

TECHNICAL INFORMATION  
**LIMBOPLAST D468**



# LIMBOPLAST D468

Art.-No.: 5080

Art.-No.: 5080H (manual application)

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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

## LIMBOPLAST D468...

- belongs to the group of solvent-free, 2-component, reactive systems
- consists of two components which – in a chemical reaction – form a duroplastic compound and cannot be thermally plastified thereafter
- has been tested as Type I and Type II marking on the turntable simulator at the German Road Institute (BASt) inclusive as marking system together with LIMBOROUTE 2-Comp. K809
- is suitable for all bituminous surfaces (e.g. mastic asphalt, asphaltic concrete) and also concrete pavements (priming required)
- can be applied with conventional application equipment / machinery for plain cold plastic markings with dispensing shoe or by manual application

## 2 Technical Data

<b>Color</b>	white, other colors upon request
<b>Density</b>	approx. 1.93 kg/l +/- 0.06
<b>Potlife</b>	5 - 10 min. (depending on hardener quantity added and air, material and surface temperatures; cf. "Table Potlife / Curing time!")
<b>Solvent content</b>	Solvent-free, do not add solvent during application
<b>Solvent for cleaning</b>	Special cleaner for marking machines Art.-No.: 3086
<b>Storage stability</b>	6 months (unmixed), in sealed original packaging; protect from frost and direct sun light
<b>Trafficability / curing time</b>	Depends on the climatic conditions (see tables under point 4.2.3). In general the marking's trafficability must be checked before exposing it to traffic.
<b>Standard packaging</b>	<p><b>LIMBOPLAST D468:</b> Tin foil container with 10/15/25/40 kg filling weight; Larger container upon request</p> <p><b>Hardener powder:</b> PE-bags – filling weight corresponds to cold plastic quantity and mixing ratio</p> <p><b>Attention:</b> all hardener types are organic peroxides - they must be separately packaged, transported and stored from the cold plastics in special containers (special cartons and boxes).</p> <p><b>Drop-on material:</b> paper bags with PE-inlay – 25 kg filling weight</p>
<b>Identification</b>	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 observed.
<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</b>	2 - 3 mm
<b>Theoretical consumption</b>	approx. 3.9 - 5.79 kg/m <sup>2</sup> (2.0 – 3.0 l/m <sup>2</sup> ) respectively approx. 1.93 kg/m <sup>2</sup> 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 ratios / Application techniques / Hardener

Product	Art.-No.	Technique	Hardener type
<a href="#">LIMBOPLAST D468</a> white (summer form.)	5080	Open mixture technique: 2-comp- marking machine (screed box) or manual application (trowel...)	Hardener powder
<a href="#">LIMBOPLAST D468</a> white (summer form.)	5080W		
<a href="#">LIMBOPLAST D468</a> white (man. applicat.)	5080H		
<a href="#">LIMBOPLAST D468</a> colored (RAL colors)	52D468....		
Mixing ratio: reactive component (D468) : Hardener powder (BPO) = 100 : 1			
<a href="#">LIMBOPLAST D468</a> = base component	reactive component	Shielded mixture technique 2-comp- marking machine (screed box) or manual application (trowel...)	Liquid hardener
	summer formulation		
	winter formulation		
Mixing ratio: reactive component (D468) : liquid hardener = 98 : 2			
Between October and April LIMBOPLAST D468 is delivered in winter formulation, due to weather conditions			

## 4 Processing instructions

### 4.1 Preparation of material and drop-on material

**LIMBOPLAST D468** must be **homogeneously stirred** in its original container before processing! Then the hardener powder is mixed in with the base component LIMBOPLAST D468 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).

Cold plastic (reactive systems) is solvent-free and must be applied without adding solvent (optimizing of material processability, point 4.2).

The cleaning must occur before the complete curing of the material is completed by using **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/m<sup>2</sup> 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 cold plastic, air, and surface temperatures. Proper storage conditions partly improve application conditions.

Within a limited extend viscosity and reactivity / curing time can be adjusted to processing conditions.

**Attention:** use methods described in 4.2.2 and 4.2.3 regarding agent quantities. Exceeding the mentioned quantities and/or simultaneous usage of two or more methods (agents) will lead to negative consequences regarding application properties or 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 with 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 of 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:** for ensuring proper chemical reaction do not get below 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 and how to add accelerator or retarder is 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 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.

**Information:** LIMBOPLAST D468 is not appropriate for large area applications on bituminous surfaces (e.g. playground, sportsground, cycle path or similar).

### 5.2 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 millcut or similar). We recommend conducting test applications.

Before applying LIMBOPLAST D468 on concrete or cement-bound surfaces should be pre-treated with primers:

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

It is essential to have a sufficient and uniform coverage with primer 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, pre-treatment and removal of the initial paint is necessary.

### 5.3 Bituminous surfaces

Any loose components such as chippings must be removed. Flux oils, 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 must be applied. It is recommended to use the LIMBOROUTE 2-Comp. K809, instead of a one-component paint when applying an initial marking. A bonding check is required before applying the final marking.

### 5.4 Block paving

All kinds of block paving are non-static surfaces which can lead to crack formation or spillings on the marking. Therefore, no guarantee can be given for any problems resulting from the application of any marking material on block paving. Test applications and surface pre-treatment are recommended to ensure proper bonding.

#### **Compound concrete stone pavements:**

Pavement must be primed with 2-component primer B71 for concrete (Art.-No.: 8010), see Technical Information). Afterwards cold plastic can be applied.

### Natural or cast stone pavements (basalt, granite....):

Marking surface must be primed with 2-Component primer B55 for cobbles (Art.-No.: 8011). Afterwards apply cobblestone mortar (Art.-No.: 5232...) and 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 application follows.

Consumption of primer and pavement mortar depends on shape of paving.

## 5.5 Floor coatings

For markings on floor coatings our indoor marking products should be used.

## 6 Application techniques

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

When applying manually, use templates or adhesive tapes to improve the formation of edges and borders of the markings. Remove tapes on 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 ensure that material and drop-on materials are uniformly spread over the application surface and that the indicated quantities are observed.

**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.

## 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	DOM	Identification (divergent identification possible - see relevant test report)	New condition	Used condition
		kg/m²	kg/m²			
Type I Marking						
2002 1DK 07.15	2.0	3.86	0.32	SWARCOLUX P21 T18 M25	P7, S2, R4, Q5, T3	P7, S1, R4, Q5
2002 1DK 07.03	3.0	5.79	0.32	SWARCOLUX P21 T18 M25	P7, S2, R5, Q5, T3	P7, S1, R5, Q5
Type II Marking						
2021 1DK 10.08	3.0	5.79	0.40	SWARCOLUX 50 425-1400 T18 MK30	P7, S1, R5, RW5, Q5, T3	P7, S2, R5, RW3, Q5

### 7.2 Table 2: Field test reports

Test report-no.	Stretch	Traffic exposure	Layer thickness	Bead type	Traffic technological properties/ used condition
5318 (DSGS*)	B87	11 months	2 mm, wide dotted marking	P23	Q4, R3, S1
5398 (DSGS*)	B87	15 months	2 mm, wide dotted marking	P23	Q3, R2, S1
5471 (DSGS*)	B87	24 months	2 mm, wide dotted marking	P23	Q3, R2, S2
7128 (DSGS*)	B97	13 months	2 mm, centre line	P21	Q3, R4, S3

\*German Road marking Society

[www.swarco.com/rms](http://www.swarco.com/rms)

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