

## TÜV-TEST 10 MONOFILAMENTS ON THE TEST BENCH



What happens to our lines when they've been in the water a while?  
Do they react differently? We had the TÜV (the German Standards Organisation) test 10 monofilament lines- and came to some surprising conclusions.

### Page 73

You're not going to know how good your new line is until you use it. Good or bad, generally you don't find out until you're on the water, when you tie a knot, or you pop off the fish of a life, even though the clutch was set perfectly. Monofilament lines are of an especially sensitive nature, particularly regarding the sun. UV rays tend to make the monofilament brittle and destroy its internal structure. Storing line too long also causes them to weaken. We set ourselves the question: What effect does water have on monofilament line? That most monofilaments absorb water is an open secret, but does it affect a line's suppleness or the breaking strain?

### Page 74

And how does a line behave when it's been extensively stretched, perhaps after playing a fish or after a particularly tuff snag? Also another practise-orientated question interested us: How does a sensitive fishing line react to exposure to heat over a long period, comparable to being shut up in the boot of a car in the sun? All these questions are very relevant to normal angling practise. Up until now nobody ran such tests. That's why Rute & Rolle asked the TÜV Product Service department to run just such tests using commercially available monofilament fishing lines.

### The Individual Test

10 monofilaments from different manufacturers were electronically tested. First off the actual diameters of the lines were compared to the manufacturer's specifications. Secondly we scrutinised the various breaking strains. Subsequently, the lines were loaded to 75 % of their average breaking strain and after this tested to their breaking point. This was in order to show how a line changes after being snagged or after fighting a large fish. Before these tests, the lines spent two hours in a fresh water "bath" at a temperature of 15°C, all in order to recreate the actual conditions under which fishing lines are used; a "dry run" would not have been realistic. The fourth test consisted of storing the lines in a very warm, acclimatised chamber in order to simulate what fishing lines go through when they're left in a hot car. The candidates were stored at a temperature of 75° for 24 hours. Afterwards the elasticity and breaking strength of the lines were tested.

### Test Results

The manufacturer's stated diameters compared favourably with our results. None of the lines were under-calibrated (thinner than stated). The largest fluctuation, just 0.008 mm above the stated diameter, was measured on Stroft GTM from Waku. Thus this line is rather a 0.26 mm line than a 0.25 mm line. This was included in the test data, but even this 40% inaccuracy in diameter couldn't prevent the Stroft GTM from being our best in test. Trophy Line from Cormoran was the only line that measured out at a true 0.25 mm, all the other candidates where thicker.

The most conspicuous results came by testing the breaking strain of the lines after they had been soaked in fresh water: All the values are wide under that claimed by the manufacturers - some retain little more than half their breaking strain. Water obviously weakens monofilament to a far greater extent than we thought possible. However, you won't notice the difference when you're fishing, a rod typically used with a line of 0.25 mm diameter will hardly be able to pull more than 2 kilograms. In an earlier test we managed to pull three or four kilos using a 30 lb boat rod and even then we had to pull flat out. During testing all the monofilament lines broke at the knot, consequently the breaking strains also refer to the actual knot-strength, of course the kind of knot and the way in which it is tied also affects the results of the breaking strain tests.

The two lines with the highest braking strain were the Ultra 2000 from BK with an average breaking strain of 4.38 kilograms and Stroft GTM from Waku with an average braking strain of 4.32 kilograms.

The test using the pre-stretched lines (snag simulation) brought some astounding results to light: All ten lines experienced an increase in breaking strain, some exceedingly so. On the other hand, the elasticity was severely reduced.

The warm storage experiment (car boot simulation) resulted in no general change in any particular direction. Some of the lines experienced an increase in breaking strains, in some the braking strains were reduced. The variation lay between 0.03 and 1 kilogram (see table) with the same lines!

The largest difference in the rate of stretch of two lines was 10% (21.3 and 31.7 percent). Line elasticity is not part of the assessment as line stretch can be a good or a bad thing depending on the fishing method.

#### Declared braking strains

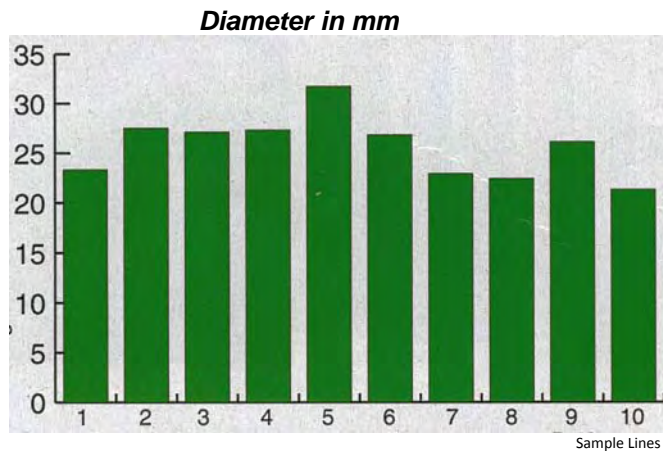
The manufacturers declare the following braking strains for their lines. To the editor's best knowledge there is no generally accepted testing standard, therefore the methods used here are not known (see "finally" below)

WAKU Stroft GTM	6.4 kg
BK Ultra 2000	6.9 kg
DAM Tectan Premium	5.95 kg
Berkley Trilene XL	5.3 kg
Zebco Quattron XT	6.2 kg
Cormoran Trophy Line	6.4 kg
Balzer Body Guard	6.1 kg
Exori Exotan Pro	6.2 kg
Jenzi top secret strong	5.5 kg
Shimano Technium Tournament Carp	6.75 kg

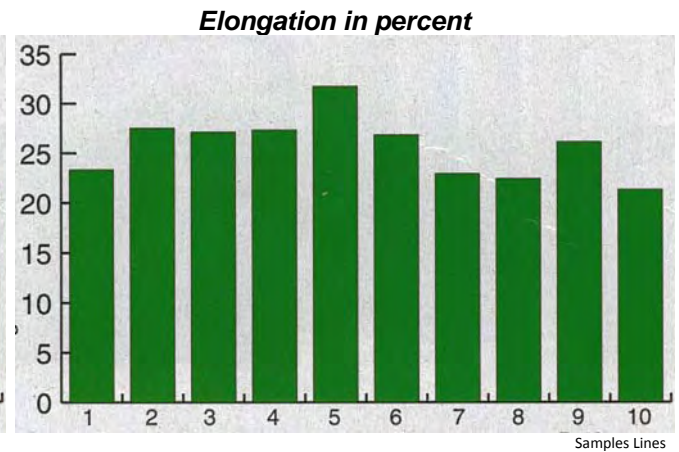


Above is the climatic chamber in which the lines were stored  
Below is the tensile stress machine head that was used to test the lines





The line from Cormoran (5) was the only line with an exact diameter (grade 1)



Monofilament lines can have over 30% elongation

**This is how we tested**

All the tests were completed to our requirements by TÜV Product Service Dept. (German standards organisation) in their own laboratories. The examiners were provided with neutral, un-labelled spools of line so that they had no idea which lines were being tested. The tests were carried out electronically on special tensile stress machines. One end was attached using a clinch-knot to a snap swivel, the other end ran over a metal roller without knots. The rate of stress: 6 mm per second. Three samples from each line were prepared and tested. Subsequently, we used the mean average in our results. For the tests with pre-stretched lines the samples were prepared by subjecting them to a tension amounting to 75% of their braking strain for a period of one minute (the value used was the result of the initial braking point test).

**Finally**

Many of you may wonder why the braking strains resulting from the TÜV's tests are so much below that of the manufacturer's stated braking strains. For that there are two main reasons; firstly, most manufacturers test their line –"dry"–, without the line having been watered.

**Seite 76**

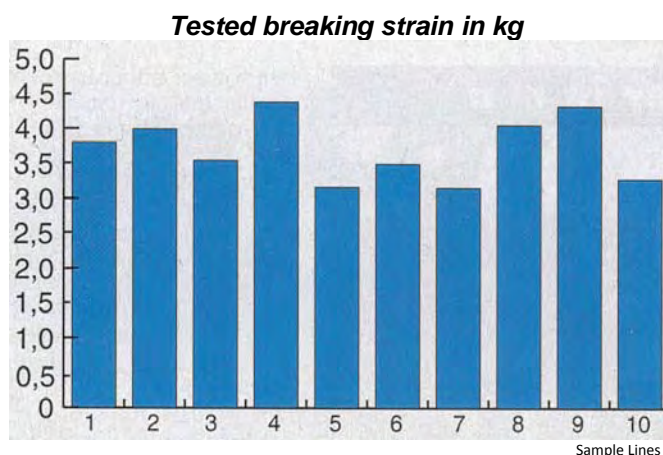
Secondly, there is no universally accepted norm for testing fishing lines. Several factors influence the braking point and rate of extension such as the length of the sample, the way in which a knot was tied and particularly the speed at which the line is pulled.

The manufacturer's given braking strains are therefore not invented, but can be the true results of tests carried out under different conditions.

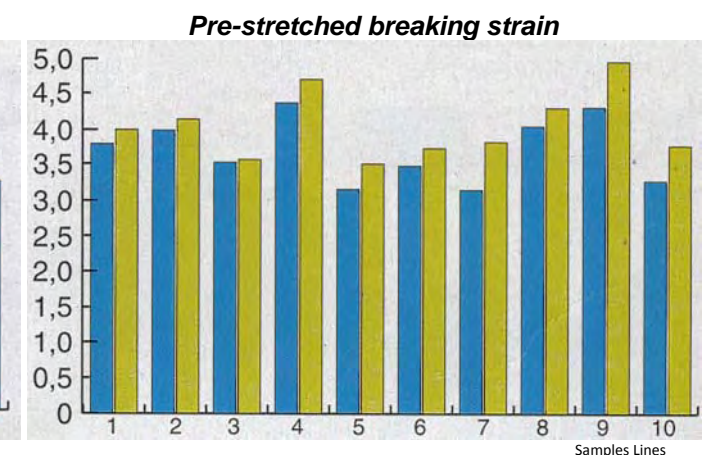
There is no single super-line. In practise other line characteristics are often much more relevant. For example, the elasticity of a line can make it more suitable for spinning or for pole angling. If I am fishing at a distance then I would choose a line with as little stretch as possible, whereas a line with a lot of stretch can be an advantage when fishing at close range.

Our table allows every angler to choose "his" line for a particular use.

Incidentally: the results with no fewer than eight lines rated as "good" and two rated as "satisfactory" is a compliment to an industry, that has apparently done its homework in regards to fishing lines.



The breaking strain is dependant on the kind of knot and the speed of pull



Blue beam before pre-stretching; green: pre-stretched to 75%

## Test Results Overview

	Max. points	1 DAM Tectan			2 Berkley Trilene XL			3 Shimano Technium C.			4 BK Ultra 2000			5 Cormoran Trophy Line		
		Points	Grade	Points	Grade	Points	Grade	Points	Grade	Points	Grade	Points	Grade	Points	Grade	
Declared diameter mm		0.25			0.25			0.25			0.25			0.25		
Measured Ø mm	20	0.257	14	3	0.256	14	3	0.256	14	3	0.257	14	3	0.25	20	1
Knot strength before pre-tensioning in kg	10	3.8	6	3	3.99	6	3	3.54	6	3	4.38	8	2	3.16	4	4
Knot strength after pre-tensioning in kg	10	4.0	8	2	4.15	8	2	3.58	6	3	4.71	10	1	3.52	6	3
Stretch before pre-tensioning in %		23.3			27.5			27.1			27.3			31.7		
Stretch after pre-tensioning in %		20.3			18.9			18.9			22.6			22.6		
Knot strength after warm storage	10	4.32	8	2	4.29	8	2	3.18	4	4	3.93	6	3	3.13	4	4
Stretch after warm storage in %		25.6			22.9			23.8			24.7			28.7		
Total points		36			36			30			38			34		
Score		<b>2</b>			<b>2</b>			<b>3</b>			<b>2</b>			<b>2</b>		
Price / 100m <sup>1)</sup>		17.90 DM <sup>2)</sup>			25.00 DM <sup>2)</sup>			29.00 DM <sup>3)</sup>			11.50 DM			21.00 DM		

<sup>1)</sup>recommended retail price    <sup>2)</sup>price 365-meter-spool    <sup>3)</sup>price 200-meter-spool

6 Jenzi top secret st.		7 Exori Exotan Pro		8 Zebco Quattron XT		9 WAKU Stroft GTM		10 Balzer Body Guard						
Points	Grade	Points	Grade	Points	Grade	Points	Grade	Points	Grade					
0.25		0.25		0.25		0.25		0.25						
0.257	14	3	0.257	14	3	0.257	14	3	0.257	14	3			
3.49	4	4	3.15	4	4	4.05	8	2	4.32	8	2	3.28	4	4
3.74	6	3	3.83	6	3	4.31	8	2	4.96	10	1	3.78	6	3
26.8			22.9			22.4			26.1			21.3		
21.5			17.8			19.5			20.1			17.9		
3.63	6	3	4.23	8	2	3.85	6	3	4.67	10	1	4.12	8	2
23.9			24.3			22.8			27.3			24.1		
<b>30</b>		<b>32</b>		<b>36</b>		<b>40</b>		<b>32</b>						
<b>3</b>		<b>2</b>		<b>2</b>		<b>2</b>		<b>2</b>						
14.50 DM		15.00 DM		23.90 DM		16.20 DM		29.00 DM <sup>4)</sup>						

<sup>4)</sup>price 300-meter-spool

**This is how we assessed**

**Diameter:** 20 points were given if the declared diameter was found to be 100% correct.

100% correct 20 Points  
(the highest grade 1)

99% = 18 points (grade 1)

98% = 16 points (grade 2)

97% = 14 points (grade 3)

96% = 12 points (grade 4)

95% = 10 points (grade 5)

The accuracy of the outside diameter had a relevance of 50% of the achieved result.

**Knot strength:**

4.5 – 5 kg = 10 points (the highest grade 1)

4.0 – 4.5 kg = 8 points (grade 2)

3.0 – 3.5 kg = 6 points (grade 3)

2.5 – 3.0 kg = 4 points (grade 4)

2.0 – 3.0 kg = 2 points (grade 5)

The three knot strength test had a relevance of 20%

**General score:**

41 – 51 points is the best score 1

31 – 40 points score 2

21 – 30 points score 3

11 – 20 points score 4

0 – 10 points score 5



*The TÜV Product Service Department's certified test machines assure exact test results*



*It depends on the use you put it to. Fishing at distance requires lines with little stretch.*