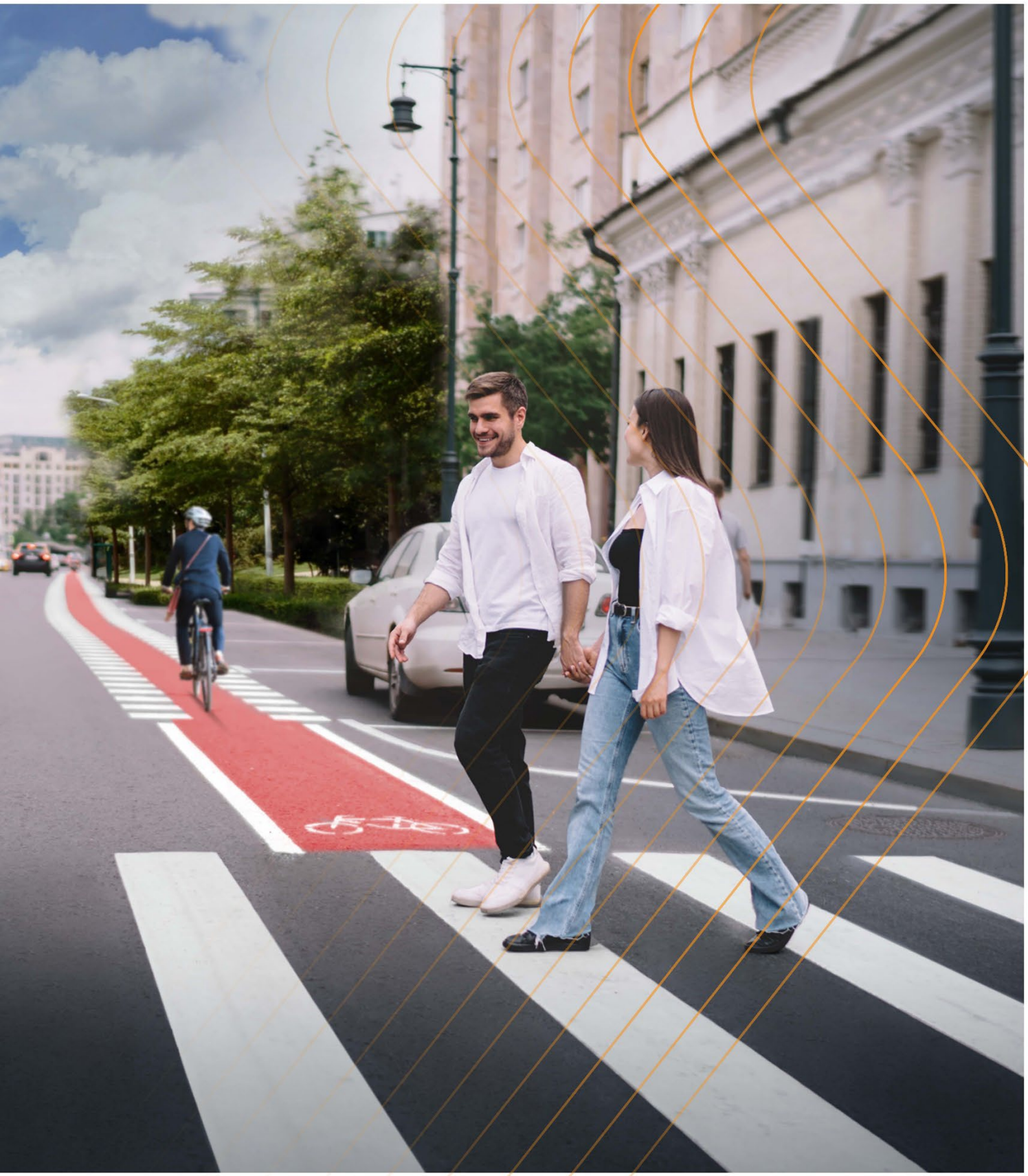
TECHNICAL INFORMATION

LIMBOPLAST D230



swarco

Road Marking Systems

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LIMBOPLAST D230

Art.-No.: 5090

Version: 2026-02-25

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 D230...

- belongs to the group of solvent-free, 2-component, reactive systems
- consists of two components which – through chemical interaction – form a duroplastic compound and cannot be thermally plastified thereafter
- has been tested as Type I marking on the turntable simulator at the German Road Institute (BASt), Type II marking is in examination
- is suitable for all bituminous surfaces (e. g. mastic asphalt, asphaltic concrete) and also concrete pavements (priming required)
- can be applied with current application equipment / machinery for plain cold plastic markings with dispensing shoe
- suitable in built-up areas by using a coarse drop-on material without haptic effect

2 Technical Data

Color	White
Density.	approx. 1.95 kg/l +/- 0.06
Potlife	5 - 10 min. (depending on hardener quantity added and air, material and surface temperatures; cf. “Table Potlife / Curing time”!)
Solvent content	Solvent-free, do not add solvent during application
Solvent for cleaning	Special cleaner for marking machines Art.-No.: 3086
Storage stability	6 months (unmixed), in sealed original packaging; protect from frost and direct sun light
Trafficability / curing time	Depends on the climatic conditions (see tables under point 4.2.3). In general the marking’s trafficability must be checked before exposing them to traffic impact.
Standard packaging	**LIMBOPLAST D230:** Tin container with 10/16/25/40 kg filling weight; larger container filling upon request **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, transported and stored in special containers (special cartons and boxes) separately from the cold plastic material. **Drop-on material:** paper bags with PE-inlay – 25 kg filling weight
Identification	The regulations and instructions concerning appropriate transport, 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 taken into consideration)
Layer thickness	2-3 mm
Theoretical consumption	approx. 3.9-5.9 kg/m² (2.0-3.0 l/m²) respectively approx. 1.95 kg/m² per 1.0 mm layer thickness; the actual consumption depends on the applied layer thickness and the type and state of the surface.

3 Mixing ratio / Application techniques / Hardener

Product	Art-No.	Techniques	Hardener Type
LIMBOPLAST D230 white summer formulation winter formulation	 **5090** **5090W**	**Open mixture technique:** 2-comp- marking machine (screed box) or manual application (trowel	Hardener powder
Mixing ratio: **base component B** (D230) : **Hardener powder** (BPO) = **100 : 1**			
Between October and April LIMBOPLAST D230 is delivered in winter formulation			

4 Processing instructions

4.1 Preparation of material and application techniques

LIMBOPLAST D230 must be homogeneously stirred in its original container before processing! Then the hardener powder is mixed with the base component LIMBOPLAST D230 at the indicated mixing ratio while using an appropriate stirring device.
Never prepare more material with hardener than is needed for the application (observe potlife). Potlife and curing times may be strongly influenced by material, ambient and surface temperatures. High temperatures reduce potlife and curing times, low temperatures will prolong them.
It is possible to influence the reaction time to a certain extent by altering the hardener.

Cold plastic (reactive systems) are solvent-free and must be applied without adding solvent (for optimizing material processability see chapter 4.2).
The cleaning must occur before the complete curing of the material takes place by using a special cleaner for marking machines (Art.-No.: 3086).

The exact machine adjustments have to be done according to the manufacturer's instructions. Layer thickness and quantity of drop-on material need to be evenly distributed. Scattering losses on both line sides make modified machine adjustments necessary.

Theoretical consumption of paint and drop-on material is listed:

- in the respective test reports by BASt
- in the table 1 "RPA – test reports by BASt" see point 7
- in the table "Theoretical consumption of material and drop-on materials" on our website in kg/m² as well as in kg/km of line to be marked depending on typical line width

4.2 Optimizing of application properties of cold plastic

4.2.1 General information

The application properties and reactivity of the material depends on the temperature of the cold plastic, air and surface. Proper storage conditions can improve application conditions.

Attention: Only use one of the methods described in 4.2.2 and 4.2.3. Beware that exceeding the mentioned quantities and simultaneous usage of two or more methods (agents) may lead to severe changes to the application properties and traffic technological properties.

4.2.2 Viscosity

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

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

Attention: Add the needed agent quantity to the required amount of material for application only, otherwise viscosity or settle properties can change.

4.2.3 Reactivity / curing time

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

a) Addition of max. 0.2 % accelerator for cold plastic (Art.-No.: 8060) or
b) Increase powder hardener quantity up to max. 2% by weight percentage

Retarding reactivity / curing time (e. g. high temperatures in the summertime)

a) Add max. 0.2 % retarder (Art.-No.: 8050) or
b) Reduce hardener quantity but not below 0.5% by weight percentage

Attention: To ensure a proper chemical reaction do not use less than 0.5% by weight percentage for hardener powder and don't exceed 2% by weight percentage for hardener powder.

Different potlife and curing times depend on material and surface temperatures, different hardener quantities, adding accelerator or retarder as shown in the spreadsheet below.

Table 1: Pot life and curing times of 2-component cold plastics depending on material and surface temperature

Temp. (°C)	Powder hardener (weight %)	Pot life (min)	Curing time (min)	Liquid hardener (weight %)	Pot life (min)	Curing time (min)
0°	2	-	-	2	-	-
5°	2	31	48	2	28	65
10°	2	23	39	2	17	50
15°	2	12	30	2	15	46
20°	1	11	29	2	14	30
25°	1	9	25	2	12	26
30°	1	7	20	2	10	21
40°	0,5	10	26	2	6	15
45°	0,5	8	19	2	5	12

Table 2: Pot life and curing times of 2-component cold plastics as a function of temperature with addition of accelerator or retarder

Temp. (°C)	Accelerator (weight %)	Retarder (weight %)	Powder hardener (weight %)	Pot life (min)	Curing time (min)	Liquid hardener (weight %)	Pot life (min)	Curing time (min)
0°	0,2	-	1	-	-	2	-	-
5°	0,2	-	1	24	67	2	23	60
10°	0,2	-	1	19	36	2	17	34
15°	0,1	-	1	18	31	2	17	32
20°	-	-	1	15	31	2	15	30
25°	-	0,1	1	14	29	2	16	29
30°	-	0,1	1	13	26	2	13	27
30°	-	0,2	1	18	35	2	16	35
40°	-	0,2	1	14	26	2	11	22
45°	-	0,2	1	12	29	2	13	30

5 Road surface / pretreatment

5.1 General information

The surface must be dry, clean and 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 by using appropriate mechanical procedures.

Information: LIMBOPLAST D230 is not appropriate for large surface applications on bituminous surfaces (e. g. playground, sportsground, cycle path or similar).

5.2 Concrete and cement-bound surfaces

Pavement components of new road surfaces that prevent good bonding (fine mortar layer, concrete slurries) must be removed appropriately (e. g. with high pressure water jet, fine millcut or similar). We recommend conducting test applications.

Before applying LIMBOPLAST D230 on concrete or cement-bound surfaces should be pre-treated with primers:

a) Spray technique (paint spray machine) with 2-C EP-primer (Art.-No.: 8609000) or
b) Manually (roller) with 2-C primer B71 for concrete (Art.-Nr.: 8010) or
c) Spray technique (air spray or airless technique) with LIMBOROUTE 2-Comp. K809 (Art.-No.: 14809A)

Sufficient and uniform primer coverage is essential in order to obtain an optimum bonding of the cold plastic and the concrete. Primer consumption may vary depending on the concrete's porosity. The moisture of concrete must not exceed 4% when applying 2-component primer B71 for concrete. Primers based on epoxide resins are suitable for residual moisture surfaces.

If an initial paint marking is applied without the above mentioned pre-treatment, bonding tests have to be conducted before applying the permanent marking. In case of doubt pretreatment and demarking the initial paint is required.

5.3 Bituminous surfaces

Any loose components such as chippings must be removed. Fluxoils, releasing agents from road rollers or other asphalt components 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 with paint is to be applied. It is recommended to use LIMBOROUTE 2-C K809, instead of a one-component paint when applying an initial marking. A bonding check is required before applying the final marking.

5.4 Cobbled pavement

All kinds of cobbled pavement are non-rigid surfaces and not an ideal substrate for thick layer markings. In the case of crack formation or spallings on the marking the manufacturer cannot be held responsible. Test applications and surface pre-treatment are recommended. Cobbled pavement must ensure proper bonding. In case of doubt test markings / bonding checks are recommended.

Natural stone block paving:
Pavements must be primed with 2-C primer B71 for concrete (Art.-No.: 8010), see Technical Information) before the cold plastic can be applied.

Natural – or cast stone pavements (basalt, granite....)
The surface must be primed with 2-C primer B55 for cobbles (Art.-No.: 8011). Afterwards apply cobblestone mortar (Art.-No.: 5232…). Pay attention to get an even and flat surface. The overall dimensions should protrude 2 – 3 cm over the marking surface. After curing, cold plastic can be applied. The consumption of primer and pavement mortar depends on the shape of the block paving.

5.5 Resin floors

For markings on resin floors our “SWARCO SAFETY-LINE” products should be used.

6 Application techniques

Apply with common cold plastic self-propelled marking machines or manually with dispensing shoe, trowel, spatula or similar.

When applying manually, use stencils or adhesive tapes to improve the formation of edges and borders of the markings. Remove tapes in time after applying cold plastic and add drop-on material as soon as possible into the fresh cold plastic in order to get appropriate traffic technological properties.

For large-scale marking jobs self-propelled marking machines are used. For manual markings (e. g. urban area markings) small machines for manual application are used. The detailed settings depend on the application conditions and machine type and have to be adjusted according to the instructions of the machine manufacturer. It is important to make sure that the material and drop-on materials are uniformly spread over the application surface and that the indicated quantities are respected.

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

It is well proven that no quality differences occur between using powder hardener or liquid hardener.

7 Test reports / Field test reports

7.1 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 kg/m²	DOM kg/m²	Identification (divergent identification possible - see relevant test report)	New condition	Used condition
Type I markings						
2004 1DK 07.03	2.0	3.90	0.32	SWARCOLUX P21 T18 M25	P7, S2, R5, Q5, T3	P7, S1, R5, Q5
2004 1DK 07.02	3.0	5.85	0.32	SWARCOLUX P21 T18 M25	P6, S1, R5, Q5, T3	P6, S1, R5, Q5
Type II markings						
2021 1DK 10.09	2.0	3.90	0.40	SWARCO SOLIDPLUS 10 425-1400 T18 MK 30	P7, S1, R5, RW5, Q5, T3	P7, S2, R5, RW3, Q5
2025 1DK 06.08	2.0	3.90	0.45	SWARCO SOLIDPLUS 10 425-1180 T18 MK30	P7, S1, R5, RW6, Q5, T2	P7, S1, R5, RW5, Q5
2020 1DK 10.08	3.0	5.85	0.45	SWARCOLUX 50 425-1400 T18 MK30	P7, S1, R5, RW5, Q5, T3	P7, S1, R5, RW2, Q5
2021 1DK 10.10	3.0	5.85	0.40	SWARCO SOLIDPLUS 10 425-1400 T18 MK30	P7, S1, R5, RW6, Q5, T3	P7, S2, R5, RW3, Q5