ADDITIONAL PRODUCT INFORMATION

MECHANICAL PROPERTIES AND REPAIR

Sikaflex®-268

OCTOBER 2022 / VERSION 03 – SIKA SERVICES AG

Validity until September 2027, unless superseded

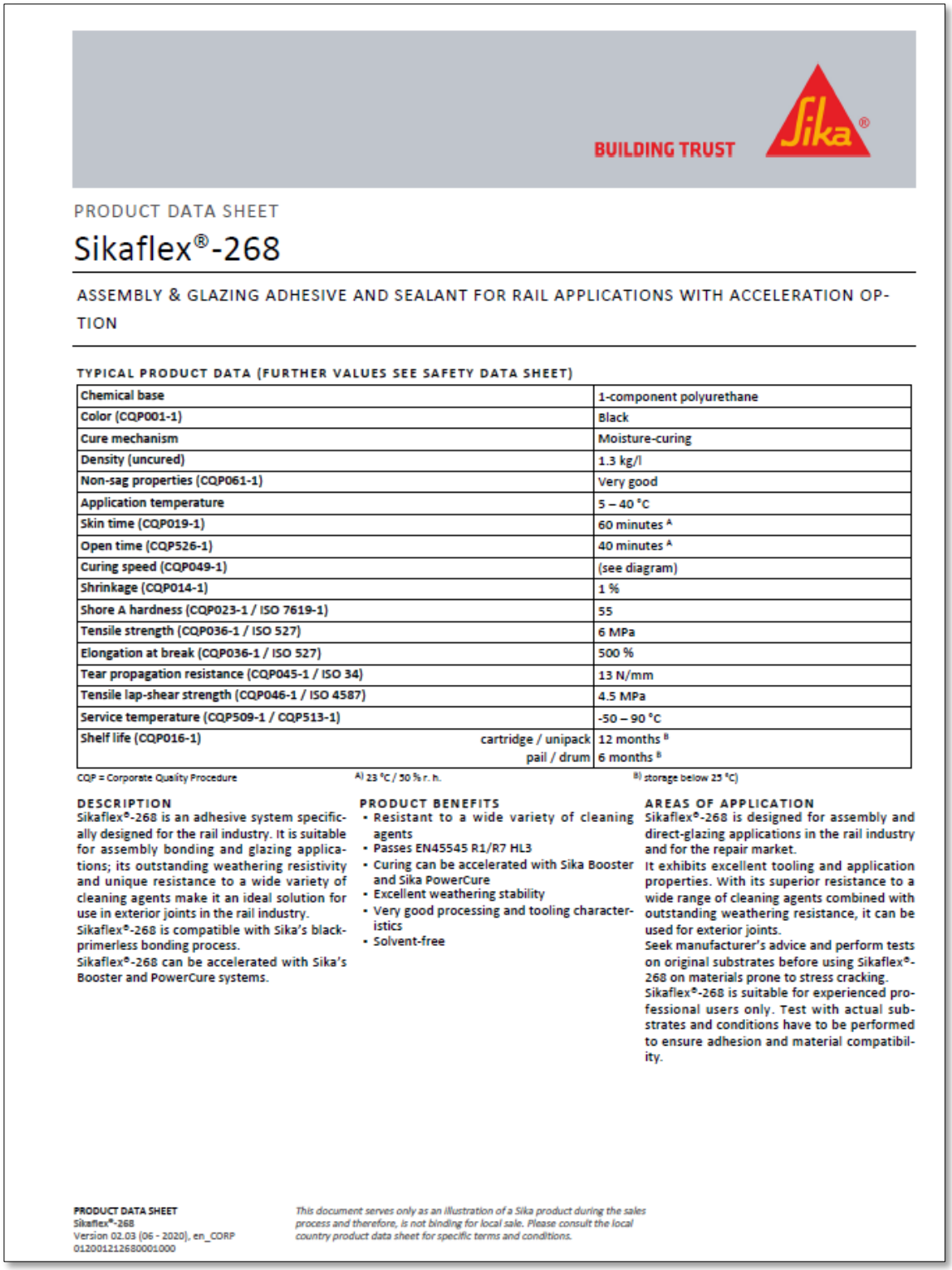
BUILDING TRUST

TABLE OF CONTENTS

1 INTRODUCTION

Basis of this API “Sikaflex®-268 – Mechanical properties and repair” is the product data sheet (PDS) available at your local Sika sales organization or at www.sika.com. Main product data shown in the PDS are constantly monitored which are true for a typical batch of Sikaflex®-268 produced.

Additional Product Information displayed in this document are basically true for the herein tested batches. Most of the information shown herein reflect the requirements of DIN 6701-3:2015-12.



BUILDING TRUST

PRODUCT DATA SHEET

Sikaflex®-268

ASSEMBLY & GLAZING ADHESIVE AND SEALANT FOR RAIL APPLICATIONS WITH ACCELERATION OPTION

TYPICAL PRODUCT DATA (FURTHER VALUES SEE SAFETY DATA SHEET)

Chemical base		1-component polyurethane
Color (CQP001-1)		Black
Cure mechanism		Moisture-curing
Density (uncured)		1.3 kg/l
Non-sag properties (CQP061-1)		Very good
Application temperature		5 – 40 °C
Skin time (CQP019-1)		60 minutes [A]
Open time (CQP526-1)		40 minutes [A]
Curing speed (CQP049-1)		(see diagram)
Shrinkage (CQP014-1)		1 %
Shore A hardness (CQP023-1 / ISO 7619-1)		55
Tensile strength (CQP036-1 / ISO 527)		6 MPa
Elongation at break (CQP036-1 / ISO 527)		500 %
Tear propagation resistance (CQP045-1 / ISO 34)		13 N/mm
Tensile lap-shear strength (CQP046-1 / ISO 4587)		4.5 MPa
Service temperature (CQP509-1 / CQP513-1)		-50 – 90 °C
Shelf life (CQP016-1)	cartridge / unipack	12 months [B]
	pail / drum	6 months [B]

CQP = Corporate Quality Procedure

[A] 23 °C / 50 % r. h.

[B] storage below 25 °C)

DESCRIPTION

Sikaflex®-268 is an adhesive system specifically designed for the rail industry. It is suitable for assembly bonding and glazing applications; its outstanding weathering resistivity and unique resistance to a wide variety of cleaning agents make it an ideal solution for use in exterior joints in the rail industry.
Sikaflex®-268 is compatible with Sika’s blackprimerless bonding process.
Sikaflex®-268 can be accelerated with Sika’s Booster and PowerCure systems.

PRODUCT BENEFITS

- Resistant to a wide variety of cleaning agents
- Passes EN45545 R1/R7 HL3
- Curing can be accelerated with Sika Booster and Sika PowerCure
- Excellent weathering stability
- Very good processing and tooling characteristics
- Solvent-free

AREAS OF APPLICATION

Sikaflex®-268 is designed for assembly and direct-glazing applications in the rail industry and for the repair market.
It exhibits excellent tooling and application properties. With its superior resistance to a wide range of cleaning agents combined with outstanding weathering resistance, it can be used for exterior joints.
Seek manufacturer’s advice and perform tests on original substrates before using Sikaflex®-268 on materials prone to stress cracking.
Sikaflex®-268 is suitable for experienced professional users only. Test with actual substrates and conditions have to be performed to ensure adhesion and material compatibility.

PRODUCT DATA SHEET
Sikaflex®-268
Version 02.03 (06 - 2020), en_CORP
012001212680001000

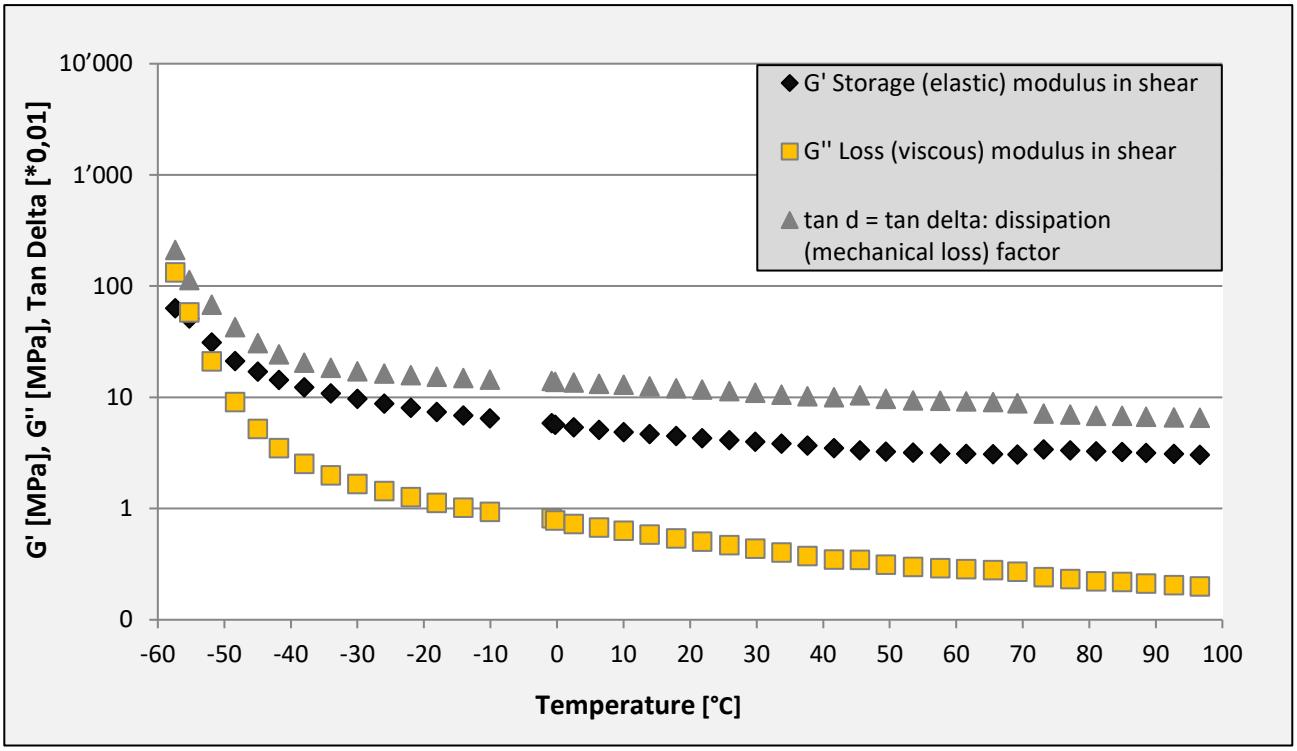
This document serves only as an illustration of a Sika product during the sales process and therefore, is not binding for local sale. Please consult the local country product data sheet for specific terms and conditions.

2 MECHANICAL PROPERTIES

2.1 THERMO MECHANICAL BEHAVIOR & GLASS TRANSITION TEMPERATURE

Thermo mechanical behavior & Glass transition temperature

Characteristics	Standard / Norm	Value / Tg
Glass transition temperature	DIN EN ISO 6721-3 Sika CQP 509-1	approx. -57 °C



2.2 TENSILE STRENGTH / ELONGATION / E-MODULUS

2.2.1 Sikaflex®-268

Tensile Strength / Elongation / E-Modulus Quasi static test DIN 6701-3:2015-12.

	Standard average values			Characteristic value R_C	
Conditions	**Tensile Strength** [σ_{max}]	**Elongation** [$_{max}$]	**E-Modulus** [E 0.5-5 %]	**Tensile Strength** [σ_{max}]	**Elongation** [$_{max}$]
-35 °C	14.9 MPa	483 %	7.2 MPa	12.8 MPa	424 %
23 °C / 50 % r.h.	7.4 MPa	578 %	2.7 MPa	6.6 MPa	523 %
70 °C	4.5 MPa	391 %	2.0 MPa	3.9 MPa	326 %
After ageing cycle according to DIN 54457 28d 23 °C/50 % r.h. + 7d water immersion + 1d at 80 °C + 7d cataplasma (70 °C/100 % r.h.)					
	Standard average values			Characteristic value R_C	
Conditions	**Tensile Strength** [σ_{max}]	**Elongation** [$_{max}$]	**E-Modulus** [E 0.5-5 %]	**Tensile Strength** [σ_{max}]	**Elongation** [$_{max}$]
-35 °C	14.6 MPa	459 %	6.6 MPa	11.7 MPa	353 %
23 °C / 50 % r.h.	6.8 MPa	501 %	2.2 MPa	5.5 MPa	422 %
70 °C	3.7 MPa	279 %	2.0 MPa	2.9 MPa	231 %

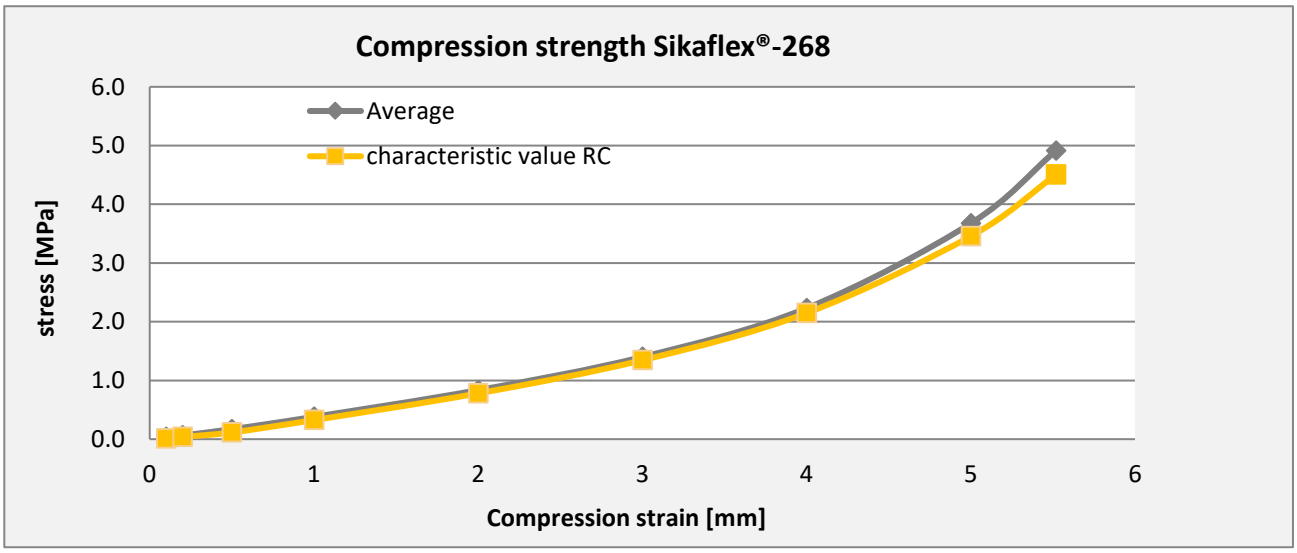
2.2.2 Sikaflex®-268 PowerCure / Sikaflex®-268 + SikaBooster® P-50

	Standard average values			Characteristic value R_C	
Conditions	**Tensile Strength** [σ_{max}]	**Elongation** [$_{max}$]	**E-Modulus** [E 0.5-5 %]	**Tensile Strength** [σ_{max}]	**Elongation** [$_{max}$]
-35 °C	12.9 MPa	472 %	7.1 MPa	8.4 MPa	378 %
23 °C / 50 % r.h.	7.0 MPa	598 %	2.3 MPa	6.0 MPa	547 %
70 °C	4.4 MPa	408 %	1.8 MPa	3.5 MPa	283 %
After ageing cycle according to DIN 54457 28d 23 °C/50 % r.h. + 7d water immersion + 1d at 80 °C + 7d cataplasma (70 °C/100 % r.h.)					
	Standard average values			Characteristic value R_C	
Conditions	**Tensile Strength** [σ_{max}]	**Elongation** [$_{max}$]	**E-Modulus** [E 0.5-5 %]	**Tensile Strength** [σ_{max}]	**Elongation** [$_{max}$]
-35 °C	13.9 MPa	482 %	6.2 MPa	9.6 MPa	385 %
23 °C / 50 % r.h.	6.3 MPa	505 %	1.8 MPa	5.2 MPa	449 %
70 °C	3.7 MPa	314 %	1.8 MPa	3.1 MPa	278 %

2.3 COMPRESSION STRENGTH

Compression Strength Quasi static test DIN 6701-3:2015-12.

Sikaflex®-268			
Test Condition (strain)	**Deformation [mm]**	**Compression strength [σ] Average value [MPa]**	**Compression strength [σ] characteristic value R_C [MPa]**
23 °C	1	0.38	0.3
	2	0.84	0.8
	3	1.40	1.3
	4	2.23	2.1
	5	3.68	3.5
	5.5	4.92	4.5
Sample dimension (cylinder): 10 mm height, 20 mm diameter			



2.4 TENSILE LAP SHEAR STRENGTH

2.4.1 Sikaflex®-268

Tensile lap shear strength Quasi static test DIN 6701-3:2015-12.

5.1 MPa

Standard average

Tensile lap shear strength of Sikaflex®-268

3.4 MPa

Characteristic value R_C

Tensile lap shear strength of Sikaflex®-268

After aging cycle acc. DIN 54457

	Standard average values		Characteristic value R_C	
Conditions	**Lap shear strength** [τ_{max}]	**Shear strain at break** [γ_{max}]	**Lap shear strength** [τ_{max}]	**Shear strain at break** [γ_{max}]
-35 °C	10.3 MPa	488 %	8.3 MPa	408 %
23 °C / 50 % r.h.	5.1 MPa	526 %	3.7 MPa	397 %
70 °C	2.8 MPa	371 %	2.1 MPa	268 %
After ageing cycle according to DIN 54457 28d 23 °C/50 % r.h. + 7d water immersion + 1d at 80 °C + 7d cataplasma (70 °C/100 % r.h.)				
	Standard average values		**Characteristic value R_C**	
Conditions	**Lap shear strength** [τ_{max}]	**Shear strain at break** [γ_{max}]	**Lap shear strength** [τ_{max}]	**Shear strain at break** [γ_{max}]
-35 °C	9.7 MPa	501 %	8.3 MPa	407 %
23 °C / 50 % r.h.	4.5 MPa	431 %	3.4 MPa	347 %
70 °C	2.2 MPa	276 %	1.8 MPa	217 %
Dimension of bond line: overlap = 12 mm, width = 25 mm, thickness = 3 mm				

2.4.2 Sikaflex®-268 PowerCure / Sikaflex®-268 + SikaBooster® P-50

Tensile lap shear strength
Quasi static test DIN 6701-3:2015-12.

5.1 MPa
Standard average
Tensile lap shear strength of Sikaflex®-268 PowerCure / Sikaflex®-268 + SikaBooster® P-50

3.3 MPa
Characteristic value R_C
Tensile lap shear strength of Sikaflex®-268 PowerCure / Sikaflex®-268 + SikaBooster® P-50
after aging cycle acc. DIN 54457

	Standard average values		Characteristic value R_C	
Conditions	**Lap shear strength [τ_{max}]**	**Shear strain at break [γ_{max}]**	**Lap shear strength [τ_{max}]**	**Shear strain at break [γ_{max}]**
-35 °C	10.2 MPa	537 %	9.2 MPa	453 %
23 °C / 50 % r.h.	5.1 MPa	519 %	3.8 MPa	336 %
70 °C	2.9 MPa	374 %	2.2 MPa	269 %
After ageing cycle according to DIN 54457 28d 23 °C/50 % r.h. + 7d water immersion + 1d at 80 °C + 7d cataplasma (70 °C/100 % r.h.)				
	Standard average values		**Characteristic value R_C**	
Conditions	**Lap shear strength [τ_{max}]**	**Shear strain at break [γ_{max}]**	**Lap shear strength [τ_{max}]**	**Shear strain at break [γ_{max}]**
-35 °C	8.9 MPa	519 %	7.0 MPa	431 %
23 °C / 50 % r.h.	4.4 MPa	464 %	3.3 MPa	326 %
70 °C	2.4 MPa	290 %	1.8 MPa	200 %
Dimension of bond line: overlap = 12 mm, width = 25 mm, thickness = 3 mm				

2.4.3 Sikaflex®-268 – CONTINUOUS LONGTERM QUALITY STATISTICS

Lap Shear Strength - Testing of one batch per month
Quasi static test DIN 6701-3:2015-12.

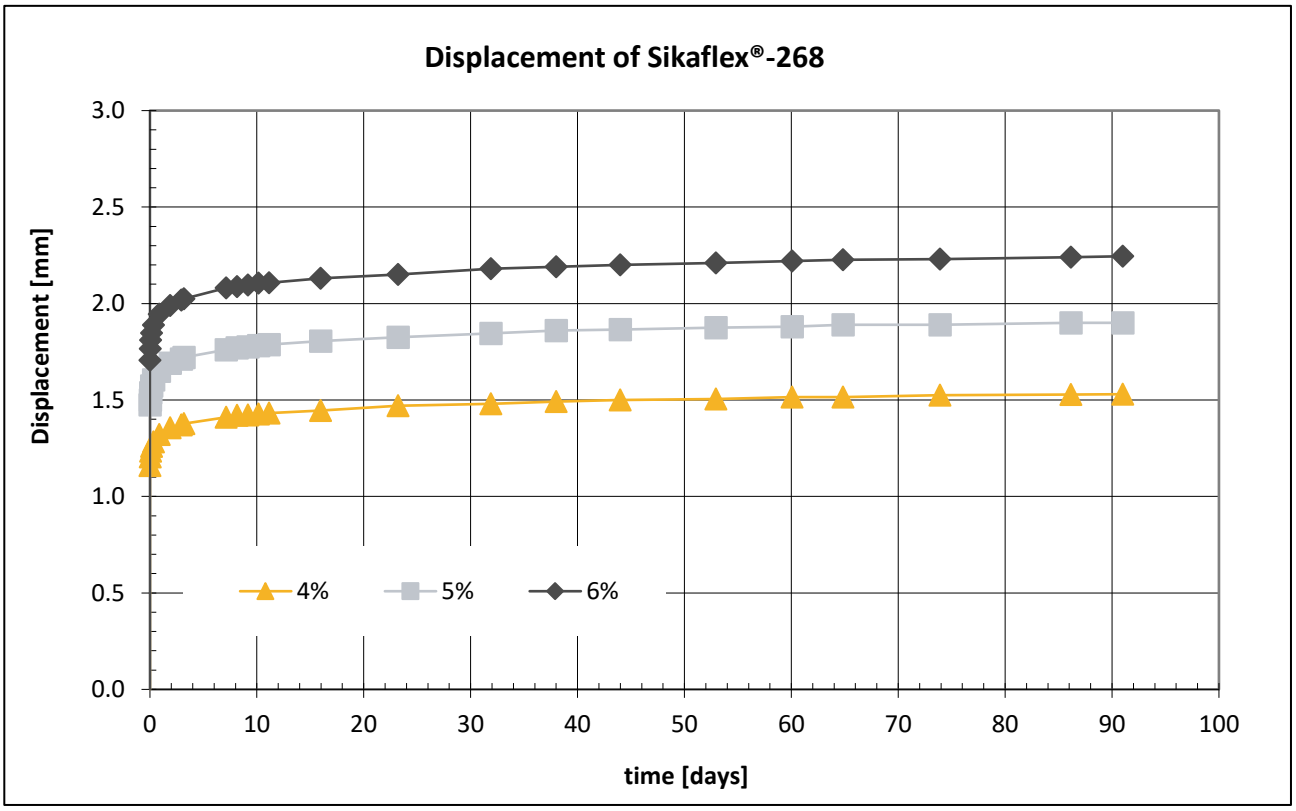
Sikaflex®-268			
Conditions	**Standard average value [τ_{max}]**	**Std. deviation**	**Characteristic value R_C [τ_{max}]**
23 °C	4.7 MPa [A]	0.5 MPa [A]	3.7 MPa [A]

[A] determined with >100 tensile lap shear strength values

2.5 CREEP

Creep Static test DIN 6701-3:2015-12.

Sikaflex®-268					
Test condition	**Static load**			**Deformation [mm]**	**Deformation [%]**
90 days at 23 °C	4 %	9.0 kg	0.18 MPa	1.5	29.6
	5 %	11.2 kg	0.23 MPa	1.9	38.3
	6 %	13.3 kg	0.27 MPa	2.3	46.0
Static load: 4 %, 5 %, 6 % of tensile lap shear strength stated in product data sheet Dimension of bond line: overlap = 20 mm, width = 25mm, thickness = 5 mm					



2.6 RELAXATION

Relaxation Static test DIN 6701-3:2015-12.

Sikaflex®-268			
Characteristics	**Test condition**	**Deformation**	**Assessment**
Allowable shear strain	1000 hours at 23 °C	(tan γ) 0.5 **50 % = 2.5 mm**	**Visual assessment OK** **NO FAILURE**

After ageing cycle according to DIN 54457 28d 23 °C/50 % r.h. + 7d water immersion + 1d at 80 °C + 7d cataplasma (70 °C/100 % r.h.)			
Characteristics	**Test condition**	**Deformation**	**Assessment**
Allowable shear strain	1000 hours at 23 °C + ageing cycle	(tan γ) 0.5 **50 % = 2.5 mm**	**Visual assessment OK** **NO FAILURE**
Dimension of bond line: overlap = 20 mm, width = 25 mm, thickness = 5 mm			

2.7 MAXIMUM PERMISSIBLE MOVEMENT OF ADHESIVE LAYER

Maximum permissible movement of adhesive layer See booklet “Elastic Bonding” Basic principles of adhesive bonding

	Thermal movement (discounting restraining force of adhesive)	**Accident** (e.g. derailment)	**Loading and unloading**	**Normal service operation** (dynamic stresses)
Tension / Compression (relative to width of adhesive/sealant layer)	20 %	20 %	20 %	10 %
Shear (relative to thickness of adhesive/sealant layer)	50 %	50 %	50 %	25 %

Booklet “Elastic Bonding” ISBN 3-478-93203-3, p.32

2.8 SHEAR FATIGUE TESTING

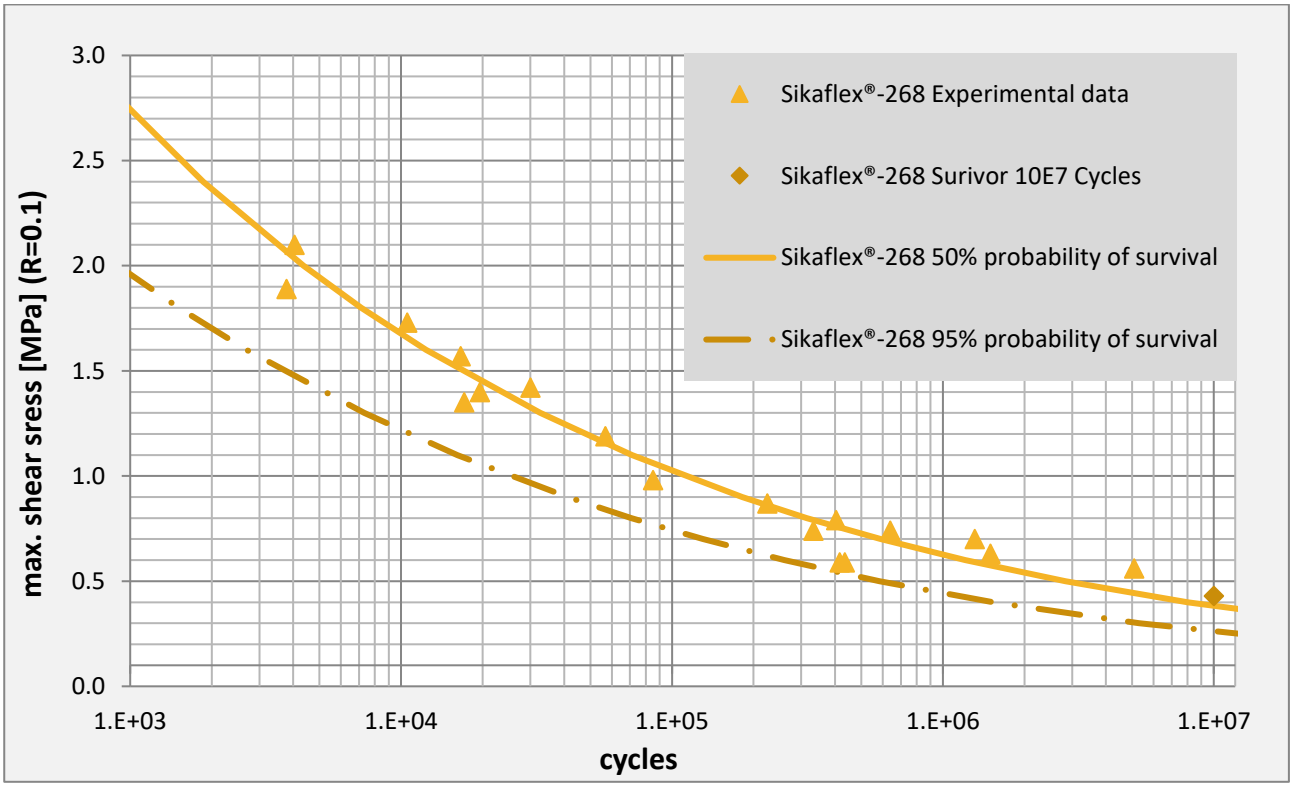
Shear Fatigue Testing Dynamic Test DIN 6701-3:2015-12.

Specimen	Characteristics	Test condition	Cycles	Nominal shear stress amplitude
Sikaflex®-268	Measured survivor of 10^7 cycles	23 °C	10^7	**0.43 MPa**
Frequency: According to **DIN 6701-3:2015-12.** Appendix A / Section 3.7 Amplitude ratio value / R = 0.1 stress regulated amplitude				

The fatigue behavior according ISO 12107 and DIN6701-3 of Sikaflex®-268 lap shear specimens can be described with the following parameters:

$$\tau = a\, N^{-b}$$

Sikaflex®-268		
Survival probability	*P*	95 %
Coefficient a (Wöhler curve y-intercept)	*a*	7.59 MPa
Coefficient b (Wöhler curve opposite slope)	*b*	0.20
Number of cycles	*N*	

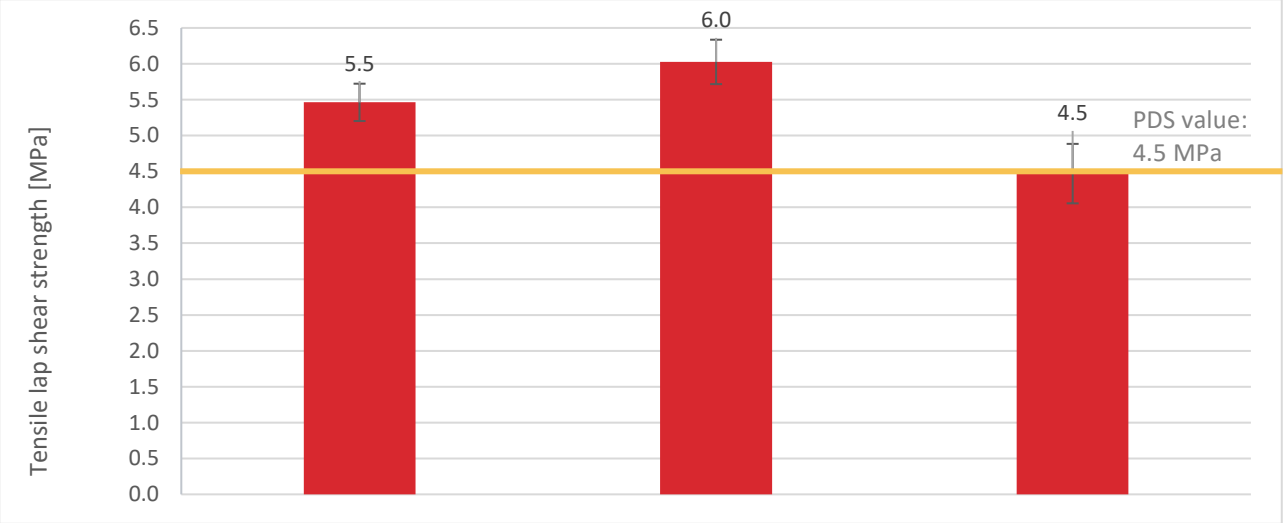


3 REPAIR

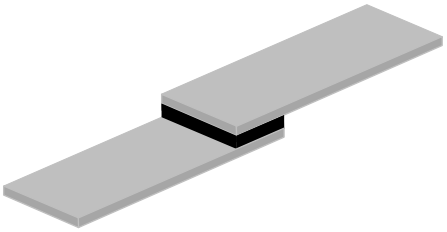
3.1 TENSILE LAP SHEAR STRENGTH AFTER REPAIR

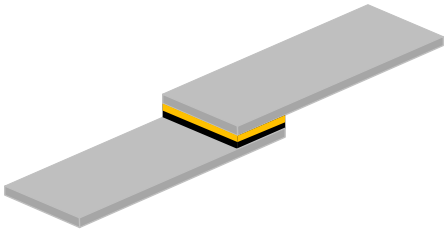
Tensile lap shear strength after repair
Quasi Static Test DIN 6701-3:2015-12.

3.1.1 CUT OLD BEAD OF Sikaflex®-265 + SikaBooster® P-50 REPAIRED WITH Sika® Aktivator-100 AND Sikaflex®-268 PowerCure

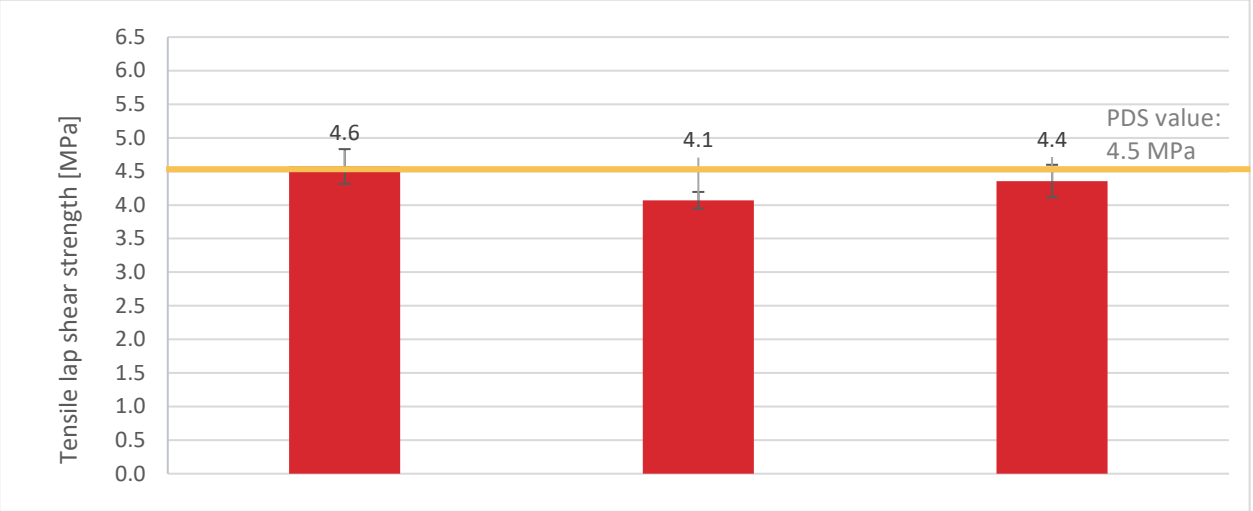


Substrate	Sikaflex®-265 + SikaBooster® P-50	Sikaflex®-265 + SikaBooster® P-50	Sikaflex®-265 + SikaBooster® P-50
Ageing	14d 23 °C/50 % r.h.	DVS-1618 + 1d 23 °C/50 % r.h.	DVS-1618 + 1d 23 °C/50 % r.h.
Repair	-	-	**Sika® Aktivator-100 Sikaflex®-268 PowerCure**
Ageing	-	-	14d 23 °C/50 % r.h.





3.1.2 CUT OLD BEAD OF Sikaflex®-268 + SikaBooster® P-50 REPAIRED WITH Sika® Aktivator-100 AND Sikaflex®-268 PowerCure



Substrate	Sikaflex®-268 + SikaBooster® P-50	Sikaflex®-268 + SikaBooster® P-50	Sikaflex®-268 + SikaBooster® P-50
Ageing	14d 23 °C/50 % r.h.	DVS-1618 + 1d 23 °C/50 % r.h.	DVS-1618 + 1d 23 °C/50 % r.h.
Repair	-	-	**Sika® Aktivator-100 Sikaflex®-268 PowerCure**
Ageing	-	-	14d 23 °C/50 % r.h.

3.2 SHEAR FATIGUE OF Sikaflex®-268 + SikaBooster® P-50 AFTER REPAIR WITH Sika® Aktivator-100 AND Sikaflex®-268 PowerCure

Shear Fatigue Testing after repair Dynamic Test DIN 6701-3:2015-12.

Fatigue behavior according ISO 12107 and DIN6701-3 of interfacial bonded Sikaflex®-268 PowerCure lap shear specimens prepared according to CQP046-2 using a metal-jig. The nominal bonding area was 35 x 20 x 5 mm.

Repair Specimen	Characteristics	Test condition	Cycles	Nominal shear stress amplitude
Sikaflex®-268 + SikaBooster® P-50 on Sikaflex®-268 PowerCure	Measured survivor of 10^7 cycles	23 °C	10^7	**0.50 MPa**
Frequency: According to **DIN 6701-3:2015-12.** Appendix A / Section 3.7 Amplitude ratio value / R = 0.1, stress regulated amplitude				

4 REFERENCES

Pos.	Report no: / Source	Title
2.1	00509-CTS1-00055-MKö	Thermo mechanical behaviour & glass transition temperature
2.2	00509-CTS1-00090-YMe	Tensile strength of Sikaflex®-268 acc. to DIN 6701-3
2.3	00509-CTS1-00091-YMe	Compressive strength Sikaflex®-268 acc. to DIN 6701-3
2.4.1	00509-CTS1-00089-YMe	Tensile lap shear strength of Sikaflex®-268 acc. to DIN 6701-3
2.4.2	00509-CTS1-00089-YMe	Tensile lap shear strength of Sikaflex®-268 PowerCure acc. to DIN 6701-3
2.4.3	Quality control statistics	Tensile lap shear strength of Sikaflex®-268
2.5	00509-CTS1-00085-YMe	Creep behavior of Sikaflex®-268 acc. to DIN 6701-3
2.6	00509-CTS1-00092-YMe	Relaxation test of Sikaflex®-268 following DIN 6701-3
2.8	wp-pb-mb-a319053-069-01-00	IFAM Test report, dynamic fatigue test of Sikaflex®-268
3.1	00511-CTS1-00077-SLe	Tensile lap shear strength of Sikaflex®-265 and Sikaflex®-268 after repair
3.2	00511-CTS1-00081-SLe	Dynamic fatigue test Sikaflex®-268 after repair