, S1, R4, Q5
2000 1DS 04.11	0.6	0.92	0.48	SWARCOLUX P21 T14 M25	P5, S1, R5, Q5, T3	P5, S1, R4, Q5
Type II marking						
2000 1DS 03.08	0.6	0.92	0.60	MEGALUX-BEADS 600-1400 T14 K25	P6, S2, R5,RW5, Q5,T2	P6,S1, R5,RW5,Q5
2022 1DS 01.13	0.6	0.92	0.48	SWARCO SOLIDPLUS 10 425-1400 T14 MK30	P6, S1, R5,RW6, Q5, T2	P6,S1, R5, RW3,Q5

6.2 Table 2: Field test reports

Report No.	German Road Society	Stretch	Traffic exposure	Layer thickness	Bead type	Traffic technological properties / used condition
5592	DSGS	B12	11 months	0.4 mm edge	SWARCOLUX P21	Q4; B3; R3
5594	DSGS	B310	10 months	0.4 mm chevron area	SWARCOLUX P21	Q4; B2; R4; S3
5596	DSGS	A93	12 months	0.4 mm edge	Potters Ballotini 3D AC 05	Q4; B2; R3; S1
5621	DSGS	L3134	14 months	2 x 0.3 mm edge	SWARCOLUX P21	Q4; B3; R3; S4
5628	DSGS	L572	12 months	0.3 mm edge	SWARCOLUX P21	Q4; B3; R4; S1
5628.1	DSGS	B54	12 months	0.3 mm edge	SWARCOLUX P21	Q4; B3; R3; S2
6522	DSGS	B16	14 months	0.6 mm edge	SWARCOLUX P21	Q2; R3; S3
6541	DSGS	B189	12 months	0.6 mm edge	MEGALUX 600-1500 T14 K25	Q3; R5; RW3; S2
6542.2	DSGS	L2	22 months	0.6 mm edge	MEGALUX 600-1500 T14 K25	Q3; R4; RW3; S2
7112	DSGS	B27	12 months	0.4 mm edge	SWARCOLUX P21	Q4; R3; S2
1.B80	PBS	B80	13 months	0,6 mm edge	SWARCOLUX 50 425-1400 T14 MK30	Q3; R2; RW2; S5
3.B80	PBS	B80	13 months	0,6 mm edge	SWARCO SOLIDPLUS 10 425-1400 T14 MK30	Q3; R3; RW3; S5