

LUCOBRIDGE® BIT

WATERPROOFING MEMBRANES FOR CONCRETE BRIDGES

INSTRUCTION MANUAL



... Waterproofing that lasts

BRIDGE SEALING WITH LUCOBRIDGE® BIT



1 PREFACE

In Germany, the base structures of bridges are made from steel or concrete. The more than 120,000 bridges in Germany must withstand increasing heavy loads-traffic, de-icing salt, UV radiation, heat, rain or frost and must be free of corrosion, cracks and imperfections. All of the systems must be tested and approved by the Federal Highway Research Institute (BAST). These suitability tests are carried out by accredited institutions to meet the required high quality standards.

The technology in most common use is a bitumen membrane to seal building constructions (ZTV-ING, Part 7 Sections 1 and 2). Single or double layer polymer-modified bitumen membranes are used; bitumen membranes which are installed beneath the asphalt layers.

The number of bridges requiring renovation today, some 6,000 of the 40,000 bridges of German motorways, make an innovative sealing system necessary.

The Lucobridge® system from LUCOBIT AG is a major departure from the products which were commonly used in the past where the bitumen membrane was usually fixed onto the main bridge body (concrete or steel) by heating a polymer-modified bitumen (PmB) adhesive layer with the bitumen membrane taking on the sealing function at the same time.

Lucobridge® membranes feature a plastic membrane made of ECB, tried and tested in roofing and waterproofing membrane applications for more than 50 years. These Lucobridge® membranes assume the sealing function when permanently applied to the concrete or steel construction in both the familiar PmB flame procedure (BIT type) and the innovative adhesive procedure (PV-BIT type) with the environmentally-friendly acrylate system.

2 APPLICATION

2.1 Preparing the surface of the Concrete Bridge

Remove the old surface evenly through (shot) blasting and/or additional milling. The tear strength must be at least 1.5 N/mm².



Figure 1: Remove the old surface

2.2 Priming with Lucobridge® Primer 2000P

Concrete surfaces must be primed and/or sealed. The Lucobridge® Primer 2000P (mixing regulation, section 6) is mixed at the construction site and applied over the entire area. The thickness of the layer should be approx. 1 mm.



Figure 2: Priming the surface

Ensure no moisture or air bubbles are trapped.

With concrete depths >1.5 mm, a scratch coat of approx. 1 mm must be made beforehand to seal/prevent pores to exclude moisture to be trapped thus preventing blistering later.

2.3 Flaming Lucobridge® BIT

The plastic sealing sheet on top of the Lucobridge® BIT membrane and PmB layer underneath are flamed directly onto the prepared concrete surface using hot air or flame activation¹. We recommend installing the membranes edge-to-edge. In a second step, the resulting butt-joint is welded over with a 20 cm wide membrane strip made of Lucobridge® BIT using hot air or flame as well.



Figure 3: Flaming the membrane

If overlapping installation is chosen, the upper- and lower layer joints must be generated with hot air or flame welding (an overlap of at least 8 cm lengthways and 10 cm crossways and a minimum lateral offset of 50 cm).

The hot seal area must be compressed by means of a suitable tool (e.g. pressure block) in order to prevent cavities from forming in the area of overlap (see Figure 4a).

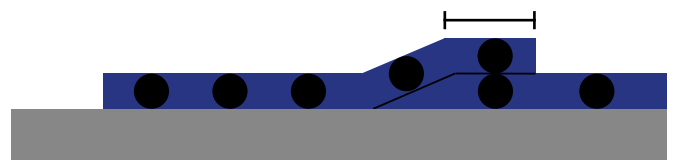


Figure 4a: Overlapping

If edge-to-edge welding was chosen, the overlay should be a 20cm Lucobridge BIT strip welded on top of the waterproofing layer with 10 cm on each side of the bottom edge-to-edge laid membranes (see Figure 4b).

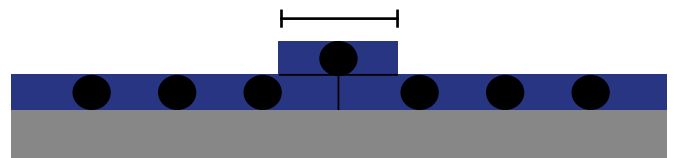


Figure 4b: Edge-to-edge



Figure 5: Laying edge-to-edge membranes

¹ Where possible, torching the PmB layer directly should be avoided due to a risk of damaging the product.

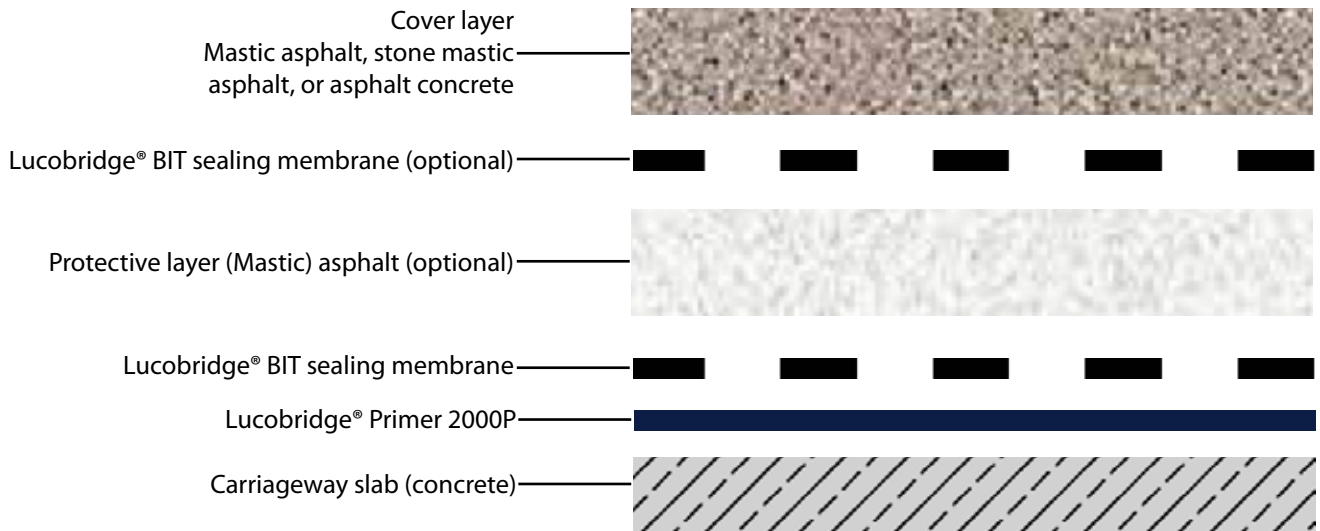


Figure 6: Two-membrane layers (mandatory) Dutch Bridge Design

3 OTHER LAYERS

3.1 Mastic asphalt

The required layer of asphalt can be applied directly onto the closed surface of the welded Lucobridge® BIT membrane with the PmB layer on top.

3.2 Porous asphalt

If a second sealing layer is required, a Lucobridge® BIT membrane can be welded onto the cooled asphalt. The hot seal must be compressed by means of a suitable tool (e.g. pressure block) in order to prevent cavities from forming in the area of overlap.

A cover layer can again be applied to this bituminous surface of the polymer membrane, e.g. mastic asphalt or porous asphalt.

3.3 Additional scope of application

As well as sealing bridges made of concrete, carriageways based on Lucobridge® BIT are used for the permanent sealing of car parks, subterranean garages and tunnel construction according to DIN ISO 18532.

4 LUCOBRIDGE® PRIMER 2000P

The Lucobridge® Primer 2000P is mixed with the enclosed Lucobridge® Hardener 2001H to form a ready-to-use mixture (Section 6).

The primer was tested by KIWA, Flörsheim, as per TL/TP-BEL-EP of ZTV-ING Part 7 Bridge Surfacing (test report 9526).

The Lucobridge® Primer 2000P, the manufacturing process and self-monitoring is certified according to EN ISO 9001.

The results are listed in Table 2

5 LUCOBRIDGE® BIT MEMBRANE

Lucobridge® BIT membranes consist of a “polymer core”, an ECB (ethylene copolymer bitumen) membrane with centered glass-fibre mat which is enclosed on both sides with a polyester fleece. A heat-activated PmB adhesive layer is applied on both sides. Firstly, on the prepared surfaces. Secondly, this layer is flamed on it is the contact surface and act as heat protection for the wearing surface to be applied later.

This ensures excellent crack-bridging resistance caused by high elasticity even after ageing.

Table 3a shows the results of the Lucobridge® BIT membrane test ascertained by KIWA, Flörsheim based on TL/TP-L-B1 and in Table 4b results of the system test as per pr-DIN EN 17048:2016 for the concrete-Lucobridge® BIT joint composite.

6 MIXING AND PROCESSING OF LUCOBRIDGE® PRIMER 2000P

6.1 Mixing with Lucobridge® Hardener 2001H

The Lucobridge® Hardener 2001H must be added to the Lucobridge® Primer 2000P in the amount indicated on the packaging and must be stirred intensively for at least 3 minutes. The powder must be dissolved fully in the primer. Do not stir by hand, always use a mechanical stirrer! (E.g. power drill with stirring apparatus etc.).

The sizes of the Lucobridge® Primer 2000P containers are 1 to 20 litres. A container of 20 L Lucobridge® Primer 2000P can be used to prepare from 40 m² (steel) up to 15 m² (concrete) depending on the substrate.

6.2 Processing and binding times

The Lucobridge® Primer 2000P mixed with the Lucobridge®

Hardener 2001H responds quickly. The processing time for a mixture is influenced by the temperature and the amount of hardener used as shown in the following chart. The gel time is the time during which the material transitions from a liquid to a solid state. Afterwards, the activated primer can no longer be processed. The binding time is the period of time after the material was applied to the surface and has completely cured.

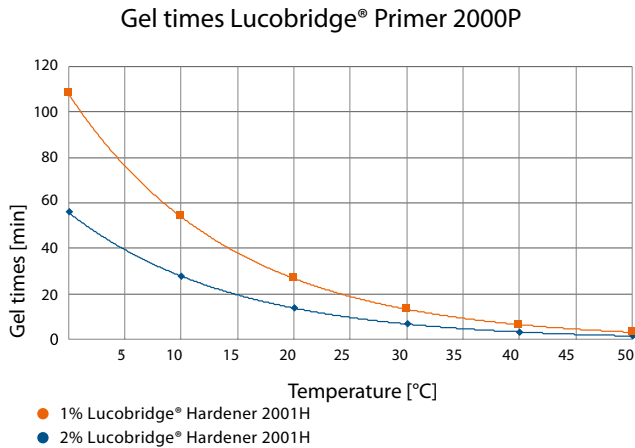


Figure 7: Gel times of the Lucobridge Primer 2000P with different amounts of hardener

These gel times are laboratory values taken from 50 g samples in each case.

During the curing reaction of Lucobridge® Primer 2000P, reaction heat is released. This released heat accelerates the reaction and shortens the potential processing time and must be taken into account. This property of reaction resins can - for the most part - be compensated by splitting fresh mixtures into several smaller containers.

The binding time of the primer depends on the temperature of the substrate and the layer thickness (approx. 60 minutes/20 °C). After this time, layers with a thickness of approx. 300 µm are hard, adhesive-free and can be reworked. An additional waiting period for the next construction step is not required.

6.3 Requirements for the substrate

The following holds for all substrates: The surface must be dry, clean, and free of foreign substances which could interfere with the adhesion proven as well as sufficiently firm and load-bearing. The dew point of air during processing must be at least 3 °C higher than the temperature of the substrate.

Pay attention to direct sunlight! Lucobridge® Primer 2000P responds more quickly to warm substrates!

Concrete: Cement laitance and fine layers must be removed, minimum strength 1.5 N/mm² in tensile tests.

6.4 Application

To prevent defects, Lucobridge® Primer 2000P must be applied in two layers. The product is liquid; it is appropriate to use rollers with a short thread as recommended; similar to applying paint. The product should be rolled out fully and evenly; avoid puddling. Before applying the second layer, layer one should be fully hardened.

The primer does not need to be sanded down neither after the 1st nor after the 2nd step. Work can be resumed directly after curing in both; the bitumen based construction using the torching method with Lucobridge® BIT.

6.5 Cleaning agent

Fresh contaminations through Lucobridge® Primer 2000P and the processing equipment can be removed by wiping off/

Table 1: Approx. Gel Times of Lucobridge® Primer 2000P in minutes with Lucobridge® Hardener 2001H.

TEMPERATURE		0°C	5°C	10°C	15°C	20°C	25°C	30°C	40°C	50°C
1% Hardener	minutes	105	75	55	35	25	20	13	6	3
2% Hardener	minutes	55	40	28	20	14	10	6	3	1,5



Figure 8: Lucobridge® BIT membrane



Figure 9: Priming the surface

rinsing with the special cleaning agent (Lucobridge® Solvent 450); hardened product can only be removed mechanically.

6.6 Safety instructions

When working with the product, wear safety goggles and gloves. Lucobridge® Primer 2000P has an intensive odor before curing. When working in closed rooms, make sure there is adequate ventilation. The liquid product is combustible: avoid naked flames, fires and sparks.

Note the information in the PDS and MSDS (material safety datasheet)!

How to apply correctly

- Store the Lucobridge® products in a cool shaded place
- Never use Lucobridge® Primer 2000P without a hardener
- Always mix the primer and hardener thoroughly with a stirring apparatus
- Apply the primer thickly and evenly, avoid defects
- Note the dew point
- Do not mix too much material. Remember the reaction heat
- At elevated temperatures, distribute the material into multiple containers

- Remove fresh contamination from Lucobridge® Primer 2000P immediately
- When working with the product, wear safety goggles and gloves
- When working with the product, do not smoke, avoid open flames or light
- Follow instructions in the safety datasheet

Disposal instructions

Polymer bitumen and bitumen membranes and site waste (European Waste Catalogue EWC Number 17 03 02 "Bitumen mixtures") can be used in thermal application processes without any harm to the environment.

Table 2a: Primer Lucobridge® Primer 2000P – basic test according to TL/TP BEL-EP-Test report P 9526 dated 17/09/2015, KIWA

TP-BEL-EP		STANDARD	CONDITIONS	UNIT	LUCOBRIDGE® PRIMER 2000P	REQUIREMENTS TL/TP BEL-EP
3.1	COMPONENTS – ISOLATED				100 + 2 /3 min	
3.1.1	Density	ISO 2811	20 °C	g/cm³	0.994	± 2%
3.1.2	Dyn. viscosity	ISO 3219	23 °C, 750 s-1	mPas	110	± 20%
3.1.3	IR spectrum	DIN 51451	ATR-IR, 4000-500 cm-1		passed	No deviation from composition
3.1.4	TGA	ISO 7111	35°C-900°C, 10K/min		1,5 % residue	No deviation from composition
3.1.5	Bulk density scratch-coating	EN-459-2		kg/dm³	N/A	± 0,05 kg/dm³
3.1.6	Grain sizes allowance of scratch-coating				N/A	± 3% abs.
3.2	COMPONENTS – MIXED		100 + 1 (23°C)	Primer/hardener ratio		
			100 + 3 (12°C)			
3.2.1	Viscosity	ISO 3219	12°C, 500 s-1	mPas	190	≤ 4000
3.2.2	Ash residue		3 h/ 550°C	%	0	≤ 1 %-Gew
3.2.3	Pot life	TP-BEL-EP 3.2.3	100 cm³, 23-40°C	min	17	>10 ± 25%
	Max. temp.		°C	162		
	Reaction time		min	24		
3.2.4	Curing time	ISO 2815	7 d – 23°C	a. Final hardness (Buchholz)	81	≥ 60
			18 h – 23°C	b. Curing grade / %	93	≥ 50
			40 h 12°C – 85% r.H.	c. Curing grade / %	89	≥ 50
3.2.5	Moisture sensitivity	TL-BEL-EP 3.2.5	40 h 12°C – 85% r.H.		passed	No white tarnish

Table 2a continued: Primer Lucobridge® Primer 2000P – basic test according to TL/TP BEL-EP-Test report P 9526 dated 17/09/2015, KIWA

TP-BEL-EP		STANDARD	CONDITIONS	UNIT	LUCOBRIDGE® PRIMER 2000P	REQUIREMENTS TL/TP BEL-EP
3.2.6	Non-volatile ingredients	acc. ISO 3251	3h – 105°C	%	98,7	≥ 98
3.2.7	Extractable ingredients	acc. ISO 6427	16h – n-Hexan Soxhlet	%	2,5 no plasticizer	≤ 11
3.2.8	Water absorption	acc. ISO 62	14d – 23°C	%	1,8	≤ 2,5
3.2.9	Consistency of scratch-coating				N/A	Various
3.3	TESTING THE COMPOSITE BODIES					
3.3.1	Manufacture	Composite bodies				
3.3.2	Free of defects	without thermal stress Silicone– 250°C – 60 m			MΩ MΩ	≥ 10000 ≥ 10000 ≥ 500 ≥ 500
3.3.3	Heat Resistance	TP-BEL-EP 3.3.3				
3.3.3.1	Silicone oil test	500 g/m ² / Sand 1000 g/m ² half-sided / 600 g/m ² 500 g/m ² / Sand 1000 g/m ² full-surface / 600 g/m ²				no complaint no complaint no bubbles, no cracks, no delamination, no release of sand layer
3.3.3.2	Welding test	Tensile of break			MPa	2,9 ≥ 1,5
		Area of fracture within concrete			%	100 ≥ 75

Table 3a: Lucobridge® BIT – basic test according to TL/TP BEL-B 1 - Test report P 9309 dated 21/10/2016, KIWA

TL/TP-BEL-B 1		STANDARD	UNIT	LUCOBRIDGE® BIT	REQUIREMENTS TL/TP-BEL-B 1
3.1	Surface weight, total membrane	DIN 52123	g/m ²	4730	≥ 4500
3.2	Surface weight Raw reinforcement insert	acc. to DIN 52123	g/m ²	N/A	> 175
3.3	Surface weight Raw reinforcement, extracted	acc. to DIN 52123	g/m ²	1160	
3.3	Surface weight Separating layer	TP-BEL-B 1	%	6,7	
3.4	Proportion of more soluble binding agent in the adhesive mass	TP-BEL-B 1	%	94,3	≥ 60
3.5	Proportion of polymers and type of polymers				
	upper layer	DIN 51451	%	PmB, 15% SBS	
	middle layer	DIN 13956	g/m ²	ECB, 100% Lucobit® 1235	
	lower layer	DIN 51451	%	PmB, 15% SBS	
3.6	Distribution of polymers in the adhesive mass	TP-Min-StB 3.1.3		N/A	homogeneous
3.7	Type of fillers of the adhesive mass	TP-Min-StB 3.1.3		mineralic	mineralic
3.8	Filler content of adhesive mass	DIN EN 53568	%	5,7	≤ 40
3.9	Type and property of reinforced sheet	DIN EN 18192	N/50 mm %	1280/1280 40 / 50	≥ 700 ≥ 30
3.10	External property of the sheet	TP-BEL-B 1		no complaint	no defects, no inclusions of particals > 0,7mm
3.11	Soaking of reinforced sheet	acc. to DIN 52123		totally soaked	totally soaked
3.12	Thickness of sheet	acc. to DIN 52123	mm	xi = 5,0 xi, min = 4,5	4,5<xi<5,5

Table 3a continued: Lucobridge® BIT – basic test according to TL/TP BEL-B 1 - Test report P 9309 dated 21/10/2016, KIWA

TL/TP-BEL-B 1		STANDARD	UNIT	LUCOBRIDGE® BIT	REQUIREMENTS TL/TP-BEL-B 1
3.13	Thickness of adhesive layer top	TP-BEL-B 1	mm	$x_m = 1,8$ $x_{i, \min} = 1,4$	$\geq 3,0$
3.13	Thickness of adhesive layer underneath	TP-BEL-B 1	mm	$x_m = 1,3$ $x_{i, \min} = 1,1$	$\leq 0,5$
3.14	Roll width	TP-BEL-B 1	cm	104,7	100
3.16	Edge covering of sheet	TP-BEL-B 1	cm	0,2	≤ 1 cm on 5 m
3.17	Maximum tensile force of sheet	acc. to DIN 52123	N/50 mm	length/cross/diagonal 1160 / 690 / 810	length/cross/diagonal $\geq 550 / \geq 550 / \geq 550$
3.17	Elongation of sheet for maximum tensile force	acc. to DIN 52123	%	length/cross/diagonal 53 / 109 / 78	length/cross/diagonal $\geq 30 / \geq 30 / \geq 30$
3.18	Water impermeability	acc. to DIN 52123	2 bar/24h	Passed	Passed
3.19	Change by water immersion	acc. to DIN 52123	%/vol	0	Volume ≤ 5
			%/mass	0	Mass ≤ 5
3.20	Heat resistance	acc. to DIN 52123	°C	130	
3.21	Availability at low temperatures	acc. to DIN 52123	°C	no crack, 0°C	no crack, 0°C
3.22	Softening RuK of adhesive layer underneath	DIN 52011	°C	152 SBS	SBS min. 125 APP min. 150
3.23	Pen of adhesive layer underneath	DIN 52010	1/10 mm	34	
3.25	Cold bending temperature	DIN EN 1109	°C	-16	≤ -10

Table 3b: Lucobridge® BIT – suitability test acc. TL/TP-BEL-B 1 – adhered - Test report P 9309 dated 21/10/2016, KIWA

TL/TP-BEL-B 1		STANDARD	UNIT	LUCOBRIDGE® BIT	REQUIREMENTS TL/TP-BEL-B 1
4.3	Tear strength β_{HZ} of the sealing layer	acc. ZTV-StB 90 - Annex 2			
		V samples	N/mm ² 8°C N/mm ² 23°C	1,2 0,6	$\geq 0,7$ $\geq 0,4$
4.4	Tear strength β_{HZ} of the protective and cover layer	acc. ZTV-StB 90 - Annex 2			
		V samples	N/mm ² 8°C N/mm ² 23°C	1,0 0,7	$\geq 0,7$ $\geq 0,4$
		B samples	N/mm ² 8°C N/mm ² 23°C	0,72 0,69	
		Stress effect $\Delta \beta_{HZ}$	% - 8°C % - 23°C	-29 0	≤ 30 ≤ 30
4.5	Crack bridging	TP-BEL-B 1			
		Dynamic	mm / -20°C	0,2 + 0,15	0,2 + 0,15
		Static	mm / +70°C	1	1
4.6	Shear strength S and distortion angle Y	TP-BEL-B 1			
		V-Samples	N/mm ² -	S = 0,21 Y = 0,4	S $\geq 0,15$ Y $\leq 1,3$
		B-Samples	N/mm ² -	S = 0,47 Y = 0,6	
		Stress effect Δs	%	124	< 30

Table 3b continued: Lucobridge® BIT – suitability test acc. TL-BEL-B 1 – adhered - Test report P 9309 dated 21/10/2016, KIWA

TL/TP-BEL-B 1		STANDARD	UNIT	LUCOBRIDGE® BIT	REQUIREMENTS TL-ING PART 7
4.7	Cavities after installation of sealing layer	TP-Min-StB 3.1.3		passed	no holes
4.8	Adhesion after installation of sealing layer	TP-BEL-B 1		passed	$k \geq 95$
4.9	Bubbles in mastic asphalt			passed	no release of binding mass
4.9	Stability of wearing course			no displacement	no displacement

Table 4a: Lucobridge®BIT - basic test in accordance to EN 17048, report P9309a dated 21.10.2016, KIWA

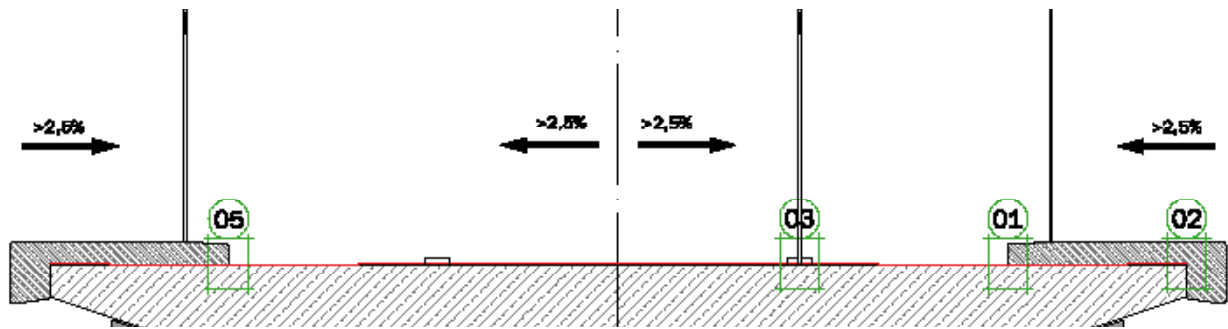
EN 17048		STANDARD	UNIT	LUCOBRIDGE® BIT	REQUIREMENTS EN 17048
PROPERTIES OF LUCOBRIDGE®-BIT MEMBRANE					
4.2.1	Visible defects	EN 1850-2	-	no visible defects	no visible defects
4.2.2	Length	EN 1848-2	mm	7500	within MDV
4.2.2	Width	EN 1848-2	mm	1045	within MDV
4.2.2	Straightness	EN 1848-2	mm/5 m	2	pass
4.2.2	Mass	EN 1849-2	g/m ²	4730	within MDV
4.2.2	Thickness	EN 1849-2	mm	5	within MDV
4.2.3	Tensile properties length / cross	EN 12311-2			
	Tensile strength		N/50mm	1160 / 690	\geq MDV
	Elongation		%	53 / 109	\geq MDV
4.2.4	Water absorption	EN 14223	%	0,4	\geq MLV
4.2.5	Foldability at low temperature	EN 495-5	°C	-20	\leq MLV
4.2.6	Flow resistance at elevated temperature	EN 1110	°C	130	\geq MLV
4.2.7	Dimensional stability 1h/160°C	EN 1107-1	%	-3	\leq MLV

Table 4b: Lucobridge®BIT - suitability test in accordance to EN 17048, adhered, report P9309a dated 21.10.2016, KIWA

EN 17048		STANDARD	UNIT	LUCOBRIDGE® BIT	REQUIREMENTS OF EN 17048
PROPERTIES OF LUCOBRIDGE®-BIT MEMBRANE, ADHERED ON CONCRETE					
4.3.2	Bond strength to entire system build-up β HZ	EN 13956	N/mm ² 8°C N/mm ² 23°C	1,0 0,7	MLV
4.3.3	Shear strength τ to entire system build-up	EN 13653	N/mm ²	0,21	MLV
4.3.4	Crack bridging ability	EN 14224	°C	-20	MLV
4.3.5	Compatibility by heat conditioning to entire system build-up	EN 14691	N/mm ²	0,45	MLV
4.3.6	Resistance to compaction of an asphalt layer	EN 14692		N/A	pass
4.3.7	Behaviour of plastic and rubber sheets during application of mastic asphalt	EN 14693	% mm -	$s = 0$ $\Delta t = 0,2$ $i = 0$	pass
4.3.8	Bitumen compatibility	EN 1548		pass	pass
4.3.9	Water tightness	EN 14694		pass	pass
4.4	Dangerous substances	as relevant		not relevant	

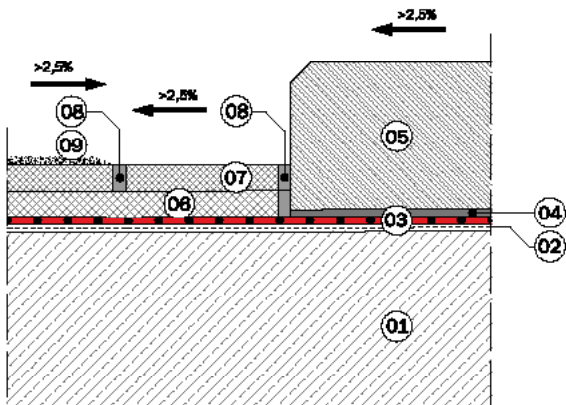
MDV Manufacturer's declared value
MLV Manufacturer's limiting value

01 CONCRETE DECK BRIDGE-ROAD | ONE LAYER



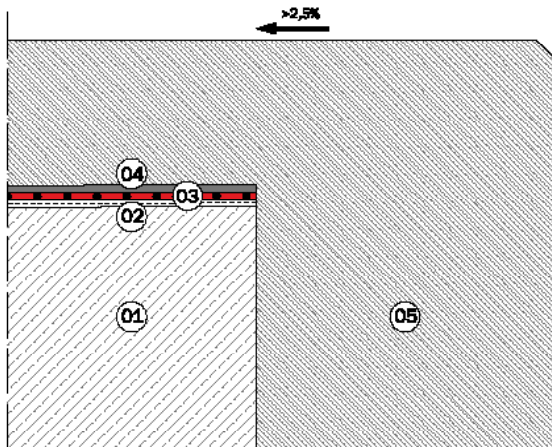
Detail 01 Track-bridge cap

- 07 Spread (grit)
- 06 Spread (grit)
- 05 Bridge cap
- 04 Protective coat
- 03 Lucobridge BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction



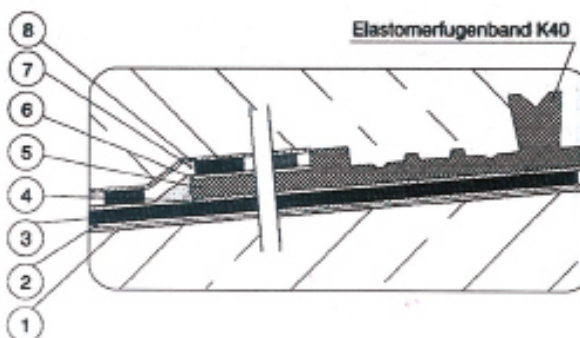
Detail 02 Bridge cap

- 05 Bridge cap, ferro-concrete
- 04 Protective coat
- 03 Lucobridge BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction

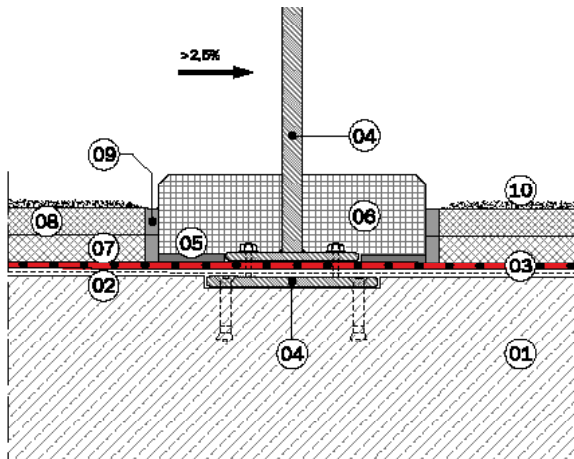


Detail 03 Sealing connection beyond border cap

- 08 Cover up-bow
- 07 Sealing course
- 06 Glue mass
- 05 Cap joint band
- 04 Bituminous glue mass
- 03 Lucobridge BIT waterproofing membrane
- 02 Hot bituminous glue mass
- 01 Undercoat

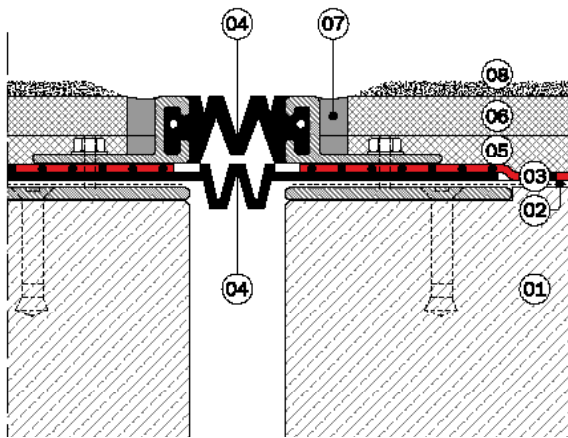


01 CONCRETE DECK BRIDGE-ROAD | ONE LAYER



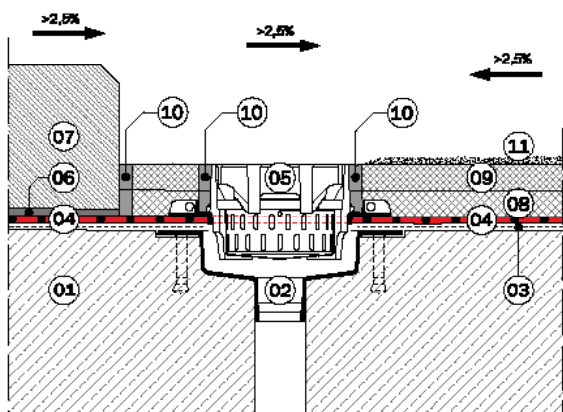
Detail 04 Light tower

- 10 Spread (grit)
- 09 Bituminous joint
- 08 Wearing course of mastic asphalt
- 07 Protective coat of mastic asphalt
- 06 Safety curb
- 05 Protective layer
- 04 Integral flange construction with welded mast
- 03 Lucobridge BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction



Detail 05 Expansion joint

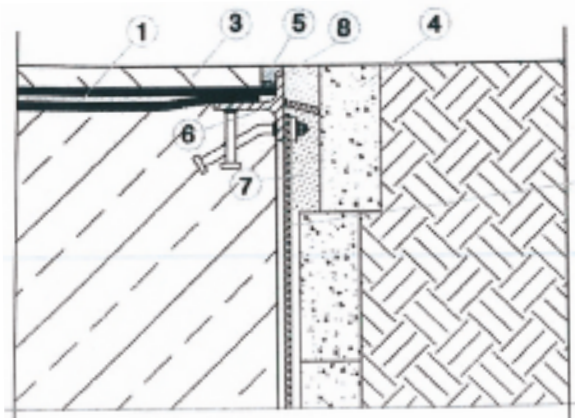
- 08 Spread (grit)
- 07 Bituminous joint
- 06 Wearing course of mastic asphalt
- 05 Protective coat of mastic asphalt
- 04 Joint profile with integral flange
- 03 Lucobridge BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction



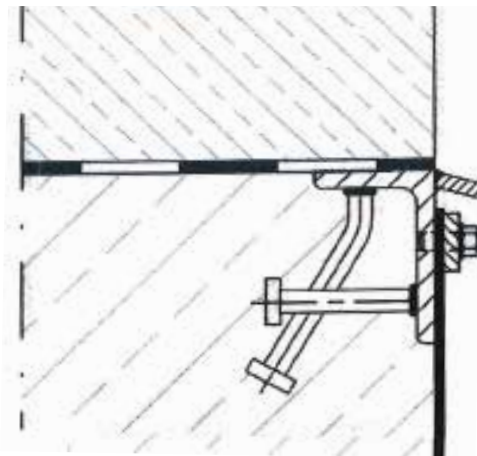
Detail 06 Bridge drains

- 11 Spread (grit)
- 10 Bituminous joint
- 09 Wearing course of mastic asphalt
- 08 Protective coat of mastic asphalt
- 07 Bridge cap, ferro-concrete
- 06 Protective layer
- 05 Waterproofing subpart flange
- 04 Lucobridge BIT waterproofing membrane
- 03 Primer
- 02 Floor drain subpart, integral flange
- 01 Steel bridge construction

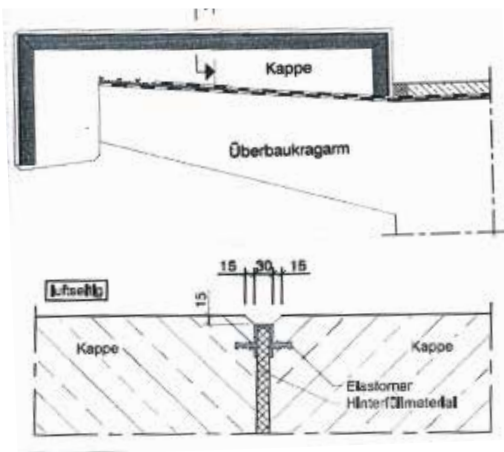
01 CONCRETE DECK BRIDGE-ROAD | ONE LAYER



Detail 01 Completion of a open joint construction



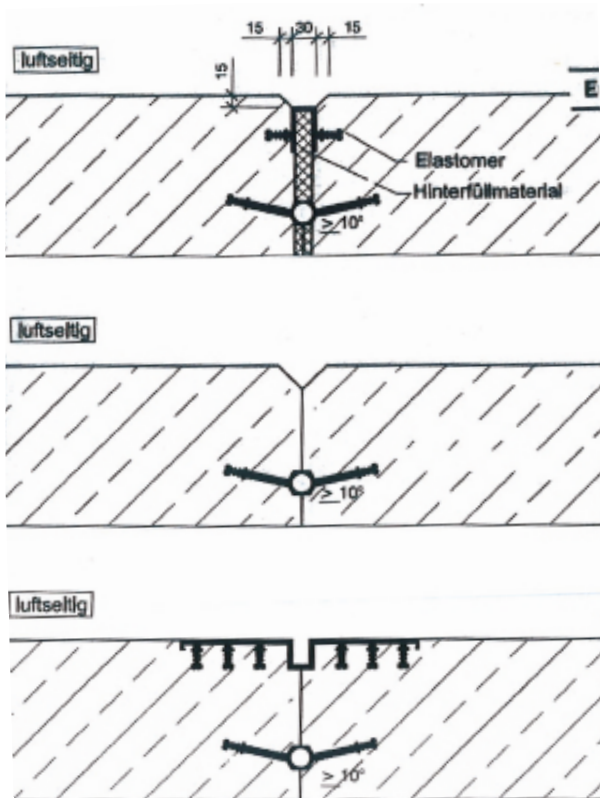
Detail 02 Completion of waterproofing



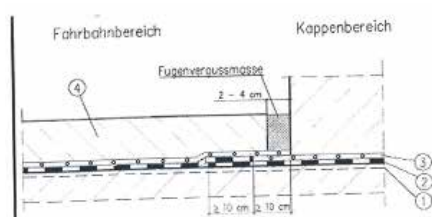
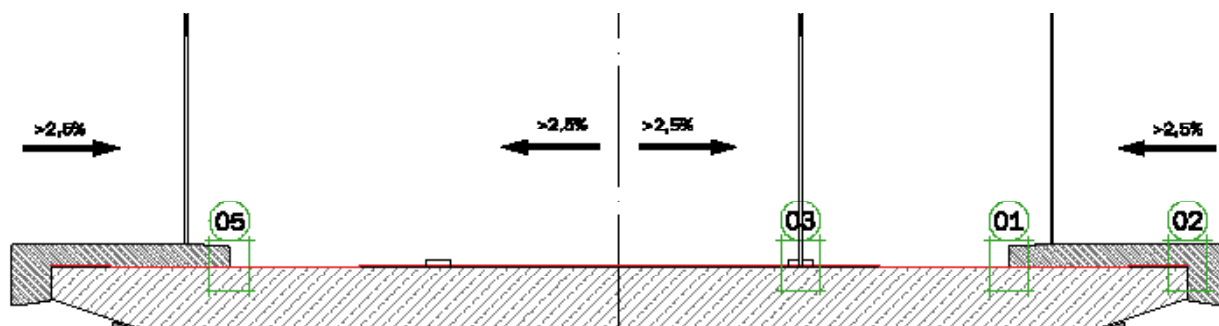
Detail 03 Joint at the edge cap

01 CONCRETE DECK BRIDGE-ROAD | ONE LAYER

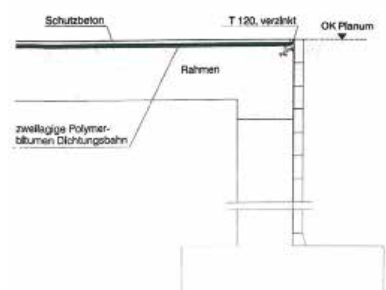
Detail 04 Installation variants



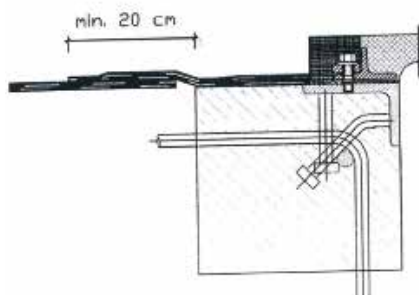
01 CONCRETE BRIDGE-ROAD | ONE LAYER



Detail 01 Waterproofing with polymer waterproofing courses on transient area edge cap/track

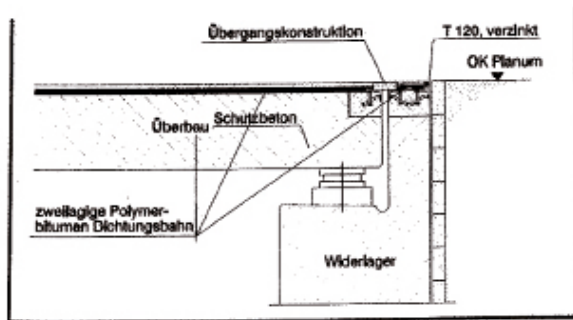


Detail 02 Completion with frame constructions

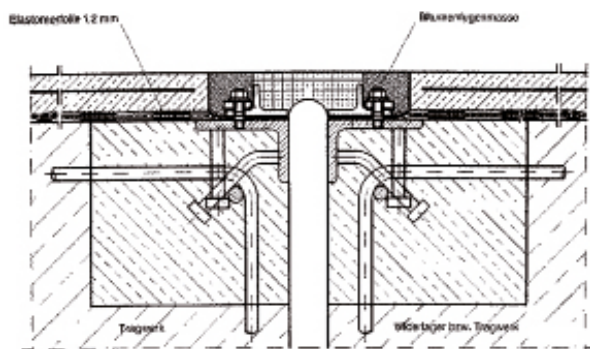


Detail 03 Closed screwed joint and transition construction

1 CONCRETE BRIDGE-ROAD | ONE LAYER



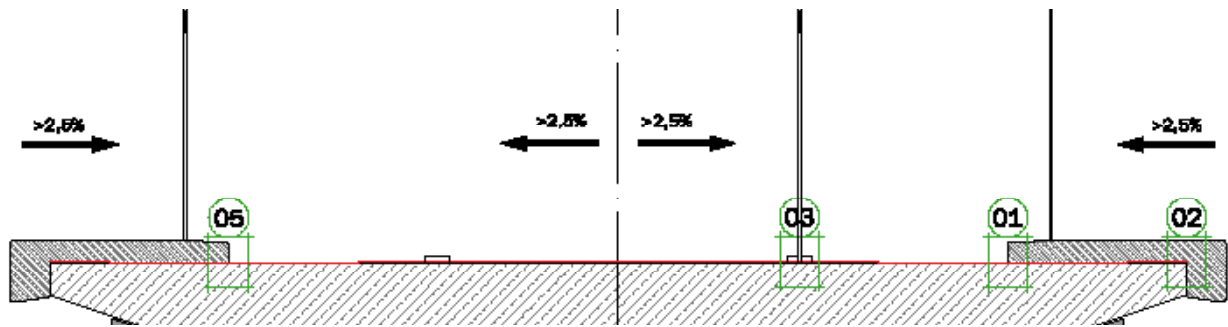
Detail 04 Transverse joints with abutment wall



Detail 05 Closed screwed joint and transition construction

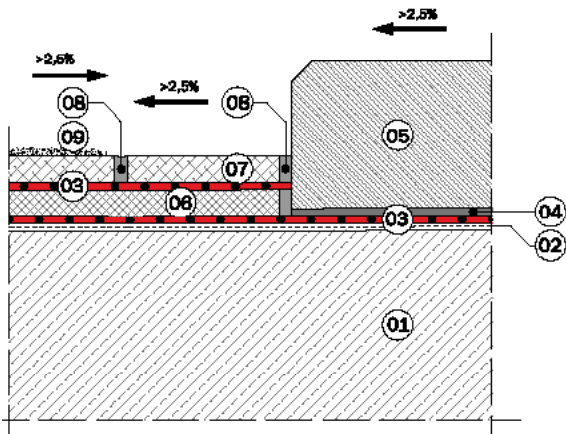


01A CONCRETE DECK BRIDGE-ROAD | DOUBLE LAYER



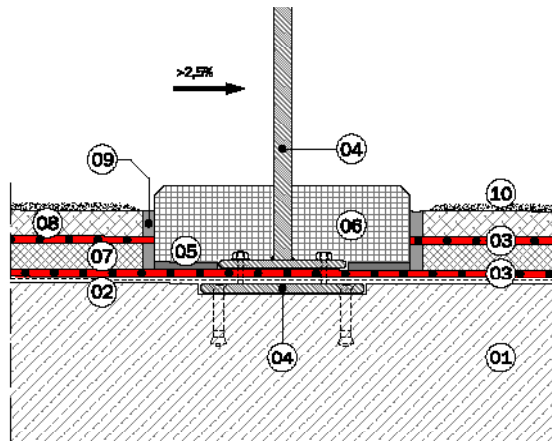
Detail 01 Connecting track/bridge cap

- 09 Spread (grit)
- 08 Bituminous joint
- 07 Porous asphalt
- 06 Protective coat of mastic asphalt
- 05 Bridge cap, ferro-concrete
- 04 Protective coat
- 03 Lucobridge BIT / PV-BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction



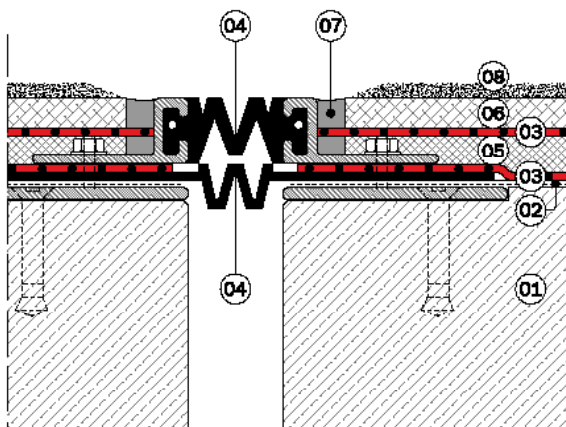
Detail 03 Mast

- 10 Spread (grit)
- 09 Bituminous joint
- 08 Wearing course of mastic asphalt
- 07 Protective coat of mastic asphalt
- 06 Safety curb
- 05 Protective layer
- 04 Integral flange construction with welded mast
- 03 Lucobridge BIT / PV-BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction

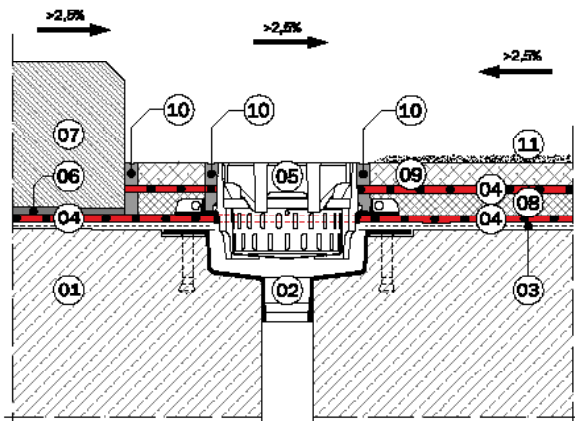


Detail 04 Expansion joint

- 08 Spread (grit)
- 07 Bituminous joint
- 06 Porous asphalt
- 05 Protective coat of mastic asphalt
- 04 Joint profile with integral flange
- 03 Lucobridge BIT / PV-BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction



01A CONCRETE DECK BRIDGE-ROAD | DOUBLE LAYER

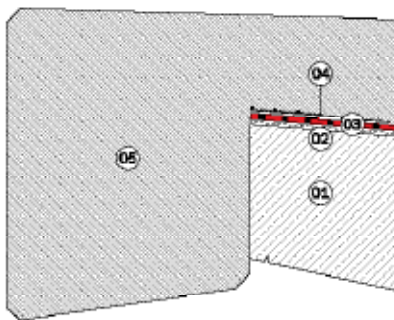
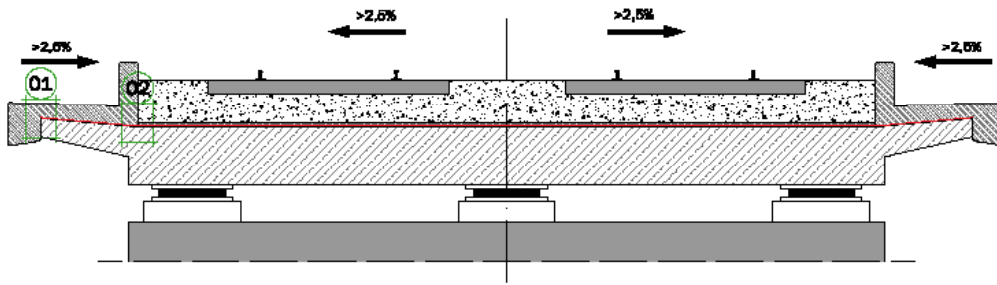


Detail 05 Bridge drains

- 11 Spread (grit)
- 10 Bituminous joint
- 09 Porous asphalt
- 08 Protective coat of mastic asphalt
- 07 Bridge cap, ferro-concrete
- 06 Protective layer
- 05 Waterproofing subpart flange
- 04 Lucobridge BIT / PV-BIT waterproofing membrane
- 03 Primer
- 02 Floor drain subpart, integral flange
- 01 Steel bridge construction

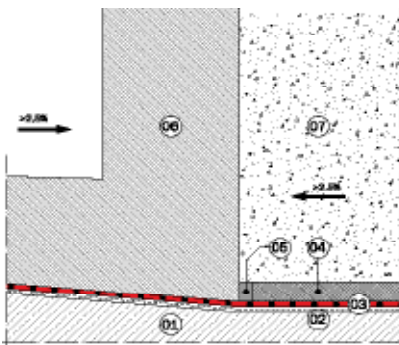


02 CONCRETE DECK BRIDGE-RAILWAY



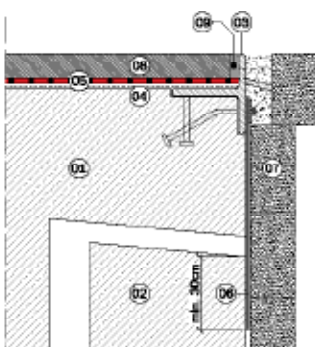
Detail 01 Waterproofing beyond bridge cap

- 05 Bridge cap, ferro-concrete
- 04 Cap joint band
- 03 Lucobridge BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction



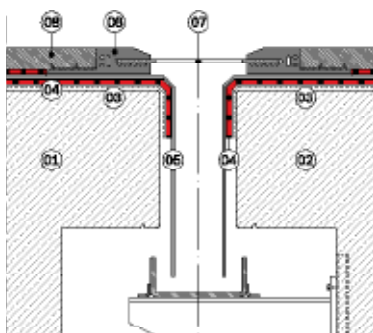
Detail 02 Connection bridge cap

- 07 Track bed, gravels
- 06 Bridge cap, ferro-concrete
- 05 XPS-stand-by stripe
- 04 Protective coat of concrete
- 03 Lucobridge BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction



Detail 03 Super structure Connection/waterproofing conclusion

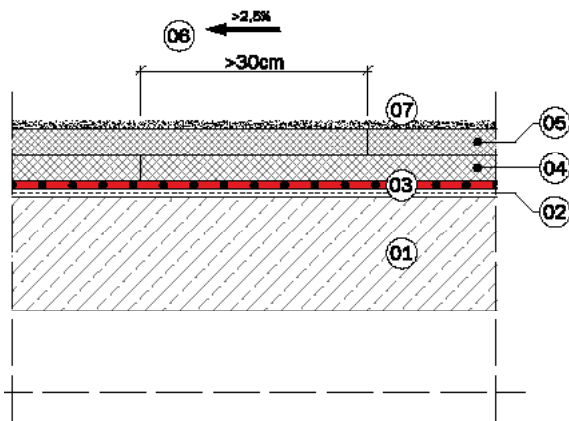
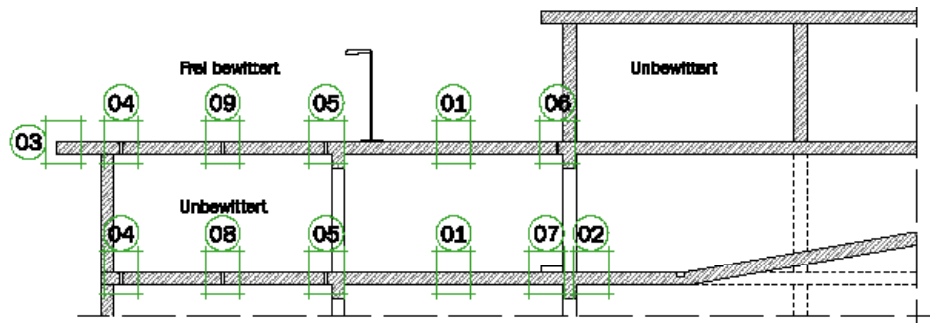
- 09 Bituminous potting
- 08 Protective concrete
- 07 Filter stone
- 06 Drip tap or bituminous waterproofing layer, mounting with terminal strip
- 05 Lucobridge BIT waterproofing membrane
- 04 Primer
- 03 Border construction with concrete anchor and long hole
- 02 Counterfort
- 01 Super structure



Detail 04 Fudge counterfort support structure

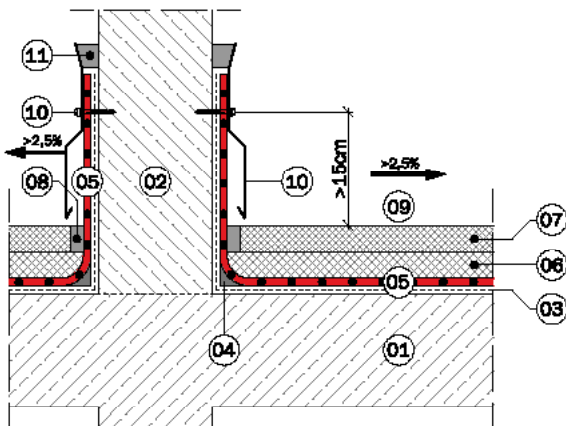
- 08 Protective concrete
- 07 PE-waterproofing band
- 06 Retain element
- 05 Molded body, integrated in the waterproofing
- 04 Lucobridge BIT waterproofing membrane
- 03 Primer
- 02 Counterfort
- 01 Support structure

03 PARKING GARAGE



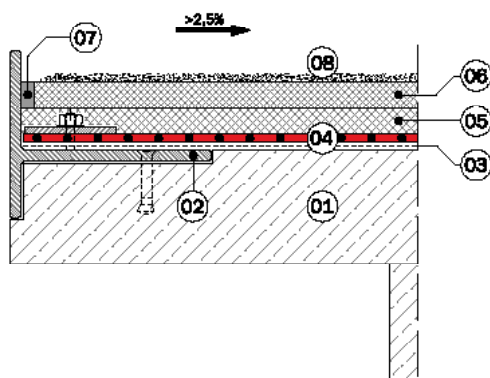
Detail 01 Ground/coating structure

- 07 Spread (grit)
- 06 Joint
- 05 Wearing course of mastic asphalt
- 04 Protective coat of mastic asphalt
- 03 Lucobridge BIT waterproofing membrane
- 02 Primer
- 01 Construction concrete with slope



Detail 02 Wall/sustain connection

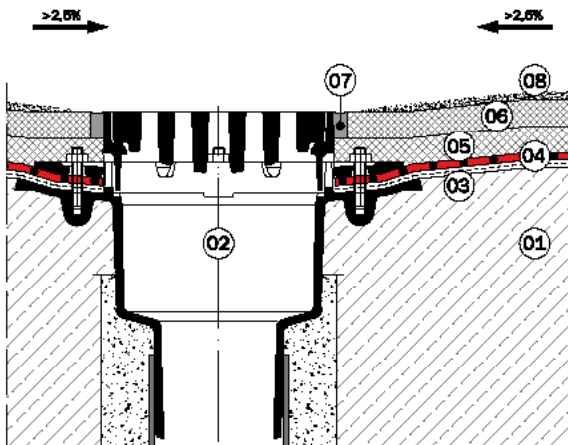
- 11 Permanently elastic joint infill
- 10 Cover plate ≥ 15 cm high with clamping effect
- 09 Spread (grit)
- 08 Joint
- 07 Wearing course of mastic asphalt
- 06 Protective coat of mastic asphalt
- 05 Lucobridge BIT waterproofing membrane
- 04 EP-fillet (PCC-mortar)
- 03 Primer
- 02 Raising component (concrete wall)
- 01 Construction concrete with slope



Detail 03 Free board connection

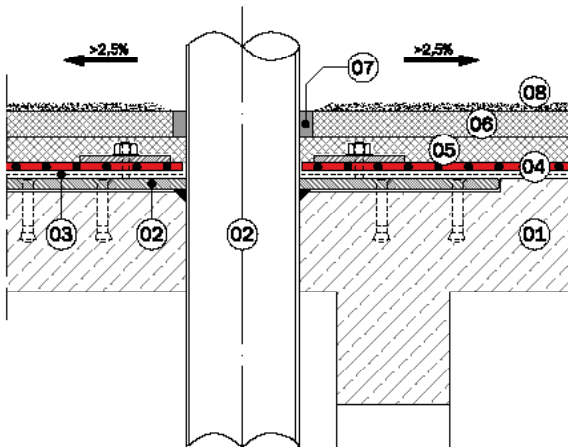
- 08 Spread (grit)
- 07 Bituminous joint
- 06 Wearing course of mastic asphalt
- 05 Protective coat of mastic asphalt
- 04 Lucobridge BIT waterproofing membrane
- 03 Primer
- 02 Boarder connection profile as integrated flange, mounting according to statics
- 01 Construction concrete with slope

03 PARKING GARAGE



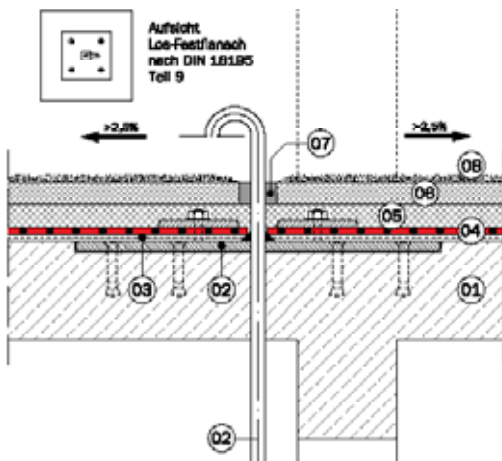
Detail 04 Floor drain

- 08 Spread (grit)
- 07 Bituminous joint
- 06 Wearing course of mastic asphalt
- 05 Protective coat of mastic asphalt
- 04 Primer
- 03 Lucobridge BIT waterproofing membrane
- 02 Floor drain
- 01 Construction concrete with slope



Detail 05 Pipe implementation

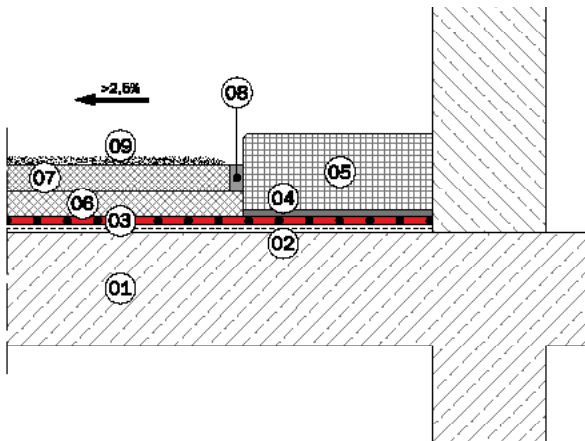
- 08 Spread (grit)
- 07 Bituminous joint
- 06 Wearing course of mastic asphalt
- 05 Protective coat of mastic asphalt
- 04 Lucobridge BIT waterproofing membrane
- 03 Primer
- 02 Pipe with waterproofed welded integrated flange, mounted according to statics
- 01 Construction concrete with slope



Detail 06 Cable implementation

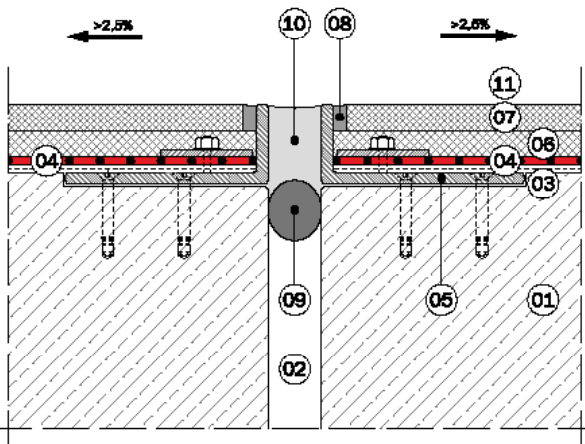
- 08 Spread (grit)
- 07 Bituminous joint
- 06 Wearing course of mastic asphalt
- 05 Protective coat of mastic asphalt
- 04 Lucobridge BIT waterproofing membrane
- 03 Primer
- 02 Pipe with waterproofed welded integrated flange, mounted according to statics
- 01 Construction concrete with slope

04 PARKING GARAGE



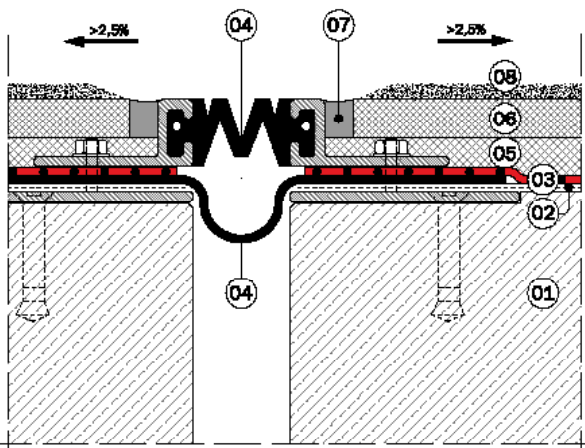
Detail 07 Safety curbs

- 09 Spread (grit)
- 08 Bituminous joint
- 07 Wearing course of mastic asphalt
- 06 Protective coat of mastic asphalt
- 05 Safety curb
- 04 Protection mat
- 03 Lucobridge BIT waterproofing membrane
- 02 Primer
- 01 Construction concrete with slope



Detail 08 Component joint, permanently elastic

- 11 Spread (grit)
- 10 Permanently elastic joint filler
- 09 Closed cell rear filling string
- 08 Bituminous joint
- 07 Wearing course of mastic asphalt
- 06 Protective coat of mastic asphalt
- 05 Integrated flange
- 04 Lucobridge BIT waterproofing membrane
- 03 Primer
- 02 Component joint
- 01 Construction concrete with slope
- 11 Abstreumittel (Splitt)



Detail 09 Expansion joint

- 08 Spread (grit)
- 07 Bituminous joint
- 06 Wearing course of mastic asphalt
- 05 Protective coat of mastic asphalt
- 04 Joint profile with integrated flange
- 03 Lucobridge BIT waterproofing membrane
- 02 Primer
- 01 Steel bridge construction

REFERENCES

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MARKTBREIT

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GROSSHESSELOHER BRIDGE, MUNICH

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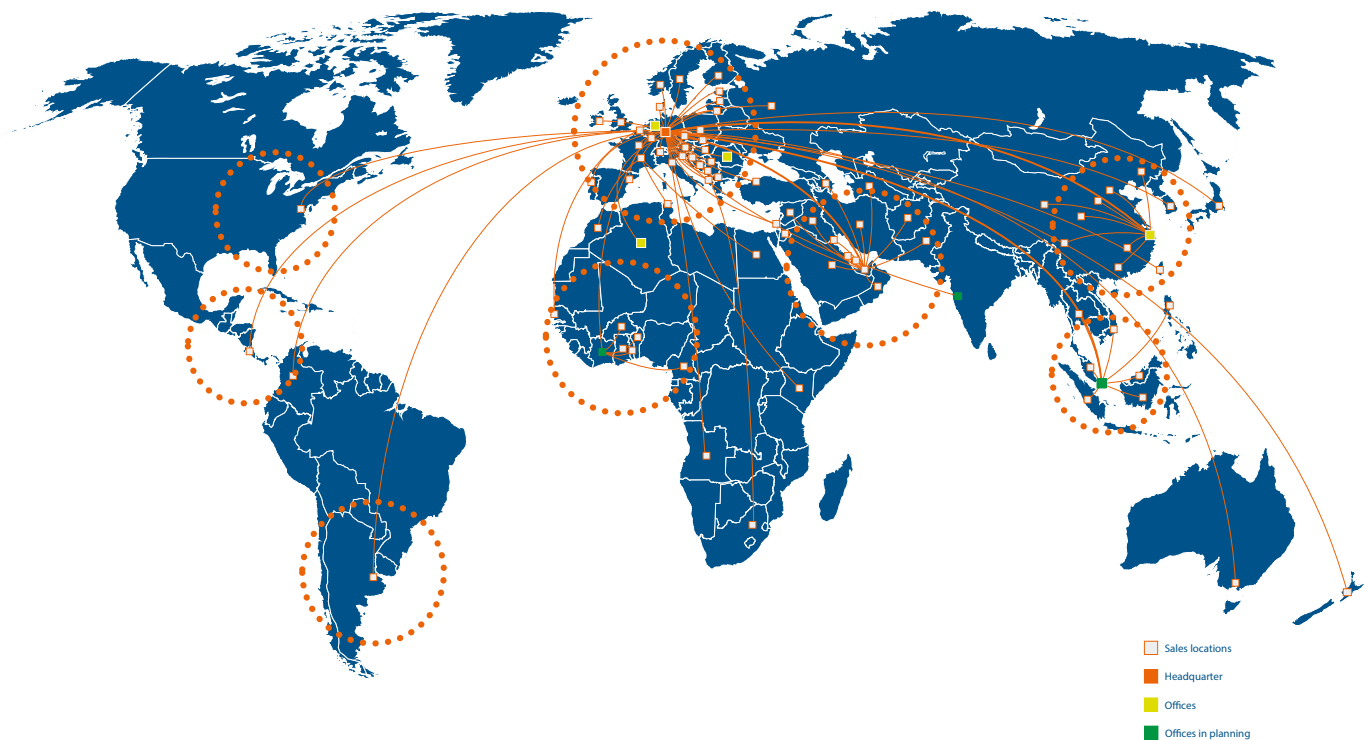
ICE BRIDGE, WALLDORF

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