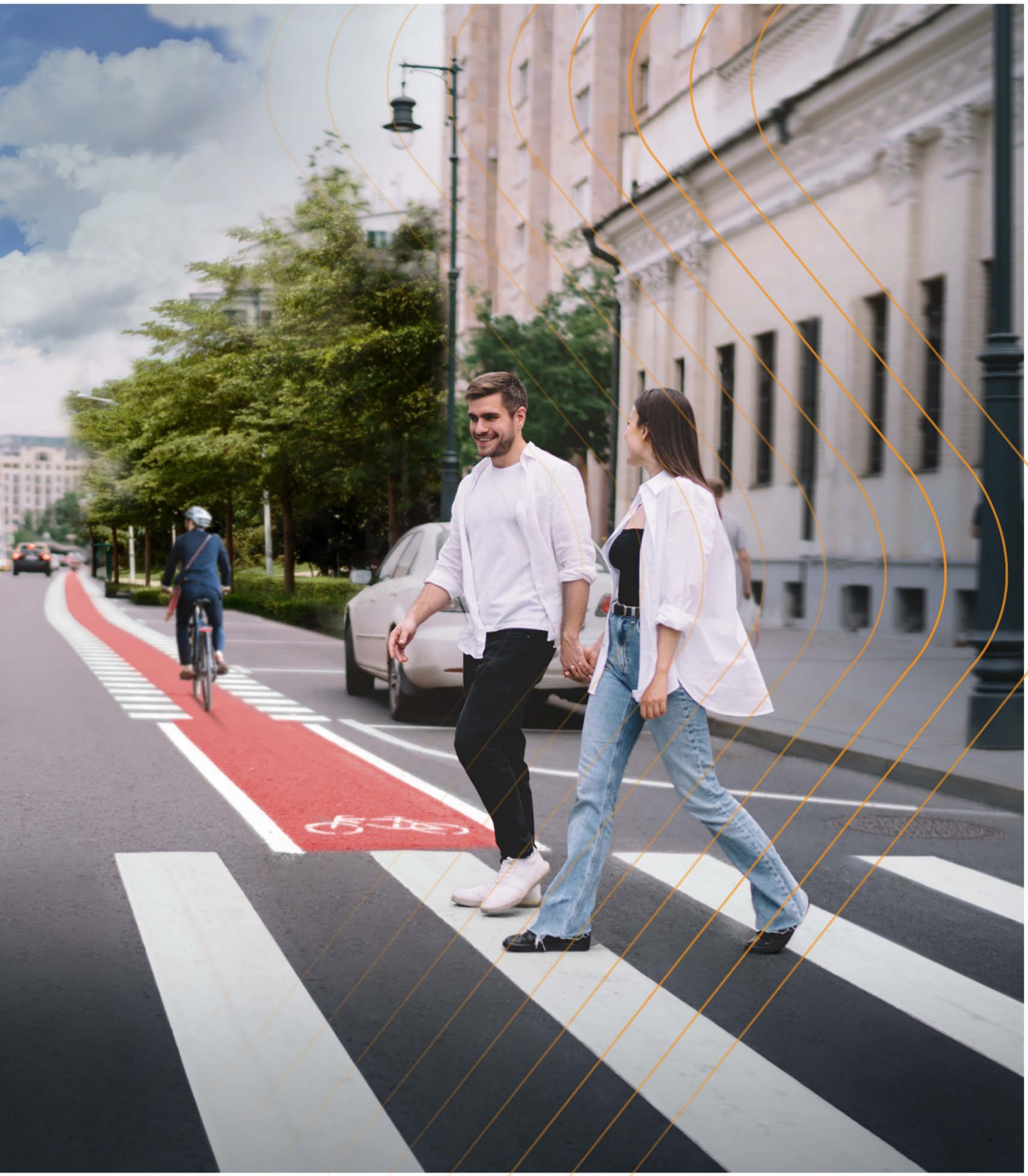
TECHNICAL INFORMATION

LIMBOPLAST FOR RUMBLE STRIPS



swarco
Road Marking Systems

swarco Road Marking Systems

LIMBOPLAST FOR RUMBLE STRIPS

Art.-No.: 5239…. (RAL)

Version: 2019-11-07

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

LIMBOPLAST for Rumble Strips...

- belongs to the group of solvent-free, 2-component, reactive systems
- is a special cold plastic developed for the application of durable, dimensionally stable markings with warning effect for traffic calmed zones with an increased accident risk (rumble strips)
- is applied as line markings in regular distance to each other perpendicular to the road with varying cross sections and line widths
- has an acoustic and haptic effect on drivers to induce a speed reduction
- not suitable for residential areas due to its acoustic effect

2 Technical Data

Color	White, other colors on request, due to sun / weather exposure the chalking effect has to be regarded
Density	approx. 1.84 kg/l +/- 0.1
Pot life	5 - 10 min. (depending on hardener quantity added and air, material and surface temperatures)
Solvent content	solvent-free, thinner must not be added
Thinner for cleaning	Special cleaner for marking machines (Art.-No.: 3086).
Storage stability	6 months; unmixed in sealed original packaging and sheltered from frost and direct sun exposure
Trafficability / curing time	Depends on the climatic conditions (cf. table “Pot life / Curing times”). In general the marking’s trafficability must be checked before exposing them to traffic impact. When applying in optimal weather conditions, T3 can be expected
Standard packaging	**LIMBOPLAST for Rumble Strips:** Tin container with 10/15kg filling weight **Hardener powder:** PE-bags – filling weight corresponds to cold plastic quantity and mixing ratio **Attention:** all hardener types are organic peroxides – they must be packaged, shipped and stored away from the cold plastic in special containers (special cartons and boxes). **Drop-on material:** paper bags with PE-inlay – 25 kg filling weight
Identification	The regulations and instructions concerning the appropriate shipping, handling, storage, first aid and measures, toxicology and ecology are stated in detail 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	In accordance with public statements (standards). Recommended total layer thickness (incl. drop-on material) 8 - 10 mm (in special cases up to approx. 20 mm)
Theoretical consumption	ca. 1.84 kg/m² per mm layer thickness The actual consumption depends on cross sections, width, profile height, type of profile, application technique and state of the surface
Recommended theoretical consumption of drop-on material	0.50 kg/m² SWARCO beads for Rumble Strips (Art.-No.: R15530)

3 Consumption of material- and drop-on material

Product	Consumption*							
	screed box 1 0,45 m width		screed box 2 0,50 m width		Standard screed box 0,12 m width		Screed box made for ramp rumble strips 0,12 m width	
	Thickness approx. 8 – 10 mm				Thickness approx. 6 – 7 mm		Thickness approx. 1 – 7 mm	
	kg/ m²	kg/ m	kg/ m²	kg/ m	kg/ m²	kg/ m	kg/ m²	kg/ m
LIMBOPLAST for Rumble Strips	18.0–22.3	8.1–10.0	20.0–24.7	9.0–11.1	13.0–14.0	1.54–1.68	10.0–11.0	1.2–1.3
Beads for Rumble Strips	0.40	0.18	0.40	0.18	0.40	0.05	0.40	0.05

4 Mixture ratio / Application technique / Hardener

Product	Article-no.:	Technique	Type of hardener
LIMBOPLAST for Rumble Strips Reactive component / Base component Summer formulation Winter formulation	 **5239…** **5239…W**	**Open mixture technique** 2-comp. special machines or by manual application with screed box (e.g. BASt – screed box)	Hardener
Mixture ratio: **Base component** (cold plastic) : **Hardener powder** (BPO) = **100 : 1**			
Between October and April LIMBOPLAST for Rumble Strips is delivered in winter formulation, due to weather conditions			

5 Processing instructions

5.1 Preparation of material and application techniques

LIMBOPLAST for Rumble Strips must be homogenously stirred in its original container before processing! Then the hardener (powder) is mixed in with the base component (LIMBOPLAST for Rumble Strips) at the indicated mixing ratio while using an appropriate stirring device.

Never prepare more material with hardener than is needed for the application (observe pot life).

Pot life and curing times may be strongly influenced by material, ambient and surface temperatures. High temperatures reduce pot life and curing times, low temperatures will prolong them.

It is possible to influence the reaction time to a certain extent by altering the hardener quantity.

Cold plastic (reactive system) is solvent-free and must be applied without adding solvent. The cleaning must occur before the complete curing of the material takes place by using **Special cleaner for marking machines** (Art.-No.: 3086).
The actual consumption depends on cross sections, width, profile height, type of profile, application technique and state of the surface.

5.2 Optimizing of application properties of material

The application properties and reactivity of the material depends on cold plastic, air and surface temperature. Proper storage conditions partly improve application conditions. To a limited extent viscosity / curing time can be adjusted to site requirements (e.g. viscosity, curing time).

5.2.1 Viscosity

Increase of viscosity (e.g. high material, air and surface temperatures): add max. 0.2 % thixotropic agent (Art.-No.: RH13700 solid or RH10459 liquid).

Reduction of viscosity (e.g. low material, air and surface temperatures) add max. 1 % condenser (Art.-No.: 3044).

Attention: Add the needed agent quantity only, otherwise viscosity or settle properties can change.

5.2.2 Reactivity / curing time

Acceleration of reactivity / curing time (e.g. spring / autumn application jobs at low temperatures)

a) addition of a max. of 0.2 % accelerator for cold plastic (Art.-No.: 8060) or
b) increase hardener quantity up to max. 2.0 weight %

Retarding of reactivity / curing time (e.g. high temperature in summer)

a) add a max. of 0.2 % retarder (Art.-No.: 8050) or
b) reduce hardener quantity but not below 0.5 weight percent

Attention: for ensuring a proper chemical reaction don't go below 0.5 weight percent and don't exceed 2.0 weight percent for hardener.

6 Road surface / pre-treatment

6.1 General information

The surface must be dry, clean and free from grease, oil and loose gravel and other contaminations. The surface and potential 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.

6.2 Concrete and cement-bound surfaces

The pavement components in new road surfaces that prevent good bonding (fine mortar layer, concrete slurries) must be appropriately removed (e.g. with high pressure water jet, fine mill cut or similar). We recommend conducting test applications.
Before applying LIMBOPLAST for Rumble Strips on concrete or cement-bound surfaces, a pre-treatment with primer is necessary:

a. via spray technique (paint spray machine) with 2-component EP-primer (Art.-No.: 8609000) or
b. manually (roller) with 2-component B71 for concrete primer (Art.-Nr.: 8010)

It is essential to have a sufficient and uniform coverage with primer in order to obtain an optimum bonding between cold plastic and concrete. Primer consumption may vary depending on the concrete's porosity. The humidity of concrete must not exceed 4% during the application of 2-component B71 for concrete primer. Primers based on epoxide resins are suitable for residual damp surfaces.

6.3 Bituminous surfaces

Any loose components such as chippings must be removed. Fluxoils, releasing agents for road rollers, are detrimental to good bonding of markings or can cause discoloration of the striping. Since a mechanical removal is hardly possible, the surface should be exposed to traffic for 4 - 6 weeks or an initial marking of paint is to be applied.

7 Application techniques

Manual application by pushing the device with the special rumble screed box with convertible sectional sheet (recommended by BASt in publication V190).

No current guideline (Version: June 2015) describing rumble strips, regarding application site, colors, cross sections, width, profile height, type of profile, application technique, distance between each rumble strip and visibility is available in Germany. Therefore it is recommended to apply according to the specifications of the authorities.

Attention: Despite the exact layer thickness adjustment at the dispensing shoe (screed box), increased consumption may occur when applying the material on coarse surfaces. This is due to the fact that hollow parts of the surface are filled first before a measurable layer thickness is built up.

For manual application and tapping the quick hardening has to be regarded. Therefore it is necessary to add drop-on material and remove tapes as quickly as possible after application. Otherwise the drop-on material will not be properly embedded and edge lines of the marking may be damaged which will have an influence on traffic technological properties and durability. Minimum requirements regarding skid resistance need to be fulfilled.

8 Test reports

8.1 Table 1: RPA – Test reports by BASt (German Road Institute)

Test report-no.	Layer thickness	Consumption		Drop-on material (DOM)	Traffic technological properties	
	mm	Material	DOM	Identification (divergent identification possible – see relevant report)	New condition	Used condition
		kg/m²	kg/m²			
Type I marking						
2015 1DK 05.12	4	7.36	0,50	Beads for rumble strips	P7, S1, R5, Q5, T3*	P7, S2, R5, Q5