

**Materialprüfungsanstalt  
Universität Stuttgart**  
P.O. Box 80 11 40  
70511 Stuttgart  
Germany

**MPA** **MPA STUTTGART**  
**Otto-Graf-Institut**  
Materialprüfungsanstalt Universität Stuttgart

# Investigation Report

Client: Porplastic  
Sportbau von Cramm GmbH & Co. KG  
Hohenneuffenstraße 14  
72622 Nürtingen  
Germany

Order-No. (Client):

Order-No. (MPA): **901 7127 000-56 /Kf/Sc**

Test Item: **Point-elastic sports floors  
Product line "PORPLASTIC PEL basic"**

Specification Applied: DIN V 18032-2:2001-04

Date of Receipt of Test Item 05-07-2009

Date of Test: beginning 05-12-2009

Date of Report: 07-29-2009

Page 1 of 7 text pages

Enclosures : 4

Supplements:

Total Number of Pages: 11

Number of Reports: 2 x Porplastic (1 Original, 1 copy)

The test results relate only to the items tested.

Publication of this report in full or partly is only allowed with written authorization by MPA University of Stuttgart.

## **1 Purpose of investigation**

We have been commissioned by Porplastic Sportbau von Cramm GmbH & Co. KG, Nürtingen, with tests on the point-elastic sports floors of the product line „**PORPLASTIC PEL basic**“ according to DIN V 18032-2:2001-04.

For the tests on 05-07-2009 we got samples with the following dimensions 1,0 m x 1,0 m with a T-joint in the elastic layer.

Testing date: beginning 05-12-2009

## **2 Construction of the sports floor**

**Top layer** approx 2,0 mm PUR-coating material with PUR-sealing

**Elastic layer** approx. x mm PUR-bound rubber granules/-fibres

a) **PORPLASTIC PEL basic 4+2**  
(thickness of the elastic layer approx. 4 mm)

b) **PORPLASTIC PEL basic 6+2**  
(thickness of the elastic layer approx. 6 mm)

c) **PORPLASTIC PEL basic 7+2**  
(thickness of the elastic layer approx. 7 mm)

d) **PORPLASTIC PEL basic 9+2**  
(thickness of the elastic layer approx. 9 mm)

bulk density <sup>1)</sup> : approx. 810 kg/m<sup>3</sup>

compression  
modulus <sup>2)</sup> : approx. 0,94 N/mm<sup>2</sup>

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<sup>1)</sup> Determined according to DIN 53 420

<sup>2)</sup> Determined in accordance with DIN 53 577 (compression 20 %, testing speed 2 x thickness of the elastic layer in mm/min)

### **3 Testing procedure**

The test were carried out according DIN V 18032-2:2001-04

The procedures applied which are accredited according to DIN EN ISO/IEC 17025:2005 (DAR-registration-no. DAP-PL-2907.07) are signed with <sup>®</sup>.

Testing conditions: 23-50-2 according to DIN 50014 (if otherwise not stated).

System testing spot 1 was places over a T-joint of the elastic layer, system testing spot 2 over a length joint of the elastic layer and system testing spot 3 over a face joint of the elastic layer. The other testing spots 4 and 5 were placed in the area.

### **4 Test results**

In the following tables the min. and max. values of the test results are summarized and as a comparison the requirements in DIN V 18032-2:2001-04 are tabulated.

The individual test results are tabulated in the enclosures 1 – 4.

**Table 1: Test results (average) and comparison with the requirements of  
DIN V 18032-2:2001-04  
a) PORPLASTIC PEL basic 4+2**

Tests according to DIN V 18 032-2:2001 04	Test results		Requirements according to DIN V 18 032-2:2001-04
	min. value	max. value	
Force reduction FR <sub>55</sub>	17 %	---	category 1: min. 51 % category 2: min. 45 %
Vertical deformation VD	--	0,7 mm	category 1: max. 3,5 mm category 2: max. 3,0 mm
Thickness factor TF	5,7	---	min. 4,0

**Table 1: Test results (average) and comparison with the requirements of  
DIN V 18032-2:2001-04 (continuation)  
a) PORPLASTIC PEL basic 4+2**

Tests according to DIN V 18 032-2:2001 04		Test results		Requirements according to DIN V 18 032-2:2001-04
		min. value	max. value	
Area deflection $w_{100}$	I	--	0 %	max. single value: 0 %
	II	--	0 %	
	III	--	0 %	
	IV	--	0 %	
Behaviour under a rolling load - axle load without damage - BRL		1000 N	--	1000 N
Impact resistance at 10 °C	IR	14 Nm	--	min. 8 Nm
Residual impression	RE	--	0,25 mm	max. 0,5 mm
Ball rebound	BR	98 %	--	min. 90 %
Sliding properties <sup>1)</sup>	SP	0,42	0,47	min. 0,4; max. 0,6

<sup>1)</sup> new, not treated with any cleaning materials

**Table 2: Test results (average) and comparison with the requirements of  
DIN V 18032-2:2001-04  
b) PORPLASTIC PEL basic 6+2**

Tests according to DIN V 18 032-2:2001 04		Test results		Requirements according to DIN V 18 032-2:2001-04
		min. value	max. value	
Force reduction	FR <sub>55</sub>	23 %	---	category 1: min. 51 % category 2: min. 45 %
Vertical deformation	VD	--	0,9 mm	category 1: max. 3,5 mm category 2: max. 3,0 mm
Thickness factor	TF	6,7	---	min. 4,0
Area deflection w <sub>100</sub>	I	--	0 %	max. single value: 0 %
	II	--	0 %	
	III	--	0 %	
	IV	--	0 %	
Behaviour under a rolling load - axle load without damage - BRL		1000 N	--	1000 N
Impact resistance at 10 °C	IR	13 Nm	--	min. 8 Nm
Residual impression	RE	--	0,31 mm	max. 0,5 mm
Ball rebound	BR	98 %	--	min. 90 %
Sliding properties <sup>1)</sup>	SP	0,42	0,47	min. 0,4; max. 0,6

<sup>1)</sup> new, not treated with any cleaning materials

**Table 3: Test results (average) and comparison with the requirements of  
DIN V 18032-2:2001-04  
c) PORPLASTIC PEL basic 7+2**

Tests according to DIN V 18 032-2:2001 04		Test results		Requirements according to DIN V 18 032-2:2001-04
		min. value	max. value	
Force reduction	FR <sub>55</sub>	25 %	---	category 1: min. 51 % category 2: min. 45 %
Vertical deformation	VD	--	1,0 mm	category 1: max. 3,5 mm category 2: max. 3,0 mm
Thickness factor	TF	7,0	---	min. 4,0
Area deflection w <sub>100</sub>	I	--	0 %	max. single value: 0 %
	II	--	0 %	
	III	--	0 %	
	IV	--	0 %	
Behaviour under a rolling load - axle load without damage - BRL		1000 N	--	1000 N
Impact resistance at 10 °C	IR	12 Nm	--	min. 8 Nm
Residual impression	RE	--	0,32 mm	max. 0,5 mm
Ball rebound	BR	98 %	--	min. 90 %
Sliding properties <sup>1)</sup>	SP	0,42	0,47	min. 0,4; max. 0,6

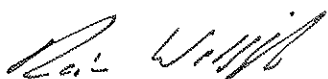
<sup>1)</sup> new, not treated with any cleaning materials

**Table 4: Test results (average) and comparison with the requirements of  
DIN V 18032-2:2001-04  
d) PORPLASTIC PEL basic 9+2**

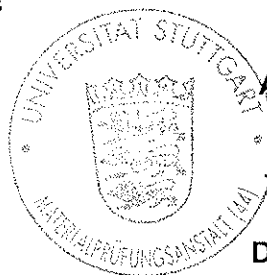
Tests according to DIN V 18 032-2:2001 04		Test results		Requirements according to DIN V 18 032-2:2001-04
		min. value	max. value	
Force reduction	FR <sub>55</sub>	30 %	---	category 1: min. 51 % category 2: min. 45 %
Vertical deformation	VD	--	1,1 mm	category 1: max. 3,5 mm category 2: max. 3,0 mm
Thickness factor	TF	8,2	---	min. 4,0
Area deflection w <sub>100</sub>	I	--	0 %	max. single: 0 %
	II	--	0 %	
	III	--	0 %	
	IV	--	0 %	
Behaviour under a rolling load - axle load without damage - BRL		1000 N	--	1000 N
Impact resistance at 10 °C	IR	10 Nm	--	min. 8 Nm
Residual impression	RE	--	0,35 mm	max. 0,5 mm
Ball rebound	BR	97 %	--	min. 90 %
Sliding properties <sup>1)</sup>	SP	0,42	0,47	min. 0,4; max. 0,6

<sup>1)</sup> new, not treated with any cleaning materials

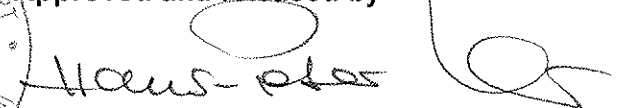
Prepared by



**Dipl.-Ing. Rainer Wellhäußer  
Tester**



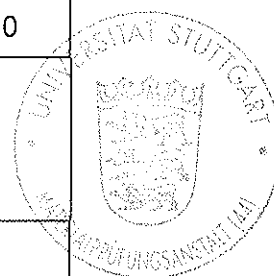
Approved and released by



**Dipl.-Ing. Hans-Peter Knauf  
Section leader „Sports floors, sports facilities“**

**Table 5: Individual test results  
a) PORPLASTIC PEL basic 4+2**

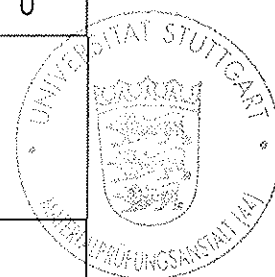
Test			System testing spot				
			1	2	3	4	5
Force reduction	FR <sub>22</sub>	%	17	18	18	17	18
	FR <sub>55</sub>	%	--	--	--	--	--
	FR <sub>88</sub>	%	--	--	--	--	--
Vertical deformation	VD	mm	0,6	0,7	0,7	0,7	0,7
Thickness factor	TH	-	6,7	5,7	5,7	5,7	5,7
area deflection	W <sub>100I</sub>	%	0	0	0	0	0
	W <sub>100II</sub>	%	0	0	0	0	0
	W <sub>100III</sub>	%	0	0	0	0	0
	W <sub>100IV</sub>	%	0	0	0	0	0
Behaviour under a rolling load - axle load without damage -	BRL	N	1000				
Impact resistance							
at 10 °C	SF <sub>new</sub>	Nm	15	16	16	15	15
	SF <sub>old</sub>	Nm	14	14	15	14	14
at 15 °C	SF <sub>new</sub>	Nm	16	15	17	15	15
at 23 °C	SF <sub>new</sub>	Nm	17	17	18	16	14
Residual impression	RI	mm	0,23	0,25	0,23	0,24	0,24
Ball rebound	BR	%	99	99	99	99	98
Sliding properties	SP	-	0,42	0,47	0,43	0,45	0,43





**Table 6: Individual test results  
b) PORPLASTIC PEL basic 6+2**

Test			System testing spot				
			1	2	3	4	5
Force reduction	FR <sub>22</sub>	%	24	23	24	24	24
	FR <sub>55</sub>	%	--	--	--	--	--
	FR <sub>88</sub>	%	--	--	--	--	--
Vertical deformation	VD	mm	0,8	0,8	0,8	0,8	0,9
Thickness factor	TH	-	6,7	7,5	7,5	6,7	7,5
area deflection	W <sub>100I</sub>	%	0	0	0	0	0
	W <sub>100II</sub>	%	0	0	0	0	0
	W <sub>100III</sub>	%	0	0	0	0	0
	W <sub>100IV</sub>	%	0	0	0	0	0
Behaviour under a rolling load - axle load without damage -			1000				
	BRL	N					
Impact resistance							
at 10 °C	SF <sub>new</sub>	Nm	15	15	14	15	15
	SF <sub>old</sub>	Nm	14	14	13	14	14
at 15 °C	SF <sub>new</sub>	Nm	16	16	15	16	16
at 23 °C	SF <sub>new</sub>	Nm	17	17	17	17	17
Residual impression	RI	mm	0,29	0,29	0,32	0,30	0,31
Ball rebound	BR	%	98	98	98	99	98
Sliding properties	SP	-	0,42	0,45	0,44	0,47	0,43



**Table 7: Individual test results  
c) PORPLASTIC PEL basic 7+2**

Test			System testing spot				
			1	2	3	4	5
Force reduction	FR <sub>22</sub>	%	26	25	25	26	26
	FR <sub>55</sub>	%	--	--	--	--	--
	FR <sub>88</sub>	%	--	--	--	--	--
Vertical deformation	VD	mm	0,9	0,9	0,9	1,0	0,9
Thickness factor	TH	-	7,0	7,8	7,8	7,0	7,0
area deflection	W <sub>100I</sub>	%	0	0	0	0	0
	W <sub>100II</sub>	%	0	0	0	0	0
	W <sub>100III</sub>	%	0	0	0	0	0
	W <sub>100IV</sub>	%	0	0	0	0	0
Behaviour under a rolling load - axle load without damage -	BRL	N	1000				
Impact resistance							
at 10 °C	SF <sub>new</sub>	Nm	13	14	13	13	14
	SF <sub>old</sub>	Nm	12	12	12	12	13
at 15 °C	SF <sub>new</sub>	Nm	14	15	14	14	15
at 23 °C	SF <sub>new</sub>	Nm	15	16	15	16	16
Residual impression	RI	mm	0,32	0,32	0,30	0,32	0,31
Ball rebound	BR	%	98	98	98	98	98
Sliding properties	SP	-	0,42	0,45	0,44	0,47	0,43

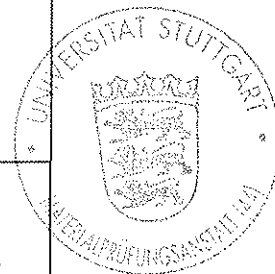


Table 8: Individual test results  
d) PORPLASTIC PEL basic 9+2

Test			System testing spot				
			1	2	3	4	5
Force reduction	FR <sub>22</sub>	%	31	30	31	30	31
	FR <sub>55</sub>	%	--	--	--	--	--
	FR <sub>88</sub>	%	--	--	--	--	--
Vertical deformation	VD	mm	1,0	1,1	0,9	1,0	1,0
Thickness factor	TH	-	9,0	10,0	8,2	9,0	9,0
area deflection	W <sub>100I</sub>	%	0	0	0	0	0
	W <sub>100II</sub>	%	0	0	0	0	0
	W <sub>100III</sub>	%	0	0	0	0	0
	W <sub>100IV</sub>	%	0	0	0	0	0
Behaviour under a rolling load - axle load without damage -	BRL	N	1000				
Impact resistance							
at 10 °C	SF <sub>new</sub>	Nm	12	12	12	12	11
	SF <sub>old</sub>	Nm	10	11	11	10	10
at 15 °C	SF <sub>new</sub>	Nm	13	13	13	13	12
at 23 °C	SF <sub>new</sub>	Nm	13	15	15	14	14
Residual impression	RI	mm	0,34	0,35	0,32	0,33	0,34
Ball rebound	BR	%	98	97	97	98	98
Sliding properties	SP	-	0,42	0,45	0,44	0,47	0,43

