



# Report 53473 Test Report

## Applicant

## Reference

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## Application

Determination of thickness and weight per unit area, and test of tensile stress-strain properties. Furthermore, verification of compliance of product with the "Technical Rules book of the International Powerlifting Federation".

## Test Material

Powerlifting costumes

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

## Issuing and Signatures

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# 1 Order

## 1.1 Chronology

<i>Date</i>	<i>Received</i>	<i>Order</i>
2006-10-04	2006-10-04	Determination of thickness and weight per unit area, and test of tensile stress-strain properties. Furthermore, verification of compliance of product with the "Technical Rules book of the International Powerlifting Federation".

## 1.2 Samples

<i>No.</i>	<i>Received</i>	<i>Sample Identification</i>	<i>Sample Material</i>
1	2006-10-04 (1)	"TRIKOT "Blast Shirt" Fa. Inzer"	Trikot, 1 piece.
2	2006-10-04 (1)	"TRIKOT "HPHD" Fa. Inzer"	Trikot, 1 piece.
3	2006-10-04 (1)	"TRIKOT "EHPhD" Fa. Inzer"	Trikot, 1 piece.
4	2006-10-04 (1)	"TRIKOT "RAGE" Fa. Inzer"	Trikot, 1 piece.
5	2006-10-04 (1)	"TRIKOT "RAGE X" Fa. Inzer"	Trikot, 1 piece.
6	2006-10-04 (1)	"TRIKOT "phenom" 48 Fa. Inzer"	Trikot, 1 piece.
7	2006-10-04 (1)	"TRIKOT "phenom" 56 Fa. Inzer"	Trikot, 1 piece.
8	2006-10-04 (1)	"TRIKOT "MURPHY" Fa. Murphy"	Trikot, 1 piece.
9	2006-10-04 (1)	"NXG" Fa. Titan	textile fabric, approx.1,5 running meter
10	2006-10-04 (1)	"NXG Plus" Fa. Titan	textile fabric, approx.1,5 running meter
11	2006-10-04 (1)	"NXG Super Plus" Fa. Titan	textile fabric, approx.1,5 running meter
12	2006-10-04 (1)	"Metal original" Fa. Metal	textile fabric, approx.1,5 running meter
13	2006-10-04 (1)	"Metal viking" Fa. Metal	textile fabric, approx.1,5 running meter
14	2006-10-04 (1)	"TRIKOT "F6"" Fa. Titan	Trikot, 1 piece.
15	2006-10-04 (1)	"TRIKOT "The Fury"" Fa. Titan	Trikot, 1 piece.
16	2006-10-04 (1)	"TRIKOT "KATANA"" Fa. Titan	Trikot, 1 piece.
17	2006-10-13 (1)	"TRIKOT "CRAIN'S Bench Shirt"" Fa. Crain	Trikot, 1 piece.

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



## 2 Findings / Tests performed

### 2.1 Determination of thickness of textiles and textile products

#### Test Conditions

Standard: DIN EN ISO 5084

Testing atmosphere:  $20 \pm 2$  °C/ $65 \pm 2$  % relative humidity

Number of tests: 5

Test area: 2500 mm<sup>2</sup>

Measuring pressure: 1 kPa

#### Test Results

tested sample:	Thickness		
	Mean value [mm]	Coefficient of variation [%]	Confidence interval (95%) [mm]
1	1,17	0,6	± 0,01
2	0,79	1,3	± 0,01
3	0,90	1,1	± 0,01
4	0,85	0,9	± 0,01
5	0,90	1,2	± 0,01
6	1,28	1,9	± 0,03
7	1,30	0,5	± 0,01
8	0,76	1,2	± 0,01
9	0,70	0,8	± 0,01
10	0,89	0,6	± 0,01
11	0,97	1,2	± 0,01
12	1,01	0,6	± 0,01
13	0,88	0,3	± 0,00
14	0,88	0,9	± 0,01
15	0,84	1,4	± 0,01
16	1,01	2,9	± 0,04
17	1,31	1,0	± 0,02



## 2.2 Determination of mass per unit area using small-sized specimens – standard atmosphere

### Test Conditions <sup>A</sup>

Standard: EN 12127

Testing atmosphere:  $20 \pm 2$  °C/ $65 \pm 2$  % relative humidity

Pre-treatment: none

Number of Specimens: sample 8: 1; all other samples: each 2

Deviation from standard: The test was carried out with a reduced number of samples due to insufficient sample material.

### Test Results

tested sample:	Mass per unit area				
	Mean value [g/m <sup>2</sup> ]	Coefficient of variation [%]	Confidence interval (95%) [mm]	Minimum value [g/m <sup>2</sup> ]	Maximum value [g/m <sup>2</sup> ]
1	259,7	0,3	1,0	259,1	260,2
2	277,0	0,6	1,9	275,9	278,1
3	291,6	0,6	2,1	290,4	292,8
4	377,9	0,2	1,1	377,3	378,5
5	405,0	0,9	4,7	402,3	407,7
6	552,8	0,3	1,8	551,7	553,8
7	576,1	0,2	1,7	575,1	577,0
8	282,5	---	---	---	---
9	294,2	0,2	0,7	293,8	294,6
10	385,9	0,1	0,4	385,7	386,1
11	474,0	0,0	0,2	473,9	474,1
12	342,0	0,2	0,9	341,5	342,5
13	333,1	0,4	1,6	332,2	334,0
14	398,4	0,2	1,2	397,7	399,1
15	393,6	1,0	4,8	390,8	396,3
16	487,0	0,3	2,1	485,8	488,2
17	601,2	0,9	6,4	597,5	604,8



## 2.3 Determination of maximum force – Grab methode

### Test Conditions

Standard: EN ISO 13934 Teil 2

Condition of specimens: conditioned (20 °C/65 % relative humidity)

Nominal gauge length: 100 mm

Rate of extension: 30 mm/min

Number of specimens: each 1 in longitudinal- and 1 in cross-direction

Deviation from standard: As ordered, each specimen was subjected to both a lengthwise and a crosswise test.

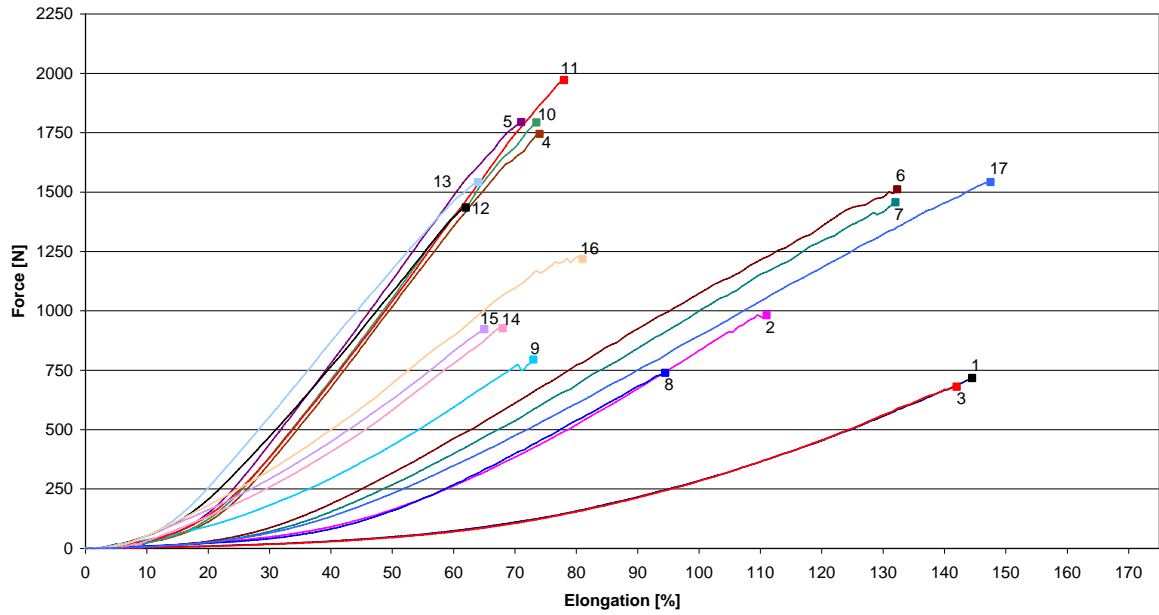
### Test results

tested sample:	Maximum force [N]	
	Longitudinal direction	Cross direction
1	716,7	534,8
2	981,9	781,9
3	680,6	815,0
4	1745,2	966,7
5	1795,5	982,9
6	1512,1	1132,2
7	1457,0	1339,9
8	738,7	650,4
9	794,7	1102,3
10	1793,5	937,7
11	1971,4	1187,6
12	1434,9	952,7
13	1542,1	709,4
14	963,2	1597,5
15	1068,0	1744,3
16	1438,8	2022,3
17	1541,9	1332,6

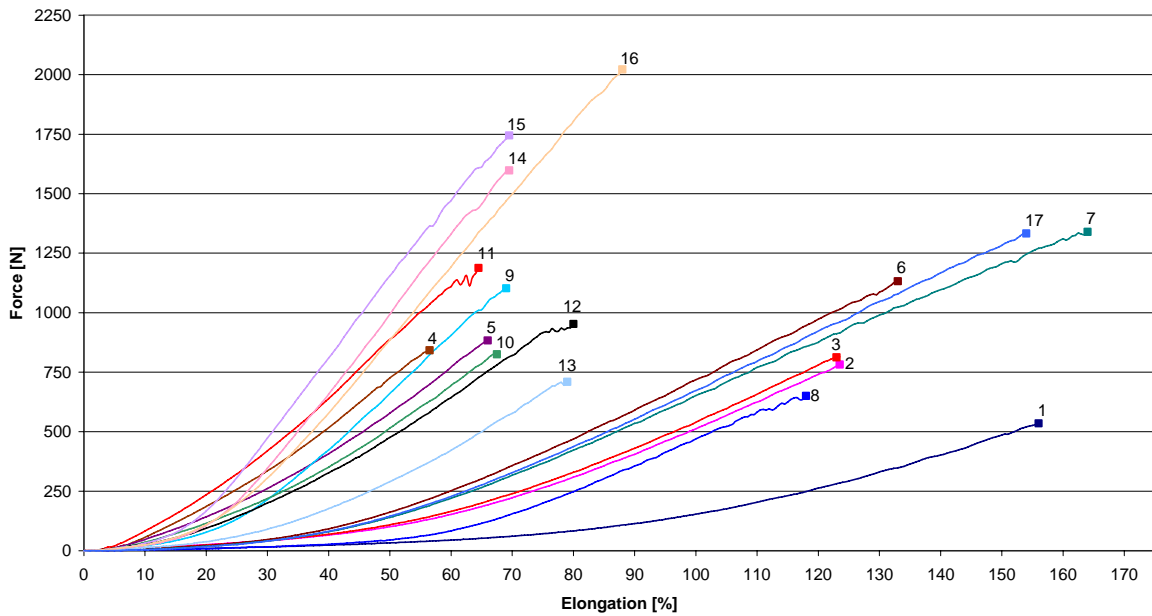


## 2.4 Stress-Strain Diagrams EN ISO 13934 Part 2

Samples in longitudinal direction

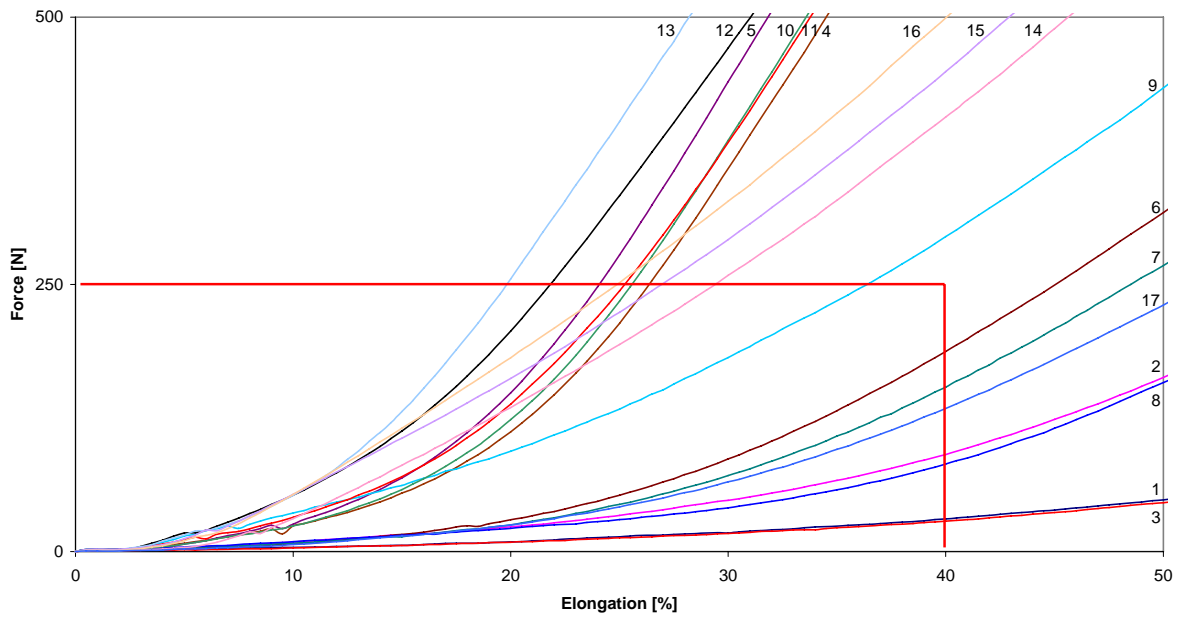


Samples in cross direction

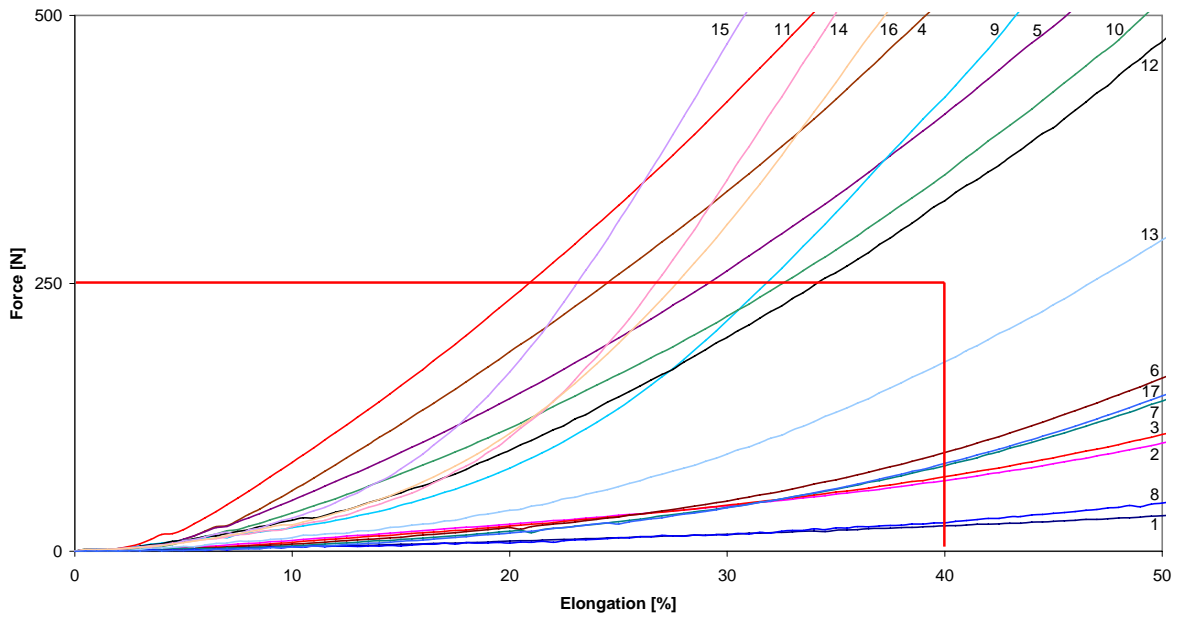




### Samples in longitudinal direction



### Samples in cross direction







## 2.5 Verification of compliance of product with the "Technical Rules book of the International Powerlifting Federation"

All submitted costumes were tested for conformity with the requirements on "T-Shirts/Supportive Shirts" and "Support Shirts" as laid out in the "Technical Rules book of the International Powerlifting Federation".

The result of the tests was that all costumes submitted conform to the above-mentioned requirements.

## 3 Evaluation

The submitted textiles are used as powerlifting gear. To ensure that the clothes do not enhance the athlete's performance excessively, the products will, in future, be required to exhibit a certain minimum elasticity.

On the basis of the tensile stress-strain tests conducted using the grab method in accordance with EN ISO 13934 Part 2, the following requirements are recommended:

- ♦ Elasticity: 40% minimum
- ♦ Force at 40% distension: 250 N

Furthermore, it is recommended that the costumes not be distended by more than 10% when worn.

## 4 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.

### Quality management and accreditations

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

ÖTI is accredited by several organisations for various tests offered. It also is a Notified Body with the registration number 0534. The accreditation by the Federal Ministry as testing laboratory was repeated under reference 92714/0574-I/12/2005 (Individual accredited test procedures are marked with the federal laboratory logo), the accreditation for testing and surveillance of building products was given by the OIB (Österreichisches Institut für Bautechnik). Details and other accreditations are given on request and can be found on [www.oeti.at](http://www.oeti.at).

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