

TECHNICAL INFORMATION  
LIMBOROUTE LW48F AIRFIELD



# LIMBOROUTE LW48F AIRFIELD

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<b>1</b>	<b>Main characteristics / Fields of application .....</b>	<b>3</b>
<b>2</b>	<b>Technical Data .....</b>	<b>3</b>
<b>3</b>	<b>Theoretical consumption of material and drop-on material .....</b>	<b>4</b>
<b>4</b>	<b>Processing instructions.....</b>	<b>4</b>
4.1	General information .....	4
4.2	Preparation of material and drop-on material.....	4
4.3	Optimizing application properties .....	5
4.4	WOT – Wash-out-time (rain sensitivity).....	5
<b>5</b>	<b>Road surface / pretreatment.....</b>	<b>5</b>
5.1	General information .....	5
5.2	Concrete and cement-bound surfaces .....	6
5.3	Bituminous surfaces .....	6
5.4	Floor coatings .....	6
<b>6</b>	<b>Application technique .....</b>	<b>6</b>
<b>7</b>	<b>Test reports .....</b>	<b>6</b>
7.1	Table: RPA – test reports by BASt (German Road Institute) .....	6

## 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

## LIMBOROUTE LW48F for airfields...

- is a water-thinnable, environmentally friendly waterborne paint
- is a tried and tested thin layer marking, well-suited for runways, taxiways and other airport operation areas that are often renewed
- available in airfield colors according to DIN 6171
- has been tested on the turntable simulator of the German Road Institute (BASt) as TYPE I and TYPE II marking
- is suitable for both bituminous and concrete surfaces
- has been tested with good results against chemical resistance according to DIN 68861, part 1 / DIN EN 12720 (test report ILF Magdeburg)
- according to the requirements of chromaticity co-ordinates, luminance factor and resistance to chemicals of EASA (European Aviation Safety Agency (confirmation is conformed to the DSGS certificates)
- is applicable with any airless and airspray application machines used at present
- available in airspray (standard) and airless quality
- is characterized by good drying and bead embedment properties, excellent covering power and good resistance against abrasion

# 2 Technical Data

<b>Color</b>	White, RAL-colors within limits of color co-ordinates according to Annex 14 ICAO and EASA* (without chromaticity co-ordinates of the color sky blue and grass-green)
<b>Density</b>	approx. 1.59 kg/l +/- 0.04
<b>Solid content</b>	≤ 80%
<b>Volume solid content</b>	approx. 67.02%
<b>Solvent-content</b>	< 2%
<b>Thinner</b>	If required add 2% water to optimize the material's properties. Clean equipment and machinery with water.
<b>Storage stability</b>	6 months; in sealed original packaging and protected from frost and direct sun light!
<b>Trafficability / curing time</b>	The drying times stated in the BASt test reports (cf. table 1) are laboratory values that may differ from field conditions depending on climate (temperature, humidity, wind), material, layer thickness and road surface. In general the marking's trafficability must be checked before exposing it to traffic impact.
<b>WOT (Wash-out-time)</b>	approx. 30 minutes after application depending on layer thickness and climatic conditions.
<b>Standard packaging</b>	Plastic container with 25 kg filling weight. Container upon request. <b>Drop-on material:</b> Paper bags with PE inlay – 25 kg filling weight
<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 followed.
<b>Processing temperature</b>	min. +10°C
<b>Surface temperature</b>	+ 10°C to +45°C
<b>Rel. humidity</b>	max. 75 % - (dew point spreadsheet has to be regarded)

<b>Layer thickness / Theoretical consumption</b>	Layer thickness	=	dry film thickness	=	Theoretical consumption
	300 µm	=	200 µm	=	ca. 0.48 kg/m <sup>2</sup> (0.3 l/m <sup>2</sup> )
	400 µm	=	268 µm	=	ca. 0.64 kg/m <sup>2</sup> (0.4 l/m <sup>2</sup> )
	600 µm	=	400 µm	=	ca. 0.95 kg/m <sup>2</sup> (0.6 l/m <sup>2</sup> )
	The actual consumption depends on the applied layer thickness and the type and state of the surface.				

\*In order to simplify color selectin: in practice RAL colors with color co-ordinates within limits of Annex 14 ICAO and EASA are used. The colors sky blue and grass-green are recommended due to improved recognizability.

### 3 Theoretical consumption of material and drop-on material

Product	RAL color	Density	Theoretical consumption / layer thickness		
		ca. kg/l	kg/m <sup>2</sup> *	kg/m <sup>2</sup> *	kg/m <sup>2</sup> *
			0.3 mm	0.4 mm	0.6 mm
LIMBOROUTE LW48F WHITE	9016	1.59	0.48	0.64	0.95
LIMBOROUTE LW48F TRAFFIC YELLOW	1023	1.60	0.48	0.64	0.96
LIMBOROUTE LW48F TRAFFIC ORANGE	2009	1.62	0.49	0.65	0.97
LIMBOROUTE LW48F TRAFFIC RED	3020	1.64	0.49	0.66	0.98
LIMBOROUTE LW48F SKY BLUE	5015	1.69	0.51	0.68	1.01
LIMBOROUTE LW48F GRASS-GREEN	6010	1.58	0.47	0.63	0.95
LIMBOROUTE LW48F TRAFFIC BLACK	9017	1.60	0.48	0.64	0.96
SWARCO P21 3:1 Type I			0.23	0.32**	
SWARCOFLEX 100-600 T14 M25 Type I			0.24	0.32	
Megalux 0,6-1,5 KT14 Type II					0.60
Airfield beads 2007 Type I		0.24**	0.32**		0.48**
SWARCO Airfield beads 2006 Type II					0.60**
SWARCO Airfield beads 2010 Type II					0.50**
SWARCO No. 1 beads Airfield beads Type II colored T14 GG 30 TRAFFICYELLOW					0.50**

\* rounded theoretical consumption

\*\* recommendation, not BAST RPA tested

The actual consumption depends on the applied layer thickness and the type and state of the surface.

## 4 Processing instructions

### 4.1 General information

In addition to the ICAO-Annex national guidelines / recommendations regarding markings for aircraft operations areas or airport ramps, taxiways and runways have to be observed.

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

LIMBOROUTE LW48F has to be homogeneously stirred in its original container. 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.

The uniformity of marking material and drop-on material over the entire application surface must be observed. Losses of drop-on material must be regarded when adjusting bead pistol or bead dispenser.

Theoretical consumption of paint and drop-on materials are listed in the BASt test report and in the table "Theoretical consumption of material and drop-on materials" on our homepage (in kg/m<sup>2</sup>).

Note: All devices and tubes must be totally free from paint residues and solvents before LIMBOROUTE LW48F is applied! Do not use equipment that has any brass or copper parts. Stainless steel parts are recommended.

Before using waterborne paints, we recommend to clean equipment and machinery used earlier for solvent-based paints following these 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 waterborne paints, equipment and machinery must be cleaned in reverse order to prepare them for the use of solvent based paints.

### 4.3 Optimizing application properties

LIMBOROUTE LW48F is ready for processing in its delivery state. Usually the addition of thinner is not necessary. It is, however, possible to optimise the material's spray properties by adding 2 % water as thinner.

### 4.4 WOT – Wash-out-time (rain sensitivity)

All waterborne paints remain sensitive to rain and moisture for some time after they have dried. Therefore, dry conditions are required before the paints achieved washout. It is recommended that LIMBOROUTE LW 48F is applied only during dry and stable weather conditions.

## 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 bonding checks are required. Ideally, old markings should be removed with appropriate mechanical procedures.

Colored marking materials may fade after some time of outside exposure. This is a normal effect caused by sun exposure, water, road salt, dew, condensed water and heat. Constant traffic impact reduces bleaching and shift of color intensity, but is not able to prevent fading completely. See our elaborations on that subject in our "General notes on technical information sheets".

If necessary, colored markings have to be renewed. Ch. 3 "Colours for markings, signs and panels" of Annex 14 ICOA describes that paints can fade, therefore specifications for paints are only valid for newly applied paint.



## 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). When applying the paint to concrete or cement-bound surfaces, bubble formation is likely occurred. In order to prevent the formation of bubbles the concrete should be pretreated with LIMBOROUTE LW48F blended 1:1 with water as a primer (approx.200µm).

The humidity of the concrete must not exceed 4% during the application of the marking. After precipitation a waiting period of a minimum of 48 hours is recommended.

## 5.3 Bituminous surfaces

Any loose components such as chippings must be removed. Fluxoils, releasing agents for road rollers, are detrimental to good bonding of markings and can cause discoloration of the striping. Since airfields with new surfaces cannot be left unused and unmarked for 4–6 weeks, test markings and bonding checks are required before applying the final marking.

## 5.4 Floor coatings

For markings on floor coatings our indoor marking products should be used. LIMBOROUTE LW48F is not suitable for floor coatings.

# 6 Application technique

With conventional marking machines (airless or atomising technique), manually with brush or roller. For airless machines use airless quality only.

Attention: when applying with brush or roller or spray gun (e.g. jobs with stencils) consider the paint's fast drying time.

Immediate broadcasting of drop-on materials is absolutely necessary. Otherwise the drop-on material will not be embedded properly, which leads to poor traffic technological properties. Two layer applications are an option (first layer + drop-on materials, second layer + drop-on material). Well embedded drop-on beads from the first layer become visible when the second layer is worn.

# 7 Test reports

## 7.1 Table: RPA – test reports by BASt (German Road Institute)

Test report-no.	Layer thickness	consumption		Drop-on material (DOM)	Traffic technological properties	
		Material	DOM		New condition	Used condition
	mm	kg/m <sup>2</sup>	kg/m <sup>2</sup>	Identification (divergent identification possible - see relevant test report)		
<b>Type I marking</b>						
<b>2006 1DW 01.04</b>	0.3	0.477	0.23	Swarcolux P21	P5, S1, R5, Q5, T2	P5, S1, R5, Q5
<b>2013 1DW 07.14</b>	0.3	0.477	0.24	Swarcoflex 100-600 T14 M25	P5, S2, R5, Q5, T2	P5, S2, R4, Q5
<b>2013 1DW 07.15</b>	0.4	0.636	0.32	Swarcoflex 100-600 T14 M25	P5, S1, R4, Q5, T3	P5, S1, R4, Q5
<b>2018 1VW 06.16 colored</b>	0.4	0.636	0.40	Swarco, airport beads type I colored T14 GG30	P5, S1, R5, Q3, T3, Y2	P5, S1, R5, Q3
<b>Type II marking</b>						
<b>97 1W 12.07</b>	0.6	0.954	0.60	Megalux 0.6-1.5 3:1	P6, S1, R5, RW5, Q5, T2	P6, S1,R5,RW3, Q5