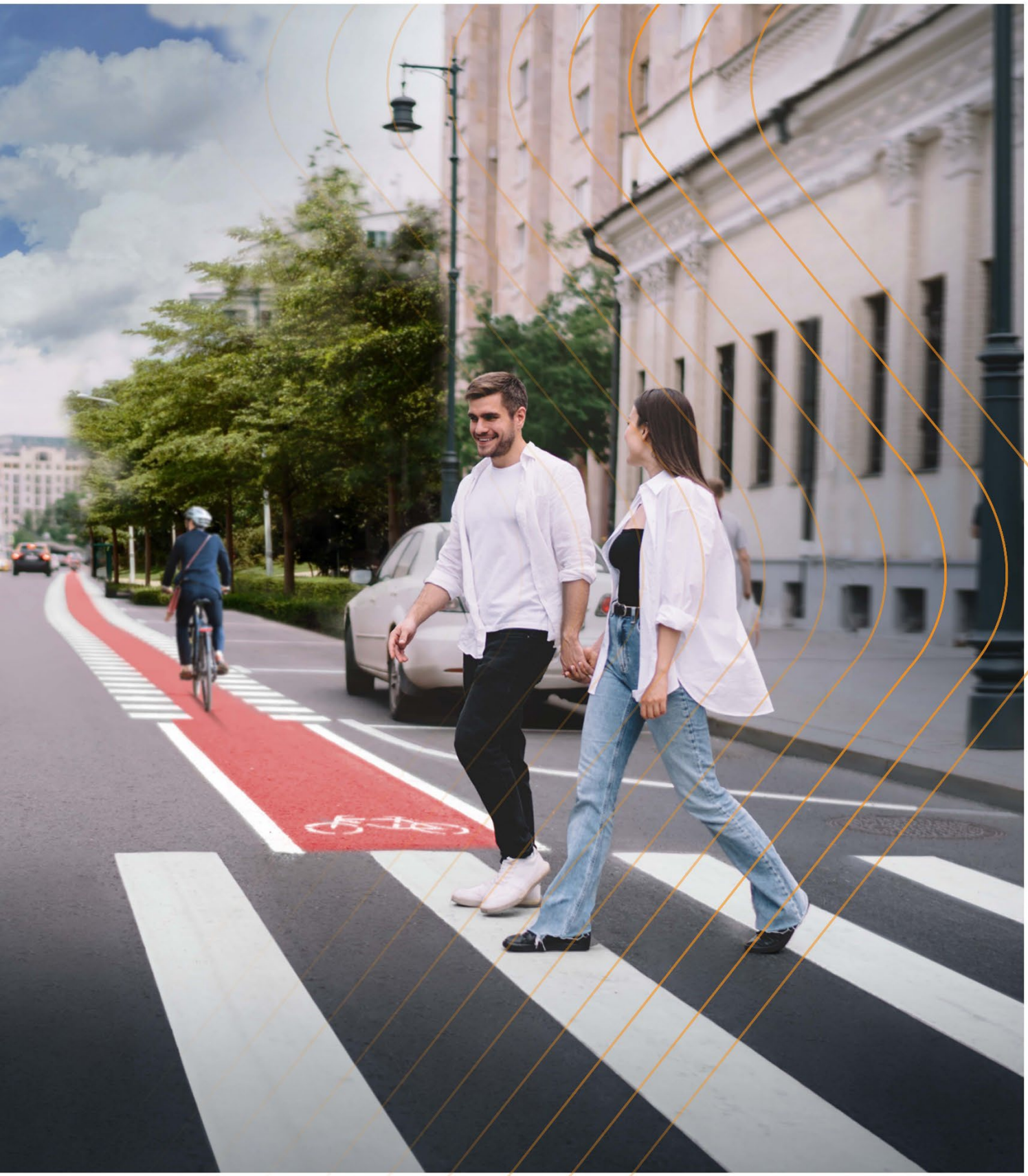
TECHNICAL INFORMATION

LIMBOPLAST KSP 120 Y1/Y2



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Road Marking Systems

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LIMBOPLAST KSP 120 Y1/Y2

Art.-No.: 5173Y1/Y2R reactive component
5173Y1/Y2NR non-reactive component
5173Y1/Y2RW reactive component, winter formulation

Version: 2025-08-22

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 KSP 120 Y1/Y2...

- belongs to the group of environmentally friendly, solvent-free, sprayable multi- component reactive systems
- consists of two or more components which – through chemical interaction – form a duroplastic, thin-layered marking
- has been tested on the turntable simulator at the German Road Institute (BASt) and approved as TYPE II yellow marking
- represents, depending on the construction sequence, an economical alternative to other temporary construction zone markings
- has been tested at the Institute for Paints and Varnish (ILF) for compliance with Y1 / Y2 chromaticity range according to DIN EN 1436 and TL-temporary markings 97
- is suitable for both bituminous surfaces, concrete and cement-bound surfaces
- is appropriate for universal use with all common application techniques for cold spray plastic (System 98:2, System 1:1, open System with reactive beads)
- is only delivered in airless quality

2 Technical Data

Color	yellow Y1/Y2 (for construction zones)
Density	approx. 1.48 kg/l +/- 0.06
Pot life	2 - 5 min (depending on added amount of hardener, air- and material temperature)
Solvent content	solvent-free
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 it to traffic impact
Standard packaging	**2-C KSP 120 Y1/Y2:** tin container with 10/16/25/40 kg filling weight; larger container upon request **3-C KSP 120 Y1/Y2** white container – 40 kg filling weight – non-reactive component silver container – 40 kg filling weight – reactive component larger container for reactive/non-reactive component upon request **Hardener powder:** PE-bags, filling weight corresponds to cold spray plastic quantity and mixture ratio **Reactive beads Type I / II:** paper bags – 25 kg filling weight **Liquid hardener:** Plastic cans – 20 kg filling weight **Attention:** all hardener types are organic peroxides – they must be packaged, transported and stored separately in special containers (special cartons and boxes), away from the cold spray plastic. **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	+ 5°C to + 45°C
Relative humidity	max. 75% (dew point spreadsheet has to be regarded)
Layer thickness	0.3 – 0.6 mm depending on BASt test report (wet film thickness = dry film thickness)
Theoretical consumption	0.44 – 0.88 kg/m² (0.3 – 0.6 l/m²), the actual consumption depends on the applied layer thickness and the type and state of the surface.

3 Mixing ratio / Application techniques / Hardener

Product name	Art.-No.	Technique	Hardener type
2-C LIMBOPLAST KSP 120 Y1/Y2 **reactive component = base component** summer formulation winter formulation	 **5173Y1/Y2R** **5173Y1/Y2RW**	**Shielded mixture procedure** Marking machine for system 98 : 2	Liquid hardener
Mixture ratio: reactive component : liquid hardener = 98 : 2			
2-C LIMBOPLAST KSP 120 Y1/Y2 **reactive component = base component** summer formulation winter formulation	 **5173Y1/Y2R** **5173Y1/Y2RW**	**Open mixture ratio:** conventional marking machine for open system	Reactive beads type I and type II
Mixture ratio: reactive component : Reactive beads Type I / II = 1 : 1.25			
3-C LIMBOPLAST KSP 120 Y1/Y2 **reactive component = base component** summer formulation winter formulation **non-reactive component***	 **5173Y1/Y2R** **5173Y1/Y2RW** **5173Y1/Y2NR**	**Shielded mixture procedure** 3-C Special marking machines	Hardener powder
Mixture ratio : non-reactive component* + Hardener powder (BPO) : reactive component = 1 : 1 (2% to 4%)			
3-C LIMBOPLAST KSP 120 Y1/Y2 **reactive component = base component** summer formulation winter formulation **non-reactive component***	 **5173Y1/Y2R** **5173Y1/Y2RW** **5173Y1/Y2NR**	**Shielded mixture procedure** 3-C Special marking machines	Liquid hardener
Mixture ratio: non-reactive component* + liquid hardener : reactive component = 1 : 1 (2% to 4%)			

* **Non-reactive c**omponent , mixed with hardener has a limited storage stability / pot life. Remaining quantity has to be removed out of the machine after the marking job is finished.
Between October and April, LIMBOPLAST KSP 120 Y1/Y2 is delivered in winter formulation, due to weather conditions

4 Processing Instructions

4.1 Preparation of material and application techniques

LIMBOPLAST KSP 120 Y1/Y2 must be homogeneously stirred in its original container. Only use the quantity needed for the next marking job. Then add the hardener while stirring homogeneously.
It is important for **2-C marking machines** with shielded mixture procedure (98:2 system) to ensure the machine is adjusted to the correct mixture ratio inside the mixing tube.
Even with only short standstill times of the machine it is necessary to rinse the mixing and spray devices with special cleaner for marking machines (Art.-No.: 3086).

For open system applications with reactive beads, layer thickness and the quantity of reactive beads need to be adjusted according to the BASt test report. It is essential to have a uniform and sufficient covering of marking with reactive beads in order to avoid curing problems. Avoid reactive beads from being broadcast outside the striping.

For **3-C marking machines** (mixture ratio 1 : 1) consider also:

- When preparing the non-reactive component hardener are added under homogenous stirring and then filled into the dedicated reservoir for the non-reactive component. Then the reservoir must be sealed.
- Extremely clean working conditions are essential when processing the components. Smallest contaminations / intermixings of the components can lead to premature curing. Therefore, it is advisable to use different stirring devices and auxiliaries for the different components.
- Even with only short standstill times of the machine it is necessary to rinse the mixing and spray devices with special cleaner for marking machines (Art. No.: 3086).

- Non-reactive component has a limited storage stability / pot life when mixed with hardener. Therefore, it is necessary to remove residuals of the non-applied, premixed material from the machine. Otherwise, machine damage may occur as a result of polymerization.

Cold spray plastic (reactive system) is solvent-free and must be applied without adding solvent (for optimizing of material processability see chapter 4.2).
The cleaning must be done before the curing of the material is complete 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 drop-on materials 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 7.1
- 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 application properties

4.2.1 General information

The application properties and reactivity of the material depends on temperatures of cold spray plastic, air and surface. Proper storage conditions may partly improve application conditions.

Attention: Use methods described in 4.2.2. and 4.2.3. regarding agent quantities. When exceeding the mentioned quantities and/or simultaneous usage of two or more methods (agents) will negatively influence application properties and/or traffic technological properties.

4.2.2 Viscosity

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

Reducing viscosity (e.g. low material, air and surface temperatures): add about 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 may change.

4.2.3 Reactivity / curing time

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

a) addition of max. 0.2 % accelerator for cold spray plastic (Art. No.: 8060) or
b) increase hardener quantity up to a max. of 2% by weight percentage

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

a) add a max. of 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 get below 0.5% by weight percentage and do not exceed 2% weight percentage for hardener.

Different pot life and curing times depend on material and surface temperatures, different hardener quantities, the addition of accelerator or retarder as shown in the spreadsheet.

Table 1: Curing times of 2-Comp. KSP 120 Y1/Y2 system 98:2 with liquid hardener in relation to material and surface temperatures

Temp. (°C)	Hardener quantity liquid (weight %)	Curing time (min)
0°	2	23
5°	2	15
10°	2	13
15°	2	10
20°	2	9
25°	2	7
30°	2	5
40°	2	4
45°	2	3

Table 2: Pot life and curing times of 3-Comp. KSP 120 Y1/Y2 depending on material and road surface temperatures

Temp. (°C)	Hardener quantity liquid / powder (weight%)*	Curing time (min)
0°	4	35
5°	4	30
10°	4	15
15°	4	10
20°	2	6
25°	2	5
30°	2	5
30°	1	8
40°	1	5
45°	1	5

* related to non-reactive component

Table 3: Pot life and curing times of 3-Comp. KSP 120 Y1/Y2 depending on temperature while adding accelerator or retarder

Temp. (°C)	Hardener quantity liquid / powder (weight%)*	Accelerator (weight%)	Retarder (weight%)	Curing Time (min)
0°	2	0.2	-	27
5°	2	0.2	-	22
10°	2	0.2	-	7
15°	2	0.1	-	6
20°	2	-	-	6
25°	2	-	0.1	7
30°	2	-	0.1	6
30°	2	-	0.2	5
40°	2	-	0.2	7
45°	2	-	0.2	7

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 with appropriate mechanical procedures.

Information: LIMBOPLAST KSP 120 Y1/Y2 is not appropriate for large surface applications on bituminous surfaces (e.g. playground, sportsground, cycle path or similar).

With passing of time color intensity may change (fading and decreased intensity) due to: sun exposure (especially UV light), water, dew, warm weather conditions, road salt. This effect is state-of-the-art and known as “chalking”. Constant traffic impact can reduce chalking (where the chalked layer is worn permanently) but will not prevent chalking completely. (see “General Information for Technical Information”). The construction zone marking may have to be renewed.

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 waterjet, fine millcut or similar). We recommend conducting test applications.

Before applying LIMBOPLAST KSP 120 Y1 / Y2 concrete or cement-bound surfaces should be pretreated with primers:

a) When using spray technique (paint spray machine) with 2-C EP-primer (Art. No.: 8609000) or
b) When applied manually (roller) with 2-C primer B71 for concrete (Art. No.: 8010)

It is essential to have a sufficient and uniform coverage with primer in order to obtain an optimum bonding of the cold spray plastic and the concrete. Primer consumption may vary depending on the concrete's porosity. The moisture of concrete must not exceed 4% during the application of 2-C primer B71 for concrete. Primers based on epoxide resins are suitable for residual moisture surfaces. We recommend the application of test markings.
Primers diminish bubble formation, likely to occur when concrete surfaces are not primered.

5.3 Bituminous surfaces

Any loose components such as chippings must be removed. Flux oils, releasing agents for road rollers, are detrimental to a good bonding of markings and/or can cause discoloration of the striping. We recommend test markings. A bonding check is required prior to the application of LIMBOPLAST KSP 120 Y1/Y2. If necessary other products should be applied.

6 Application techniques

Application with 2-component or 3-component marking machines. Airless machines require airless products to be used. The quality of cured cold spray plastic is independent of the chosen application technique and shows no differences. Powder and liquid hardeners are chemically the same.
Following application techniques are used:

1. **3-component marking machine, 1 : 1 technique**

   Non-reactive component (mixed with 2-4% liquid or powder hardener) and the reactive component are conveyed from separate containers with a mixture ratio 1 :1, then constantly mixed in a mixing tube and finally applied using airless technique. The drop-on material is eventually broadcasted onto the fresh layer with the desired quantity.

2. **2-component marking machine, 98 : 2 technique**

   Reactive component and the liquid hardener are stirred up inside the mixing tube and applied using airless or airspray technique. The drop-on material is evenly broadcasted onto the fresh layer with the wanted quantity.

3. **Open system with reactive beads type I and reactive beads type II**

   Reactive component is applied with the required layer thickness (max. 0.4 mm for type I and max. 0.6 mm for type II markings) with conventional paint spray machine, spray gun, brush or roller. Reactive beads type I or type II are immediately dropped onto the still wet KSP Y1 / Y2 film at a ratio of 1: 1.25.

Attention: It is essential to have a uniform and sufficient covering of the marking with reactive beads in order to avoid curing problems. The drop-on reactive beads have to be broadcast evenly to make sure that KSP Y1 / Y2 cures properly. The beads must not be blown away by wind or applied outside the striping. The open system, however, is very sensitive to high or low material and surface temperatures. Practical experience has shown that LIMBOPLAST KSP

120 Y1 / Y2, applied as an open system, should be processed within the temperature range of + 10 C° to + 35 C° only.

At higher temperatures, the reactive beads immediately react on the KSP 120 Y1 / Y2 surface and do no enter into deeper layers of the applied film in sufficient quantities. Consequently, a cured upper layer is created that can be separated / pulled off from the softer lower layer. At lower temperatures, the curing process might also be disturbed when the amount of reactive beads is too low for this temperature. Therefore, the uniform distribution of marking material and a sufficient amount of drop-on beads over the entire application surface must be observed for all application methods. The mixture ratio has to be regarded (1 : 1,25).

7 Test reports

7.1 Table 1: RPA – test report 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						
2024 1VY 11.16	0.4	0.59	0.60	SWARCO SOLIDPLUS 10 300-850 T18 GGK 30	P6, S1, R4, Q3, T2	P6, S1, R4, Q3
Type II Marking						
2012 1VY 08.08	0.6	0.88	0.60	SWARCO SOLIDPLUS 100 212-1400 T18 GGK30	P7, S3, R4, RW4, Q3, T2, Y2	P7, S2, R4, RW3, Q3
2020 1VY 11.11	0.6	0.88	0.60	MEGALUX-BEADS 600-1400 T18 K25	P7, S1, R4, RW3, Q3, T2, Y2	P7, S1, R4, RW3, Q3
2020 1VY 12.10	0.6	0.88	0.60	MEGALUX-BEADS 600-1400 T18 K25	P7, S1, R4, RW4, Q3, T2, Y2	P7, S1, R4, RW3, Q3
2024 1VY 11.15	0.6	0.88	0.60	SWARCO SOLIDPLUS 10 425-1400 T18 GGK 30	P6, S1, R5, RW6, Q3, T3, Y2	P6, S1, R5, RW3, Q3

*only confirmation of testing the marking systems available

7.2 Table 2: Field test reports

Report-No.	Stretch	Traffic exposure	Layer thickness	Bead type	Traffic technological properties
5636.1 DSGS*	A 13	8 months	0.6 mm edge	Meg. 0.6-1.5 KT14	S2, R4, RW3, Q2, B2
5636 DSGS*	A 13	8 months	0.6 mm edge	Meg. 0.6-1.5 KT14	S1, R4, RW3, Q2, B2

* German Road Marking Society