



**International Cotton Advisory Committee**



# CSITC Global - Round Trial 2023 - 3 General Evaluation

**Section One: Result Distribution**  
Section Two: Instrument Evaluation  
Section Three: Within Limits Evaluation

## Section One: Result Distribution

Content:

Mandatory Parameters  
-Summary Table  
-Distribution Graphs

Optional Parameters  
-Summary Table  
-Distribution Graphs

Executed By:  
Faserinstitut Bremen e.V., Bremen, Germany\*  
USDA-AMS, Memphis, TN, USA

System Provided by:  
Generation 10 Limited



This report is an outcome of the Project CFC/ICAC/33 – CSITC,  
which benefitted from support from the Common Fund for Commodities  
and the European Union, partners in Commodity Development.



\* Faserinstitut Bremen are a Cooperation Partner with ICA Bremen

Global - Round Trial 2023 - 3

Inter-Instrument Averages, Inter-Instrument Variations, Typical within-instrument Variations

Micronaire							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			4.449	3.936	4.949	4.340	
Reference Values for Evaluation			4.449	3.936	4.949	4.340	
Number Of Instruments			158	158	158	158	<b>158</b>
Inter-Instrument Variation	based on 30 tests	SD	0.040	0.052	0.042	0.048	<b>0.045</b>
		CV %	0.9	1.3	0.8	1.1	<b>1.0</b>
	based on 6 tests	SD	0.043	0.059	0.047	0.053	<b>0.050</b>
		CV %	1.0	1.5	0.9	1.2	<b>1.2</b>
	based on single tests	SD	0.053	0.064	0.056	0.061	<b>0.059</b>
		CV %	1.2	1.6	1.1	1.4	<b>1.3</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.017	0.023	0.019	0.018	<b>0.019</b>
		CV %	0.4	0.6	0.4	0.4	<b>0.4</b>
	between single tests on one day	SD	0.029	0.033	0.029	0.030	<b>0.030</b>
		CV %	0.7	0.8	0.6	0.7	<b>0.7</b>
	between all tests on different days	SD	0.034	0.040	0.033	0.033	<b>0.035</b>
		CV %	0.8	1.0	0.7	0.8	<b>0.8</b>

Strength							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			34.053	25.025	28.635	28.199	
Reference Values for Evaluation			34.053	25.025	28.635	28.199	
Number Of Instruments			158	158	158	158	<b>158</b>
Inter-Instrument Variation	based on 30 tests	SD	0.608	0.745	0.604	0.602	<b>0.640</b>
		CV %	1.8	3.0	2.1	2.1	<b>2.3</b>
	based on 6 tests	SD	0.712	0.775	0.687	0.665	<b>0.710</b>
		CV %	2.1	3.1	2.4	2.4	<b>2.5</b>
	based on single tests	SD	1.017	0.899	0.879	0.841	<b>0.909</b>
		CV %	3.0	3.6	3.1	3.0	<b>3.2</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.314	0.265	0.250	0.286	<b>0.279</b>
		CV %	0.9	1.1	0.9	1.0	<b>1.0</b>
	between single tests on one day	SD	0.527	0.500	0.455	0.487	<b>0.492</b>
		CV %	1.5	2.0	1.6	1.7	<b>1.7</b>
	between all tests on different days	SD	0.618	0.612	0.533	0.593	<b>0.589</b>
		CV %	1.8	2.4	1.9	2.1	<b>2.1</b>

Length							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			1.2067	0.9938	1.1673	1.0801	
Reference Values for Evaluation			1.2067	0.9938	1.1673	1.0801	
Number Of Instruments			158	158	158	158	<b>158</b>
Inter-Instrument Variation	based on 30 tests	SD	0.0086	0.0120	0.0092	0.0075	<b>0.0093</b>
		CV %	0.7	1.2	0.8	0.7	<b>0.9</b>
	based on 6 tests	SD	0.0099	0.0132	0.0106	0.0087	<b>0.0106</b>
		CV %	0.8	1.3	0.9	0.8	<b>1.0</b>
	based on single tests	SD	0.0138	0.0165	0.0146	0.0132	<b>0.0145</b>
		CV %	1.1	1.7	1.2	1.2	<b>1.3</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.0050	0.0060	0.0052	0.0047	<b>0.0052</b>
		CV %	0.4	0.6	0.4	0.4	<b>0.5</b>
	between single tests on one day	SD	0.0101	0.0111	0.0106	0.0101	<b>0.0105</b>
		CV %	0.8	1.1	0.9	0.9	<b>0.9</b>
	between all tests on different days	SD	0.0111	0.0123	0.0114	0.0109	<b>0.0114</b>
		CV %	0.9	1.2	1.0	1.0	<b>1.0</b>

Uniformity							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			83.438	77.888	81.590	79.356	
Reference Values for Evaluation			83.438	77.888	81.590	79.356	
Number Of Instruments			158	158	158	158	<b>158</b>
Inter-Instrument Variation	based on 30 tests	SD	0.370	0.418	0.382	0.396	<b>0.392</b>
		CV %	0.4	0.5	0.5	0.5	<b>0.5</b>
	based on 6 tests	SD	0.424	0.449	0.454	0.451	<b>0.445</b>
		CV %	0.5	0.6	0.6	0.6	<b>0.6</b>
Typical within-instrument Variation (Median)	based on single tests	SD	0.560	0.656	0.642	0.648	<b>0.626</b>
		CV %	0.7	0.8	0.8	0.8	<b>0.8</b>
	between different days with each 6 tests	SD	0.189	0.235	0.236	0.237	<b>0.224</b>
		CV %	0.2	0.3	0.3	0.3	<b>0.3</b>
Typical within-instrument Variation (Median)	between single tests on one day	SD	0.384	0.494	0.468	0.444	<b>0.448</b>
		CV %	0.5	0.6	0.6	0.6	<b>0.6</b>
	between all tests on different days	SD	0.442	0.537	0.512	0.508	<b>0.500</b>
		CV %	0.5	0.7	0.6	0.6	<b>0.6</b>

Color Rd							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			76.137	77.569	77.218	79.464	
Reference Values for Evaluation			76.137	77.569	77.218	79.464	
Number Of Instruments			158	158	158	158	<b>158</b>
Inter-Instrument Variation	based on 30 tests	SD	0.433	0.396	0.462	0.497	<b>0.447</b>
		CV %	0.6	0.5	0.6	0.6	<b>0.6</b>
	based on 6 tests	SD	0.440	0.414	0.483	0.499	<b>0.459</b>
		CV %	0.6	0.5	0.6	0.6	<b>0.6</b>
Typical within-instrument Variation (Median)	based on single tests	SD	0.452	0.439	0.512	0.513	<b>0.479</b>
		CV %	0.6	0.6	0.7	0.6	<b>0.6</b>
	between different days with each 6 tests	SD	0.114	0.118	0.152	0.128	<b>0.128</b>
		CV %	0.1	0.2	0.2	0.2	<b>0.2</b>
Typical within-instrument Variation (Median)	between single tests on one day	SD	0.089	0.093	0.090	0.084	<b>0.089</b>
		CV %	0.1	0.1	0.1	0.1	<b>0.1</b>
	between all tests on different days	SD	0.173	0.183	0.215	0.165	<b>0.184</b>
		CV %	0.2	0.2	0.3	0.2	<b>0.2</b>

Color +b							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			13.396	12.493	9.064	13.004	
Reference Values for Evaluation			13.396	12.493	9.064	13.004	
Number Of Instruments			158	158	158	158	<b>158</b>
Inter-Instrument Variation	based on 30 tests	SD	0.290	0.265	0.217	0.382	<b>0.288</b>
		CV %	2.2	2.1	2.4	2.9	<b>2.4</b>
	based on 6 tests	SD	0.292	0.283	0.238	0.386	<b>0.300</b>
		CV %	2.2	2.3	2.6	3.0	<b>2.5</b>
Typical within-instrument Variation (Median)	based on single tests	SD	0.306	0.298	0.247	0.389	<b>0.310</b>
		CV %	2.3	2.4	2.7	3.0	<b>2.6</b>
	between different days with each 6 tests	SD	0.094	0.093	0.088	0.093	<b>0.092</b>
		CV %	0.7	0.7	1.0	0.7	<b>0.8</b>
Typical within-instrument Variation (Median)	between single tests on one day	SD	0.049	0.048	0.045	0.043	<b>0.046</b>
		CV %	0.4	0.4	0.5	0.3	<b>0.4</b>
	between all tests on different days	SD	0.120	0.122	0.107	0.124	<b>0.118</b>
		CV %	0.9	1.0	1.2	1.0	<b>1.0</b>

Optional Parameters

Inter-Instrument Averages, Inter-Instrument Variations, Typical within-instrument Variations

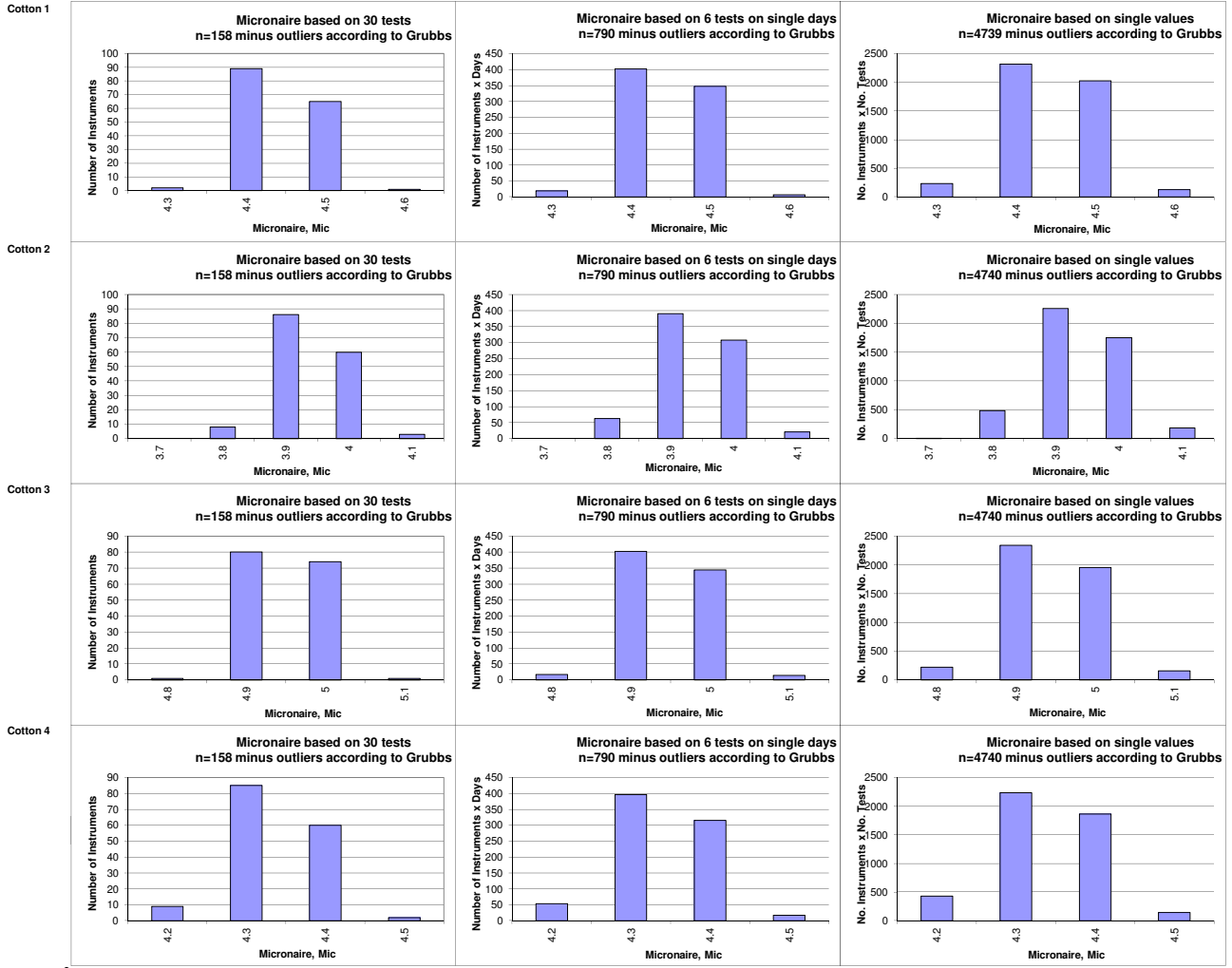
Trash Count							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			17.11	16.12	14.76	10.97	
Reference Values for Evaluation			17.11	16.12	14.76	10.97	
Number Of Instruments			90	90	90	90	<b>90</b>
Inter-Instrument Variation	based on 30 tests	SD	2.67	2.93	3.02	2.77	<b>2.85</b>
		CV %	15.6	18.2	20.5	25.2	<b>19.9</b>
	based on 6 tests	SD	3.40	3.42	3.92	2.97	<b>3.43</b>
		CV %	19.9	21.2	26.6	27.0	<b>23.7</b>
	based on single tests	SD	4.02	4.10	4.38	3.28	<b>3.95</b>
		CV %	23.5	25.5	29.7	29.9	<b>27.1</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	1.50	1.58	1.72	1.21	<b>1.50</b>
		CV %	8.7	9.8	11.7	11.0	<b>10.3</b>
	between single tests on one day	SD	1.58	1.40	1.43	1.22	<b>1.41</b>
		CV %	9.2	8.7	9.7	11.1	<b>9.7</b>
	between all tests on different days	SD	2.55	2.38	2.47	2.03	<b>2.36</b>
		CV %	14.9	14.7	16.7	18.5	<b>16.2</b>

Trash Area							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			0.146	0.130	0.131	0.100	
Reference Values for Evaluation			0.146	0.130	0.131	0.100	
Number Of Instruments			90	90	90	90	<b>90</b>
Inter-Instrument Variation	based on 30 tests	SD	0.027	0.024	0.029	0.022	<b>0.026</b>
		CV %	18.7	18.8	22.5	22.5	<b>20.6</b>
	based on 6 tests	SD	0.032	0.029	0.034	0.026	<b>0.030</b>
		CV %	22.0	22.2	25.8	26.4	<b>24.1</b>
	based on single tests	SD	0.037	0.033	0.038	0.031	<b>0.035</b>
		CV %	25.1	25.3	28.8	31.1	<b>27.6</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.017	0.016	0.017	0.015	<b>0.016</b>
		CV %	11.3	12.5	13.1	14.8	<b>12.9</b>
	between single tests on one day	SD	0.014	0.011	0.010	0.011	<b>0.011</b>
		CV %	9.5	8.6	7.9	10.6	<b>9.1</b>
	between all tests on different days	SD	0.026	0.025	0.026	0.022	<b>0.025</b>
		CV %	17.5	19.5	20.2	21.6	<b>19.7</b>

Maturity							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			86.15	86.09	87.40	85.66	
Reference Values for Evaluation			86.15	86.09	87.40	85.66	
Number Of Instruments			83	83	83	83	<b>83</b>
Inter-Instrument Variation	based on 30 tests	SD	0.61	0.62	0.57	0.71	<b>0.63</b>
		CV %	0.7	0.7	0.6	0.8	<b>0.7</b>
	based on 6 tests	SD	0.62	0.60	0.59	0.68	<b>0.62</b>
		CV %	0.7	0.7	0.7	0.8	<b>0.7</b>
	based on single tests	SD	0.70	0.69	0.63	0.67	<b>0.67</b>
		CV %	0.8	0.8	0.7	0.8	<b>0.8</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.09	0.10	0.09	0.07	<b>0.09</b>
		CV %	0.1	0.1	0.1	0.1	<b>0.1</b>
	between single tests on one day	SD	0.12	0.15	0.10	0.10	<b>0.12</b>
		CV %	0.1	0.2	0.1	0.1	<b>0.1</b>
	between all tests on different days	SD	0.23	0.23	0.18	0.18	<b>0.21</b>
		CV %	0.3	0.3	0.2	0.2	<b>0.2</b>

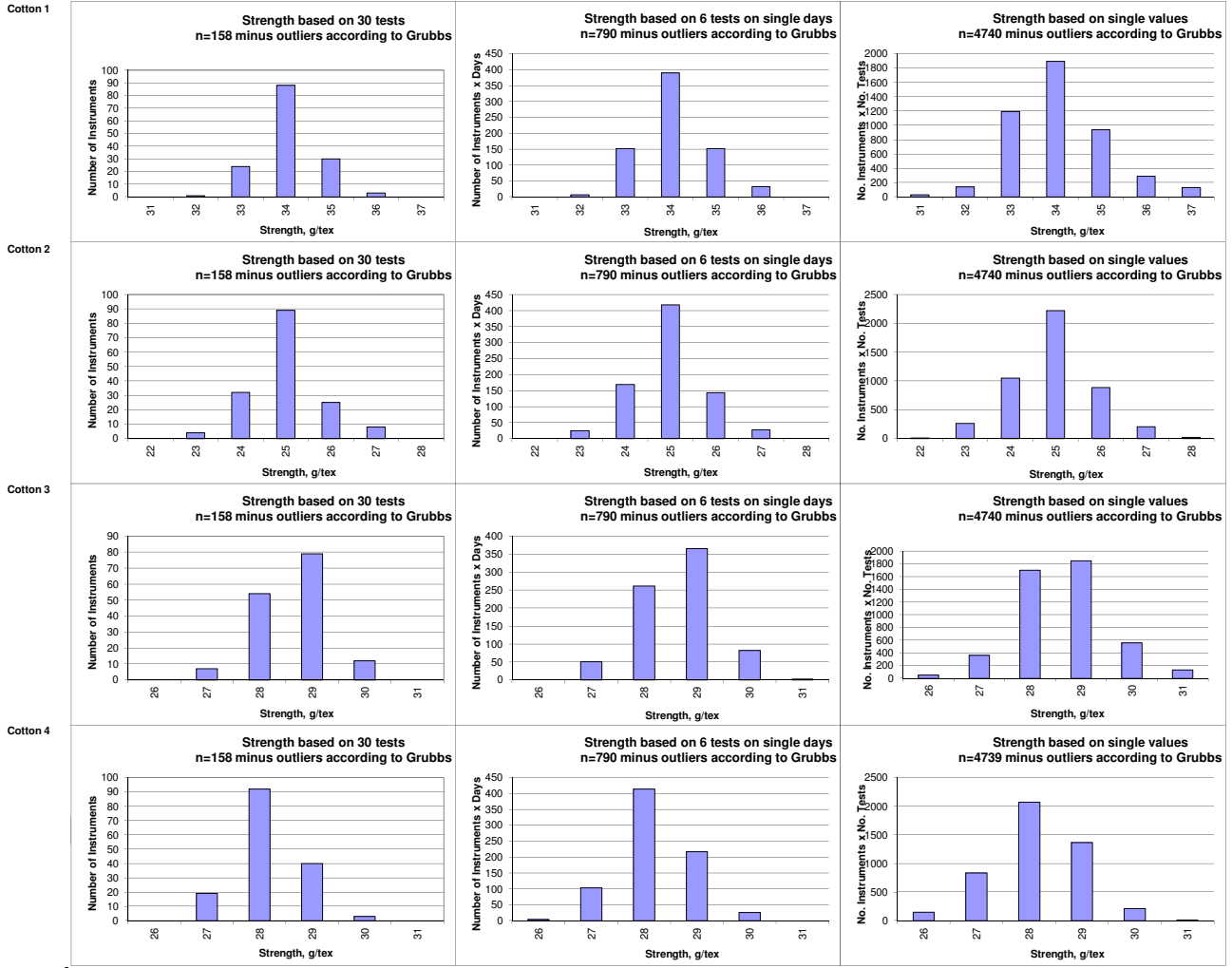
SFI							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
<b>Average of Instruments (Grubbs)</b>			7.02	15.14	8.74	11.95	
<b>Reference Values for Evaluation</b>			7.02	15.14	8.74	11.95	
<b>Number Of Instruments</b>			92	92	92	92	<b>92</b>
<b>Inter-Instrument Variation</b>	based on 30 tests	SD	0.71	1.57	0.75	1.04	<b>1.02</b>
		CV %	10.1	10.4	8.5	8.7	<b>9.4</b>
	based on 6 tests	SD	0.76	1.61	0.82	1.04	<b>1.06</b>
		CV %	10.8	10.6	9.4	8.7	<b>9.9</b>
	based on single tests	SD	0.83	1.84	0.91	1.23	<b>1.21</b>
		CV %	11.9	12.2	10.4	10.3	<b>11.2</b>
<b>Typical within-instrument Variation (Median)</b>	between different days with each 6 tests	SD	0.18	0.51	0.23	0.35	<b>0.32</b>
		CV %	2.5	3.4	2.6	3.0	<b>2.9</b>
	between single tests on one day	SD	0.32	0.87	0.44	0.66	<b>0.57</b>
		CV %	4.6	5.8	5.0	5.5	<b>5.2</b>
	between all tests on different days	SD	0.35	1.02	0.48	0.73	<b>0.64</b>
		CV %	5.0	6.7	5.5	6.1	<b>5.8</b>

Test Result Distributions  
Micronaire



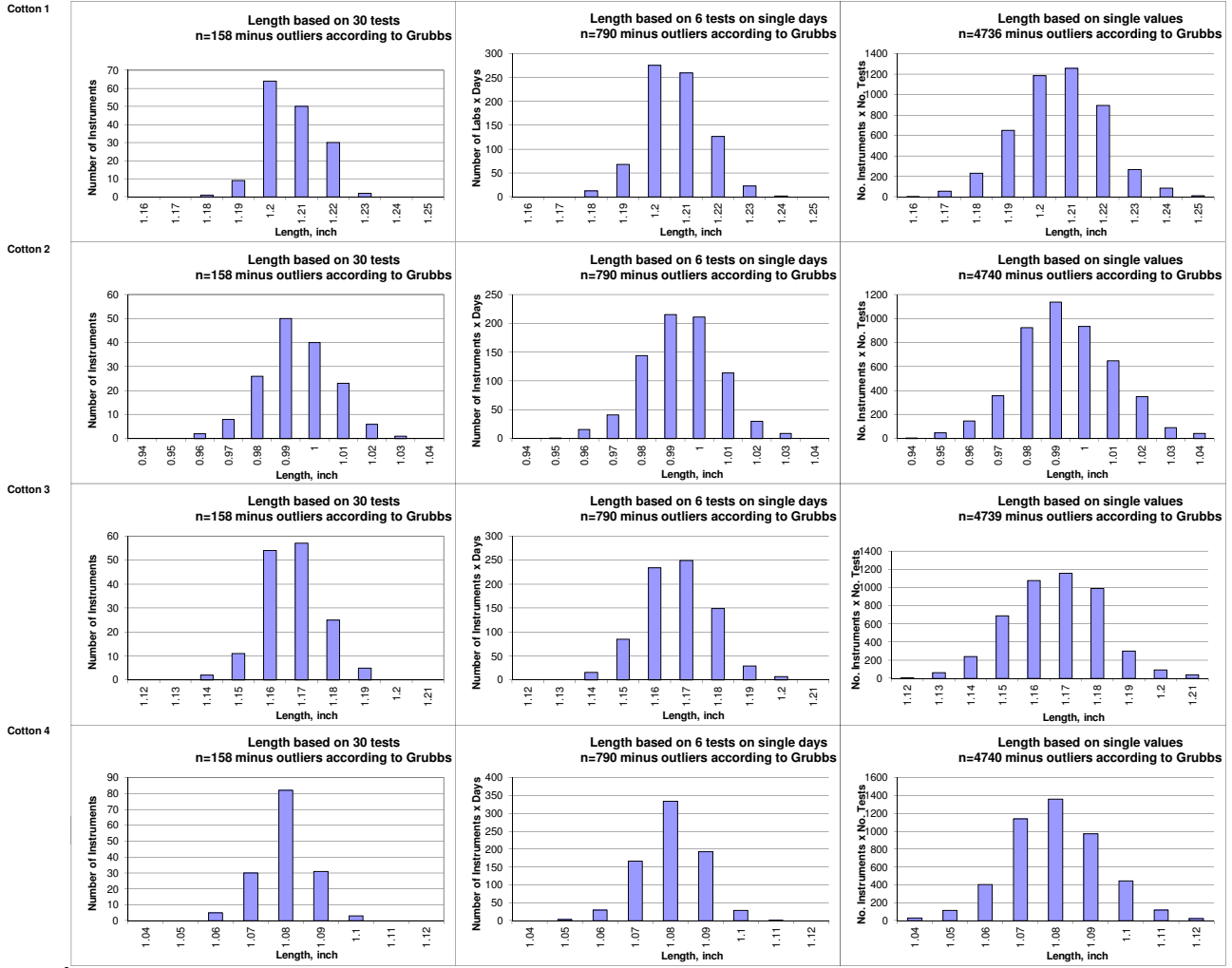
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method.)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Strength



(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

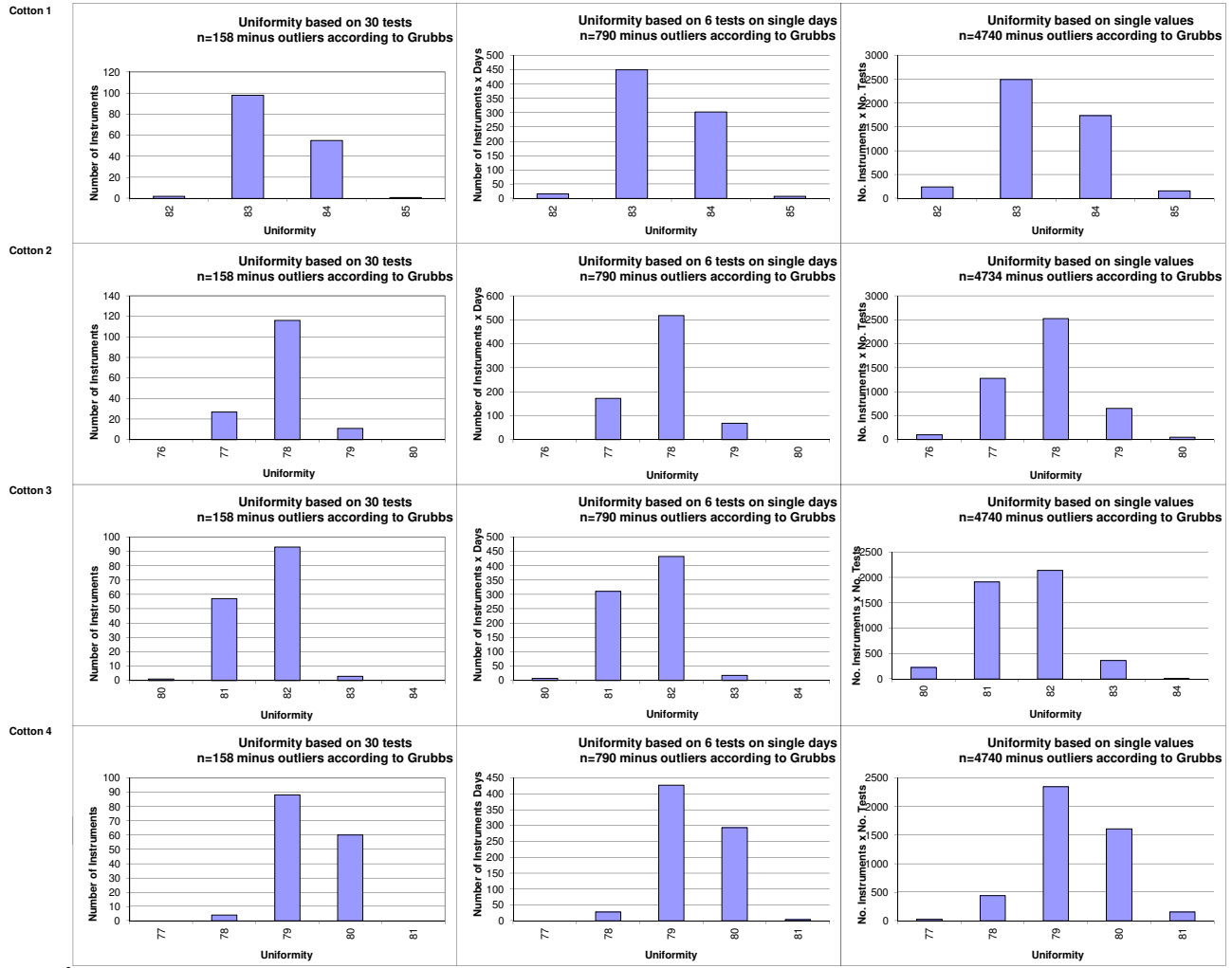
Test Result Distributions  
Length



(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

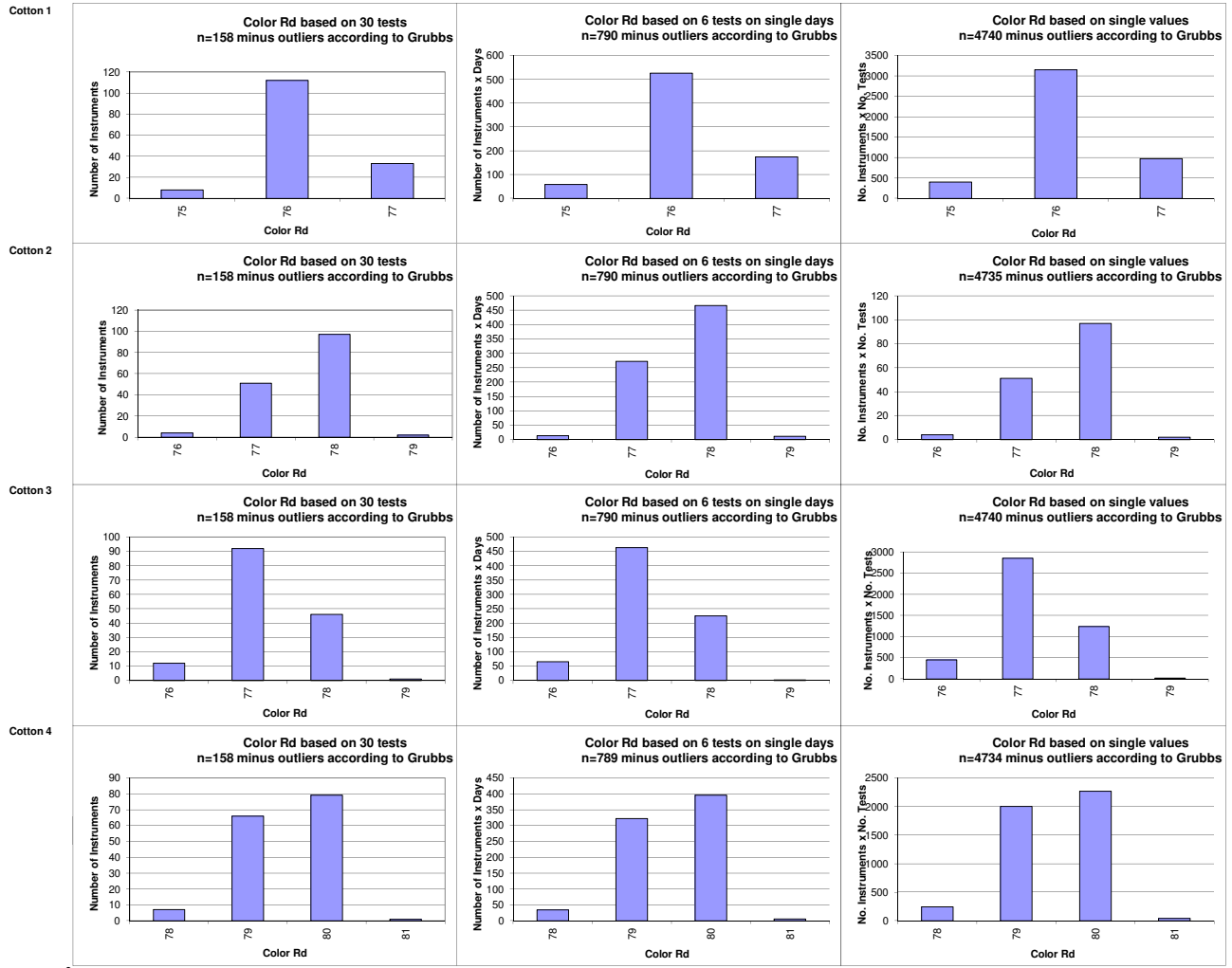


Test Result Distributions  
Uniformity



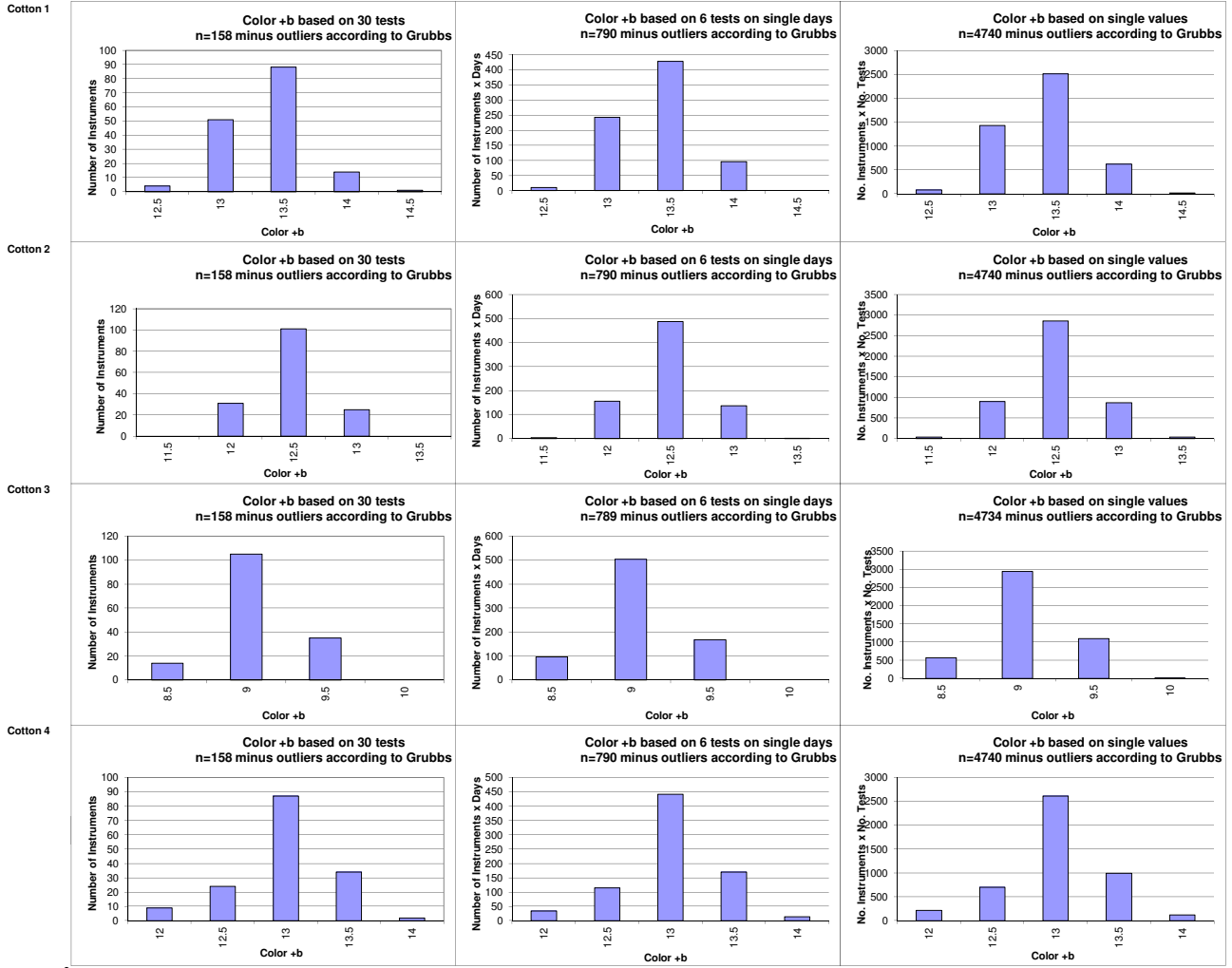
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Color Rd



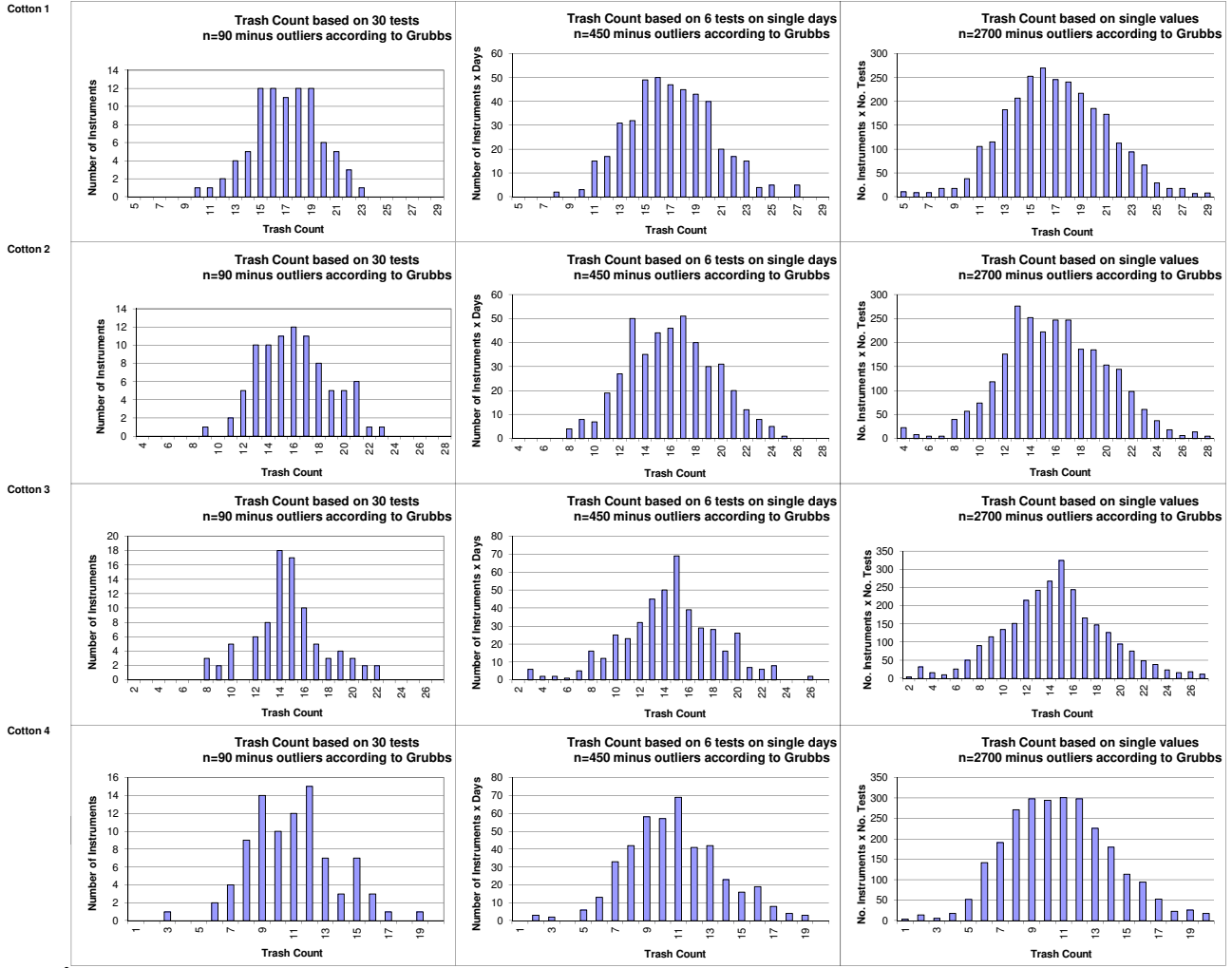
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Color +b



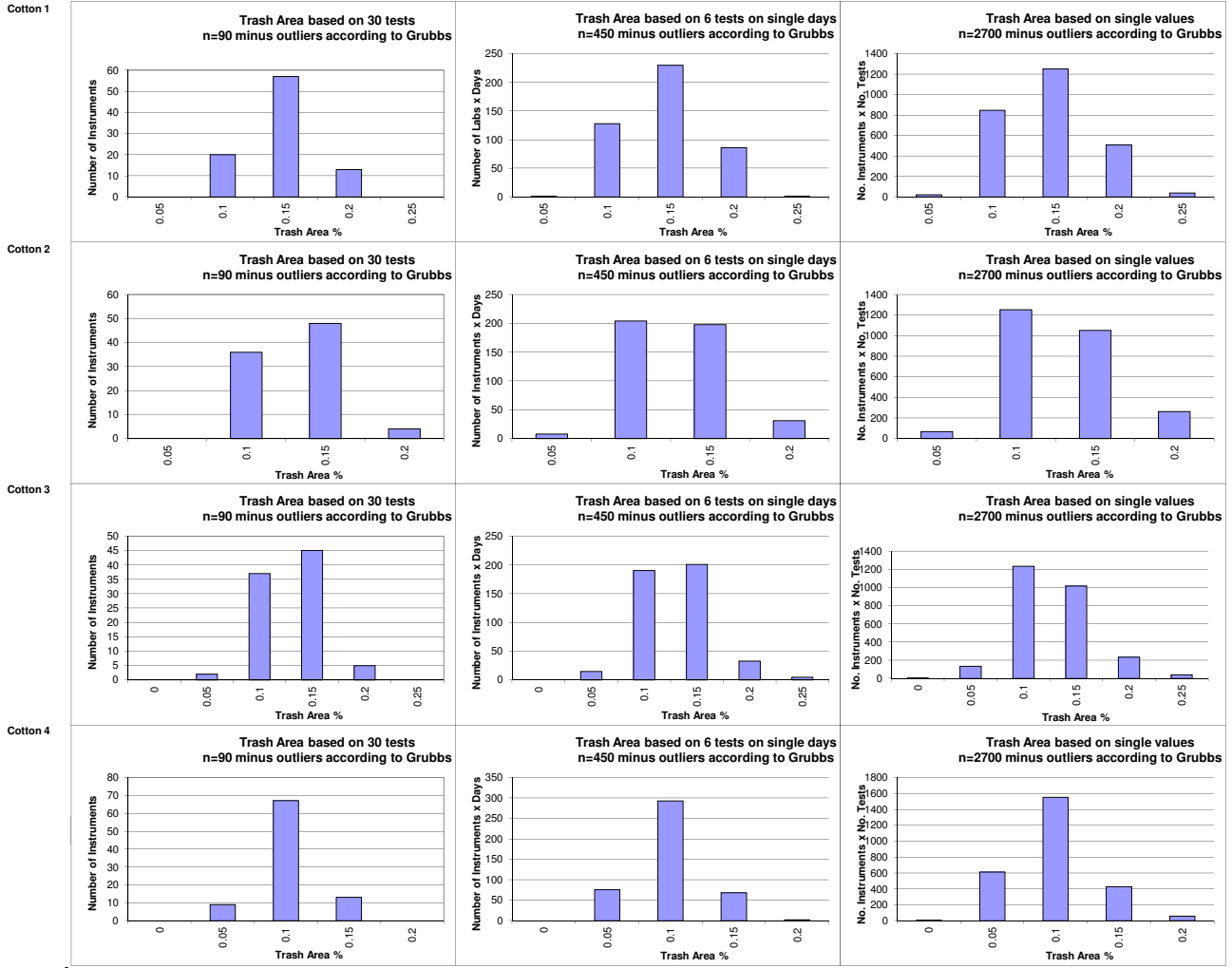
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Trash Count



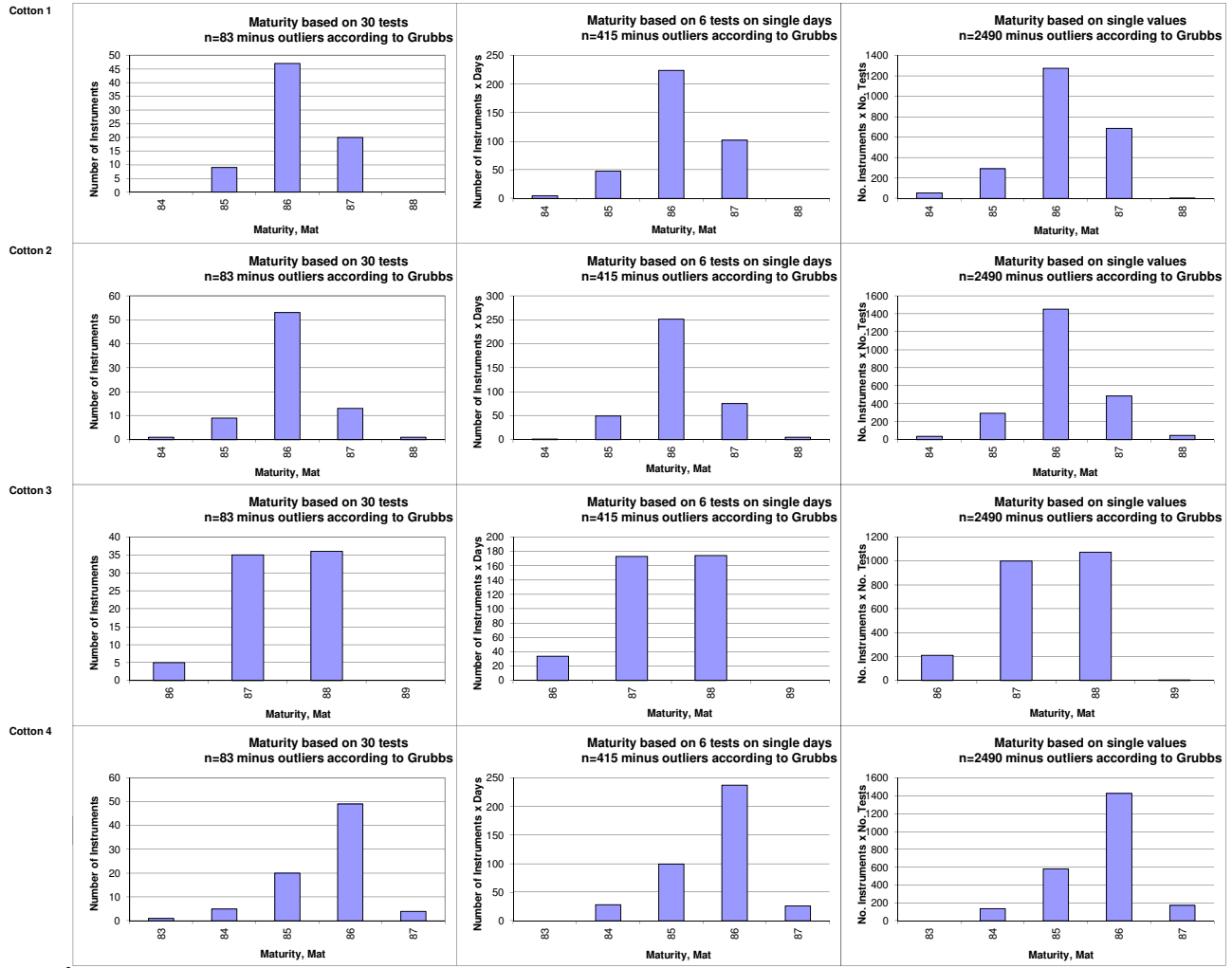
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Trash Area



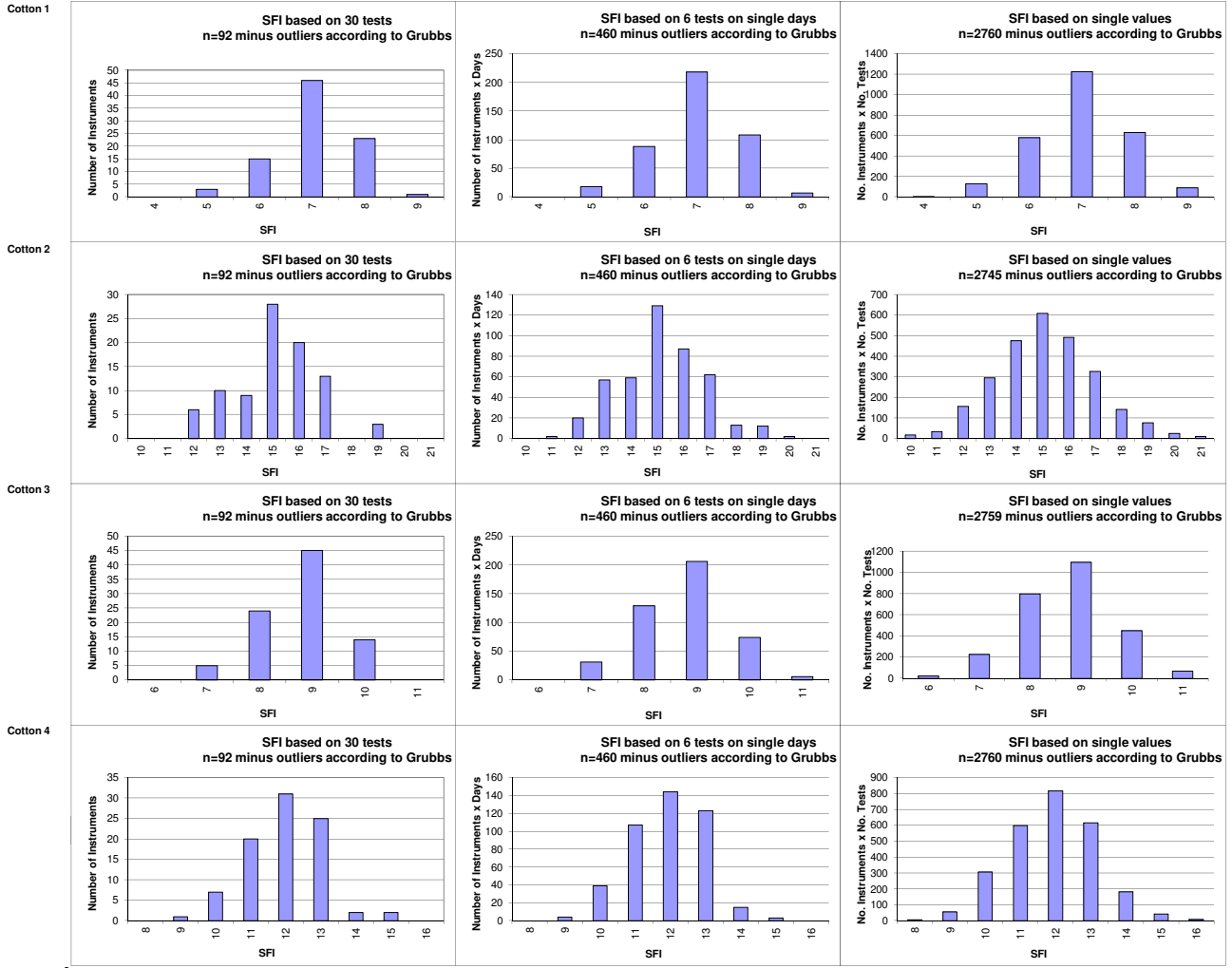
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Maturity



(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method.)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
SFI



(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)



International Cotton Advisory Committee



## CSITC Global - Round Trial 2023 - 3 General Evaluation

Section One: Result Distribution  
**Section Two: Instrument Evaluation**  
Section Three: Within Limits Evaluation

### Section Two: Instrument Evaluation

Content:

- Evaluation of Combined Parameters
- Evaluation of Single Parameters

Executed By:  
Faserinstitut Bremen e.V., Bremen, Germany\*  
USDA-AMS, Memphis, TN, USA

System Provided by:  
Generation 10 Limited



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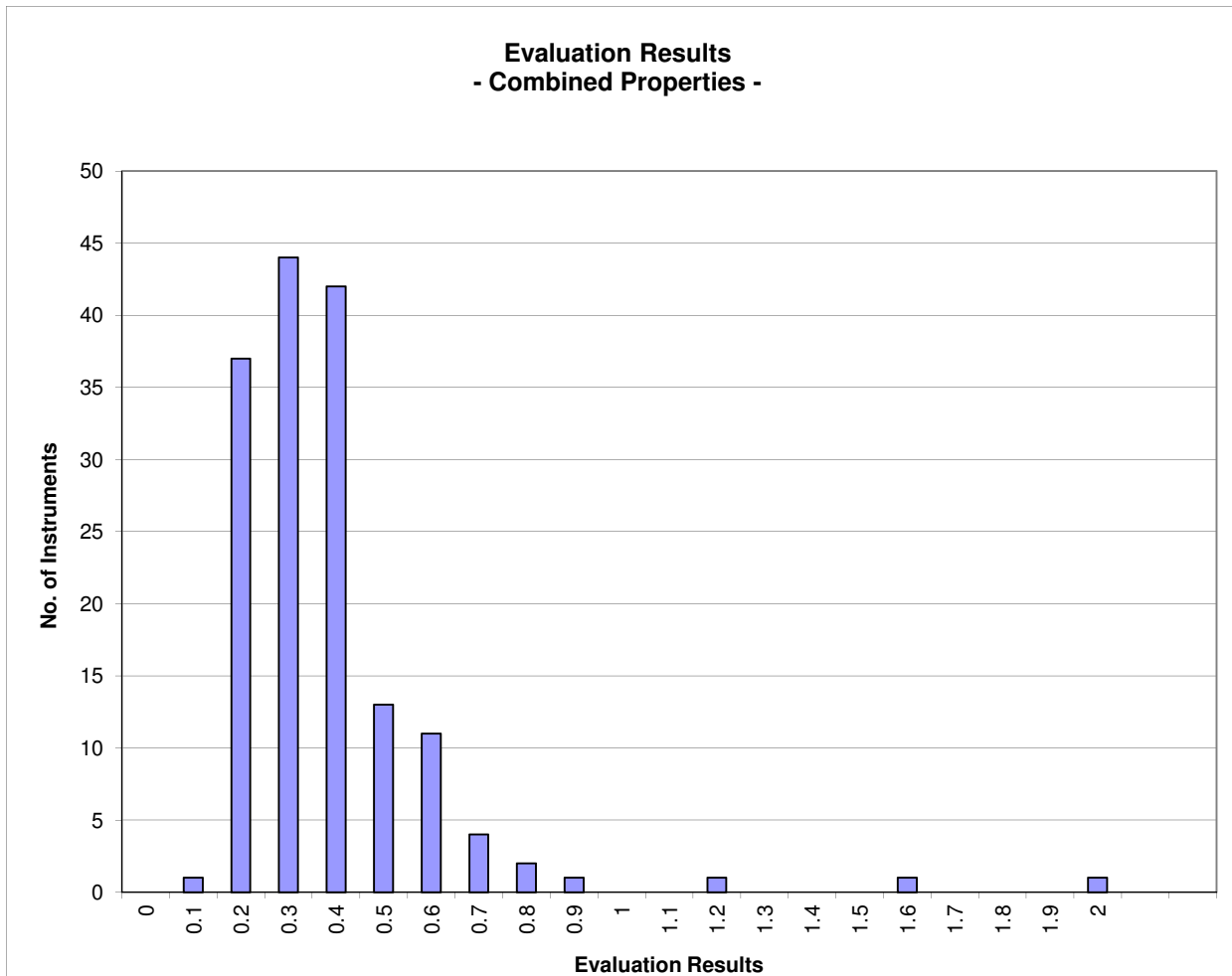
Instrument Evaluation

- Graph of Combined Properties -

According to ICAC CSITC Task Force Recommendations

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		Evaluation Combined Prop.
<b>Statistics</b>	Average	0.38
	Median	0.33
	Best Instrument	0.14
	Worst Instrument	2.00



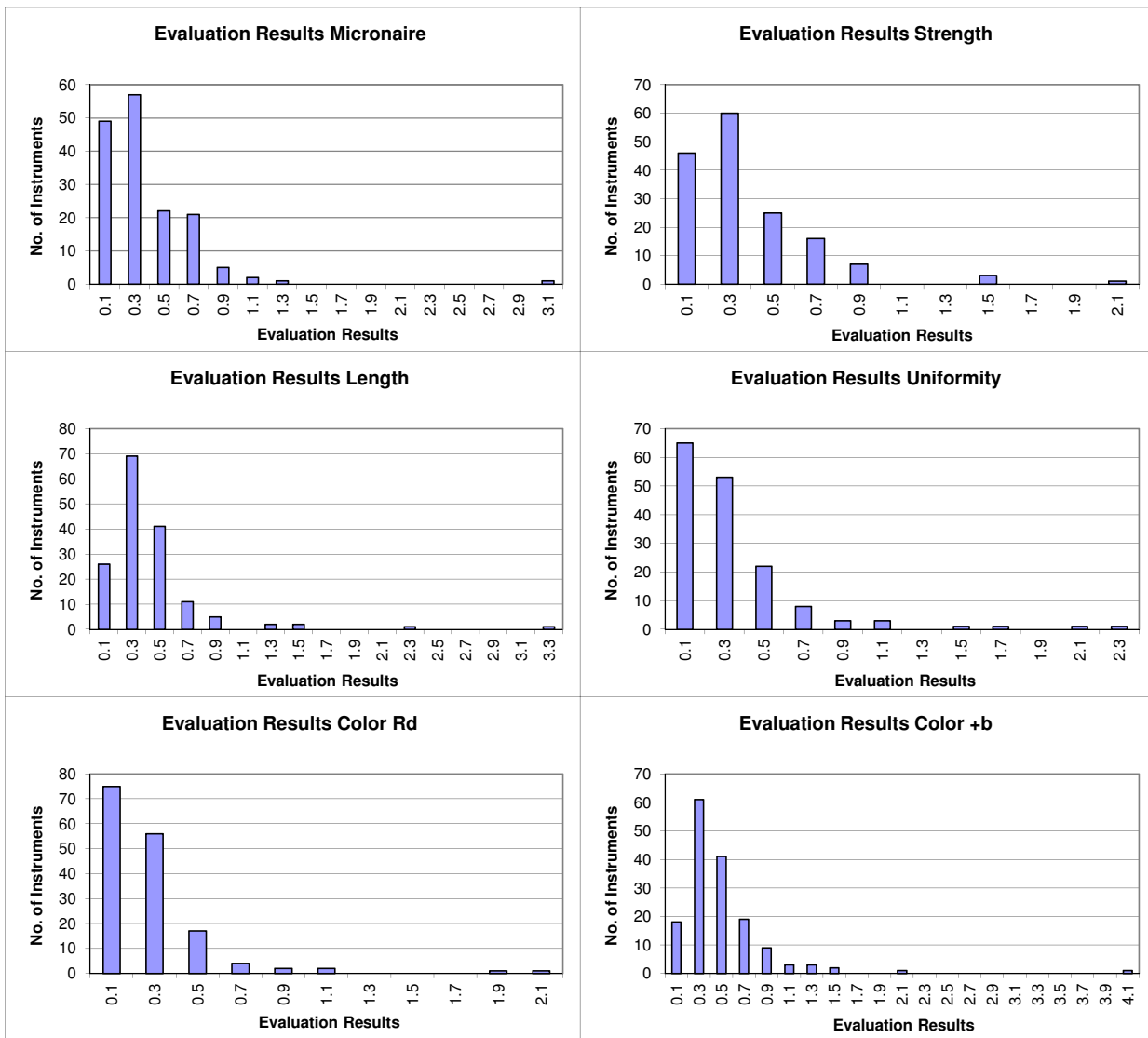
x-Axis shows midpoints of classes

The evaluation results are entered based on the unrounded values

(classes are defined as > lower limit and <= upper limit)

Instrument Evaluation  
 - Graph of Single Properties -  
 According to ICAC CSITC Task Force Recommendations  
 Global - Round Trial 2023 - 3

		Evaluation Micronaire	Evaluation Strength	Evaluation Length	Evaluation Uniformity	Evaluation Color Rd	Evaluation Color +b
Statistics	Average	0.37	0.38	0.43	0.35	0.28	0.49
	Median	0.30	0.30	0.34	0.26	0.20	0.40
	Best Instr.	0.06	0.04	0.09	0.03	0.05	0.10
	Worst Instr.	3.14	2.06	3.30	2.28	2.03	4.15



x-Axis shows midpoints of classes  
 The evaluation results are entered based on the unrounded values



International Cotton Advisory Committee



# CSITC Global - Round Trial 2023 - 3 General Evaluation

Section One: Result Distribution  
Section Two: Instrument Evaluation  
**Section Three: Within Limits Evaluation**

## Section Three: Within Limits Evaluation

Content:

- Based on Average of 30 Test Results
- Based on Single Test Results

Executed By:  
Faserinstitut Bremen e.V., Bremen, Germany\*  
USDA-AMS, Memphis, TN, USA

System Provided by:  
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## Within Limits Evaluation

Based on average of 30 test results for each sample

	<b>Micronaire</b>	<b>Strength</b>	<b>Length</b>	<b>Uniformity</b>	<b>Color Rd</b>	<b>Color +b</b>
Limits	0.20	2.0	0.030	2.0	1.5	0.5
	units	g/tex	inch	%	units	units
Average % Results within Limits	99.7	96.4	97.6	98.4	96.8	90.7
Completely within limits	99.4	88.6	94.3	96.8	94.3	77.8
% of Instruments $\geq 75\%$ within limits	99.4	97.5	96.8	98.1	95.6	90.5
% of Instruments $\geq 50\%$ within limits	100.0	99.4	99.4	99.4	98.7	96.2

## Within Limits Evaluation

Based on Single Test Results

	<b>Micronaire</b>	<b>Strength</b>	<b>Length</b>	<b>Uniformity</b>	<b>Color Rd</b>	<b>Color +b</b>
Limits	0.20	2.0	0.030	2.0	1.5	0.5
	units	g/tex	inch	%	units	units
Average % Results within Limits	99.1	93.7	95.9	97.6	96.2	89.8
% of Instruments 100% within limits	72.8	40.5	39.2	63.3	79.1	41.1
% of Instruments $\geq 95\%$ within limits	96.8	69.0	79.7	91.1	86.7	62.0
% of Instruments $\geq 75\%$ within limits	99.4	93.7	96.2	97.5	95.6	85.4
% of Instruments $\geq 65\%$ within limits	99.4	97.5	97.5	98.1	96.8	92.4
% of Instruments $\geq 50\%$ within limits	100.0	98.1	98.7	98.7	98.1	94.3