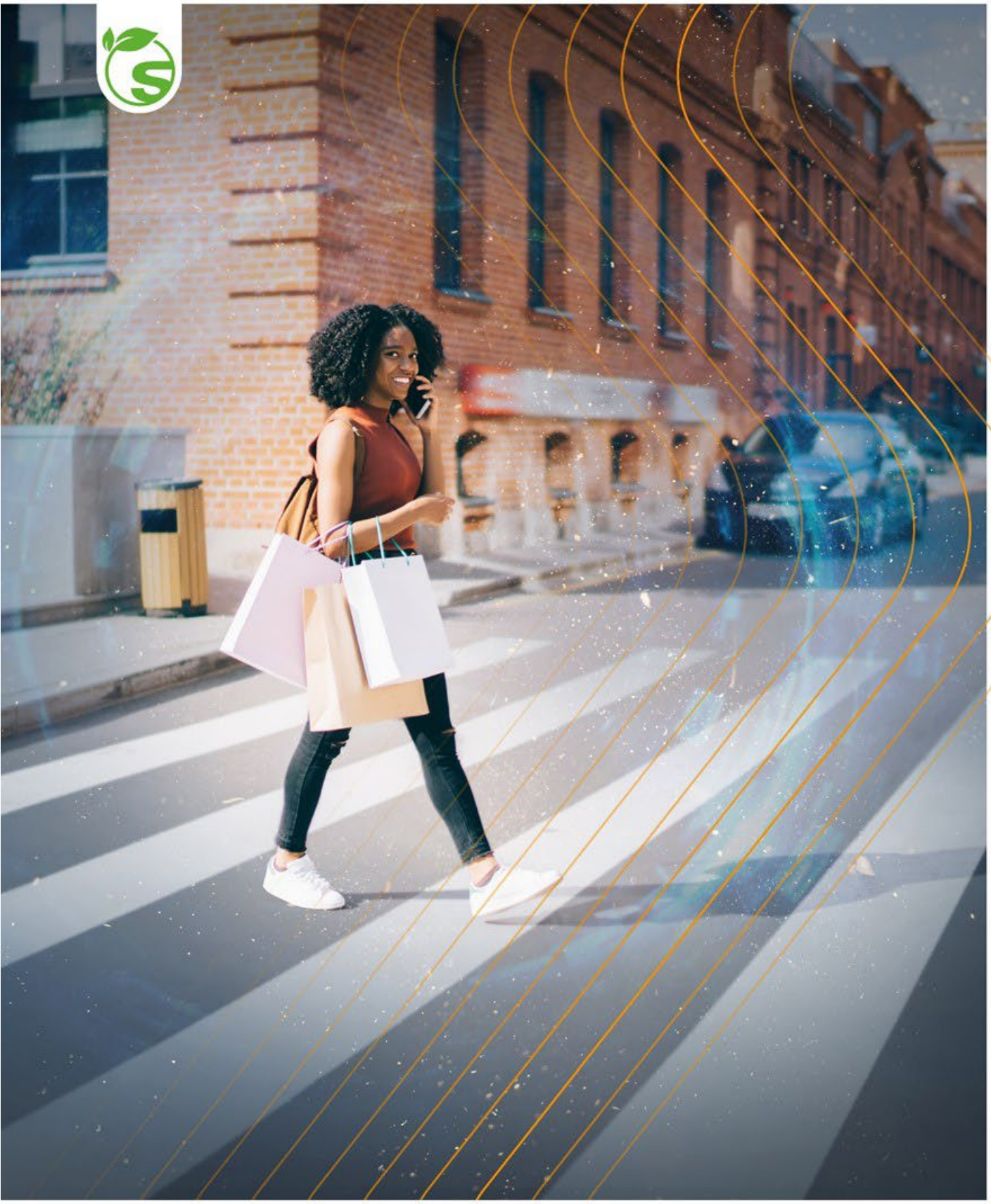
TECHNICAL INFORMATION

SWARCO LIMBOROUTE

Circuitline WBP



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Road Marking Systems

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SWARCO LIMBOROUTE Circuitline WBP

Art.-No.: 1180Fim, white
29WBP…. (RAL), colored

Version: 2024-10-08

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 applications

SWARCO LIMBOROUTE Circuitline WBP…

- is a waterborne, environmentally sound paint especially developed for the application on kerbs and as delineation along road racing circuits
- is characterized by fast drying, excellent covering power and good abrasion resistance
- provides excellent skid resistance for high-speed racing and a drain effect under rainy conditions without requiring any drop-on materials
- is suitable for both bituminous (e. g. mastic asphalt, asphaltic concrete) and concrete surfaces
- can only be processed with atomizing technique. Applying the material with a roller might be an option
- is homologated for road racing circuits by the Fédération Internationale de Motocyclisme in conformity with the FIM Paint Standard FRHPpa-01 and by the FEDERATION INTERNATIONALE DE L'AUTOMOBILE according to FIA/FIM Standard 3503-2019 Paints for Motor Racing Circuits (P.003.19)
- has been tested according to EN 1871 by EUROCONSULT (report no. 3573/19-2709)
- has already been used on many international road racing circuits (see list of references)

2 Technical Data

Color	white, (other colors upon request (see page 6))
Density	approx. 1.60 kg/l +/- 0.1
Solid content	approx. 80%
organic solvent content	69.95%
Thinner	max. 2% water to optimize the material's properties cleaning of equipment and machinery with water
Storage stability	6 months in sealed original packaging; protect from frost and direct sun light
Overrollability / drying time	approx. 20 minutes at 20°C The drying times stated are laboratory values that may differ from field conditions depending on climate (temperature, humidity, wind), material, layer thickness and road surface. In general the markings' overrollability must be checked before exposing them to traffic impact.
WOT (Wash-out-time)	approx. 10 minutes after drying depending on layer thickness and climatic conditions
Hiding power	≥ 95%
Standard packaging	Plastic container with 25 kg filling weight Container upon request
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.
VOC	<1% (see EUROCONSULT report no. 3573/19-2709)
Processing temperature	min. +10°C
Surface temperature	+10°C to +45°C
Relative humidity	max. 75% – (dew point spreadsheet has to be regarded)
Layer thickness	approx. 80 – 150 µm (depending on type of application) (**Attention**: higher layer thickness can reduce SRT-value)
Theoretical consumption	approx. 0.13 – 0.24 kg/m² The actual consumption depends on the applied layer thickness and the type and state of the surface.

3 Processing Instructions

3.1 Preparation of material and application techniques

The SWARCO LIMBOROUTE Circuitline WBP has to be homogeneously stirred in the original container. The exact machine adjustments have to be done according to the instructions see 5.1 and the manufacturer` instructions. Layer thickness need to be evenly distributed.

Theoretical consumption is listed in the table “Theoretical consumption of material and drop-on materials” on our homepage in kg/m².

Note: All devices and tubes must be totally free from paint residues and solvents before SWARCO LIMBOROUTE Circuitline WBP is applied!
All devices and tubes must be totally free from old paint residue and solvents. Do not use equipment that has any brass or copper parts. Stainless steel parts are recommended.

Before using dispersion paints, we recommend to clean equipment and machinery used earlier for solvent-based paints in the following three steps:

1. Rinse thoroughly with solvent (Art.-No. RH10010 Acetone)
2. Rinse with industrial alcohol or an alcohol / water mix (Art.-No. RH10070 Ethanol)
3. Rinse with plenty of water

At each work interruption the nozzles must be cleaned. Once the work is completed, the machine must be thoroughly rinsed.
Immediately after the application of dispersion paints, equipment and machinery must be cleaned in reverse order to prepare them for the use of solvent- based paints.

3.2 Optimizing of application properties

The SWARCO LIMBOROUTE Circuitline WBP in its delivery state is ready for processing. Usually the addition of thinner is not necessary. It is, however, possible to optimize the material's spray properties by adding max. 2 % water as thinner.

3.3 WOT (Wash-out-time)

In contrast to other marking materials dispersions in addition to overollability the rainproof properties have to be considered. Rainproof characteristic / WOT of dispersion paints is defined as the span after overrollability / drying time is finished up to the time at which the paint will be rainproof and will not be dissoluble. Therefore, we recommend apply water-based marking materials only when weather is dry without any chance of rain.

3.4 Drying times according to climatic conditions

Drying times (min)				
Relative humidity (%)	temperature (°C)			
	5	10	20	30
50	non-applicable	18	16	13
80	non-applicable	41	34	27

4 Road surface / pretreatment

4.1 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 bonding checks are required. Ideally, old markings should be removed with appropriate mechanical procedures. If the marking has to be applied on top of already existing markings, particular attention must be given to the FIA / FIM directives concerning skid resistance. Skid resistance tests are obligatory. In order to end up with the required skid resistance, it is essential not to exceed the prescribed layer thickness.
SWARCO LIMBOROUTE Circuitline WBP can **only** be processed with atomising technique!

4.2 Concrete or 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).
Attention: New process for the production of concrete (prefabricated curbes) results in a very smooth surface. To ensure optimum adhesion of the paint coating, it is essential to clean the substrate thoroughly with high-pressure water before applying the paint. This step ensures that the surface is roughened, which improves the adhesion of the paint. Make sure that all residues are removed to achieve the best results.
When applying the paint to concrete or cement-bound surfaces, bubble formation is likely occur. In order to prevent the formation of bubbles the concrete should be pretreated with SWARCO LIMBOROUTE Circuitline WBP blended 1:1 with water as a primer. The humidity of the concrete must not exceed 4% during the marking work. After precipitations a waiting period of minimum 48 hours is recommended.

4.3 Bituminous surfaces

Any loose components such as chippings must be removed. Fluxoils of new bituminous surfaces are detrimental to the good bonding of markings and may lead to discoloration of the stripings. Since these oils are hardly removable mechanically, the surface should either be exposed to traffic for 4-6 weeks or initially be marked with paint.

5 Application techniques

5.1 Mechanical application

Type of application	Machine	Nozzle height	Nozzle size	Basic air	Pre-nozzle	Material pressure	Atomizing pressure
Atomizing technique	H8-1	14 cm	Ø 2.6 mm	Ø 4.5 mm	10-15	2.6 bar	4.5 bar
Atomizing technique	RM3D	14 cm	Ø 3.0 mm	Ø 6.5 mm	10-15	2.6 bar	4.0 bar
Atomizing technique	H33	14 cm	Ø 23.0 mm	Ø 6.5 mm	10-15	2.9 bar	4.0 bar

5.2 Manual application by manual coating gun

Type of application	Type of spray gun	Nozzle Size	Basic air	Pre-nozzle
Atomizing technique	Hofmann Mod. 200 / 205 or similar	Ø 2.6 mm	Ø 4.5 mm	10-15

The expected consumption can vary due to the manual application and is between 0.42-0.48 kg/m². It is important, to ensure that the SRT values are met.

5.3 Manual application by roller

Type of application	Material	Pile length
Roller	polyamide	6-9 mm
Roller	polyester	6-9 mm

The expected consumption can vary due to the manual application and is between 0.42-0.48 kg/m². It is important, to ensure that the SRT values are met.

5.4 Additional instructions to the type of application

With conventional marking machines (only atomizing technique) or 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. By applying manually with brush or roller increased consumption may occur and higher layer thickness cause lower SRT-values. The uniform spread of the marking material over the entire application surface must be observed.

5.5 Instructions of demarking

Avoid overmarking too frequently, this may cause cracking and chipping. It is recommended to demark the old coatings previously. The SWARCO LIMBOROUTE Circuitline WBP can be demarked by all usual types of demarking.
The current methods are i. a. fine millcut, shot blasting, high pressure millcut etc. It should be noted that in all these methods so-called "phantom markings" can arise. Those are not unavoidable and not reversible.

5.6 Types of color

RAL-Tone	Type of color		Soll	Min	Max
1023	Traffic yellow	Y	53,64	50,64	56,64
		x	0,4807	0,4737	0,4877
		y	0,4627	0,4557	0,4697
2002	Vermilion	Y	17,60	14,60	20,60
		x	0,5638	0,5568	0,5708
		y	0,3435	0,3365	0,3505
2009	Traffic orange	Y	22,47	19,47	25,47
		x	0,5381	0,5311	0,5451
		y	0,3603	0,3533	0,3673
3020	Traffic red	Y	16,00	13,00	19,00
		x	0,5450	0,5380	0,5520
		y	0,3340	0,3270	0,3410
5002	Ultramarine blue	Y	7,75	5,00	9,00
		x	0,2120	0,2050	0,2190
		y	0,2000	0,1930	0,2070
5011	Steel blue	Y	6,00	3,00	9,00
		x	0,2750	0,2680	0,2820
		y	0,2950	0,2880	0,3020
5017	Traffic blue	Y	11,00	8,00	14,00
		x	0,1830	0,1760	0,1890
		y	0,2250	0,2180	0,2320
6018	Yellow green	Y	24,00	21,00	27,00
		x	0,3430	0,3360	0,3500
		y	0,4900	0,4830	0,4970
6024	Traffic green	Y	18,00	15,00	21,00
		x	0,2750	0,2680	0,2820
		y	0,4350	0,4280	0,4420
6029	Mint green	Y	13,00	10,00	16,00
		x	0,2640	0,2570	0,2710
		y	0,4500	0,4430	0,4570
7042	Traffic grey A	Y	27,00	24,00	30,00
		x	0,3120	0,3050	0,3190
		y	0,3330	0,3260	0,3400
7043	Traffic grey B	Y	8,65	5,65	11,65
		x	0,3151	0,3101	0,3201
		y	0,3350	0,3300	0,3400
9006	White aluminium	Y	32,55	29,55	35,55
		x	0,3131	0,3061	0,3201
		y	0,3306	0,3236	0,3376
		Y	80,00	80,00	100,00

9016	Traffic white	x	0,3250	0,3100	0,3400
		y	0,3400	0,3300	0,3500
9017	Traffic black	Y	3,44	0,44	6,44
		x	0,3136	0,3066	0,3206
		y	0,3287	0,3217	0,3357

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