



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna University of Technology



Civil Engineering
Institute of Transportation
Laboratory for Road Materials
Gußhausstraße 28/230-3, A-1040 Vienna
www.istu.tuwien.ac.at
DVR: 005886

PROJECT REPORT

Project Number: 17435D

Performance of Viacore AC 8 Resistance to Permanent Deformation - Uniaxial Cyclic Compression Test (UCCT)

by

**Ass. Prof. Dipl.-Ing. Dr. techn.
Bernhard Hofko**

and

Ing. David Valentin

On behalf of
Österreichische Vialit GmbH
Josef-Reiter-Straße 78
A-5280 Braunau

Vienna, August 2018

This report contains 5 pages and one annex with test reports.

The contents of this report shall only be used verbatim and without omission or addition in case of reproduction or publication. Publication or reproduction under reference to this report in extracts needs pre-approval of the Institute of Transportation, TU Wien.

Contents

- 1. Contents of this Project 3**
- 2. Materials and Specimen Production 3**
- 3. Asphalt Mix Test Results 3**
 - 3.1. Resistance to Permanent Deformation of Viacore AC 8 - UCCT..... 3**

1. Contents of this Project

The Institute of Transportation, Research Center of Road Engineering, Vienna University of Technology was contracted by Österreichische Vialit GmbH, Josef-Reiter-Straße 78, A-5280 Braunau, represented by Mr. Thomas Schinkinger to carry out performance based tests for a Viacore AC 8.

The following tests have been conducted:

Test Method	Standard	Remarks
Production of asphalt mix slabs by steel segment compactor	EN 12697-33	
Dimensions of specimens	EN 12697-29	
Bulk density	EN 12697-6	SSD Method
Uniaxial cyclic compression test	EN 12697-25	according EN 13108-20, table D.5, reference D.5.4 additionally at +40°C

2. Materials and Specimen Production

For this project, asphalt mix samples of Viacore AC 8 were provided by the client in January 2018. Uniaxial Cyclic Compression Tests (UCCT) at +40°C and +50°C were carried out.

For specimen production, the asphalt mix was homogenized in a laboratory mixer according to EN 12697-35 at room temperature with 3 M% of water. Subsequently, the mix was compacted to slabs in a steel segment compactor. The slabs were conditioned for 24 h at room temperature and another 48 h at +60°C in a heating cabinet. After another 24 h storage at room temperature, the slabs were cut and cored into specimens. Dimensions and bulk density of the specimens were determined before testing.

3. Asphalt Mix Test Results

3.1. Resistance to Permanent Deformation of Viacore AC 8 - UCCT

For the Viacore AC 8, UCCT were carried at +50°C according to EN 13108-20 and in addition at +40°C. Figure 1 contains the results after 2,500 load cycles and after 5,000 load cycles for a test temperature of +40°C (left) and +50°C (right).

The mean axial deformation after 2,500 load cycles at +50°C comes to 1,8 mm and after 5,000 load cycles to 1,9 mm. This corresponds to a category $U_{2500 \max 2,0}$ and $U_{5000 \max 2,0}$ according to EN 13108-6, respectively.

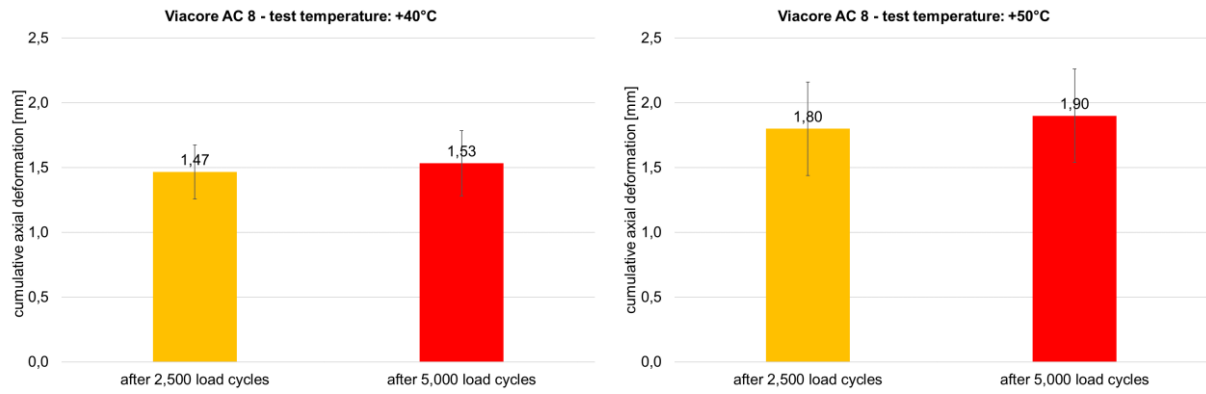
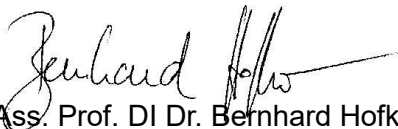


Figure 1: UCCT results of Viacore AC 8


Ass. Prof. DI Dr. Bernhard Hofko
Head of Laboratory

Vienna, August 2018


Ing. David Valentin
Project Manager

APPENDIX

Project Number: 17435D

This Annex contains all test reports.

Test report: bulk density, dimensions, space density and voids content
P429-CY
Page 1 of 1

Client	Österreichische Vialit GmbH
Date	23.01.2018
Project	17435
Project manager	David Valentin
Tested by	Tina Strohmeier
	-
Standard	EN 12697-6, edition 2012

Sample information

Asphalt mixture	Viacore AC 8	Lab Code	AS1147
Asphalt sample	Viacore AC 8	Lab Code	A687
Origin	Österreichische Vialit GmbH		

Results

Bulk density of the mixture			
Bulk density [Mg/m³]	2,39	Test method	A - Volumetric method
Test temperature [°C]	-	Test liquid	air-free water

Specimen	Height [mm]	Diameter [mm]	Weight dry [g]	Space density Method B [Mg/m³]	Voids content [V%]
T817A	60,5	148,6	2319,9	2,219	
T817B	60,3	148,7	2358,5	2,257	
T817C	60,0	148,6	2315,6	2,240	

Test report: bulk density, dimensions, space density and voids content
P429-CY
Page 1 of 1

Client	Österreichische Vialit GmbH
Date	23.01.2018
Project	17435
Project manager	David Valentin
Tested by	Tina Strohmeier
	-
Standard	EN 12697-6, edition 2012

Sample information

Asphalt mixture	Viacore AC 8	Lab Code	AS1147
Asphalt sample	Viacore AC 8	Lab Code	A687
Origin	Österreichische Vialit GmbH		

Results

Bulk density of the mixture			
Bulk density [Mg/m³]	2,39	Test method	A - Volumetric method
Test temperature [°C]	-	Test liquid	air-free water

Specimen	Height [mm]	Diameter [mm]	Weight dry [g]	Space density Method B [Mg/m³]	Voids content [V%]
T818A	60,2	148,4	2274,0	2,201	
T818B	59,9	148,4	2323,5	2,249	
T818C	60,7	148,7	2318,6	2,217	

**Test Report: Resistance to permanent deformation - Uniaxial
 Cyclic Compression Test (UCCT) - Sinusoidal loading**
**P526
 Page 1 von 1**

Client	Österreichische Vialit GmbH
Date	24.01.2018
Project	17435
Project Manager	David Valentin
Tester	Mariyan Dimitrov
Standard	EN 12697-25, Version 2016

Sample Data

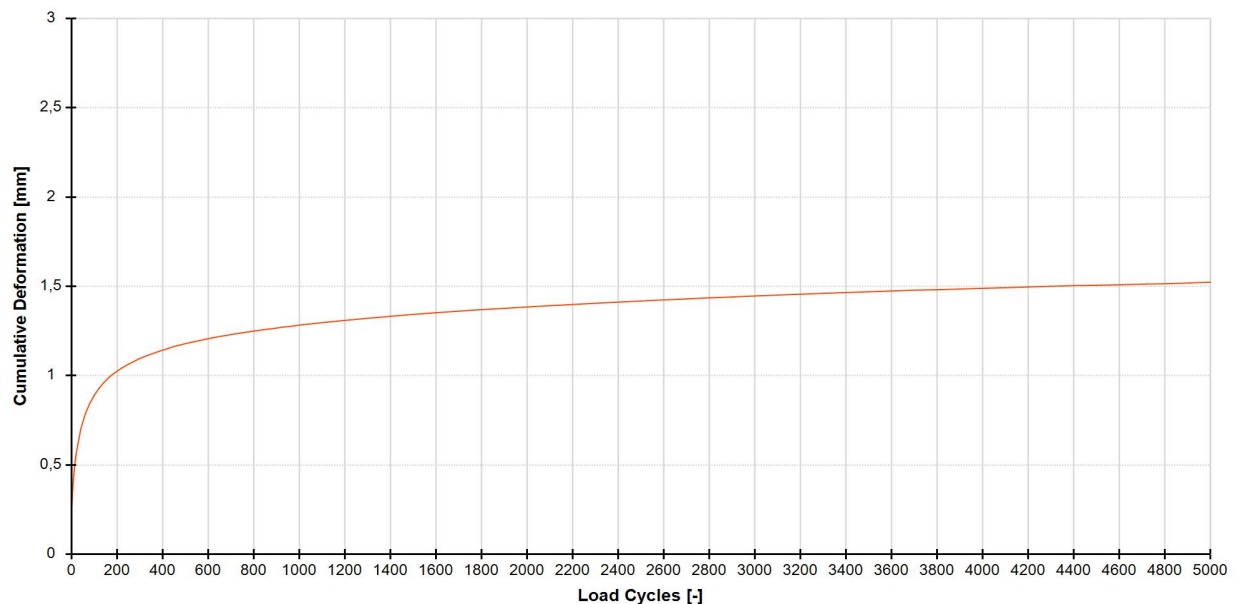
Lab Code	T817A	Production	Produced in lab
Mix Production	EN 12697-35		
Bulk Density	2,219 Mg/m ³ Method B		
Height	60,5 mm	Diameter	148,6 mm
Asphalt	Viacore AC 8		

Test Parameters

Temperature	40 °C		
Lower Stress Level	80 kPa	Upper Stress Level	350 kPa
Loading Duration	(0,2 ± 0,005) s	Rest Period	(1,5 ± 0,05) s

Test Results

Cumulative deformation after 2,500 load cycles ($U_{2500,max}$)	1,4 mm
Cumulative deformation after 5.000 load cycles ($U_{5000,max}$)	1,5 mm



**Test Report: Resistance to permanent deformation - Uniaxial
 Cyclic Compression Test (UCCT) - Sinusoidal loading**
**P526
 Page 1 von 1**

Client	Österreichische Vialit GmbH
Date	25.01.2018
Project	17435
Project Manager	David Valentin
Tester	Mariyan Dimitrov
Standard	EN 12697-25, Version 2016

Sample Data

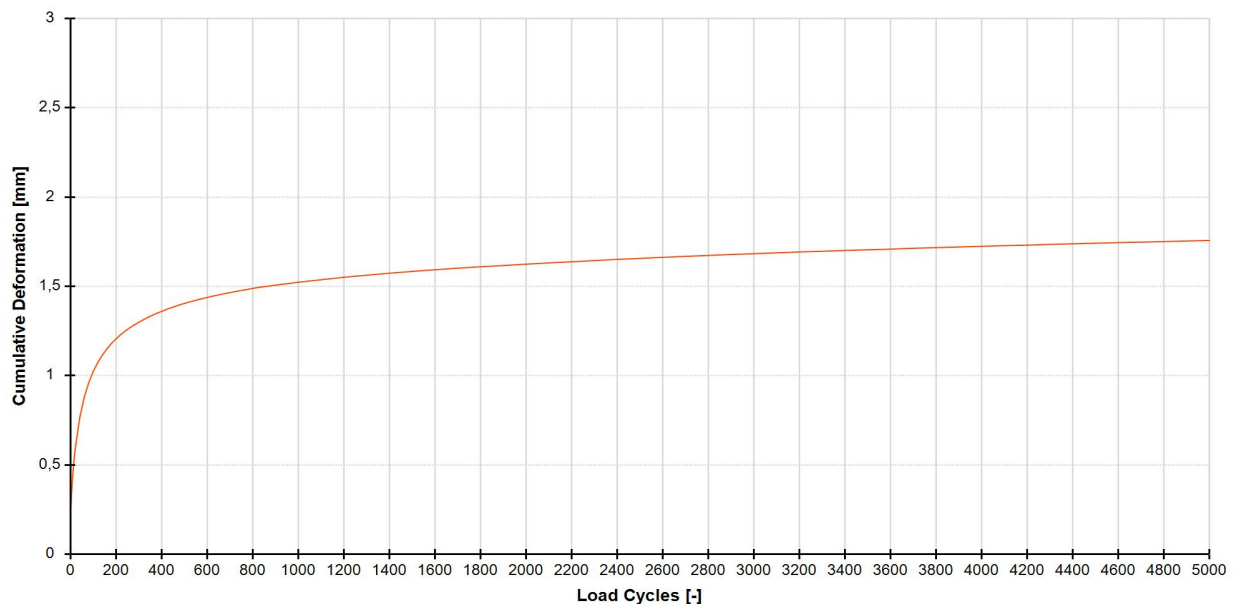
Lab Code	T817B	Production	Produced in lab
Mix Production	EN 12697-35		
Bulk Density	2,257 Mg/m ³ Method B		
Height	60,3 mm	Diameter	148,7 mm
Asphalt	Viacore AC 8		

Test Parameters

Temperature	40 °C		
Lower Stress Level	80 kPa	Upper Stress Level	350 kPa
Loading Duration	(0,2 ± 0,005) s	Rest Period	(1,5 ± 0,05) s

Test Results

Cumulative deformation after 2,500 load cycles ($U_{2500,max}$)	1,7 mm
Cumulative deformation after 5.000 load cycles ($U_{5000,max}$)	1,8 mm



**Test Report: Resistance to permanent deformation - Uniaxial
 Cyclic Compression Test (UCCT) - Sinusoidal loading**
**P526
 Page 1 von 1**

Client	Österreichische Vialit GmbH
Date	31.01.2018
Project	17435
Project Manager	David Valentin
Tester	Mariyan Dimitrov
Standard	EN 12697-25, Version 2016

Sample Data

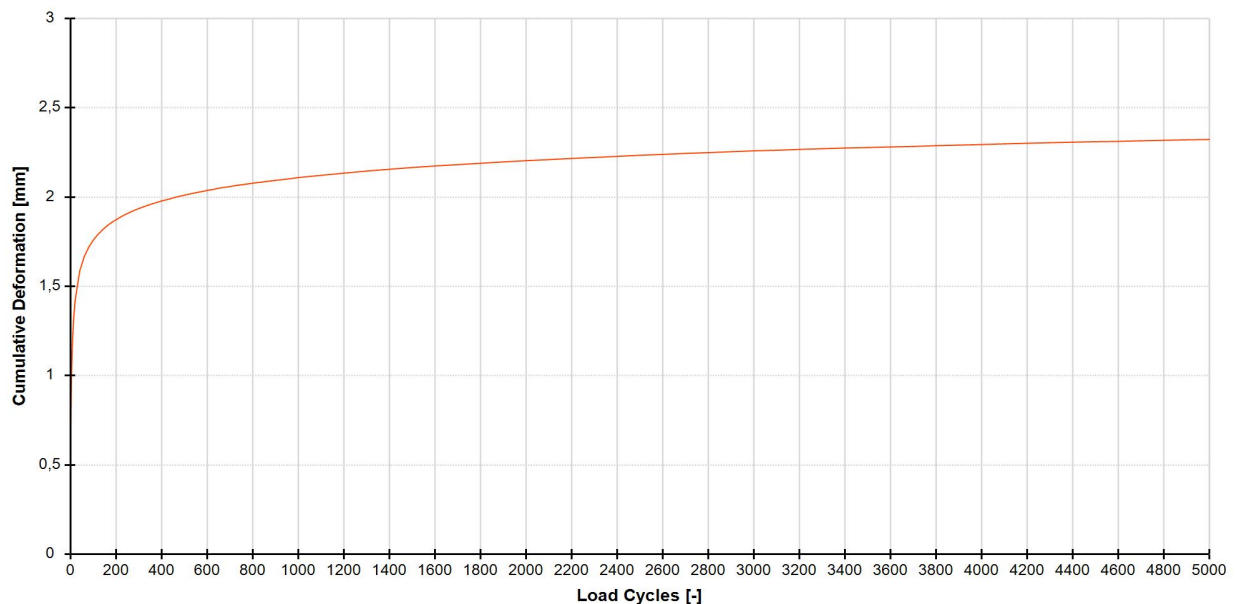
Lab Code	T817C	Production	Produced in lab
Mix Production	EN 12697-35		
Bulk Density	2,240 Mg/m ³ Method B		
Height	60,0 mm	Diameter	148,6 mm
Asphalt	Viacore AC 8		

Test Parameters

Temperature	50 °C		
Lower Stress Level	80 kPa	Upper Stress Level	350 kPa
Loading Duration	(0,2 ± 0,005) s	Rest Period	(1,5 ± 0,05) s

Test Results

Cumulative deformation after 2,500 load cycles ($U_{2500,max}$)	2,2 mm
Cumulative deformation after 5.000 load cycles ($U_{5000,max}$)	2,3 mm



**Test Report: Resistance to permanent deformation - Uniaxial
 Cyclic Compression Test (UCCT) - Sinusoidal loading**
**P526
 Page 1 von 1**

Client	Österreichische Vialit GmbH
Date	26.01.2018
Project	17435
Project Manager	David Valentin
Tester	Mariyan Dimitrov
Standard	EN 12697-25, Version 2016

Sample Data

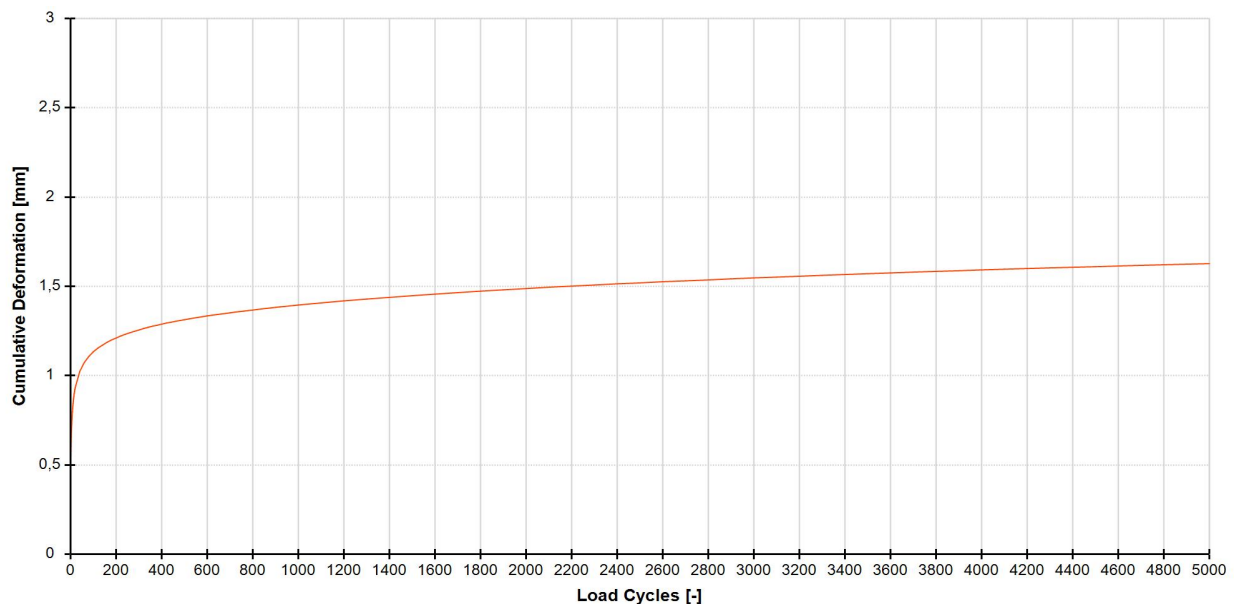
Lab Code	T818A	Production	Produced in lab
Mix Production	EN 12697-35		
Bulk Density	2,201 Mg/m ³ Method B		
Height	60,2 mm	Diameter	148,4 mm
Asphalt	Viacore AC 8		

Test Parameters

Temperature	50 °C		
Lower Stress Level	80 kPa	Upper Stress Level	350 kPa
Loading Duration	(0,2 ± 0,005) s	Rest Period	(1,5 ± 0,05) s

Test Results

Cumulative deformation after 2,500 load cycles ($U_{2500,max}$)	1,5 mm
Cumulative deformation after 5.000 load cycles ($U_{5000,max}$)	1,6 mm



**Test Report: Resistance to permanent deformation - Uniaxial
 Cyclic Compression Test (UCCT) - Sinusoidal loading**
**P526
 Page 1 von 1**

Client	Österreichische Vialit GmbH
Date	26.01.2018
Project	17435
Project Manager	David Valentin
Tester	Mariyan Dimitrov
Standard	EN 12697-25, Version 2016

Sample Data

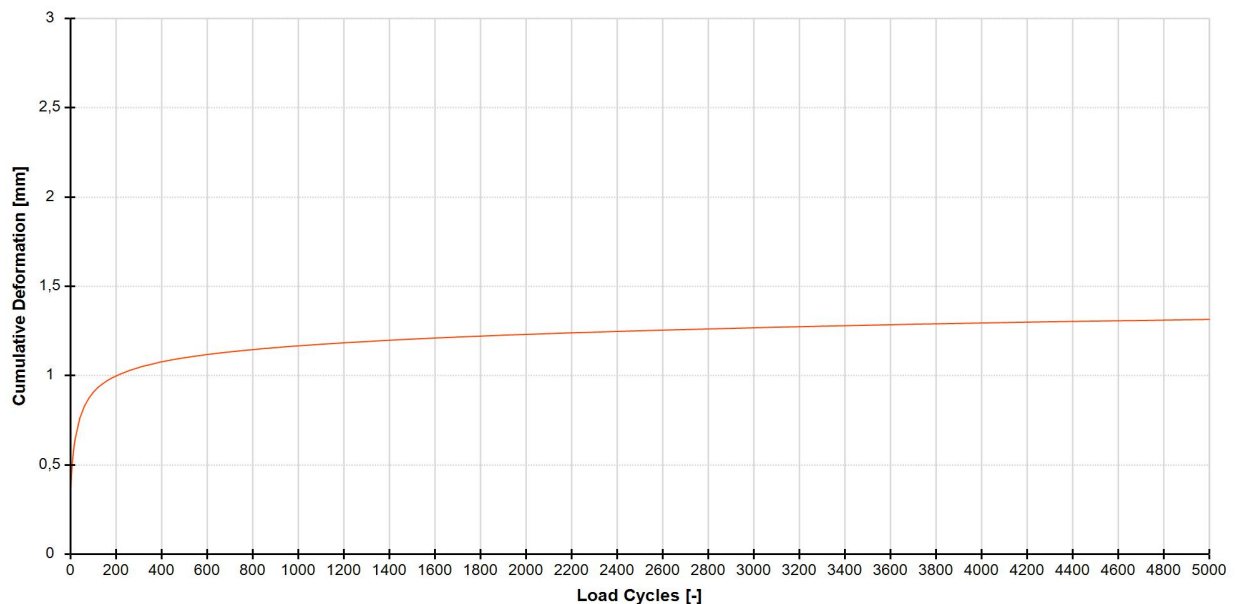
Lab Code	T818B	Production	Produced in lab
Mix Production	EN 12697-35		
Bulk Density	2,249 Mg/m ³ Method B		
Height	59,9 mm	Diameter	148,4 mm
Asphalt	Viacore AC 8		

Test Parameters

Temperature	40 °C		
Lower Stress Level	80 kPa	Upper Stress Level	350 kPa
Loading Duration	(0,2 ± 0,005) s	Rest Period	(1,5 ± 0,05) s

Test Results

Cumulative deformation after 2,500 load cycles ($U_{2500,max}$)	1,3 mm
Cumulative deformation after 5.000 load cycles ($U_{5000,max}$)	1,3 mm



**Test Report: Resistance to permanent deformation - Uniaxial
 Cyclic Compression Test (UCCT) - Sinusoidal loading**
**P526
 Page 1 von 1**

Client	Österreichische Vialit GmbH
Date	31.01.2018
Project	17435
Project Manager	David Valentin
Tester	Mariyan Dimitrov
Standard	EN 12697-25, Version 2016

Sample Data

Lab Code	T818C	Production	Produced in lab
Mix Production	EN 12697-35		
Bulk Density	2,217 Mg/m ³ Method B		
Height	60,7 mm	Diameter	148,7 mm
Asphalt	Viacore AC 8		

Test Parameters

Temperature	50 °C		
Lower Stress Level	80 kPa	Upper Stress Level	350 kPa
Loading Duration	(0,2 ± 0,005) s	Rest Period	(1,5 ± 0,05) s

Test Results

Cumulative deformation after 2,500 load cycles (U_{2500,max})	1,7 mm
Cumulative deformation after 5.000 load cycles (U_{5000,max})	1,8 mm

