



Report 49828 Test Report

Applicant

Kaindl Flooring GmbH
Walser Weg 12
A-5071 WALS / SALZBURG

Reference

Mr. Ruhdorfer

Application

Determination of the coefficient of friction according to ÖNORM EN 13893

Test Material

laminare flooring

Material used in testing was anonymized for laboratory purposes. A detailed sample list is contained in the report.

Issuing and Signatures

Number of pages contained: 16

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Translation 2005-08-02

Responsible for testing,
Ing. Hannes Vittek

Responsible for technical group, authorized to sign,
Ing. Hanspeter Bauer

Director,
Dipl.-Ing. Dr. Erich Zippel





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1 Order

1.1 Chronology

<i>Date</i>	<i>Received</i>	<i>Order</i>
2005-08-01	2005-08-01	Determination of the coefficient of friction according to ÖNORM EN 13893

1.2 Samples

<i>No.</i>	<i>Received</i>	<i>Sample Identification</i>	<i>Sample Material</i>
1	2004-08-25 ⁽¹⁾	laminat flooring "ST"	1 piece 133x33 cm
2	2004-08-25 ⁽¹⁾	laminat flooring "AH"	1 piece 133x33 cm
3	2004-08-25 ⁽¹⁾	laminat flooring "SS"	1 piece 133x33 cm
4	2004-08-25 ⁽¹⁾	laminat flooring "SC"	1 piece 133x33 cm
5	2004-08-25 ⁽¹⁾	laminat flooring "BG"	1 piece 133x33 cm
6	2004-08-25 ⁽¹⁾	laminat flooring "SP"	1 piece 138x19 cm
7	2004-08-25 ⁽¹⁾	laminat flooring "FL"	1 piece 140x20 cm
8	2004-08-25 ⁽¹⁾	laminat flooring "MO"	1 piece 138x19 cm
9	2004-08-25 ⁽¹⁾	laminat flooring "BS"	1 piece 140x20 cm

(1) Samples provided by the customer. (2) Sample drawn by ÖTI.

2 Findings / Tests performed

2.1 Description and designation of the Sample Material

The Test Materials are laminate floorings according to ÖNORM 13329, with different surface remarks.

Sample Material	Kaindl Flooring surface structure
1	ST
2	AH
3	SS
4	SC
5	BG
6	SP
7	FL
8	MO
9	BS

2.2 Determination of the coefficient of friction in dry condition

Test conditions

According to ÖNORM EN 13893

Test apparatus: GMG 100

Sliding material: Building group consisting of 2 leather and 1 shoe rubber glider.

Number of measurements: 5 each, evaluation is taken only from measurements 3-5

Test climate: 20 ± 2 °C, 65 ± 5 % relative air humidity

Deviation from the standard: In lack of sufficient material the measurements were accomplished only in length direction.

Test results

Tested sample: 1 (ST)

Measurement	coefficient of friction (μ)	
	Length direction	Cross direction
3	0,47	--
4	0,46	--
5	0,46	--
Mean value	0,46	--



Tested sample: 2 (AH)

Measurement	coefficient of friction (μ)	
	Length direction	Cross direction
3	0,42	--
4	0,42	--
5	0,39	--
Mean value	0,41	--

Tested sample: 3 (SS)

Measurement	coefficient of friction (μ)	
	Length direction	Cross direction
3	0,52	--
4	0,53	--
5	0,52	--
Mean value	0,52	--

Tested sample: 4 (SC)

Measurement	coefficient of friction (μ)	
	Length direction	Cross direction
3	0,56	--
4	0,49	--
5	0,47	--
Mean value	0,51	--

Tested sample: 5 (BG)

Measurement	coefficient of friction (μ)	
	Length direction	Cross direction
3	0,56	--
4	0,56	--
5	0,55	--
Mean value	0,56	--

Tested sample: 6 (SP)

Measurement	coefficient of friction (μ)	
	Length direction	Cross direction
3	0,54	--
4	0,52	--
5	0,53	--
Mean value	0,53	--



Tested sample: 7 (FL)

Measurement	coefficient of friction (μ)	
	Length direction	Cross direction
3	0,58	--
4	0,51	--
5	0,52	--
Mean value	0,54	--

Tested sample: 8 (MO)

Measurement	coefficient of friction (μ)	
	Length direction	Cross direction
3	0,32	--
4	0,32	--
5	0,32	--
Mean value	0,32	--

Tested sample: 9 (BS)

Measurement	coefficient of friction (μ)	
	Length direction	Cross direction
3	0,58	--
4	0,54	--
5	0,57	--
Mean value	0,56	--

2.3 Summary of Results

Sample Material	Kaindl Flooring surface structure	middle coefficient of friction (μ)	
		Length direction	Cross direction
1	ST	0,46	-
2	AH	0,41	-
3	SS	0,52	-
4	SC	0,51	-
5	BG	0,56	-
6	SP	0,53	-
7	FL	0,54	-
8	MO	0,32	-
9	BS	0,56	-

3 Evaluation

The judgement of the coefficient of friction as criteria for the safety in walking is based on the experiences in the institute and the published technical literature. The following estimation scheme, based on the "Wuppertaler Gleitreibungsskala" is only valid for a "straight normal walk".

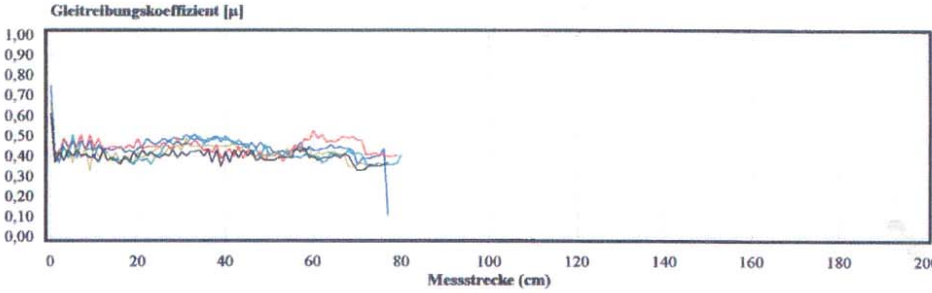
coefficient of friction (μ)	assessment
< 0,21	extremely unsafe
0,22 – 0,29	unsafe
0,30 – 0,42	partly safe
0,43 – 0,63	safe
> 0,64	extremely safe



4 Evaluation protocols / Diagramms

		GMG - Auswertung (c) GTE	
mit Gleitmessgerät Typ GMG - 100SC GMG Seriennr.: 5044725 Letzte Kalibrierung: 19.05.2003 Betreiber des Bodens: _____ Einsatzort: _____ Bodendaten: Bauart: ST Hersteller: Kaindl Baujahr: 2004 Belagart: Laminat Benutzungsart: 21,6°C/30% Messbedingungen: trocken Sonstiges: 46828; tr.mes Sonstiges: NG.250804			
Gleitreibungskoeffizient [μ] Messstrecke (cm)			
Scan Nr.	Mw. Gleitr.	Temperatur rel. Feuchte Slidermaterial Scangültigkeit	
— 1	0,48		gültig
— 2	0,47		gültig
— 3	0,47		gültig
— 4	0,46		gültig
— 5	0,46		gültig
Flächendruck		8,67 N/cm ²	
Mittelwert Scan 3-5		0,46	
Prüfer: <i>Wolfgang Gelhaus</i>		Österreichisches Textil-Forschungsinstitut A-1050 Wien, Spengergasse 20 Tel: +43 1 544 25 43-0 (Firmenstempel und Unterschrift)	
Datum: 26.08.06			



		GMG - Auswertung (c) GTE			
mit Gleitmessgerät Typ GMG - 100SC					
GMG Seriennr.:	5044725	Letzte Kalibrierung: 19.05.2003			
Betreiber des Bodens:					
Einsatzort:					
Bodendaten:					
Bauart:	AH				
Hersteller:	Kaindl				
Baujahr:	2004				
Belagart:	Laminat				
Benutzungsart:	21,6°C/30%				
Messbedingungen:	trocken				
Sonstiges:	46828; tr.mes				
Sonstiges:	NG.250804				
					
Scan Nr.	Mw. Gleitr.	Temperatur	rel. Feuchte	Slidermaterial	Scangültigkeit
— 1	0,45				gültig
— 2	0,44				gültig
— 3	0,42				gültig
— 4	0,42				gültig
— 5	0,39				gültig
Flächendruck		8,67 N/cm²			
Mittelwert Scan 3-5		0,41			
Prüfer: <i>Wolfgang G. G. G.</i>		Datum: <i>26 08 04</i>		Österreichisches Textil-Forschungsinstitut A-1050 Wien, Spengergasse 20 Tel. +43 (0) 1 544 25 43-0 (Firmenstempel und Unterschrift)	

**GMG - Auswertung**
(c) GTE

mit Gleitmessgerät Typ GMG - 100SC

GMG Seriennr.: 5044725

Letzte Kalibrierung: 19.05.2003

Betreiber des Bodens:

Einsatzort:

Bodendaten:

Bauart: SS

Hersteller: Kaindl

Baujahr: 2004

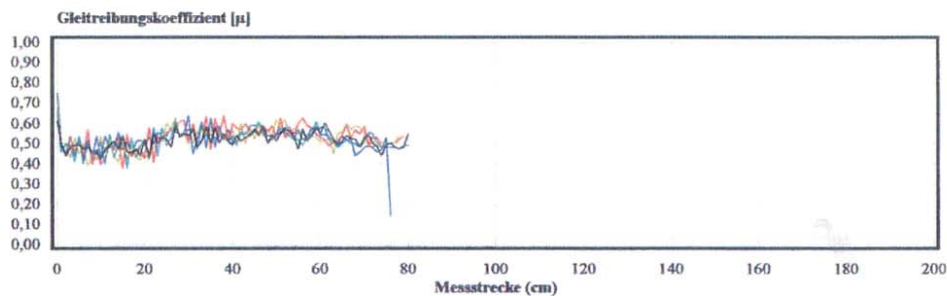
Belagart: Laminat

Benutzungsart: 21,6°C/30%

Messbedingungen: trocken

Sonstiges: 46828; tr.mes

Sonstiges: NG.250804



Scan Nr.	Mw. Gleitr.	Temperatur	rel. Feuchte	Slidermaterial	Scangültigkeit
— 1	0,53				gültig
— 2	0,54				gültig
— 3	0,52				gültig
— 4	0,53				gültig
— 5	0,52				gültig

Flächendruck**8,67 N/cm²****Mittelwert Scan 3-5****0,52**

Prüfer:

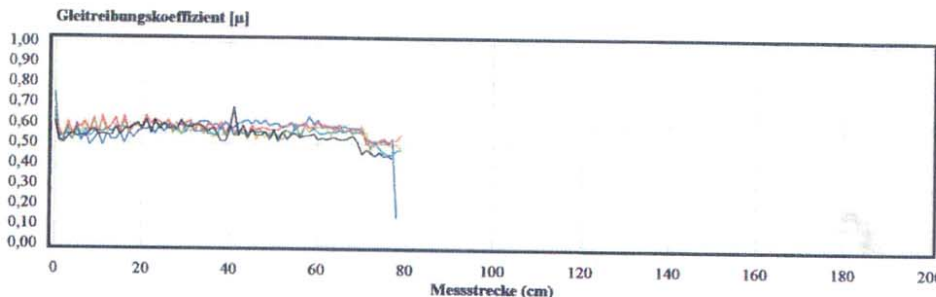
Datum:

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Tel. +43 1 544 25 43-0
(Firmenstempel und Unterschrift)



		GMG - Auswertung (c) GTE			
mit Gleitmessgerät Typ GMG - 100SC					
GMG Seriennr.:	5044725	Letzte Kalibrierung: 19.05.2003			
Betreiber des Bodens:					
Einsatzort:					
Bodendaten:					
Bauart:	SC				
Hersteller:	Kaindl				
Baujahr:	2004				
Belagart:	Laminat				
Benutzungsart:	21,6°C/30%				
Messbedingungen:	trocken				
Sonstiges:	46828; tr.mes				
Sonstiges:	NG.250804				
Gleitreibungskoeffizient [μ] Messstrecke (cm)					
Scan Nr.	Mw. Gleitr.	Temperatur	rel. Feuchte	Slidermaterial	Scangültigkeit
1	0,58				gültig
2	0,57				gültig
3	0,56				gültig
4	0,49				gültig
5	0,47				gültig
Flächendruck		8,67 N/cm ²			
Mittelwert Scan 3-5		0,51			
		Prüfer: <i>Walter Gerold</i> Österreichisches Datum: <i>26.08.04</i> Textil-Forschungsinstitut A-1050 Wien, Spengergasse 20 Tel. +43 (0) 1 504 23 43-0 (Firmenstempel und Unterschrift)			



		GMG - Auswertung (c) GTE
mit Gleitmessgerät Typ GMG - 100SC		
GMG Seriennr.:	5044725	Letzte Kalibrierung: 19.05.2003
Betreiber des Bodens:		
Einsatzort:		
Bodendaten:		
Bauart:	BG	
Hersteller:	Kaindl	
Baujahr:	2004	
Belagart:	Laminat	
Benutzungsart:	21,6°C/30%	
Messbedingungen:	trocken	
Sonstiges:	46828; tr.mes	
Sonstiges:	NG.250804	
		
Scan Nr.	Mw. Gleitr.	Temperatur rel. Feuchte Slidermaterial Scangültigkeit
— 1	0,58	gültig
— 2	0,58	gültig
— 3	0,56	gültig
— 4	0,56	gültig
— 5	0,55	gültig
Flächendruck		8,67 N/cm ²
Mittelwert Scan 3-5		0,56
Prüfer: <i>Wolfgang Gehring</i>		Osterreichisches Textil-Forschungsinstitut A-1050 Wien, Spengergasse 20 Tel. +43 1 514 22 43-0 (Firmenstempel und Unterschrift)
Datum: <i>26.08.04</i>		



		GMG - Auswertung (c) GTE			
mit Gleitmessgerät Typ GMG - 100SC					
GMG Seriennr.:	5044725	Letzte Kalibrierung: 19.05.2003			
Betreiber des Bodens:					
Einsatzort:					
Bodendaten:					
Bauart:	SP				
Hersteller:	Kaindl				
Baujahr:	2004				
Belagart:	Laminat				
Benutzungsart:	21,6°C/30%				
Messbedingungen:	trocken				
Sonstiges:	46828; tr.mes				
Sonstiges:	NG.250804				
Gleitreibungskoeffizient [μ] Messstrecke (cm)					
Scan Nr.	Mw. Gleitr.	Temperatur	rel. Feuchte	Slidermaterial	Scangültigkeit
— 1	0,59				gültig
— 2	0,59				gültig
— 3	0,54				gültig
— 4	0,52				gültig
— 5	0,53				gültig
Flächendruck		8,67 N/cm²			
Mittelwert Scan 3-5		0,53			
		Prüfer: <i>Stefan Gehard</i> Österreichisches Datum: <i>16.08.06</i> Textil-Forschungsinstitut A-1050 Wien, Spengergasse 20 Tel. +43 1 644 75 48-0 (Firmenstempel und Unterschrift)			



		GMG - Auswertung (c) GTE			
mit Gleitmessgerät Typ GMG - 100SC					
GMG Seriennr.:	5044725	Letzte Kalibrierung: 19.05.2003			
Betreiber des Bodens:					
Einsatzort:					
Bodendaten:					
Bauart:	FL				
Hersteller:	Kaindl				
Baujahr:	2004				
Belagart:	Laminat				
Benutzungsart:	21,6°C/30%				
Messbedingungen:	trocken				
Sonstiges:	46828; tr.mes				
Sonstiges:	NG.250804				
Gleitreibungskoeffizient [μ]					
Messstrecke (cm)					
Scan Nr.	Mw. Gleitr.	Temperatur	rel. Feuchte	Slidermaterial	Scangültigkeit
— 1	0,62				gültig
— 2	0,61				gültig
— 3	0,58				gültig
— 4	0,51				gültig
— 5	0,52				gültig
Flächendruck		8,67 N/cm ²			
Mittelwert Scan 3-5		0,54			
Prüfer:		Österreichisches Textil-Forschungsinstitut			
Datum:		A-1050 Wien, Spengergasse 20 Tel. +43 1 544 25 43-0 (Firmenstempel und Unterschrift)			



		GMG - Auswertung (c) GTE			
mit Gleitmessgerät Typ GMG - 100SC					
GMG Seriennr.:	5044725	Letzte Kalibrierung: 19.05.2003			
Betreiber des Bodens:					
Einsatzort:					
Bodendaten:					
Bauart:	MO				
Hersteller:	Kaindl				
Baujahr:	2004				
Belagart:	Laminat				
Benutzungsart:	21,6°C/30%				
Messbedingungen:	trocken				
Sonstiges:	46828; tr.mes				
Sonstiges:	NG.250804				
Scan Nr.	Mw. Gleitr.	Temperatur	rel. Feuchte	Slidermaterial	Scangültigkeit
— 1	0,31				gültig
— 2	0,32				gültig
— 3	0,32				gültig
— 4	0,32				gültig
— 5	0,32				gültig
Flächendruck		8,67 N/cm²			
Mittelwert Scan 3-5		0,32			
		Prüfer: <i>Wolfgang Gebauer</i>			
		Datum: 26.08.04			
		Österreichisches Textil-Forschungsinstitut A-1050 Wien, Schenkerplatz 20 Tel. +43 1 544 25 43 0 (Firmenstempel und Unterschrift)			

**GMG - Auswertung**
(c) GTE

mit Gleitmessgerät Typ GMG - 100SC

GMG Seriennr.: 5044725

Letzte Kalibrierung: 19.05.2003

Betreiber des Bodens:

Einsatzort:

Bodendaten:

Bauart: BS

Hersteller: Kaindl

Baujahr: 2004

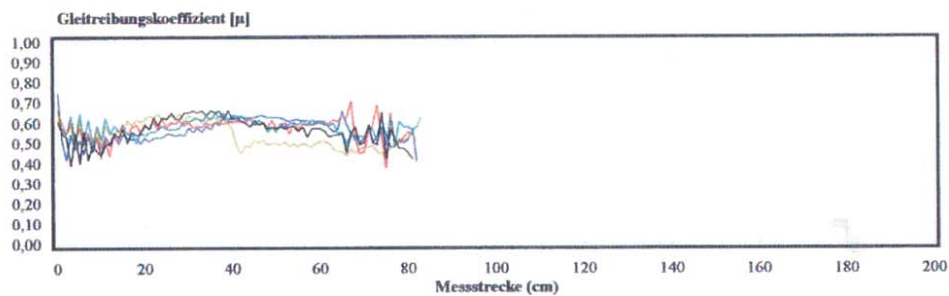
Belagart: Laminat

Benutzungsart: 21,6°C/30%

Messbedingungen: trocken

Sonstiges: 46828; tr.mes

Sonstiges: NG.250804



Scan Nr.	Mw. Gleitr.	Temperatur	rel. Feuchte	Slidermaterial	Scangültigkeit
— 1	0,57				gültig
— 2	0,58				gültig
— 3	0,58				gültig
— 4	0,54				gültig
— 5	0,57				gültig

Flächendruck8,67 N/cm²**Mittelwert Scan 3-5**

0,56

Prüfer:

Datum:

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Textil-Forschungsinstitut**
A-1050 Wien, Spargnergasse 20
Tel. +43 1 544 25 43 0
(Firmenstempel und Unterschrift)

5 Remarks

Sample Material

Results of performed tests only refer to the sample material provided.

Without explicit written other agreement testing is destructive and the sample material is transferred to the property of ÖTI, which is entitled to freely decide on storage and disposal.

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All tests and services are performed under a quality management system according to EN ISO 17025.

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End of Report



Report 50141 Test Report

Applicant

Kaindl Flooring GmbH
Kaindlstraße 2
5071 Wals / Salzburg
ÖSTERREICH

Reference

Mr. Ruhdorfer

Application

Measurement of dynamic coefficient of friction according to EN 13893.

Test Material

"Kaindl laminate flooring 37326 SL"; "Kaindl laminate flooring 37372 SA"

Material used in testing was anonymized for laboratory purposes. A detailed sample list is contained in the report.

Issuing and Signatures

Number of pages contained: 5

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Translation 2005-09-21

Responsible for testing,
Ing. Hannes Vittek

Responsible for technical group,
Ing. Hanspeter Bauer

Director, Dipl.-Ing. Dr. Erich Zippel





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2.5	Diagram	4
3	Remarks	5

1 Order

1.1 Chronology

Date	Received	Order
2005-08-29	2005-08-29	Measurement of dynamic coefficient of friction according to EN 13893.

1.2 Sample Material

No.	Received	Quantity	Description
1	2005-08-31 (1)	Laminate flooring 1 piece approx. 20x138cm	"Kaindl laminate flooring 37326 SL"
2	2005-08-31 (1)	Laminate flooring 1 piece approx. 20x138cm	"Kaindl laminate flooring 37372 SA"

(1) Samples provided by the customer. (2) Sample drawn by ÖTI.

2 Findings / Tests performed

2.1 Description of the specimen

The submitted specimen is a DPL laminate flooring with a HDF substrate according to EN 13329 with an insulating layer on the backside.

2.2 Measurement of dynamic coefficient of friction on dry floor surfaces

Test conditions

According to ÖNORM EN 13893

Test apparatus: GMG 100

Sliders: Group consisting of two leather- and one rubber-slider

Number of measurements: 5 each, evaluation is taken only from measurements 3-5

Test climate: 20 ± 2 °C / 65 ± 5 % relative air humidity

Deviation from the standard: The test was carried out only in the length direction of the panel in the supplied condition.

Test results

Tested sample: 1

Measurement	dynamic coefficient of friction (μ)	
	length direction	cross direction
3	0,49	--
4	0,52	--
5	0,51	--
Mean value	0,51	--

Dynamic coefficient of friction (μ): -- ¹⁾

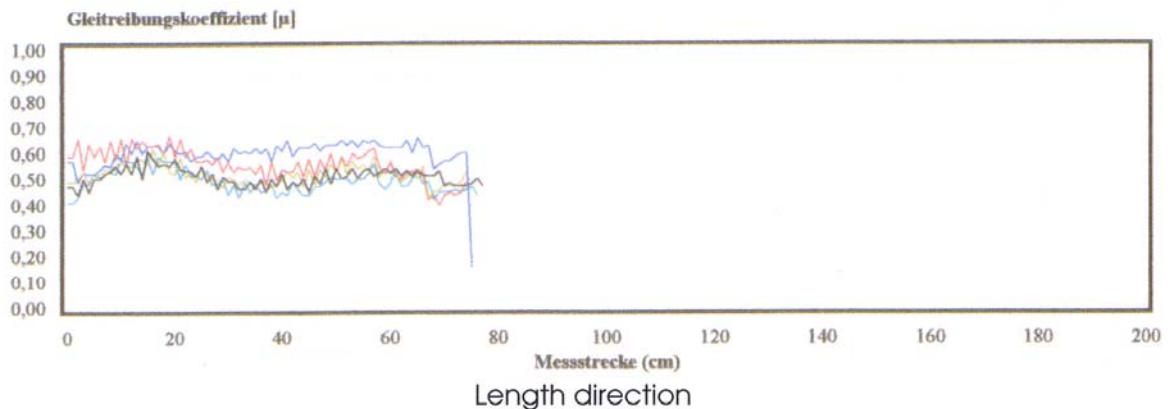
Note

¹⁾ The lower of the two results is authoritative for the assessment of the dynamic coefficient of friction.

The judgement of the dynamic coefficient of friction as criteria for the safety in walking is based on the experiences in the institute and the published technical literature. The following estimation scheme, based on the "Wuppertaler Gleitreibungsskala" is only valid for a "straight normal walk".

dynamic coefficient of friction (μ)	assessment
< 0,21	extremely unsafe
0,22 - 0,29	unsafe
0,30 - 0,42	partly safe
0,43 - 0,63	safe
> 0,64	extremely safe

2.3 Diagram





2.4 Measurement of dynamic coefficient of friction on dry floor surfaces

Test conditions

According to ÖNORM EN 13893

Test apparatus: GMG 100

Sliders: Group consisting of two leather- and one rubber-slider

Number of measurements: 5 each, evaluation is taken only from measurements 3-5

Test climate: 20 ± 2 °C / 65 ± 5 % relative air humidity

Deviation from the standard: The test was carried out only in the length direction of the panel in the supplied condition.

Test results

Tested sample: 2

Measurement	dynamic coefficient of friction (μ)	
	length direction	cross direction
3	0,58	--
4	0,53	--
5	0,57	--
Mean value	0,53	--

Dynamic coefficient of friction (μ): -- ¹⁾

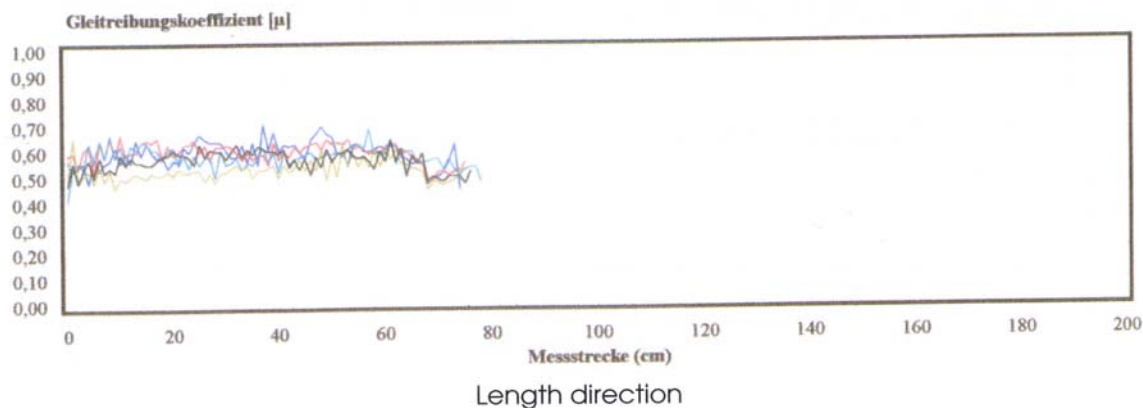
Note

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dynamic coefficient of friction (μ)	assessment
< 0,21	extremely unsafe
0,22 – 0,29	unsafe
0,30 – 0,42	partly safe
0,43 – 0,63	safe
> 0,64	extremely safe

2.5 Diagram





3 Remarks

Sample Material

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Quality management and accreditations

This issue replaces report 49193 dated 2005-06-06

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