

# GARNRUNDTEST

## 79

### AUSWERTUNG / EVALUATION

#### Type of yarn

Type of fibre	:	100% cotton
Spinning system	:	Ring spun, combed
Fineness	:	Ne 60/1
Twist	:	1110

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**A N M E R K U N G**

Verschiedentlich zeigen einzelne Resultate eines Labors eine unerwartet hohe Abweichung zu den Resultaten anderer Labors. Solche Resultate beeinflussen die Berechnung des Mittelwertes teilweise sehr stark.

Um den Mittelwert nicht zu verfälschen werden die Resultate auf ihre Abweichung zum Mittelwert überprüft.

Resultate, welche bei einer ersten Berechnung des Mittelwertes ausserhalb des Bereiches von  $\pm 2 s$  liegen, werden mit (x) gekennzeichnet.

Die mit (x) gekennzeichneten Resultate sind bei der Berechnung der in der Tabelle angegebenen statistischen Kenndaten nicht berücksichtigt, werden der Vollständigkeit halber aber trotzdem aufgeführt..

Resultate, welche nach der Berechnung des in der Tabelle angegebenen Mittelwertes ausserhalb des Bereiches von  $\pm 1.5s$  liegen, werden in der Tabelle mit (o) markiert.

Als Kontrollgrenze wurde der Bereich von  $\pm 1.5s$  gewählt, da die häufig verwendete Kontrollgrenze von  $\pm 1.0s$  nach unseren Erfahrungen die normalen Schwankungen zwischen den Garnproben nicht genügend berücksichtigt.

**R E M A R K S**

Sometimes single results of a lab show an unusual high standard deviation compared to the results of other labs. Such results may affect the calculation of the average value to a large extent.

We avoid a distortion of the average value by checking each single value with the average value & standard deviation (s)

After having calculated the average value the results which exceed the range of  $\pm 2s$  are marked with (x).

The (x) designated results are not taken into consideration for the calculation of the statistical values listed in the table. However, they are listed for reason of completion.

After having calculated the average value given in the table the results which exceed the range of  $\pm 1.5s$  are marked with (o) in the table.

According to long time experience the control limit with  $\pm 1.0s$  was too small because of too much swing between the yarn samples and their values. Hence the more appropriate limit value of  $\pm 1.5s$  has been applied.

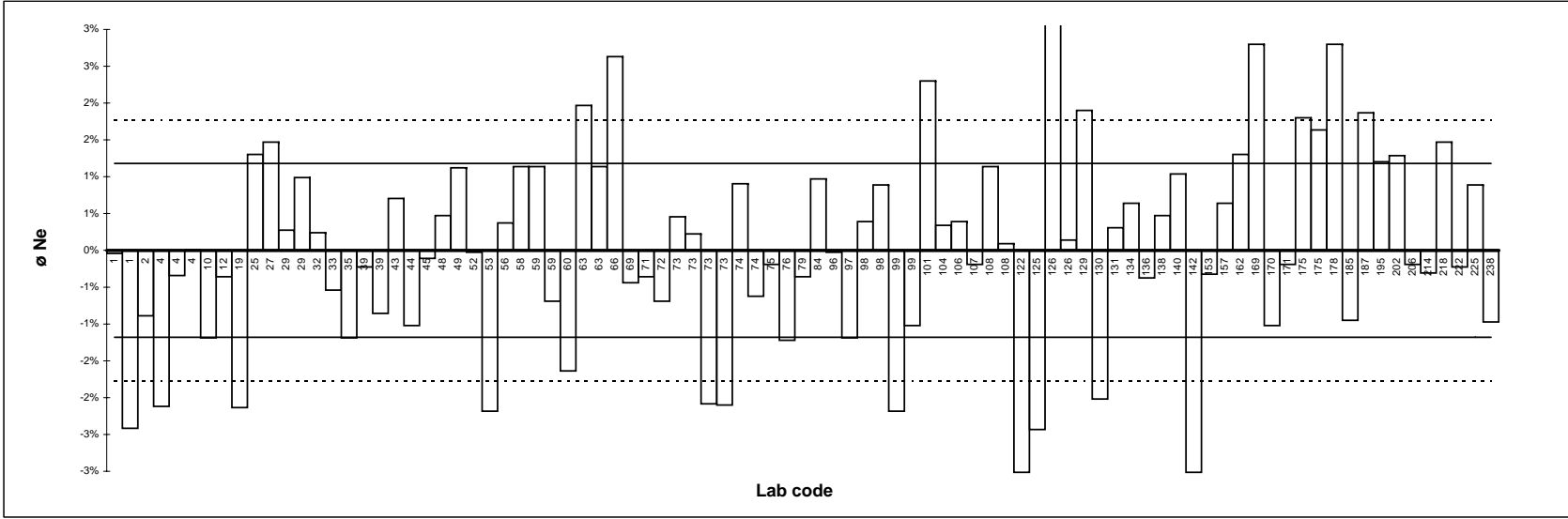
Yarn count							
Lab Code	Instrument	No. of tests	Length (m/sample)	Pre-tension cN (g)	ø tex	ø Ne	CV (%)
1	Autosorter	10	100		9.81	60.19	2.10
1	UT3	10	100		o 10.05	o 58.76	11.21
2	Autosorter IV	10	100		9.89	59.68	1.60
4	UT4	10	100		o 10.03	o 58.94	2.90
4	UT5 400	10	100		9.85	60.01	2.50
4	UT5 800	10	100		9.81	60.22	2.00
10	Autosorter IV	10	110		9.90	59.50	1.97
12	Mesdan Lab	10	100	5.00	9.80	60.00	1.90
19	Autosorter IV	10	100		o 10.01	o 58.93	3.16
25	Autosorter IV	10	100	5.00	9.67	61.00	1.47
27	Zweigle	10	100	5.00	9.66	61.10	1.42
29	UT 4-1	10	100		9.78	60.38	1.60
29	UT 4-2	10	100		9.71	60.81	2.20
32	Autosorter III	10	120		9.77	60.36	2.12
33	Zweigle L232	10	100	5.00	9.86	59.89	
35	Autosorter	10	100	4.96	9.92	59.50	1.87
39	Sartorius	10	100			60.08	2.30
39	UT4	10	100			59.70	1.40
43	Sortier-Modul	10	100		9.73	60.64	1.40
44	Zweigle L232	10	100	5.00	9.90	59.60	1.80
45	Zweigle	10	110		9.81	60.15	2.18
48	Compusorter 700	10	100	4.90	9.76	60.50	1.55
49	Zweigle	10	100	5.00	9.70	60.89	1.20
52	Autosorter III	10	100	5.00	9.80	60.20	1.03
53	Zweigle L232	10	100	5.00	o 10.02	o 58.90	2.51
56	UT3	10	100	12.50	9.77	60.44	3.28
58	Zweigle	10	100	5.00	9.69	60.90	2.75
59	Abschnittverfahren	10	1	5.00	9.70	60.90	3.40
59	Weife	10	100	5.00	9.90	59.80	1.40
60	Olsen yarn counter	10	100	9.80	o 9.96	59.23	2.70
63	Garnweife	10	100	5.00	o 9.60	o 61.40	2.47
63	UT5	10	100	5.00	9.70	60.90	1.70
66	Autosorter	10	100	4.80	o 9.60	o 61.80	3.12
69	Compusorter	10	10		9.85	59.95	2.37
71	Textest Weife	10	100	5.00	9.83	60.00	1.37
72	Zweigle L-220	10	100	0.50	9.90	59.80	1.60
73	Cascade S1	10	110			60.49	1.75
73	Cascade S2	10	110			60.35	1.55
73	Cascade T	10	110			o 58.96	1.53
73	Cascade F	10	110			o 58.95	2.90
74	Balance A.S.	10	110		9.71	60.76	1.81
74	Olhaus SDL	10	110		9.86	59.84	1.83
75	Autosorter III	10	110		9.82	60.10	1.34
76	Zweigle	10	110	0.30	9.92	59.48	1.35
79	DPE	10	100		9.83	60.00	1.84
84	Autosorter	10	100	5.00	9.70	60.80	1.60
96	Autosorter III	10	100		9.80	60.20	2.81
97	Autosorter IV	10	100		9.90	59.50	1.20
98	Cascade 1	10	110		9.77	60.45	1.80
98	Cascade 2	10	110		9.72	60.75	1.40
99	Zweigle L232	10	110			o 58.90	1.50
99	UT4	10	110			59.60	1.80
101	Sartorius	10	100	5.00	o 9.58	o 61.60	2.63
104	Zweigle L232	10	100	6.00	9.77	60.42	1.90
106	Defraime	10	100		9.81	60.45	1.87
107	Zweigle	10	100	5.00	9.80	60.10	2.95
108	Mettler PN 460	10	100		9.70	60.90	2.69
108	Statimat ME	10	100	5.00	9.79	60.27	1.60
122	Autosorter III	10	110		x 10.10	x 58.40	2.87

Yarn count							
Lab Code	Instrument	No. of tests	Length (m/sample)	Pre-tension cN (g)	ø tex	ø Ne	CV (%)
125	Autosorter	10	100		x 10.06	o 58.75	2.12
126	Zweigle L232	10	110		x 9.49	x 62.20	2.15
126	Zweigle L232	10	110		9.79	60.30	1.68
129	TLE Skein reel	10	110		9.62	o 61.36	1.88
130	Autosorter IV	10	100		o 10.00	o 59.00	1.84
131	Autosorter III	10	100		9.80	60.40	2.60
134	Galderara Bossi	10	110		9.73	60.60	1.87
136	Autosorter IV	10	100		9.84	59.99	2.49
138	?	100	100		9.75	60.50	2.01
140	Shimadzu	10	110		9.70	60.84	2.48
142	Galderara Bossi	10	100		x 10.10	x 58.40	1.80
153	Branca Gibertini	30	100		9.83	60.02	2.90
157	Statex	10	120		9.70	60.60	1.68
162	Cascade	10	110		9.68	61.00	1.74
169	Count Analyzer	10	300	2.00	o 9.53	x 61.90	1.38
170	ASPO Calabrara	10	100	5.00	9.90	59.60	1.80
171	Statex Labdata	10	110		9.82	60.10	1.14
175	Zweigle	10	110		o 9.60	o 61.30	1.80
175	Autosorter V	10	110		o 9.60	61.20	1.80
178	Statex CSP	20	110			x 61.90	1.79
185	Zweigle N265	10	100	5.00	9.89	59.64	2.38
187	Olsen yarn counter	10	100	4.80	o 9.61	o 61.34	1.97
195	Cascade	10	110		9.69	60.94	1.87
202	Lea Wrapping weel	20	110	5.00	9.69	60.99	2.65
206	Statex CSP	40	110			60.10	2.10
214	Autosorter IV	10	110			60.03	1.98
218	Cascade	10	110		9.67	61.10	2.00
222	Statex	20	110			60.08	2.85
225	AutosorterIII	10	100		9.72	60.75	2.56
238	Grime Tester	10	100	6.00	9.90	59.63	1.70
<b>n</b>					<b>73</b>	<b>84</b>	
<b>Ø</b>					<b>9.78</b>	<b>60.22</b>	
<b>s</b>					<b>0.12</b>	<b>0.71</b>	
<b>CV %</b>					<b>1.18</b>	<b>1.18</b>	
<b>s<sub>r</sub><sup>2</sup></b>						<b>2.06</b>	
<b>s<sub>t</sub><sup>2</sup></b>						<b>0.27</b>	
<b>s<sub>R</sub><sup>2</sup></b>						<b>2.33</b>	
<b>r</b>						<b>4.02</b>	
<b>R</b>						<b>4.27</b>	

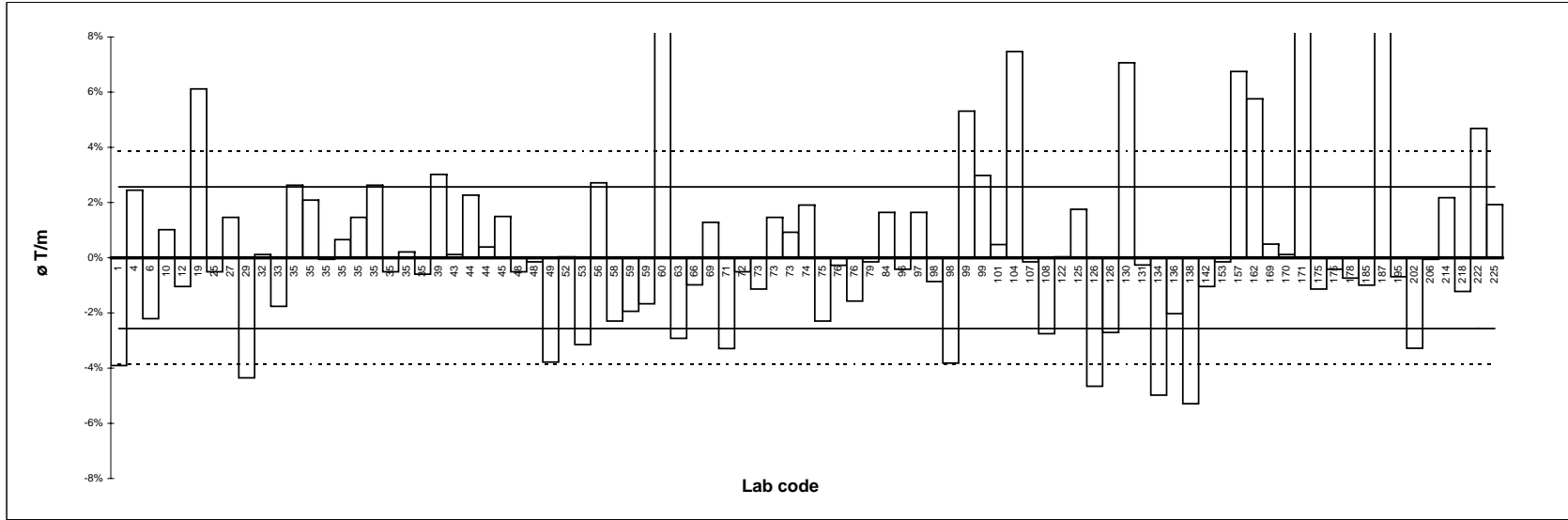
Yarn twist									
Lab Code	Instrument	Standard applied	No. of tests	Pre-tension cN (g)	Speed (rpm)	ø T / m	ø max. / Cop	ø min. / Cop	CV (%)
1	Zweigle D315	SN 197452	100	5.00		o 1074	1154	982	3.72
4	Zweigle D302		100	5.00		1145	1212	1014	3.14
6	Zweigle D301		100	5.00		1093	1185	1001	3.48
10	Zweigle D312		200	5.00		1129	1151	1106	o 1.11
12	ZIVY		100	5.00	1325	1106	1190	1032	3.60
19	Zweigle D304	ISO 17202	100	5.00		o 1186	1389	1099	3.29
25	Zweigle D-301	methode 1	100	5.00	2150	1112	1213	998	4.00
27	Zweigle D302		100	5.00		1134	1159	1101	3.22
29	ZWD 6		10	3.00		o 1069	1147	968	3.31
32	Branca Idealair		30	5.00	1000	1119	1191	1031	4.07
33	Zweigle D 314		30	5.00	1000	1098	1177	1003	3.66
35	Zweigle D 302	ISO 17202	100	5.00		1147	1233	1067	2.65
35	Calderara Bossi	ISO 17202	100	5.00		1141	1247	1093	3.20
35	Calderara Bossi	ISO 17202	100	5.00		1117	1175	1023	2.55
35	Calderara Bossi	ISO 17202	100	5.00		1125	1212	1033	3.24
35	Calderara Bossi	ISO 17202	100	5.00		1134	1200	1027	3.27
35	Mesdan Lab	ISO 17202	100	5.00		1147	1220	1057	3.18
35	Mesdan Lab	ISO 17202	100	5.00		1112	1172	1039	2.64
35	Mesdan Lab	ISO 17202	100	5.00		1120	1240	910	4.70
35	Mesdan Lab	ISO 17202	100	5.00		1111	1172	1014	3.24
39	Zweigle D302	methode 1	100	8.00	1151.43	1151	1260	1010	4.71
43	Zweigle D302	4	10	5.00	2150	1119	1208	1020	4.36
44	Zweigle D314	ISO 17202	100	5.00	1000	1143	1245	1002	3.90
44	Zweigle D302	ISO 2061	100	5.00	2150	1122	1195	1018	3.50
45	Zweigle		10			1134	1159	1109	o 1.83
48	Marte	ASTM 1422	50	4.90		1112	1196	1030	3.18
48	Zweigle D-304	ASTM 1422	100			1116	1193	981	3.69
49	Zweigle D-301	ISO 2061	100	5.00	2130	1075	1142	1011	4.30
52	Zweigle D314		100	5.00		1118	1232	1009	3.97
53	Zweigle D302		100	5.00		1082	1165	1000	2.94
56	Mesdan		100	10.00	800	1148	1248	1038	3.19
58	Zweigle D312	ISO 17202	100	12.10	1000	1092	1166	955	4.00
59	Aufdrehverfahren		20	5.00		1096			x 9.40
59	Spannungsfühlervf		100	5.00		1099	1200	1012	3.70
60	Torsiometro		100	8.00	2300	x 1236	1309	1137	2.60
63	Zweigle D-301	ISO 17202	100	5.00		1085	1007	1171	o 5.64
66	Twist tester	ASTM 1422	200	4.80		1107	1260	945	x 10.73
69	Statex		100	7.50	1600	1132	1220	1026	3.34
71	Zweigle D-314	ISO 17202	100	5.00	900	1081	1219	904	o 5.47
72	Zweigle D-301		100	0.50		1112	1233	1010	3.20
73	Statex Twist Tester-S		100	7.40	1500	1105	1172	1017	3.20
73	Statex Twist Tester-T		100	7.40	1500	1134	1178	1072	2.23
73	Statex Twist Tester-F		100	7.40	1500	1128	1176	1074	o 1.93
74	Zweigle D312		100	5.00		1139	1167	1113	4.02
75	Zweigle D-314		100	5.00		1092	1201	976	4.70
76	Zweigle D311		100	5.00	60	1115	1143	1082	o 0.90
76	Zweigle D312		100	5.00	60	1100	1143	1064	x 0.80
79	Zweigle D-312		100			1116	1216	1037	3.36
84	Twist Tester	ISO 17202	100	5.00		1136	1209	1069	4.70
96	Zweigle D-314		100	5.00		1113	1184	1022	3.65
97	Branca Idealair		100	4.90	1275	1136	1213	1066	4.20
98	MAG	1500	100	5.00		1108	1190	993	3.61
98	Statex	1500	100	5.00	1300	1075	1140	993	3.18
99	Zweigle D 312	10	20	5.00		o 1177	1262	1120	o 1.50
99	Zweigle D 302	10	20	5.00		1151	1219	1067	3.03
101	Calderara Bossi	UNI 9069	100	10.00	800	1123	1264	944	o 5.30
104	Zweigle L312		100	6.00	1700	x 1201	1319	1	3.70
107	Zweigle		100	5.00		1116	1157	1075	3.70
108	Zweigle D314		100	5.00		1087	1184	950	4.00

Yarn twist									
Lab Code	Instrument	Standard applied	No. of tests	Pre-tension cN (g)	Speed (rpm)	ø T / m	ø max. / Cop	ø min. / Cop	CV (%)
122	Zweigle D 314		100	5.00	2150	1118	1170	1079	o 1.89
125	Calderara Bossi		100	15.00	1500	1137	1267	960	o 5.99
126	Zweigle D 302		100			o 1066	1167	923	4.29
126	Zweigle D 301		100			1087	1178	1011	3.57
130	Zweigle D314		100	5.00		o 1197	1338	1044	o 5.10
131	Zweigle D-301		10	4.90		1115	1170	1051	3.84
134	Baer		100	5.00		o 1062	1158	999	3.37
136	Calderara Bossi	ISO 2061	100	2.00	500	1095	1200	1007	4.45
138	Zweigle D314	ISO 17202	100	2.40		o 1059	1092	1025	2.21
142	Zweigle Twist Tester	ISO 17202	100	5.00		1106	1178	1007	3.30
153	Brustio	ISO 7211-4	50	9.80	800	1116	1165	1068	2.70
157	Statex	ISO 17202	100		1200	o 1193	1322	1057	4.95
162	Statex Twist Tester		100	7.80	1000	o 1182	1279	1058	3.88
169	Twistmatic	ISO 2061	100	5.00	1500	1123	1246	1020	4.08
170	Zweigle D314	UNI 9069	100	10.00	2800	1119	1210	1014	3.50
171	Statex Twist Tester		100	8.50	1286	x 1228	1269	1183	2.43
175	Textest YT2100	ASTM 1422	100	5.00	1200	1105	1145	1066	2.50
175	Mesdan 2531 C	ASTM 1422	100	5.00	1200	1113	1165	1063	3.20
178	Statex mp	IS-83	100	7.30	1250	1109	1197	1012	3.51
185	Zweigle D314	ISO 2061	10	5.00		1107	1166	1044	4.05
187	Brustio	ATSM 1422	100	5.00		x 1289	1420	1196	o 5.21
195	Statex		100	6.00	1335	1110	1133	1095	3.43
202	Statex	ASTM 1422	100	5.00	390	1081	1173	1019	3.64
206	Statex	ASTM 1422	40	5.00		1117			o 5.10
214	Twistmatic Mesdan		100	5.00	1500	1142	1206	1100	2.30
218	Testex Twist Tester	ISO 17202	100	7.50	1710	1104	1175	1052	2.55
222	Statex		10	4.80	1500	o 1170	1237	1111	3.54
225	Digital Twist Tester	ISO 17202	100	2.00	1000	1139	1248	1047	4.00
<b>n</b>						<b>83</b>			<b>84</b>
<b>Ø</b>						<b>1117.67</b>			<b>3.53</b>
<b>s</b>						<b>28.70</b>			<b>0.97</b>
<b>CV %</b>						<b>2.57</b>			<b>27.51</b>
<b>s<sub>r</sub><sup>2</sup></b>						<b>2008.34</b>			
<b>s<sub>L</sub><sup>2</sup></b>						<b>775.81</b>			
<b>s<sub>R</sub><sup>2</sup></b>						<b>2784.15</b>			
<b>r</b>						<b>125.48</b>			
<b>R</b>						<b>147.74</b>			

Yarn count

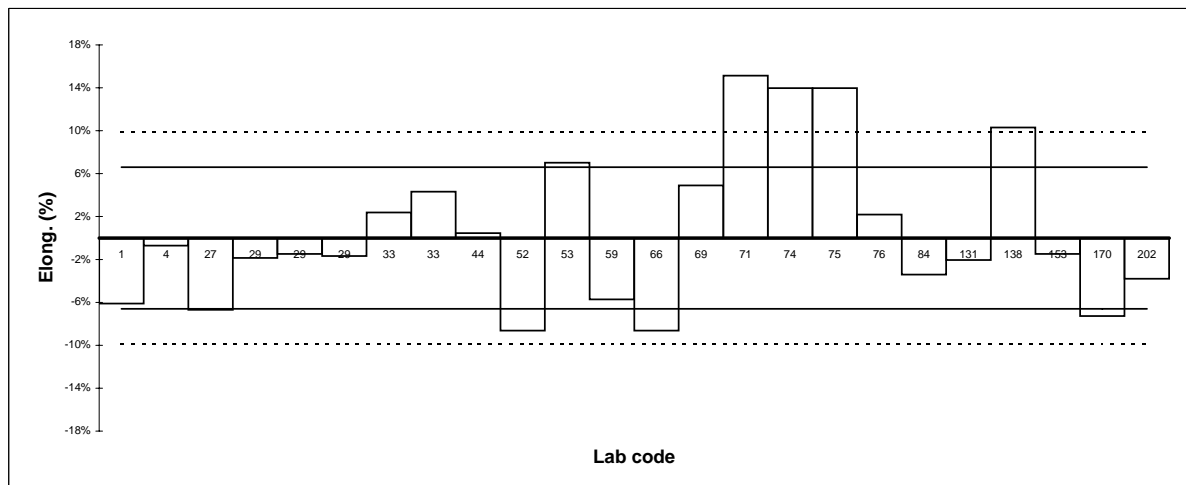
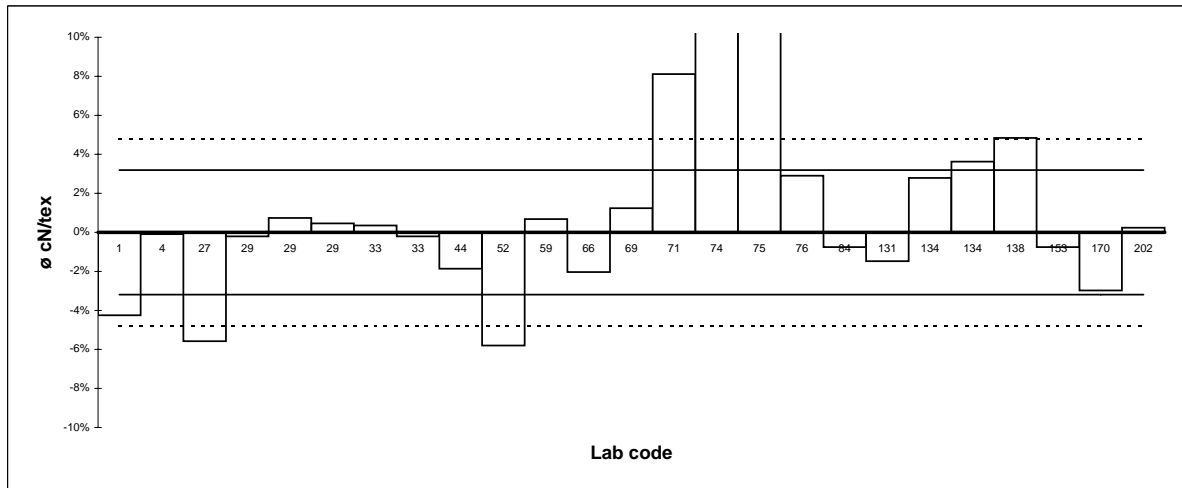
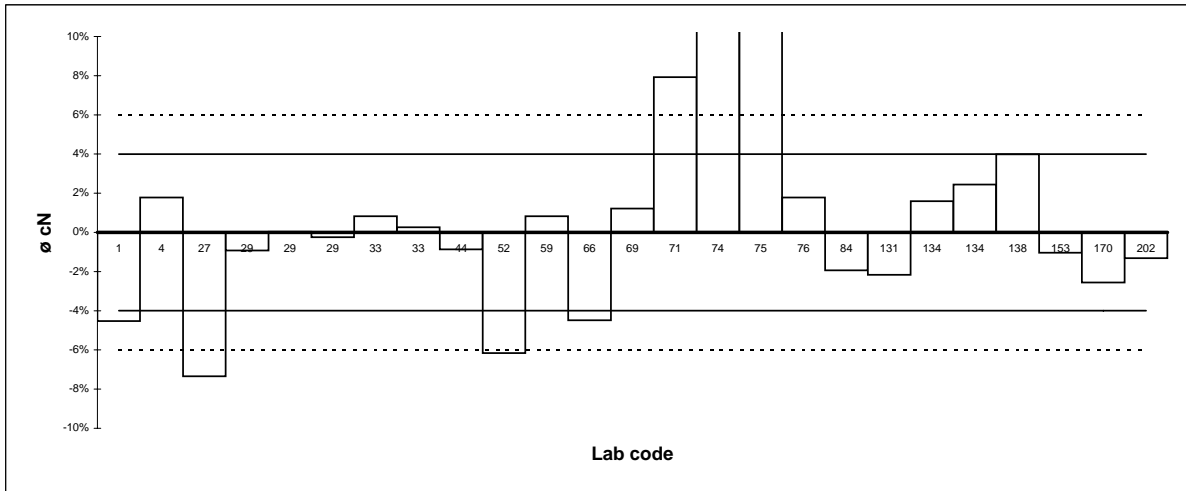


Yarn twist



Tenacity / Elongation CRE 20 sec												
Lab Code	Instrument	No. of tests	Pre-tension cN (g)	Testing time (sec)	cN.cm	ø cN	ø g	ø cN/tex	Rkm	CV (%)	Elong. (%)	CV (%)
1	UTR3	200	4.90	20.90	224.20	169.50	172.78	17.27	17.60	9.33	4.86	10.49
4	UTR4	200	5.00	19.28	245.10	180.70	184.20	18.02	18.37	8.50	5.14	9.30
27	UTR	200	4.80	19.56	213.10	o 164.50	o 167.69	o 17.03	o 17.36	9.51	4.83	10.80
29	Statimat ME1	200	0.50	19.11	241.90	o 175.90	o 179.31	o 18.00	o 18.35	9.91	5.08	7.34
29	Statimat ME2	200	0.50	19.83	243.90	o 177.60	o 181.04	o 18.17	o 18.52	9.02	5.10	7.52
29	Statimat ME3	200	0.50	19.70	243.70	o 177.10	o 180.53	o 18.12	o 18.47	8.00	5.09	7.04
33	UTR3-2629	100	4.90	20.00	179.00	o 182.47	o 18.10	o 18.45	o 9.10	5.30	9.70	
33	UTR3-1232	100	4.90	20.01	178.00	o 181.45	o 18.00	o 18.35	o 11.30	5.40	11.40	
44	Statimat M	200	5.00	20.10	239.00	o 176.00	o 179.41	o 17.70	o 18.04	10.30	5.20	9.20
52	UTR	200	4.90	20.05	o 210.20	o 166.60	o 169.83	o 16.99	o 17.32	8.53	4.73	8.18
53	Uster Dynamat	200	400.00	19.84					x 22.08	8.97	5.54	12.32
59	UTR	200	5.00	20.00	240.00	o 179.00	o 182.47	o 18.16	o 18.55	8.05	4.88	9.53
66	Statimat M	200	4.80	19.00	o 209.14	o 169.58	o 172.86	o 17.67	o 18.01	7.68	4.73	7.44
69	UTR-3	200	10.00	20.40	179.70	o 183.18	o 18.26	o 18.61	o 8.53	5.43	8.11	
71	Tiratest 2151	200	5.00	20.00	o 191.60	o 195.31	o 19.50	x 19.88	8.88	x 5.96	8.74	
74	Uster (A)	100	400.00	20.00	x 207.00	x 203.07	x 20.25	x 21.15	2.10	o 5.90		
75	Uster Dynamat	200	400.00	19.73	o 196.87	x 200.68	x 20.02	x 20.41	5.90	o 5.90	7.56	
76	Statimat ME	200	0.50	20.95	255.37	o 180.70	o 184.20	o 18.56	o 18.92	8.38	5.29	7.86
84	UTR	200	5.00	20.70	261.00	o 174.10	o 177.47	o 17.90	o 18.25	10.20	5.00	10.80
131	Statimat M	500	4.90	20.30	239.70	o 173.70	o 177.06	o 17.77	o 18.11	8.97	5.07	8.96
134	Uster Dynamat II	200	600.00	20.00	180.36	o 183.85	o 18.54	o 18.90	o 9.87			
134	Zellweger Uster	200	600.00	20.00	181.87	o 185.39	o 18.69	o 19.05	o			
138	UTR3	200	5.00	20.21	o 270.96	o 184.62	o 188.20	o 18.91	o 19.28	7.39	o 5.71	6.62
153	Brustio ADF	200	0.50		175.70	o 179.10	o 17.90	o 18.25	o 11.50	5.10	10.00	
170	Brustio ADF	200	5.00	20.00	173.00	o 176.35	o 17.50	o 17.84	o 9.70	4.80	9.10	
202	UTR-3	200	4.90	20.00	233.50	o 175.20	o 178.59	o 18.08	o 18.43	9.79	4.98	9.40
<b>n</b>					<b>15</b>	<b>24</b>	<b>23</b>	<b>23</b>	<b>22</b>		<b>23</b>	
<b>Ø</b>					<b>238.05</b>	<b>177.54</b>	<b>180.12</b>	<b>18.04</b>	<b>18.32</b>		<b>5.18</b>	
<b>s</b>					<b>17.92</b>	<b>7.09</b>	<b>6.02</b>	<b>0.58</b>	<b>0.50</b>		<b>0.34</b>	
<b>CV %</b>					<b>7.53</b>	<b>3.99</b>	<b>3.34</b>	<b>3.19</b>	<b>2.74</b>		<b>6.60</b>	
<b>s<sub>r</sub><sup>2</sup></b>						<b>256.75</b>		<b>2.73</b>			<b>0.22</b>	
<b>s<sub>L</sub><sup>2</sup></b>						<b>50.25</b>		<b>0.31</b>			<b>0.09</b>	
<b>s<sub>R</sub><sup>2</sup></b>						<b>307.00</b>		<b>3.04</b>			<b>0.31</b>	
<b>r</b>						<b>44.87</b>		<b>4.63</b>			<b>1.30</b>	
<b>R</b>						<b>49.06</b>		<b>4.88</b>			<b>1.55</b>	

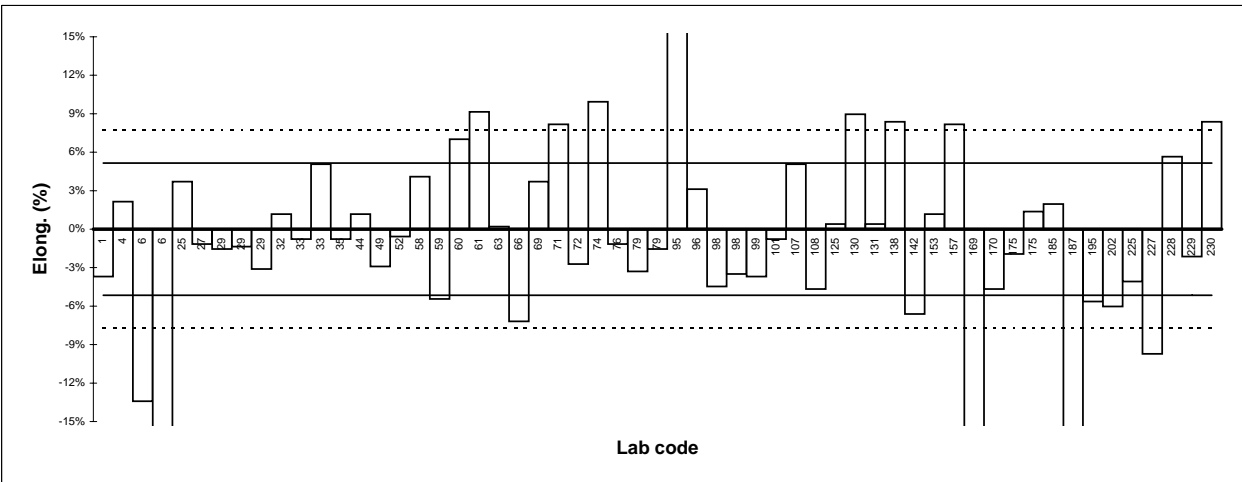
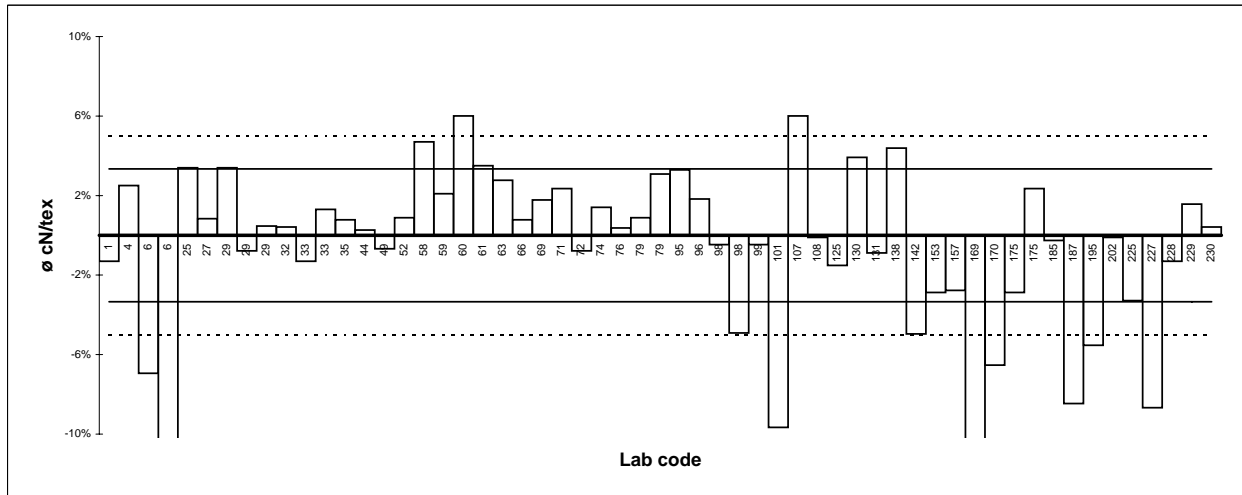
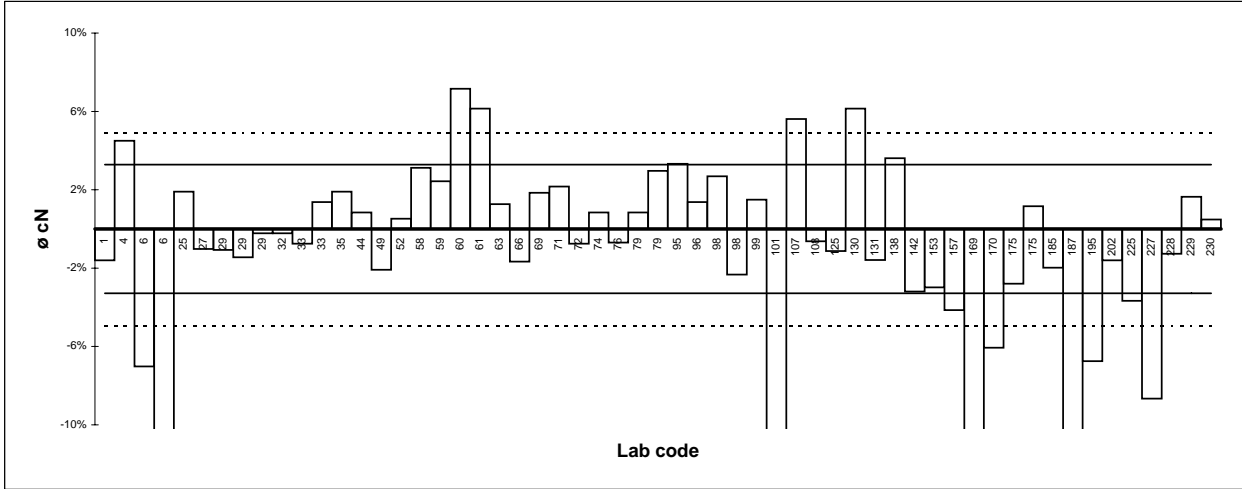
Tenacity / Elongation CRE 20 sec



Tenacity / Elongation CRE 500 mm/min												
Lab Code	Instrument	No. of tests	Pre-tension cN (g)	Testing time (sec)	cN.cm	ø cN	ø g	ø cN/tex	Rkm	CV (%)	Elong. (%)	CV (%)
1	UTR3	200	4.90	3.00	248.40	185.40	188.99	18.90	19.27	9.71	4.95	9.48
4	UTR4	200	5.00	3.15	272.00	196.90	200.71	19.63	20.01	9.00	5.25	9.30
6	UTR3	200	4.90	2.70	o 217.50	o 175.20	o 178.59	o 17.82	o 18.16	9.39	o 4.45	12.97
6	UTR	200	4.90	2.65	x 193.20	x 166.00	x 169.22	x 16.87	x 17.20	8.79	x 4.25	11.64
25	UTR1-2	300	5.00	3.37	262.00	192.00	196.00	19.80	20.18	8.19	5.33	8.88
27	UTR	200	4.80	3.10	248.50	186.50	190.11	19.31	19.68	10.00	5.08	10.30
29	Statimat ME1	200	0.50	3.05	255.20	186.40	190.01	19.80	20.18	9.52	5.06	8.18
29	Statimat ME2	200	0.50	3.17	252.90	185.70	189.30	19.00	19.37	8.14	5.07	6.71
29	Statimat ME3	200	0.50	3.16	257.50	188.00	191.64	19.24	19.61	8.27	4.98	7.84
32	UTR	200	4.90	3.12	257.50	188.00	192.00	19.23	19.61	8.40	5.20	6.90
33	UTR3-2629	100	4.90	3.10		187.00	190.62	18.90	19.27	9.00	5.10	10.40
33	UTR3-1232	100	4.90	3.20		191.00	194.70	19.40	19.78	10.50	5.40	9.80
35	UTR3	200	5.00	3.10	260.00	192.00	195.72	19.30	19.70	10.30	5.10	10.60
44	Statimat M	200	5.00	3.10	259.00	190.00	x 164.00	19.20	x 16.60	9.30	5.20	9.40
49	Statimat M	500	5.00	3.00	243.90	184.49	188.18	19.02	19.40	8.48	4.99	11.00
52	UTR	200	4.90	3.14	249.80	189.40	193.07	19.32	19.69	8.00	5.11	7.56
58	UTR3	200	4.80	3.20	271.70	194.30	198.10	20.05	o 20.44	8.92	5.35	10.34
59	UTR	200	5.00	3.00	258.00	193.00	196.74	19.55	19.93	9.53	4.86	10.52
60	UTR4	200	5.10	3.30	o 284.70	o 201.90	o 205.90	o 20.30	x 20.70	8.40	5.50	7.50
61	Statimat ME	500	0.50	3.50	o 287.66	o 199.99	o 203.86	19.82	20.20	6.99	o 5.61	5.11
63	UTR 3	200	4.80	3.50	262.80	190.80	194.50	19.68	20.20	9.25	5.15	7.49
66	Statimat M	200	4.80	2.90	o 227.78	185.28	188.80	19.30	19.67	8.04	4.77	8.15
69	UTR-3	200	10.00	3.20		191.90	195.60	19.49	19.87	8.41	5.33	8.96
71	Tiratest 2151	200	5.00			192.50	196.20	19.60	20.00	8.69	o 5.56	9.39
72	Statimat M	200	0.50	3.00	244.00	187.00	190.62	19.00	19.37	8.00	5.00	7.60
74	UTR	100	4.70	2.26	o 222.00	190.00	193.70	19.42	19.79	8.48	o 5.65	10.16
76	Statimat ME	200	0.50	3.25	256.76	187.11	190.73	19.22	19.59	8.39	5.08	7.84
79	Instron 6025	200	0.50	3.00		190.00	193.70	19.32	19.69	8.95	4.97	8.74
79	Instron 5567	200	0.50	3.04		194.00	197.80	19.74	20.12	9.14	5.06	8.35
95	Premier Tensomaxx 7000	200	0.50	3.60		194.68	198.45	19.78	20.16	8.54	x 6.01	9.10
96	UTR3	400	4.90	3.19	268.00	191.00	195.00	19.50	19.90	9.20	5.30	8.50
98	Statimat M	200	0.50	2.94		193.49	189.82	19.06	19.43	7.96	4.91	7.96
98	UTR	200	0.43	3.00		184.03	o 180.54	18.21	18.57	9.09	4.96	8.21
99	UTR3	200				191.23	187.60	19.06	19.42	7.86	4.95	8.14
101	Automatico ADF	200	5.00	3.24	229.80	x 165.90	x 169.20	x 17.30	o 17.70	9.70	5.10	10.10
107	Instron	100	5.00			o 199.00	o 203.00	o 20.30	x 20.70	8.90	5.40	7.40
108	Statimat ME	200	5.00	3.19	257.15	187.23	190.85	19.13	19.50	3.56	4.90	4.83
125	UTR3	200	5.00	2.80		186.30	190.00	18.86	19.23	3.01	5.16	8.25
130	UTR3	400	5.00	3.30	o 289.00	o 200.00	o 203.87	19.90	20.30	9.60	o 5.60	8.30
131	Statimat M	500	4.90	3.10	259.26	185.44	189.03	18.98	19.35	8.62	5.16	9.14
138	UTR3	200	5.00	3.36	282.01	195.22	199.00	19.99	20.38	9.71	o 5.57	8.92
142	SDL UTT350	200	5.00			182.40	185.90	18.20	18.60	11.20	4.80	10.10
153	ADF Brustio	200	0.50			182.80	186.10	18.60	18.96	10.60	5.20	8.80
157	Premier Tensomaxx 7000	200	0.50	3.20		180.61	184.11	18.62	18.98	8.46	o 5.56	9.13
169	Autodyn 300	500	4.80	2.10		x 156.60	x 159.63	x 16.40	x 16.71	7.68	x 3.56	9.36
170	ADF Brustio	200	5.00	3.00		o 177.00	o 180.00	o 17.90	o 18.20	9.60	4.90	9.80
175	UTR3	200	4.90	3.03	247.00	183.15	186.70	18.60	18.96	9.00	5.04	8.40
175	UTR4	200	4.90	3.10	268.30	190.60	194.30	19.60	19.74	8.55	5.21	7.89
185	Zweigle F247	200	5.00		270.48	184.70	188.28	19.10	19.47	9.79	5.24	7.86
187	SDL	200	4.80			x 168.65	o 171.92	o 17.53	o 17.87	11.29	x 4.24	11.98
195	UTR3	200	4.85	2.80	230.80	o 175.70	o 179.10	o 18.09	18.44	8.40	4.85	8.00
202	UTR3	200	4.90	2.90	241.20	185.40	189.00	19.13	19.50	8.46	4.83	10.16
225	UTR1	200	5.00	3.03	240.60	181.50	185.01	18.52	18.87	10.39	4.93	9.52
227	Premier Tensomaxx 7000	200	0.50	2.80		o 172.10	o 175.43	o 17.49	o 17.83	8.47	o 4.64	10.33
228	Premier Tensomaxx 7000	200	0.50			186.03	189.41	18.90	19.25	9.06	5.43	10.90
229	Premier Tensomaxx 7000	200	0.50	2.70		191.52	187.89	19.45	19.09	10.21	5.03	11.95
230	Premier Tensomaxx 7000	200	0.50	3.20		189.33	193.00	19.23	19.61	8.29	o 5.57	8.12
<b>n</b>					<b>34</b>	<b>53</b>	<b>53</b>	<b>54</b>	<b>52</b>		<b>53</b>	
<b>ø</b>					<b>255.39</b>	<b>188.42</b>	<b>191.12</b>	<b>19.15</b>	<b>19.42</b>		<b>5.14</b>	
<b>s</b>					<b>17.80</b>	<b>6.19</b>	<b>7.02</b>	<b>0.64</b>	<b>0.67</b>		<b>0.26</b>	
<b>CV %</b>					<b>6.97</b>	<b>3.29</b>	<b>3.67</b>	<b>3.34</b>	<b>3.45</b>		<b>5.15</b>	
<b>s<sub>r</sub><sup>2</sup></b>						<b>275.34</b>		<b>2.87</b>			<b>0.21</b>	
<b>s<sub>L</sub><sup>2</sup></b>						<b>39.46</b>		<b>0.38</b>			<b>0.07</b>	
<b>s<sub>R</sub><sup>2</sup></b>						<b>314.81</b>		<b>3.25</b>			<b>0.28</b>	
<b>r</b>						<b>46.46</b>		<b>4.74</b>			<b>1.28</b>	
<b>R</b>						<b>49.68</b>		<b>5.05</b>			<b>1.48</b>	

(x) unexpected value  
(o) beyond control limit

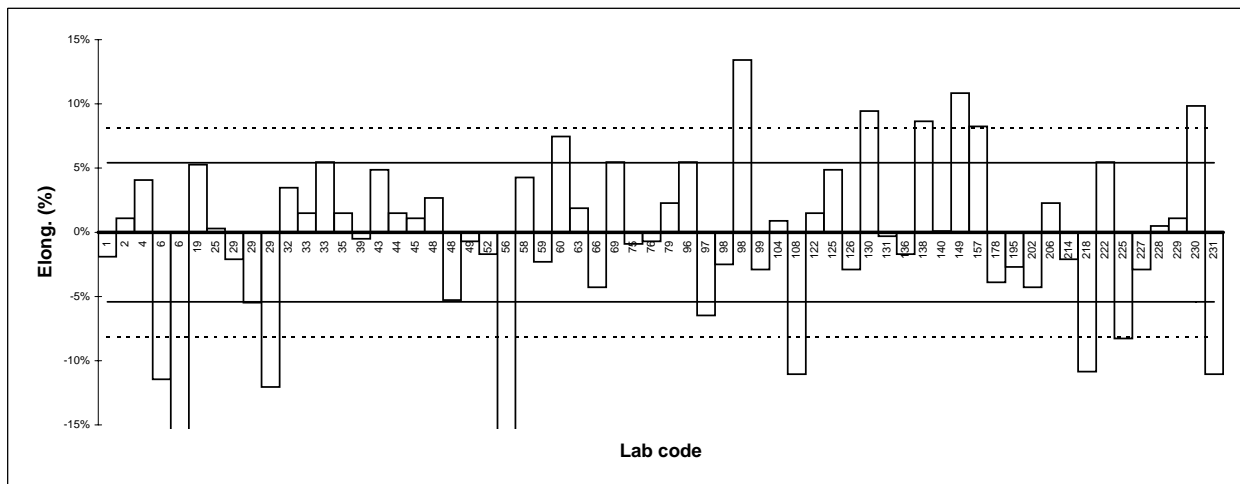
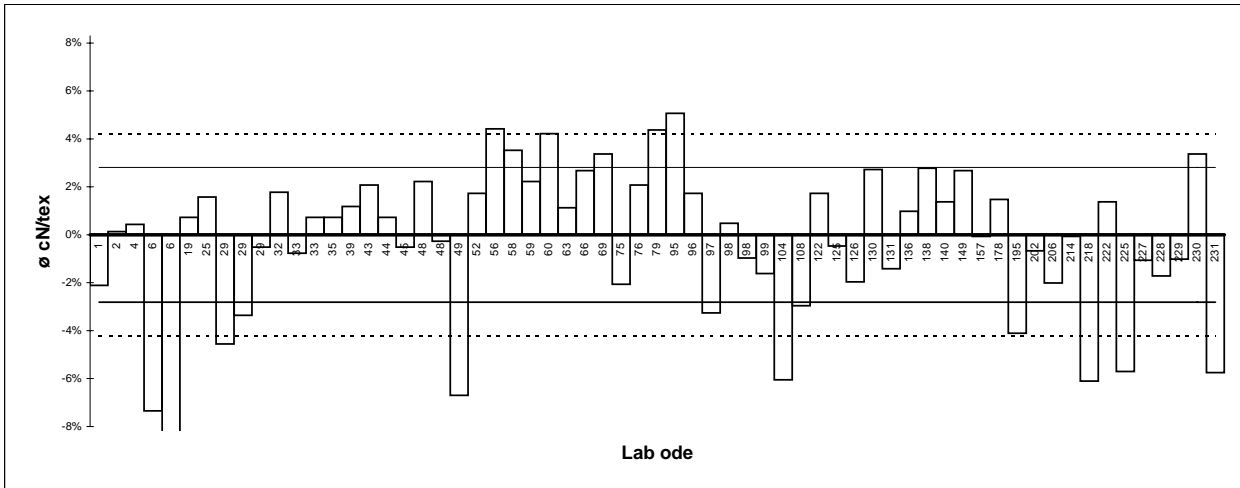
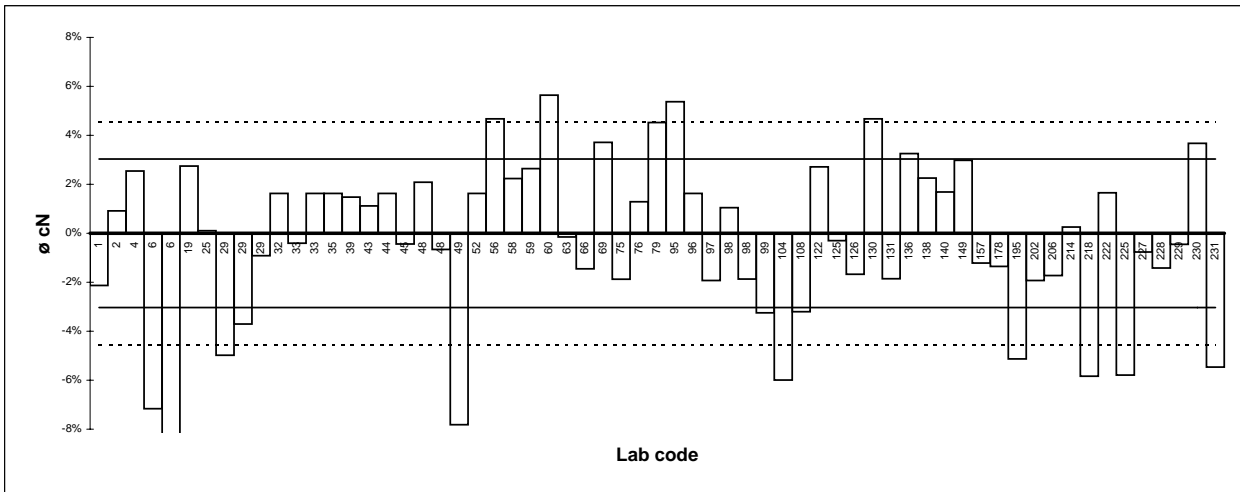
Tenacity / Elongation CRE 500 mm/min



Tenacity / Elongation CRE 5000 mm/min												
Lab Code	Instrument	No. of tests	Pre-tension cN (g)	Testing time (sec)	cN.cm	ø cN	ø g	ø cN/tex	Rkm	CV (%)	Elong. (%)	CV (%)
1	UTR3	200	4.90	0.30	248.00	192.60	196.33	19.63	20.01	9.31	4.93	9.94
2	UTR1	200	5.00	0.37	256.00	198.60	202.45	20.08	20.47	8.43	5.08	7.44
4	UTR4	200	5.00	0.31	273.70	201.80	205.71	20.14	20.53	9.60	5.23	8.30
6	UTR3	200	4.90	0.30	o 217.10	o 182.70	x 186.20	x 18.58	x 18.94	8.19	o 4.45	11.01
6	UTR	200	4.90	0.31	x 184.10	x 174.30	x 177.67	x 17.72	x 18.06	8.57	x 4.09	11.65
19	UTR1	300	5.00	0.30	275.70	202.20	206.20	20.20	20.60	10.12	5.29	7.74
25	UTR1	300	5.00	0.36	260.00	197.00	201.00	20.37	20.76	8.61	5.04	9.50
29	Statimat ME1	200	0.50	0.30	249.30	o 187.00	o 190.62	o 19.14	o 19.51	9.29	4.92	7.24
29	Statimat ME2	200	0.50	0.38	256.60	189.50	193.17	19.38	19.76	9.81	4.75	8.65
29	Statimat ME3	200	0.50	0.37	263.50	195.00	198.78	19.95	20.34	8.55	o 4.42	9.03
32	UTR	200	4.90	0.31	269.00	200.00	204.00	20.41	20.82	8.30	5.20	7.30
33	UTR3-2629	100	4.90	0.30		196.00	199.80	19.90	20.29	10.00	5.10	10.00
33	UTR3-1232	100	4.90	0.30		200.00	203.87	20.20	20.59	10.10	5.30	9.70
35	UTR3	200	5.00	0.30	262.00	200.00	204.00	20.20	20.60	8.70	5.10	9.06
39	UTR	100	4.90	0.41	232.90	199.70	203.57	20.29	20.68	9.42	5.00	9.00
43	UTR3	20	4.90		269.00	199.00	203.00	20.47	20.87	9.33	5.27	8.97
44	Statimat M	200	5.00	0.31	263.00	200.00	204.00	20.20	20.60	8.40	5.10	8.60
45	Statimat ME	100		0.39	261.62	195.94	199.73	19.95	20.34	9.36	5.08	8.62
48	UTR	200	4.90	0.37	248.00	200.90	204.80	20.50	20.90	9.43	5.16	8.28
48	Tensomax	200	4.90	0.30		195.50	199.30	20.00	20.40	9.26	4.76	7.68
49	Statimat M	200	5.00	0.30	o 221.00	x 181.42	x 185.05	o 18.71	o 19.08	9.34	4.99	10.58
52	UTR	200	4.90	0.35	259.20	200.00	203.87	20.40	20.80	8.49	4.94	7.56
56	UTR3	200	4.90	0.20	o 222.00	o 206.00	o 210.00	o 20.94	o 21.34	9.09	x 4.16	9.56
58	UTR3	200	4.80	0.30	270.60	201.20	205.10	20.76	21.16	9.01	5.24	8.90
59	UTR	200	5.00	0.30	266.00	202.00	205.91	20.50	20.90	8.91	4.91	8.32
60	UTR-4	200	5.10	0.32	o 285.20	o 207.90	o 212.00	o 20.90	21.30	8.90	5.40	8.20
63	UTR3	200	4.80	0.35	260.50	196.50	200.30	20.28	20.70	8.55	5.12	7.52
66	Statimat M	200	4.80	0.29	o 217.95	193.94	197.69	20.59	20.98	8.73	4.81	8.39
69	UTR3	200	10.00	0.30		204.10	208.10	20.73	21.14	10.08	5.30	9.53
75	UTR	200	4.90	0.36	249.20	193.10	196.84	19.64	20.02	8.90	4.98	8.91
76	Statimat ME	200	0.50	0.38	268.61	199.33	203.19	20.47	20.87	7.46	4.99	7.37
79	Statimat M	200	0.50		205.70	o 209.70	o 20.93	o 21.34	8.88	5.14	8.05	
95	Premier Tensomax 7000	200	0.50	0.30		o 207.37	o 211.39	o 21.07	o 21.48			
96	UTR3	400	4.90	0.32	273.00	200.00	204.00	20.40	20.80	9.00	5.30	8.80
97	UTR3	200	4.90	0.30	243.00	193.00	196.00	19.40	19.80	8.20	4.70	8.10
98	Statimat M	200	0.50	0.29		198.86	200.68	20.15	20.54	7.41	4.90	7.41
98	UTR	200	0.43	0.30		193.12	196.86	19.86	20.25	9.22	x 5.70	7.97
99	UTR3	200				190.41	194.10	19.73	20.11	9.26	4.88	9.22
104	UTR3	200	4.90	0.30	260.00	o 185.00	195.00	o 18.84	o 19.21	9.92	5.07	10.38
108	Statimat ME	200	5.00	0.41	254.63	190.50	194.19	19.46	19.84	4.06	o 4.47	6.50
122	UTR	200	5.00	0.30		202.13	206.04	20.40	20.80	9.50	5.10	13.80
125	UTR3	200				196.20	200.00	19.96	20.35	9.40	5.27	8.54
126	UTR	200	4.90		245.30	193.50	197.25	19.66	20.04	9.49	4.88	10.03
130	UTR3	400	5.00	0.30	o 288.00	o 206.00	o 210.00	20.60	21.00	10.00	o 5.50	8.40
131	Statimat M	500	4.90	0.30	259.18	193.15	196.90	19.77	20.15	9.13	5.01	9.13
136	UTR3	200	4.90	0.30	257.50	203.20	207.26	20.25	20.64	8.64	4.94	9.69
138	UTR3	200	5.00	0.32	280.35	201.24	205.14	20.61	21.01	9.13	o 5.46	9.07
140	Premier Tensomax 7000	200	5.00	0.30	272.34	200.12	204.00	20.33	20.72	9.32	5.03	9.56
149	Premier Tensomax 7000	200	0.50	0.30		202.66	206.59	20.59	20.99	10.68	o 5.57	11.52
157	Premier Tensomax 7000	200	0.50	0.30		194.41	198.18	20.04	20.43	8.54	o 5.44	9.47
178	Premier Tensomax 7000	200	0.50	0.30		194.13	197.89	20.35	20.74	9.87	4.83	11.29
195	UTR3	200	4.85	0.29	239.30	o 186.70	o 190.30	19.23	19.60	12.50	4.89	9.00
202	UTR3	200	4.90	0.30	242.90	193.00	196.80	19.92	20.30	10.13	4.81	10.38
206	UTR3	200	4.90	0.30	257.60	193.40	197.10	19.65	20.03	9.03	5.14	7.68
214	UTR4	200	4.00	0.32		197.30	201.12	20.04	20.43	8.70	4.92	10.30
218	UTR3	200	0.50	0.30	x 207.00	o 185.31	o 188.90	o 18.83	o 19.19	7.89	o 4.48	8.68
222	Premier Tensomax 7000	100	5.00	0.30		200.05	203.92	20.33	20.72	8.51	5.30	7.87

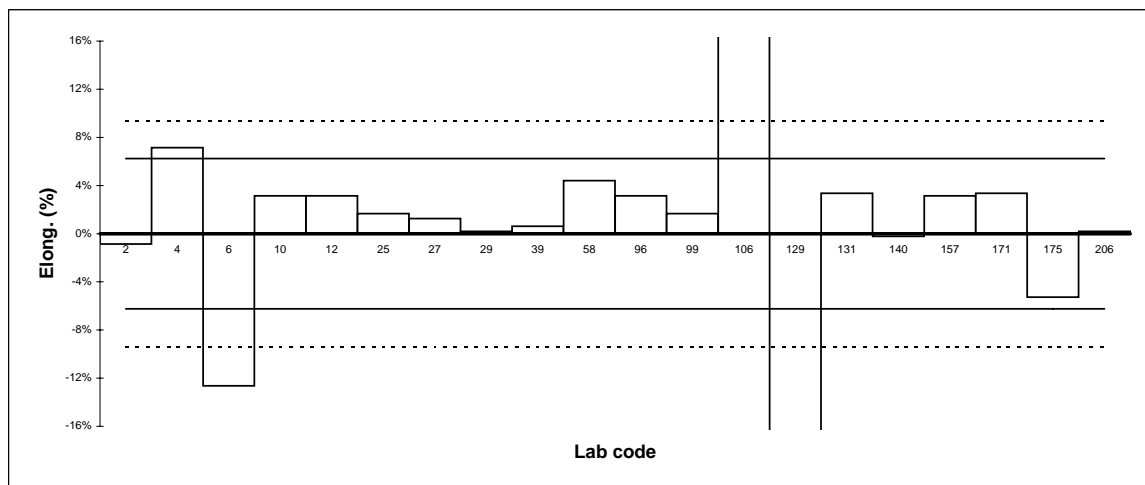
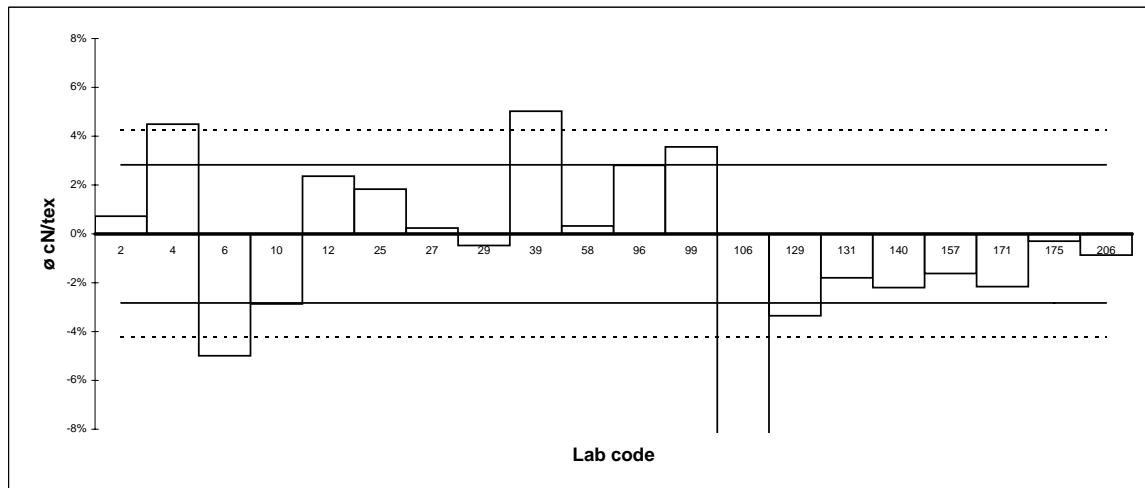
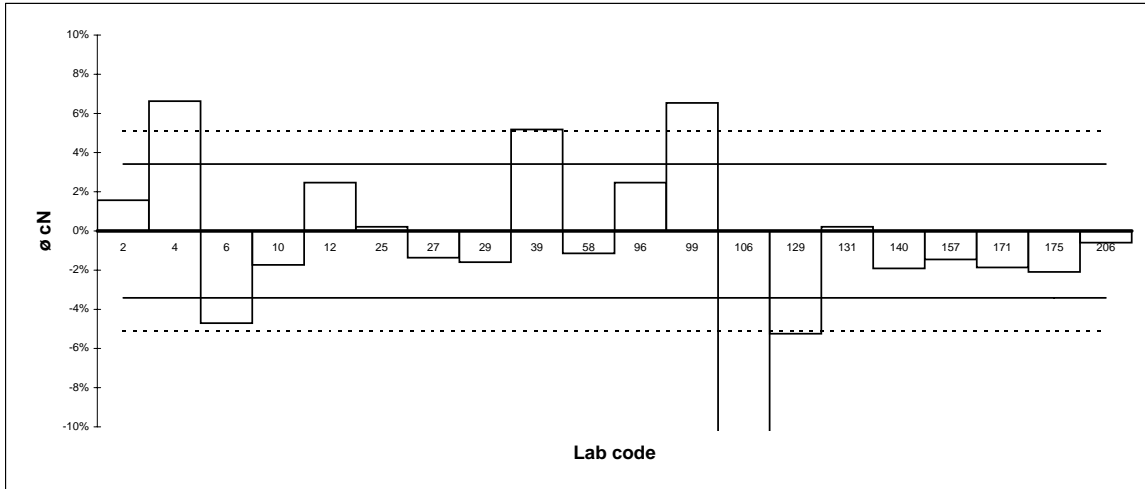
Tenacity / Elongation CRE 5000 mm/min												
Lab Code	Instrument	No. of tests	Pre-tension cN (g)	Testing time (sec)	cN.cm	o cN	o g	o cN/tex	Rkm	CV (%)	Elong. (%)	CV (%)
225	UTR1	200	5.00	0.32	232.70	o 185.40	o 188.99	o 18.91	o 19.27	10.20	o 4.61	10.31
227	Premier Tensomaxx 7000	200	0.50	0.30		195.29	199.07	19.84	20.23	8.68	4.88	10.22
228	Premier Tensomaxx 7000	200	0.50			194.00	201.26	19.71	20.45	9.33	5.05	11.93
229	Premier Tensomaxx 7000	200	0.50	0.30		195.91	199.70	19.85	20.23	9.59	5.08	11.79
230	Premier Tensomaxx 7000	200	0.50	0.30		204.03	207.99	20.73	21.13	9.60	o 5.52	9.20
231	?					o 186.04	o 189.65	o 18.90	o 19.27	8.73	o 4.47	11.40
<b>n</b>					<b>40</b>	<b>61</b>	<b>60</b>	<b>61</b>	<b>61</b>		<b>59</b>	
<b>Ø</b>					<b>255.79</b>	<b>196.80</b>	<b>200.99</b>	<b>20.05</b>	<b>20.45</b>		<b>5.03</b>	
<b>s</b>					<b>17.66</b>	<b>5.97</b>	<b>5.67</b>	<b>0.56</b>	<b>0.57</b>		<b>0.27</b>	
<b>CV %</b>					<b>6.90</b>	<b>3.03</b>	<b>2.82</b>	<b>2.81</b>	<b>2.80</b>		<b>5.41</b>	
<b>s<sub>f</sub><sup>2</sup></b>						<b>324.44</b>		<b>3.38</b>			<b>0.21</b>	
<b>s<sub>L</sub><sup>2</sup></b>						<b>32.57</b>		<b>0.27</b>			<b>0.07</b>	
<b>s<sub>R</sub><sup>2</sup></b>						<b>357.01</b>		<b>3.65</b>			<b>0.29</b>	
<b>r</b>						<b>50.43</b>		<b>5.15</b>			<b>1.30</b>	
<b>R</b>						<b>52.91</b>		<b>5.35</b>			<b>1.50</b>	

Tenacity / Elongation CRE 5000 mm/min



Tenacity / Elongation USTER-TENSOJET										
Lab Code	Instrument	No. of tests	Pre-tension cN (g)	Speed (m/min)	Work break cN.cm	cN	cN/tex	CV% load	Elong. (%)	CV % elong.
2	UTJ4	10'000	4.95	400.00	331.00	225.00	22.73	9.10	4.71	7.92
4	UTJ4	1'000	5.00	400.00	333.90	o 236.20	o 23.58	9.10	5.09	8.00
6	UTJ4	10'000	5.00	400.00	262.00	211.10	o 21.44	9.50	o 4.15	10.50
10	UTJ	100	5.00	400.00	306.50	217.70	21.92	9.30	4.90	7.90
12	UTJ	10'000	4.90	400.00	301.10	227.00	23.10	9.00	4.90	8.20
25	UTJ	10'000	4.84	400.00	332.00	222.00	22.98	o 8.62	4.83	8.29
27	UTJ	10'000	4.80	400.00	327.30	218.50	22.62	8.88	4.81	8.31
29	UTJ	10'000	0.50	400.00	320.20	218.00	22.46	9.04	4.76	9.51
39	UTJ	2'000	4.92	400.00	346.00	o 233.00	o 23.70	o 9.71	4.78	9.44
58	UTJ	10'000	4.85	400.00	281.00	219.00	22.64	x 10.48	4.96	9.88
96	UTJ	10'000	4.90	400.00	344.00	227.00	23.20	9.20	4.90	8.80
99	UTJ	5'000		400.00		o 236.00	23.37	9.10	4.83	8.10
106	JBA	200	0.50	400.00	500.00	x 198.55	x 20.24	9.52	x 6.89	5.89
129	UTJ	10'000	4.91	400.00		o 209.91	21.81	8.87	o 3.88	9.92
131	UTJ	10'000	4.90	400.00	334.00	222.00	22.16	8.81	4.91	8.62
140	UTJ	10'000	4.92	400.00	324.40	217.30	22.07	9.23	4.74	9.86
157	UTJ 4	10'000	5.00	400.00	308.20	218.30	22.20	9.10	4.90	8.50
171	UTJ 4	10'000	5.00	400.00	303.10	217.40	22.08	9.20	4.91	8.20
175	UTJ	10'000	4.70	400.00	309.10	216.90	22.50	9.30	4.50	9.20
206	UTJ	10'000	5.10	400.00	298.00	220.20	22.37	o 9.70	4.76	7.80
<b>n</b>						<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>
<b>Ø</b>						<b>221.53</b>	<b>22.57</b>	<b>9.18</b>	<b>4.75</b>	<b>8.84</b>
<b>s</b>						<b>7.56</b>	<b>0.64</b>	<b>0.30</b>	<b>0.30</b>	<b>0.83</b>
<b>CV %</b>						<b>3.41</b>	<b>2.83</b>	<b>3.25</b>	<b>6.25</b>	<b>9.42</b>
<b>s<sub>r</sub><sup>2</sup></b>						<b>411.46</b>	<b>4.29</b>		<b>0.18</b>	
<b>s<sub>L</sub><sup>2</sup></b>						<b>35.91</b>	<b>0.28</b>		<b>0.09</b>	
<b>s<sub>R</sub><sup>2</sup></b>						<b>447.38</b>	<b>4.57</b>		<b>0.27</b>	
<b>r</b>						<b>56.80</b>	<b>5.80</b>		<b>1.17</b>	
<b>R</b>						<b>59.22</b>	<b>5.98</b>		<b>1.44</b>	

Tenacity / Elongation USTER-TENSOJET

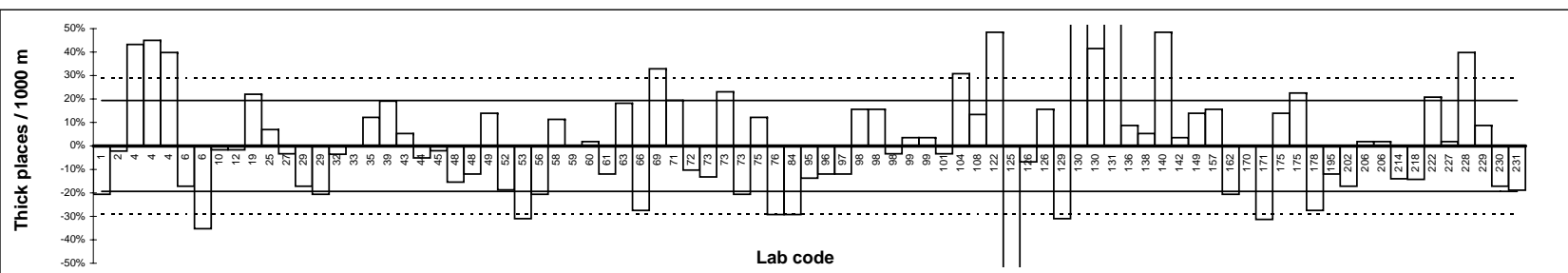
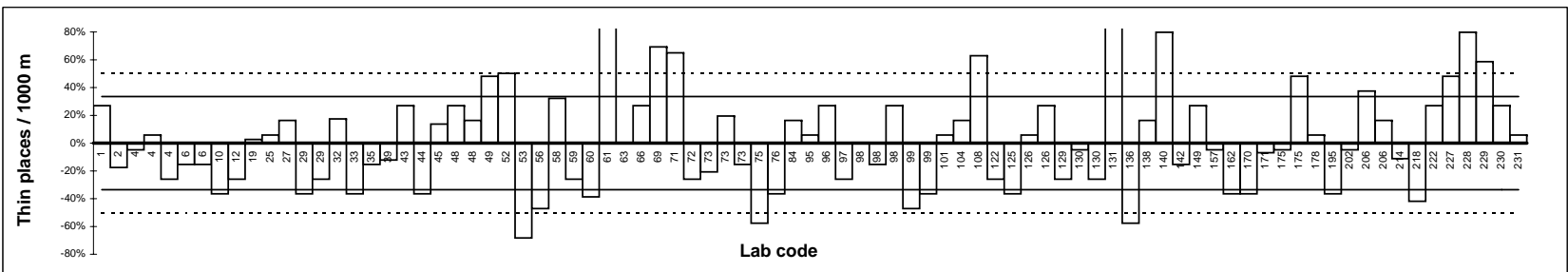
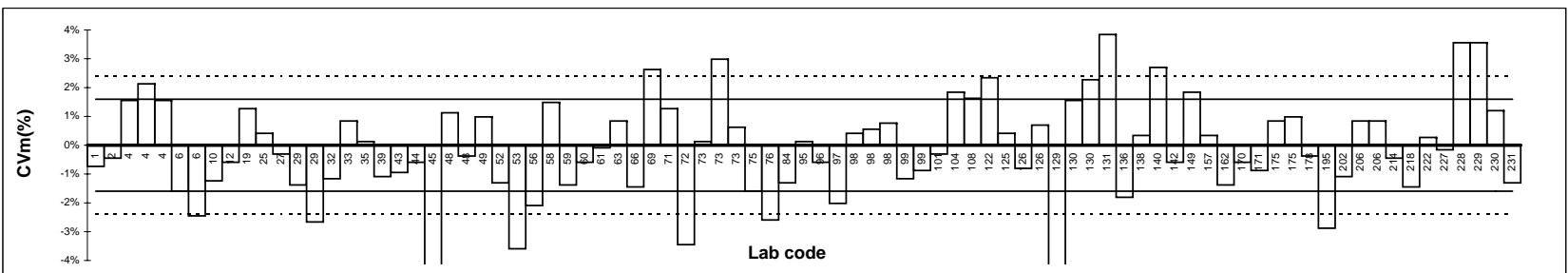


Lea - Test									
Lab Code	Instrument	No. of tests	Testing length [mm]	Length / sample [yd]	Speed [mm/min]	Breaking force [N]	Breaking force CV %	Skein breaking tenacity [cN/tex]	Skein breaking tenacity [CSP]
66	Strength Testet	20	603	120	305	231.67	3.24	2413	o 3219
69	Electronic Lea Tester	10	686	120	305	233.50	6.09	2371	3144
73	Stretch 500 M S1	10	686	120	300	223.00	4.40		3032
73	Stretch 500 M S2	10	686	120	300	232.00	4.51		3149
73	Stretch 500 M T	10	686	120	300	o 240.00	4.72		3189
73	Stretch 500 M F	10	686	120	300	231.00	6.44		3061
75	Good Brand	10		120			4.82		3171
98	Statex	10	686	120	300	233.00	4.26		3176
98	Statex	10		120		223.00	3.73		3043
140	Shimadzu	10		120		232.70	5.27	2399	3116
157	Statex	10	688	120	304		5.68		3058
162	Cascade	20	659	120	305	216.00	4.45		2972
171	Statex csp	10	670	120	300	228.05	o 2.19	2320	3080
178	Statex csp	20	686	120	300	223.04	4.29		3102
195	Mag. Lea. Str.	10	110	120	300	220.00	3.89	2270	3011
202	Cascade	20	686	120	305	217.60	6.44	2246	2983
206	Statex csp	40	677	120	300	228.70	3.40	2329	3089
225	Ansano Lea Tester	10	686	120	300	o 213.85	o 7.11	o 2200	o 2920
<b>n</b>						<b>16</b>	<b>18</b>	<b>8</b>	<b>18</b>
<b>Ø</b>						<b>226.69</b>	<b>4.72</b>	<b>2318.63</b>	<b>3084.12</b>
<b>s</b>						<b>7.41</b>	<b>1.27</b>	<b>75.56</b>	<b>82.27</b>
<b>CV %</b>						<b>3.27</b>	<b>26.89</b>	<b>3.26</b>	<b>2.67</b>

Evenness / Imperfections												
Lab Code	Instrument	No. of tests	Speed (m/min)	Testing time (min)	Um (%)	CVm(%)	Thin places / 1000 m	CV (%)	Thick places / 1000 m	CV (%)	Neps / 1000 m	CV (%)
1	UT3	10	400	2.50	10.98	13.88	12	38.20	46	16.70	137	35.30
2	UT4	10	400	2.50	10.95	13.92	8	36.70	57	19.60	o 168	20.90
4	UT4	10	400	2.50	11.21	14.20	9	42.20	o 83	20.80	o 156	13.40
4	UT5	10	400	2.50	11.29	14.28	10	41.30	o 84	18.70	o 170	16.20
4	UT5	10	800	1.25	11.18	14.20	7	57.90	o 81	23.50	x 195	19.00
6	UT3	10	400	2.50	10.89	13.76	8		48		113	22.80
6	UT4	10	400	1.00	o 10.80	o 13.64	8		o 38		103	28.60
10	UT4	10	400	5.00		13.81	6	27.90	57	28.00	130	20.50
12	UT4	10	400	1.00	11.10	13.90	7	65.90	57	36.90	146	21.80
19	UT4	10	400	2.50	11.19	14.16	10	26.20	71	17.10	o 168	20.10
25	UT3	10	400	2.50	11.11	14.04	10	67.10	62	20.50	134	27.00
27	UT3	10	400	2.50	11.00	13.94	11	45.90	56	20.30	151	16.90
29	UT4-1	10	400	2.50		13.79	6	55.00	48	18.00	123	16.00
29	UT4-2	10	400	2.50		o 13.61	7	47.00	46	22.00	118	15.00
32	UT4	10	400	2.50	10.93	13.82	11	39.00	56	33.50	132	20.60
33	UT3	10	400	2.50	11.10	14.10	6	66.10	58	22.30	o 167	28.70
35	UT3	10	400	2.50	11.10	14.00	8	32.30	65	25.10	140	19.70
39	UT4	10	400	1.00	10.93	13.83	8	68.60	69	18.50	149	18.10
43	UT3	10	400	1.00		13.85	12	59.60	61	28.00	149	15.70
44	UT3	10	400	1.00	11.00	13.90	6	71.40	55	27.10	131	16.90
45	UT4	100	400	1.00	11.15	x 12.38	11	50.00	57	31.10	135	21.90
48	UT3	10	400	2.50	11.18	14.14	12	49.40	49	35.50	119	28.10
48	Premier Tester 7000	10	400	2.50	11.02	13.93	11	50.70	51	22.20	102	24.60
49	UT3	10	200	5.00	11.15	14.12	14	50.60	66	22.60	139	22.30
52	UT3	10	400	2.50	10.92	13.80	14	100.50	47	80.20	115	19.50
53	UT3	10	400	1.00	o 10.66	o 13.48	o 3	76.60	o 40	31.60	o 90	22.40
56	UT3	10	400	2.50	o 10.82	13.69	5	91.40	46	28.80	o 88	13.60
58	UT4	10	400	2.50	11.22	14.19	13	78.30	65	26.50	154	22.60
59	UT3	10	400	5.00	10.89	13.79	7		58		118	
60	UT4	10	400	2.50	11.00	13.90	6	51.90	59	19.80	134	1.29
61	KET - 8011B	10	400	2.50		13.97	x 21		51		x 37	
63	UT5	10	800	1.25		14.10	10	53.00	69	27.20	146	25.30
66	UT3	10	400	2.50	10.91	13.78	12	30.20	42	35.10	116	26.10
69	UT5	10	400	1.00	o 11.34	o 14.35	o 16	54.50	o 77	30.00	x 191	36.70
71	UT4	10	50	5.00	11.19	14.16	o 16	45.90	69	20.80	o 170	30.50
72	UT3	10	400	1.00	x 10.60	o 13.50	7	83.80	52	33.60	133	18.20
73	UT4-S	10	400	1.00	11.10	14.00	8	78.60	50	30.30	118	24.40
73	UT4-T	10	400	1.00	o 11.40	o 14.40	11	54.70	71	23.70	150	22.80
73	UT4-F	10	400	1.00	11.14	14.07	8	40.50	46	30.30	121	17.90
75	UT2	10	400	1.00	10.89	13.76	o 4	93.70	65	42.30	o 97	22.70
76	UT4	10	200	1.00	o 10.79	o 13.62	6	94.60	o 41	20.60	119	26.40
84	UT2	10	400	1.00	11.10	13.80	11	66.50	o 41	36.20	x 62	25.60
95	iQ Quali Center	10	400	1.00	11.08	14.00	10	73.81	50	27.03	109	26.89
96	UT4	10	400	1.00	11.00	13.90	12	103.40	51	39.80	141	20.40
97	UT4 - 5x	10	400	2.50	o 10.80	13.70	7	40.90	51	19.60	120	25.10
98	UT4	10	400	1.00	11.09	14.04	10	36.80	67	27.50	126	18.80
98	UT3	10	400	1.00	11.12	14.06	8	44.30	67	29.50	103	19.50
98	UT3	10	400	1.00	x 11.50	14.09	12	65.80	56	35.70	116	28.00
99	UT3	10	400	2.50	10.92	13.82	5	75.80	60	31.70	126	22.40
99	UT4	10	400	2.50	10.95	13.86	6	41.50	60	36.50	125	13.00
101	UT3	10	400	2.50	11.30	13.94	10	64.00	56	30.70	132	16.90
104	UT5-1	10	800	0.50	11.16	14.24	11	54.80	o 76	47.30	155	18.20
108	UT4	10	400	2.50	11.24	14.21	o 15	69.68	66	24.11	140	45.08
122	UT3	10	400	1.00	11.31	14.31	7	67.90	x 86	26.40	156	16.00
125	UT3	10	400	1.00	11.11	14.04	6		x 15		120	
126	UT3	10	400	1.00	10.97	13.87	10	52.00	54	39.80	144	43.60
126	UT3	10	400	1.00	11.13	14.08	12	90.00	67	22.20	151	40.30
129	UT2	10	400	2.50	x 10.14	x 12.91	7		o 40		x 61	
130	UT3	10	400	2.50	11.20	14.20	9	45.00	x 89	20.90	166	21.90
130	UT5	10	400	2.50	11.30	14.30	7	72.00	o 82	33.50	o 177	28.00

Evenness / Imperfections													
Lab Code	Instrument	No. of tests	Speed (m/min)	Testing time (min)	Um (%)	CVm(%)	Thin places / 1000 m	CV (%)	Thick places / 1000 m	CV (%)	Neps / 1000 m	CV (%)	
131	UT3	10	400	1.00	o 11.46	o 14.52	x 25	82.70	x 90	62.90	159	26.30	
136	UT3	10	400	1.00	o 10.85	o 13.73	o 4	76.80	63	34.40	123	44.30	
138	UT3	10	400	2.50	o 11.10	o 14.03	o 11	69.80	61	26.30	138	22.00	
140	UT4	10	400	1.00	o 11.35	o 14.36	o 17	70.70	x 86	27.30	o 171	27.30	
142	UT3	10	400	2.50	o 11.25	o 13.90	8	43.20	60	26.80	125	19.30	
149	PT - 3	10	400	1.00	o 11.25	o 14.24	12	104.30	66	43.60	146	26.50	
157	UT5	10	800	1.25	o 11.02	o 14.03	9	87.90	67	35.00	138	30.50	
162	Premier Tester 7000	10	400	1.00	o 10.93	o 13.79	6	78.57	46	36.22	124	43.46	
170	UT3	10	400	2.50	o 10.99	o 13.90	6	44.90	58	16.70	113	16.40	
171	UT4-SX	10	400	1.00	o 10.98	o 13.86	9	50.80	o 40	31.70	109	19.60	
175	UT4-SX	10	100	1.00	o 11.10	o 14.10	9	64.90	66	28.70	o 167	36.20	
175	UT3	10	100	1.00	o 11.15	o 14.12	14	71	71	71	o 170	170	
178	Premier Tester 7000	10	400	1.00	o 11.03	o 13.93	10	81.75	42	30.88	123	29.23	
195	UT3	10	400	2.50	o 10.84	o 13.58	6	78.00	51	38.80	114	23.50	
202	UT5	10	400	1.00	o 10.94	o 13.83	9	57.40	48	42.20	104	33.80	
206	UT4	10	400	2.50	o 11.15	o 14.10	13	52.70	59	29.50	143	17.00	
206	UT4	10	400	2.50	o 11.15	o 14.10	11	68.90	59	31.10	157	15.70	
214	UT4	10	400	2.50	o 11.02	o 13.92	8	43.85	50	30.60	113	10.60	
218	UT5 - 800	10	800	1.25	o 10.84	o 13.78	6	61.40	50	32.30	114	32.60	
222	UT3	20	400	1.00	o 11.08	o 14.02	12	56.90	70	44.90	o 167	20.00	
227	Premier QualiCenter	10	400	1.00	o 11.04	o 13.96	14	50.15	59	33.82	121	23.07	
228	Premier QualiCenter	10	400	1.00	o 11.45	o 14.48	o 17	40.24	o 81	34.05	139	22.63	
229	Premier QualiCenter	10	400	1.00	o 11.45	o 14.48	o 15	60.93	63	28.16	x 201	61.29	
230	Premier IQ	10	400	1.00	o 11.20	o 14.15	12	75.17	48	28.02	134	14.20	
231					o 10.93	o 13.80	10	78.57	47	23.57	o 91	50.35	
<b>n</b>					<b>75</b>	<b>83</b>	<b>83</b>		<b>80</b>		<b>79</b>		
<b>∅</b>					<b>11.07</b>	<b>13.98</b>	<b>9.45</b>		<b>57.94</b>		<b>133.61</b>		
<b>s</b>					<b>0.17</b>	<b>0.22</b>	<b>3.17</b>		<b>11.22</b>		<b>21.76</b>		
<b>CV %</b>					<b>1.53</b>	<b>1.60</b>	<b>33.50</b>		<b>19.37</b>		<b>16.29</b>		
<b>s<sub>r</sub><sup>2</sup></b>							<b>38.75</b>		<b>342.21</b>		<b>1078.12</b>		
<b>s<sub>L</sub><sup>2</sup></b>							<b>5.63</b>		<b>76.58</b>		<b>312.34</b>		
<b>s<sub>R</sub><sup>2</sup></b>							<b>44.38</b>		<b>418.79</b>		<b>1390.46</b>		
<b>r</b>							<b>17.43</b>		<b>51.80</b>		<b>91.94</b>		
<b>R</b>							<b>18.65</b>		<b>57.30</b>		<b>104.41</b>		

### Evenness / Imperfections



Optical evenness														
Lab Code	Instrument	No. of tests	Speed (m/min)	Length / sample (m)	2D Ø mm	CV 2D 0.3mm %	CV 2D 8mm %	CV FS %	Shape	Thin places (-30%)	Thick places (+30%)	Neps (+50%)	Reference yarn ø mm	OCV %
2	UT4	10	400	1000	0.160	14.79	10.75	10.75	0.83					
2	Oasys	10	400	1000						0.00	5.00	99.00	0.15	15.29
4	UT4	10	400	1000	0.151	14.93	11.57	9.04	0.82					
4	UT5	10	400	1000	0.148	14.86	11.19	9.77	0.82					
4	UT5	10	800	1000	0.150	15.30	11.54	10.04	o 0.84					
12	UT4	10	400	1	0.160	15.48	11.13	10.75	0.83	1807.00	462.00			
19	UT4	10	400	1000	o 0.163	15.17	10.94	10.51	0.83					
29	UT4-1	10	400	2.5	0.157	14.46	10.62	9.84	0.82					
29	UT4-2	10	400	2.5	0.151	o 14.10	10.52	9.39	o 0.81					
32	UT4	10	400	1000	x 0.191	x 21.30	x 13.56		x 0.76					
58	UT4	10	400		0.156	15.31	o 13.27	9.70	0.83	2044.00				
130	UT5	10	400	1000	0.150	14.98	11.28		0.83	2025.00		82.00		
175	UT4-SX	10	400	400	0.147	15.06	11.39	9.85	0.83	2016.00				
185	Zweigle G585	10	300	1000						34.00	508.00	268.00	0.12	15.17
202	UT5	10	400	400	0.147	14.86	11.09	9.88	0.82	1887.00				
<b>n</b>					<b>11</b>	<b>11</b>	<b>11</b>		<b>11</b>	<b>7</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>
<b>Ø</b>					<b>0.15</b>	<b>14.96</b>	<b>11.32</b>		<b>0.83</b>					
<b>s</b>					<b>0.01</b>	<b>0.40</b>	<b>0.73</b>		<b>0.01</b>					
<b>CV %</b>					<b>3.56</b>	<b>2.65</b>	<b>6.43</b>		<b>0.99</b>					

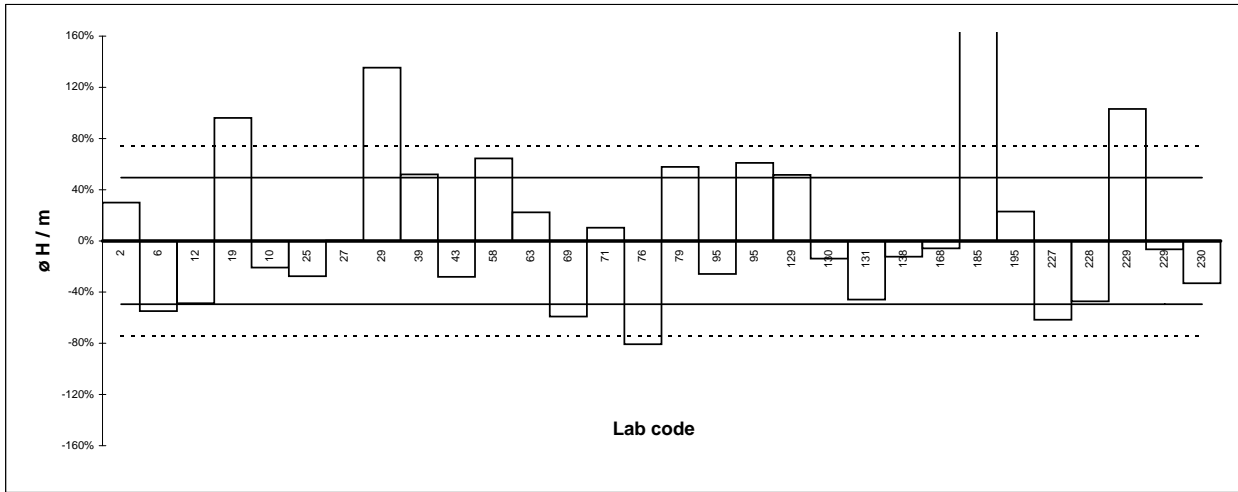
Yarn hairiness - Count							
Lab Code	Instrument	No. of tests	Speed (m/min)	Length (m/sample)	Distance mm	ø H / m	CV (%)
2	Zweigle G 566	10	50	300	3	6.48	48.08
6	Zweigle G566	10	50	300	3	2.25	33.44
12	Zweigle G567	10	50	300	3	2.56	45.50
19	Zweigle G565	10	50	300	3	o 9.78	44.44
10	Zweigle G567	10	50	300		3.95	47.69
25	Zweigle G566	10	50	300	3	3.61	23.50
27	Zweigle G565	10	50	300	3	5.00	45.50
29	Zweigle G566	10	50	300	3	x 11.74	44.00
39	Zweigle G566	10	49	100		7.58	65.90
43	Zweigle G566	5	50	100	3	3.59	23.43
58	Zweigle G565	9	50	300	3	8.20	26.60
63	Zweigle G565	10		300		6.10	
69	Zweigle G566	10	50	300	3	2.04	38.15
71	Zweigle G566	10	50	300	3	5.50	37.50
76	Zweigle G565	10	50	300	3	o 0.96	18.39
79	Zweigle G565	10	50	300	3	7.87	58.50
95	Premier QualiCenter	10	50	300	3	3.70	22.90
95	Premier QualiCenter	10	50	300	3-10	8.03	13.80
129	Zweigle G566	10	50	100	3	7.56	54.37
130	Zweigle G566	10	50	300	3	4.30	67.70
131	Zweigle G566	10	50	300	3	2.70	39.44
138	Zweigle G565	10	50	300		4.37	47.86
168	Zweigle G567	10	50	300	3	4.70	36.98
185	Zweigle G566	10	50	100	5	x 13.34	47.42
195	Zweigle G566	10	50	300		6.13	30.08
227	Premier QualiCenter	10	400	1	3-10	1.91	14.90
228	Premier QualiCenter	10	400	400	3-10	2.64	17.50
229	Premier QualiCenter	10	50	250	3-10	o 10.13	92.00
229	Premier QualiCenter	10	50	250	3	4.66	80.70
230	Premier IQ	10	50	250	3	3.34	13.60
<b>n</b>						<b>28</b>	
<b>Ø</b>						<b>4.99</b>	
<b>s</b>						<b>2.47</b>	
<b>CV %</b>						<b>49.50</b>	
<b>s<sub>r</sub><sup>2</sup></b>						<b>9.01</b>	
<b>s<sub>L</sub><sup>2</sup></b>						<b>5.39</b>	
<b>s<sub>R</sub><sup>2</sup></b>						<b>14.40</b>	
<b>r</b>						<b>8.41</b>	
<b>R</b>						<b>10.62</b>	

Yarn hairiness - Index							
Lab Code	Instrument	No. of tests	Speed (m/min)	Testing time (sec)	ø H - Index	CV %	sh
1	UT3	10	400	2.50	3.95	3.36	0.92
2	UT4	10	400	2.50	3.82	7.70	0.91
4	UT4	10	400	2.50	o 4.13	7.70	x 1.03
4	UT5	10	400	2.50	3.80	6.10	o 0.97
4	UT5	10	800	1.25	3.95	6.10	0.91
6	UT3	10	400	2.50	3.52	3.67	0.83
6	UT4	10	400	1.00	3.53	3.00	0.82
10	UT4	10	400	5.00	3.95	8.10	0.92
12	UT4	10	400	1.00	3.82	6.70	0.96
19	UT4	10	400	2.50	o 4.03	7.00	o 0.99
25	UT3	10	400	2.50	3.79	2.91	0.86
27	UT3	10	400	2.50	3.60	3.21	o 0.80
29	UT4-1	10	400	2.50	3.74	4.40	0.87
29	UT4-2	10	400	2.50	3.49	3.60	0.89
32	UT4	10	400	2.50	3.52	2.90	0.86
33	UT3	10	400	2.50	3.88	5.10	0.93
35	UT3	10	400	2.50	3.79	5.04	0.88
39	UT4	10	400	1.00	o 4.07	x 10.40	o 0.97
44	UT3	10	400	1.00	3.70	o 9.80	0.90
45	UT4	10	400	1.00	3.76	3.69	0.90
48	UT3	10	400	2.50	o 3.41	3.60	o 0.79
48	Premier Tester 7000	10	400	2.50	3.47	3.40	0.90
49	UT3	10	200	5.00	3.43	3.59	0.81
52	UT4	10	400	2.50	3.59	1.80	0.85
53	UT3	10	400	1.00	3.95	6.95	0.94
58	UT4	10	400	2.50	3.75	4.20	0.85
59	UT3	10	400	5.00	3.61	o 0.86	
60	UT4	10	50	6.00	3.70	o 9.20	0.90
63	UT5	10	800	1.25	3.68	5.90	
69	UT4	10	400	1.00	3.75	4.20	0.95
71	UT4	10	50	5.00	3.46	3.00	0.83
73	UT3	10	400	1.00	3.70	4.60	0.85
75	UT3	10	400	1.00	o 3.35	6.33	
95	iQ Quali Center	10	400	1.00	x 2.46	o 9.98	x 0.52
96	UT4	10	400	1.00	3.70	3.60	0.84
97	UT4 - 5x	10	400	2.50	3.90	3.20	0.89
98	UT4	10	400	1.00	3.55	2.90	0.85
98	UT3	10	400	1.00	3.88	2.93	0.94
98	UT3	10	400	1.00	3.49	3.12	0.84
99	UT3	10	1000	2.50	3.81	6.23	0.94
99	UT4	10	1000	2.50	3.97	o 8.70	o 0.97
104	UT5-1	10	800	2.50	3.87	2.70	0.86
122	UT3	10	400	1.00	o 4.13	o 9.18	o 0.98
125	UT3	10	400	1.00	3.60	7.95	0.86
126	UT3	10	400	1.00	3.61	2.22	0.86
126	UT3	10	400	1.00	3.69	3.36	0.84
130	UT5	10	400	2.50	3.90	7.80	0.95
131	UT3	10	400	1.00	3.62	4.79	0.86
136	UT3	10	400	1.00	3.70	o 10.10	0.91
138	UT3	10	400	2.50	3.61	5.11	0.84
140	UT3	10	400	1.00	o 4.04	2.46	0.86
142	UT3	10	400	2.50	3.54	7.90	0.84
149	PT - 3	10	400	1.00	3.63	4.83	o 0.98
157	PT - 3	10	400	1.00	3.69	3.80	0.82
162	Premier Tester 7000	10	50	5.00	3.74	7.06	o 1.00
170	UT3	10	400	2.50	3.67	7.67	0.92
171	UT4-SX	10	400	1.00	3.67	2.00	0.86
175	UT4-SX	10	400	1.00	3.67	2.60	0.86
175	UT3	10	100	1.00	3.96	5.06	0.93

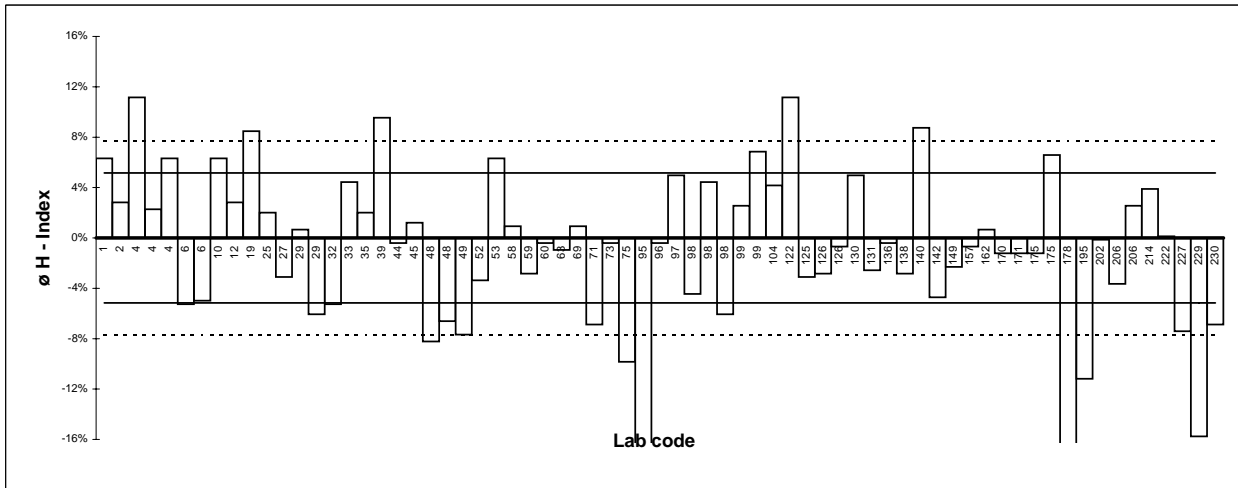
Yarn hairiness - Index							
Lab Code	Instrument	No. of tests	Speed (m/min)	Testing time (sec)	ø H - Index	CV %	sh
178	Premier Tester 7000	10	400	1.00	x 3.10	5.21	0.85
195	UT3	10	50	2.50	o 3.30	5.90	0.81
202	UT5	10	400	1.00	3.71	4.10	0.89
206	UT3	10	400	2.50	3.58	8.20	0.87
206	UT4	10	400	2.50	3.81	5.80	0.86
214	UT4	10	400	2.50	3.86	3.80	0.91
222	UT3	20	400	1.00	3.72	6.29	o 0.98
227	Premier QualiCenter	10	400	1.00	3.44	2.30	0.88
229	Premier QualiCenter	10	400	1.00	x 3.13	x 10.90	o 0.78
230	Premier IQ	10	400	1.00	3.46	1.99	0.82
<b>n</b>					<b>66</b>	<b>67</b>	<b>64</b>
<b>Ø</b>					<b>3.72</b>	<b>5.05</b>	<b>0.89</b>
<b>s</b>					<b>0.19</b>	<b>2.31</b>	<b>0.05</b>
<b>CV %</b>					<b>5.16</b>	<b>45.70</b>	<b>6.16</b>
<b>s<sub>r</sub><sup>2</sup></b>					<b>0.04</b>		
<b>s<sub>L</sub><sup>2</sup></b>					<b>0.03</b>		
<b>s<sub>R</sub><sup>2</sup></b>					<b>0.08</b>		
<b>r</b>					<b>0.59</b>		
<b>R</b>					<b>0.77</b>		

Yarn friction					
Lab Code	Instrument	No. of tests	Length (m/sample)	$\sigma \mu /$ friction value	CV (%)
1	Zweigle G530	10	800	0.223	10.62
6	Rothschild FM	10	150	0.310	2.26
10	Schlafhorst	10		0.240	3.06
19	Zweigle G534	5	200	0.260	9.01
27	Rothschild FM	5	1000	0.283	
27	Honigmann	5	1000	o 0.330	
29	Schlafhorst	10	200	0.275	1.71
35	Schlafhorst	10		0.286	1.44
35	Attrifil	10	100	x 0.355	2.94
39	Schlafhorst	50		0.278	3.90
44	Schlafhorst	10	750	0.290	9.50
45	Schlafhorst	10		0.279	0.87
48	Zweigle G 530	10	1000	0.250	
53	Mesdan Attrifil	10		x 0.157	
58	Wronz	10		0.290	2.35
63	Zweigle G530	10		o 0.210	
76	Zweigle G 532	10	80	0.270	4.10
96	Schlafhorst	10		0.306	2.15
98	Schlafhorst	10	10	o 0.201	4.34
104	Tamashiro	50	1250	0.314	1.58
130	Zweigle G530	10	500	0.216	1.80
131	Zweigle G530	10	400	0.273	4.90
134	Zweigle G532	10	532	0.285	1.43
136	Zweigle G530	10	5	0.280	
142	SDL Friction tester	10	300	0.253	4.70
169	Mesdan Attrifil	100	50	0.233	1.03
175	Mesdan Attrifil	10	100	0.250	0.70
185	Zweigle G 532	10		0.230	
206	Lawson Hemphill	10		o 0.210	
<b>n</b>				<b>27</b>	
<b>Ø</b>				<b>0.26</b>	
<b>s</b>				<b>0.03</b>	
<b>CV %</b>				<b>13.14</b>	
<b>s<sub>r</sub><sup>2</sup></b>				<b>0.0001</b>	
<b>s<sub>L</sub><sup>2</sup></b>				<b>0.0012</b>	
<b>s<sub>R</sub><sup>2</sup></b>				<b>0.0013</b>	
<b>r</b>				<b>0.0258</b>	
<b>R</b>				<b>0.1002</b>	

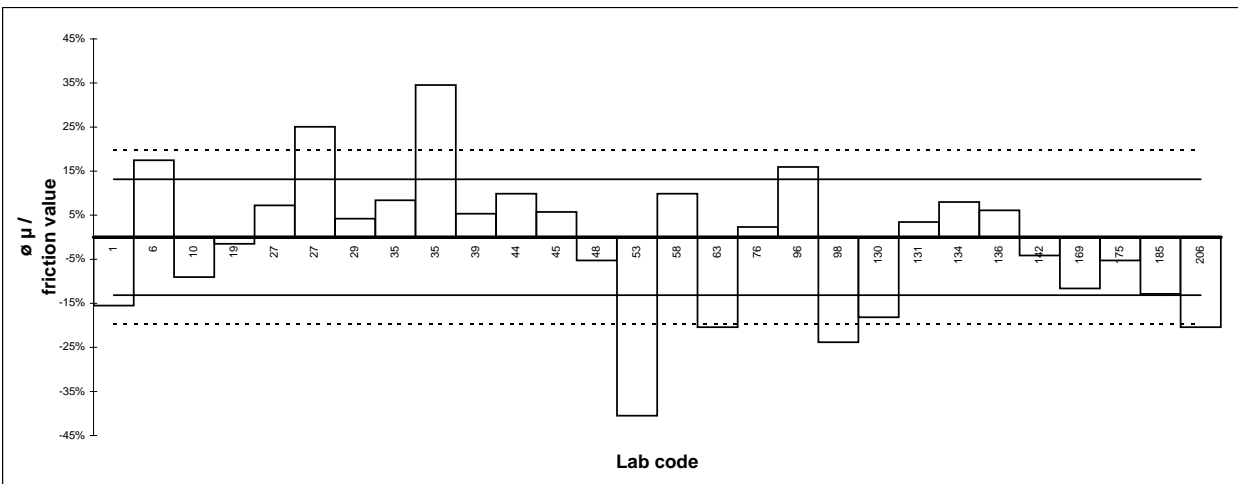
### Yarn hairiness count



### Yarn hairiness Index



### Yarn friction



Climate conditions					
Lab Code	°C	% rel. humidity	Lab Code	°C	% rel. humidity
1	21	65	106	?	?
2	20	65	107	20	65
4	20.6	64	108	21.6	59
5	20	65	122	22	63
6	22.5	52	125	21	65
10	20	64	126	?	?
12	22	65	129	23	55
19	20	65	130	22.2	69.7
25	22	66	131	21	63
27	21.5	65	134	?	?
29	21.1	64.5	136	23	50
32	21	65	138	20	65
33	20	64	140	25	65
35	20	65	142	20	63
39	21	65	149	26	70
43	20	64	153	26	66
44	20	65	157	26	66
45	21	65	161	20	65
48	20	65	162	?	?
49	20.3	63	167	33	55
52	20	65	168	?	?
53	20	66	169	21	50
56	26	52	170	20	65
58	?	?	171	26	63
59	20	65	175	21	64
60	20	63	178	27	63
61	?	?	185	20	65
63	20	65	186	20	65
66	20	60	187	?	?
69	25	64	191	?	?
71	20	65	195	25	59
72	?	?	202	21	65
73	25	65.5	206	21	65
74	19.5	62	207	?	?
75	?	?	214	22.5	65
76	24	65	216	21	66
78	--	--	218	24	64
79	20	65	220	?	?
84	20	65	222	27	65
95	27	67	225	23	65
96	?	?	227	27	66
97	?	?	228	27	65
98	21.1	65	229	26	62
99	23	63	230	25.5	66
101	20	65	231	?	?
102	25	62	238	20	67
104	27	65			

## DICTIONARY / LEXIKON

Abbreviation	English	Deutsch
n	Number of values	Anzahl Werte
Ø	Mean value	Mittelwert
s	Standard deviation	Standardabweichung
CV%	Coefficient of variation (%)	Variationskoeffizient (%)
$s_r^2$	Repetition variance	Wiederholvarianz
$s_L^2$	Variance between laboratories	Varianz zwischen den Labors
$s_R^2$	Comparison variance	Vergleichsvarianz
r	Repetition limit	Wiederholgrenze
R	Comparison limit	Vergleichsgrenze
	Breaking force	Höchstkraft
	Confidence rate	Vertrauensbereich
	Cops	Kops
	Distance	Abstand
	Elongation	Dehnung
	Evenness	Gleichmässigkeit
	Friction value	Reibwert
	Humidity	Feuchtigkeit
	Imperfections	Imperfektionen
	Lab code	Laborkennzahl
	Length (m/sample)	Länge (m/Probe)
	Neps	Nissen
	Number of tests	Anzahl Tests
	Optical	Optisch
	Pre-tension	Vorspannung
	Shape	Rundheit
	Skein breaking tenacity	Strang Höchstzugfestigkeit
	Speed	Geschwindigkeit
	Tenacity	Festigkeit
	Testing time	Zeit / Test
	Thick places	Dickstellen
	Thin places	Dünnstellen
	Yarn count	Garnfeinheit
	Yarn friction	Garnreibung
	Yarn hairiness	Garnhaarigkeit
	Yarn twist	Garndrehung