



**International Cotton Advisory Committee**



# CSITC Global - Round Trial 2021 - 4 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 2021 - 4

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

Micronaire							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			4.928	4.137	4.646	4.156	
Reference Values for Evaluation			4.928	4.137	4.646	4.156	
Number Of Instruments			120	120	120	120	<b>120</b>
Inter-Instrument Variation	based on 30 tests	SD	0.051	0.055	0.044	0.046	<b>0.049</b>
		CV %	1.0	1.3	0.9	1.1	<b>1.1</b>
	based on 6 tests	SD	0.056	0.062	0.053	0.053	<b>0.056</b>
		CV %	1.1	1.5	1.1	1.3	<b>1.3</b>
	based on single tests	SD	0.064	0.071	0.062	0.062	<b>0.065</b>
		CV %	1.3	1.7	1.3	1.5	<b>1.5</b>
Typical within-instrument Variation (Median)	between different days	SD	0.024	0.024	0.022	0.022	<b>0.023</b>
	with each 6 tests	CV %	0.5	0.6	0.5	0.5	<b>0.5</b>
	between single tests	SD	0.034	0.033	0.033	0.033	<b>0.033</b>
	on one day	CV %	0.7	0.8	0.7	0.8	<b>0.7</b>
	between all tests	SD	0.041	0.043	0.040	0.040	<b>0.041</b>
	on different days	CV %	0.8	1.0	0.9	1.0	<b>0.9</b>

Strength							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			28.446	31.315	28.742	22.752	
Reference Values for Evaluation			28.446	31.315	28.742	22.752	
Number Of Instruments			120	120	120	120	<b>120</b>
Inter-Instrument Variation	based on 30 tests	SD	0.551	0.583	0.575	0.704	<b>0.603</b>
		CV %	1.9	1.9	2.0	3.1	<b>2.2</b>
	based on 6 tests	SD	0.672	0.732	0.744	0.749	<b>0.724</b>
		CV %	2.4	2.3	2.6	3.3	<b>2.6</b>
	based on single tests	SD	0.853	0.929	0.894	0.885	<b>0.890</b>
		CV %	3.0	3.0	3.1	3.9	<b>3.2</b>
Typical within-instrument Variation (Median)	between different days	SD	0.354	0.344	0.366	0.307	<b>0.343</b>
	with each 6 tests	CV %	1.2	1.1	1.3	1.3	<b>1.2</b>
	between single tests	SD	0.506	0.568	0.526	0.481	<b>0.520</b>
	on one day	CV %	1.8	1.8	1.8	2.1	<b>1.9</b>
	between all tests	SD	0.616	0.666	0.640	0.592	<b>0.628</b>
	on different days	CV %	2.2	2.1	2.2	2.6	<b>2.3</b>

Length							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			1.1177	1.1944	1.0417	0.9477	
Reference Values for Evaluation			1.1177	1.1944	1.0417	0.9477	
Number Of Instruments			120	120	120	120	<b>120</b>
Inter-Instrument Variation	based on 30 tests	SD	0.0075	0.0089	0.0086	0.0097	<b>0.0087</b>
		CV %	0.7	0.7	0.8	1.0	<b>0.8</b>
	based on 6 tests	SD	0.0095	0.0108	0.0101	0.0123	<b>0.0107</b>
		CV %	0.8	0.9	1.0	1.3	<b>1.0</b>
	based on single tests	SD	0.0130	0.0146	0.0132	0.0155	<b>0.0141</b>
		CV %	1.2	1.2	1.3	1.6	<b>1.3</b>
Typical within-instrument Variation (Median)	between different days	SD	0.0056	0.0058	0.0051	0.0051	<b>0.0054</b>
	with each 6 tests	CV %	0.5	0.5	0.5	0.5	<b>0.5</b>
	between single tests	SD	0.0093	0.0105	0.0085	0.0095	<b>0.0095</b>
	on one day	CV %	0.8	0.9	0.8	1.0	<b>0.9</b>
	between all tests	SD	0.0108	0.0116	0.0099	0.0113	<b>0.0109</b>
	on different days	CV %	1.0	1.0	0.9	1.2	<b>1.0</b>

Uniformity							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			81.977	83.404	81.348	76.543	
Reference Values for Evaluation			81.977	83.404	81.348	76.543	
Number Of Instruments			120	120	120	120	<b>120</b>
Inter-Instrument Variation	based on 30 tests	SD	0.370	0.430	0.420	0.582	<b>0.451</b>
		CV %	0.5	0.5	0.5	0.8	<b>0.6</b>
	based on 6 tests	SD	0.489	0.470	0.506	0.666	<b>0.533</b>
		CV %	0.6	0.6	0.6	0.9	<b>0.7</b>
Typical within-instrument Variation (Median)	based on single tests	SD	0.681	0.701	0.667	0.853	<b>0.725</b>
		CV %	0.8	0.8	0.8	1.1	<b>0.9</b>
	between different days with each 6 tests	SD	0.251	0.236	0.248	0.288	<b>0.256</b>
		CV %	0.3	0.3	0.3	0.4	<b>0.3</b>
Typical within-instrument Variation (Median)	between single tests on one day	SD	0.472	0.478	0.431	0.532	<b>0.478</b>
		CV %	0.6	0.6	0.5	0.7	<b>0.6</b>
	between all tests on different days	SD	0.529	0.534	0.494	0.594	<b>0.538</b>
		CV %	0.6	0.6	0.6	0.8	<b>0.7</b>

Color Rd							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			76.697	77.759	74.770	77.640	
Reference Values for Evaluation			76.697	77.759	74.770	77.640	
Number Of Instruments			120	120	120	120	<b>120</b>
Inter-Instrument Variation	based on 30 tests	SD	0.447	0.492	0.482	0.510	<b>0.483</b>
		CV %	0.6	0.6	0.6	0.7	<b>0.6</b>
	based on 6 tests	SD	0.455	0.512	0.465	0.529	<b>0.490</b>
		CV %	0.6	0.7	0.6	0.7	<b>0.6</b>
Typical within-instrument Variation (Median)	based on single tests	SD	0.500	0.559	0.511	0.528	<b>0.524</b>
		CV %	0.7	0.7	0.7	0.7	<b>0.7</b>
	between different days with each 6 tests	SD	0.148	0.177	0.156	0.162	<b>0.161</b>
		CV %	0.2	0.2	0.2	0.2	<b>0.2</b>
Typical within-instrument Variation (Median)	between single tests on one day	SD	0.112	0.132	0.102	0.104	<b>0.112</b>
		CV %	0.1	0.2	0.1	0.1	<b>0.1</b>
	between all tests on different days	SD	0.202	0.250	0.229	0.210	<b>0.223</b>
		CV %	0.3	0.3	0.3	0.3	<b>0.3</b>

Color +b							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			8.589	10.208	8.143	9.863	
Reference Values for Evaluation			8.589	10.208	8.143	9.863	
Number Of Instruments			120	120	120	120	<b>120</b>
Inter-Instrument Variation	based on 30 tests	SD	0.191	0.198	0.192	0.173	<b>0.189</b>
		CV %	2.2	1.9	2.4	1.8	<b>2.1</b>
	based on 6 tests	SD	0.212	0.217	0.208	0.186	<b>0.206</b>
		CV %	2.5	2.1	2.6	1.9	<b>2.3</b>
Typical within-instrument Variation (Median)	based on single tests	SD	0.226	0.243	0.221	0.199	<b>0.222</b>
		CV %	2.6	2.4	2.7	2.0	<b>2.4</b>
	between different days with each 6 tests	SD	0.085	0.078	0.086	0.079	<b>0.082</b>
		CV %	1.0	0.8	1.1	0.8	<b>0.9</b>
Typical within-instrument Variation (Median)	between single tests on one day	SD	0.051	0.059	0.052	0.043	<b>0.051</b>
		CV %	0.6	0.6	0.6	0.4	<b>0.6</b>
	between all tests on different days	SD	0.106	0.119	0.111	0.099	<b>0.109</b>
		CV %	1.2	1.2	1.4	1.0	<b>1.2</b>

Optional Parameters

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

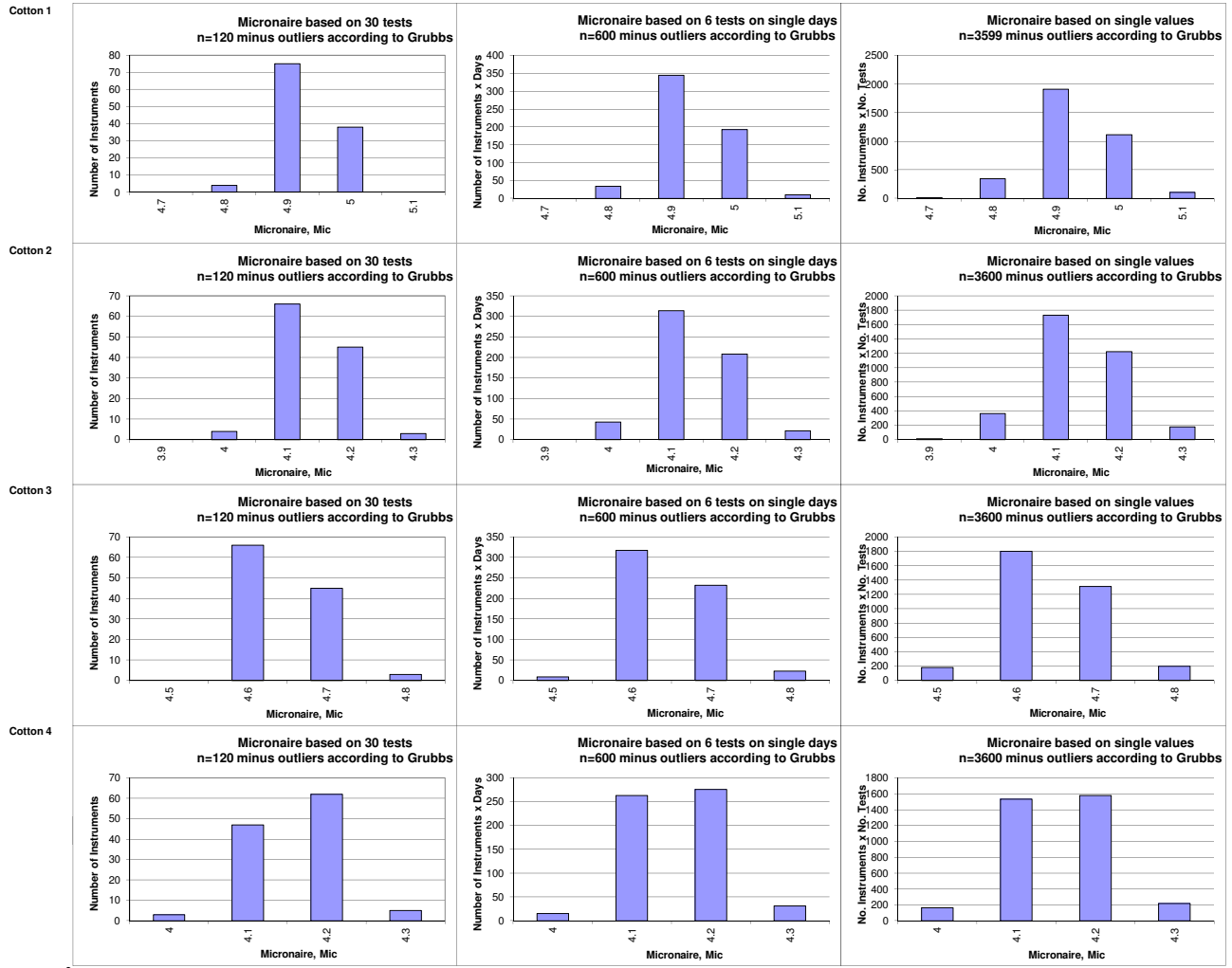
Trash Count							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			16.34	28.05	23.46	24.43	
Reference Values for Evaluation			16.34	28.05	23.46	24.43	
Number Of Instruments			84	84	84	84	<b>84</b>
Inter-Instrument Variation	based on 30 tests	SD	3.63	6.45	5.06	6.01	<b>5.29</b>
		CV %	22.2	23.0	21.6	24.6	<b>22.9</b>
	based on 6 tests	SD	4.00	7.06	5.44	6.54	<b>5.76</b>
		CV %	24.5	25.2	23.2	26.8	<b>24.9</b>
	based on single tests	SD	4.45	7.52	6.26	7.16	<b>6.35</b>
		CV %	27.3	26.8	26.7	29.3	<b>27.5</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	1.62	2.68	2.03	2.23	<b>2.14</b>
		CV %	9.9	9.6	8.7	9.1	<b>9.3</b>
	between single tests on one day	SD	1.55	2.10	1.89	1.85	<b>1.85</b>
		CV %	9.5	7.5	8.1	7.6	<b>8.2</b>
	between all tests on different days	SD	2.46	3.77	3.04	3.62	<b>3.22</b>
		CV %	15.0	13.4	13.0	14.8	<b>14.1</b>

Trash Area							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			0.185	0.281	0.264	0.189	
Reference Values for Evaluation			0.185	0.281	0.264	0.189	
Number Of Instruments			84	84	84	84	<b>84</b>
Inter-Instrument Variation	based on 30 tests	SD	0.046	0.051	0.055	0.036	<b>0.047</b>
		CV %	24.7	18.3	21.0	19.3	<b>20.8</b>
	based on 6 tests	SD	0.051	0.065	0.069	0.046	<b>0.058</b>
		CV %	27.4	23.3	26.3	24.1	<b>25.3</b>
	based on single tests	SD	0.065	0.075	0.079	0.050	<b>0.067</b>
		CV %	35.2	26.7	29.8	26.6	<b>29.6</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.027	0.033	0.033	0.016	<b>0.027</b>
		CV %	14.7	11.7	12.3	8.3	<b>11.8</b>
	between single tests on one day	SD	0.023	0.030	0.027	0.014	<b>0.023</b>
		CV %	12.2	10.7	10.1	7.6	<b>10.1</b>
	between all tests on different days	SD	0.042	0.049	0.053	0.029	<b>0.043</b>
		CV %	22.7	17.6	20.2	15.3	<b>18.9</b>

Maturity							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			87.05	85.65	87.40	85.40	
Reference Values for Evaluation			87.05	85.65	87.40	85.40	
Number Of Instruments			78	78	78	78	<b>78</b>
Inter-Instrument Variation	based on 30 tests	SD	0.81	0.60	0.62	0.43	<b>0.61</b>
		CV %	0.9	0.7	0.7	0.5	<b>0.7</b>
	based on 6 tests	SD	0.70	0.54	0.59	0.45	<b>0.57</b>
		CV %	0.8	0.6	0.7	0.5	<b>0.7</b>
	based on single tests	SD	0.77	0.60	0.63	0.57	<b>0.64</b>
		CV %	0.9	0.7	0.7	0.7	<b>0.7</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.12	0.14	0.09	0.11	<b>0.11</b>
		CV %	0.1	0.2	0.1	0.1	<b>0.1</b>
	between single tests on one day	SD	0.15	0.14	0.12	0.17	<b>0.14</b>
		CV %	0.2	0.2	0.1	0.2	<b>0.2</b>
	between all tests on different days	SD	0.20	0.21	0.20	0.21	<b>0.21</b>
		CV %	0.2	0.2	0.2	0.2	<b>0.2</b>

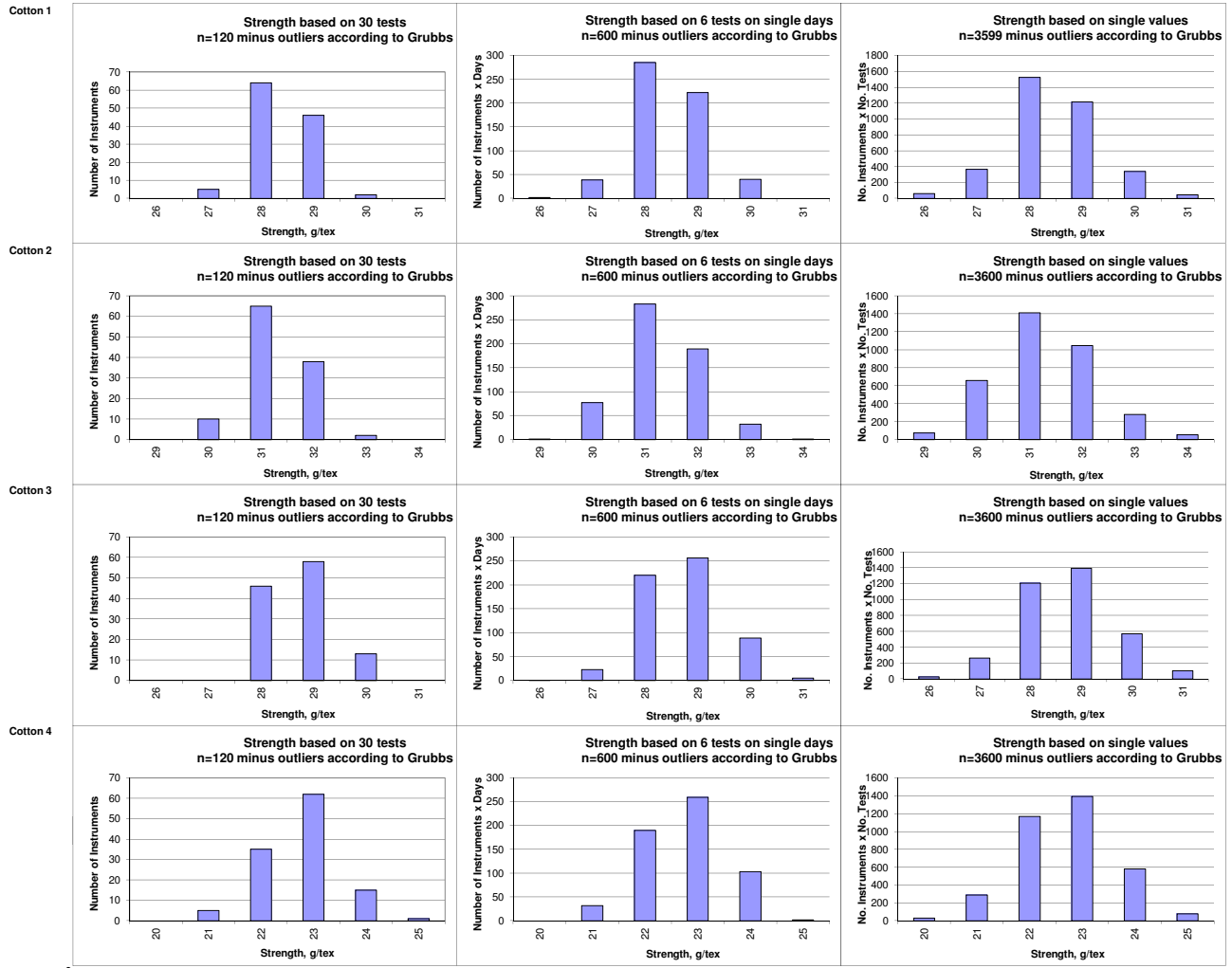
SFI							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
<b>Average of Instruments (Grubbs)</b>			9.14	7.41	9.68	18.42	
<b>Reference Values for Evaluation</b>			9.14	7.41	9.68	18.42	
<b>Number Of Instruments</b>			87	87	87	87	<b>87</b>
<b>Inter-Instrument Variation</b>	based on 30 tests	SD	0.67	0.64	0.82	2.16	<b>1.08</b>
		CV %	7.4	8.6	8.5	11.7	<b>9.1</b>
	based on 6 tests	SD	0.70	0.68	0.90	2.31	<b>1.14</b>
		CV %	7.6	9.1	9.3	12.5	<b>9.6</b>
	based on single tests	SD	0.84	0.76	1.04	2.48	<b>1.28</b>
		CV %	9.2	10.3	10.8	13.5	<b>10.9</b>
<b>Typical within-instrument Variation (Median)</b>	between different days with each 6 tests	SD	0.24	0.20	0.30	0.55	<b>0.32</b>
		CV %	2.7	2.7	3.1	3.0	<b>2.8</b>
	between single tests on one day	SD	0.47	0.38	0.48	0.97	<b>0.58</b>
		CV %	5.2	5.2	5.0	5.3	<b>5.2</b>
	between all tests on different days	SD	0.54	0.42	0.59	1.11	<b>0.66</b>
		CV %	5.9	5.7	6.1	6.0	<b>5.9</b>

Test Result Distributions  
Micronaire



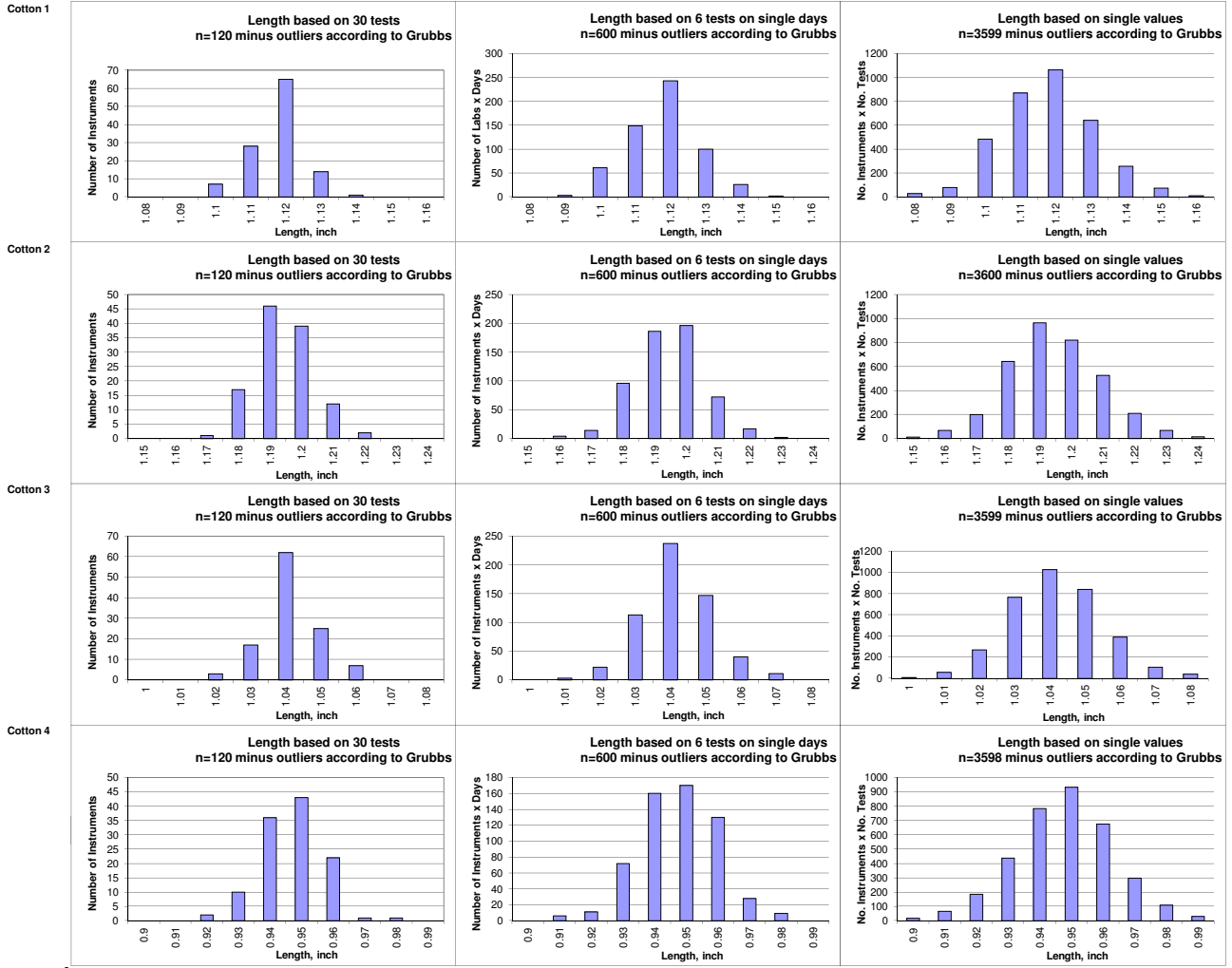
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method.)  
(classes are defined as > lower limit and <= upper limit)

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)

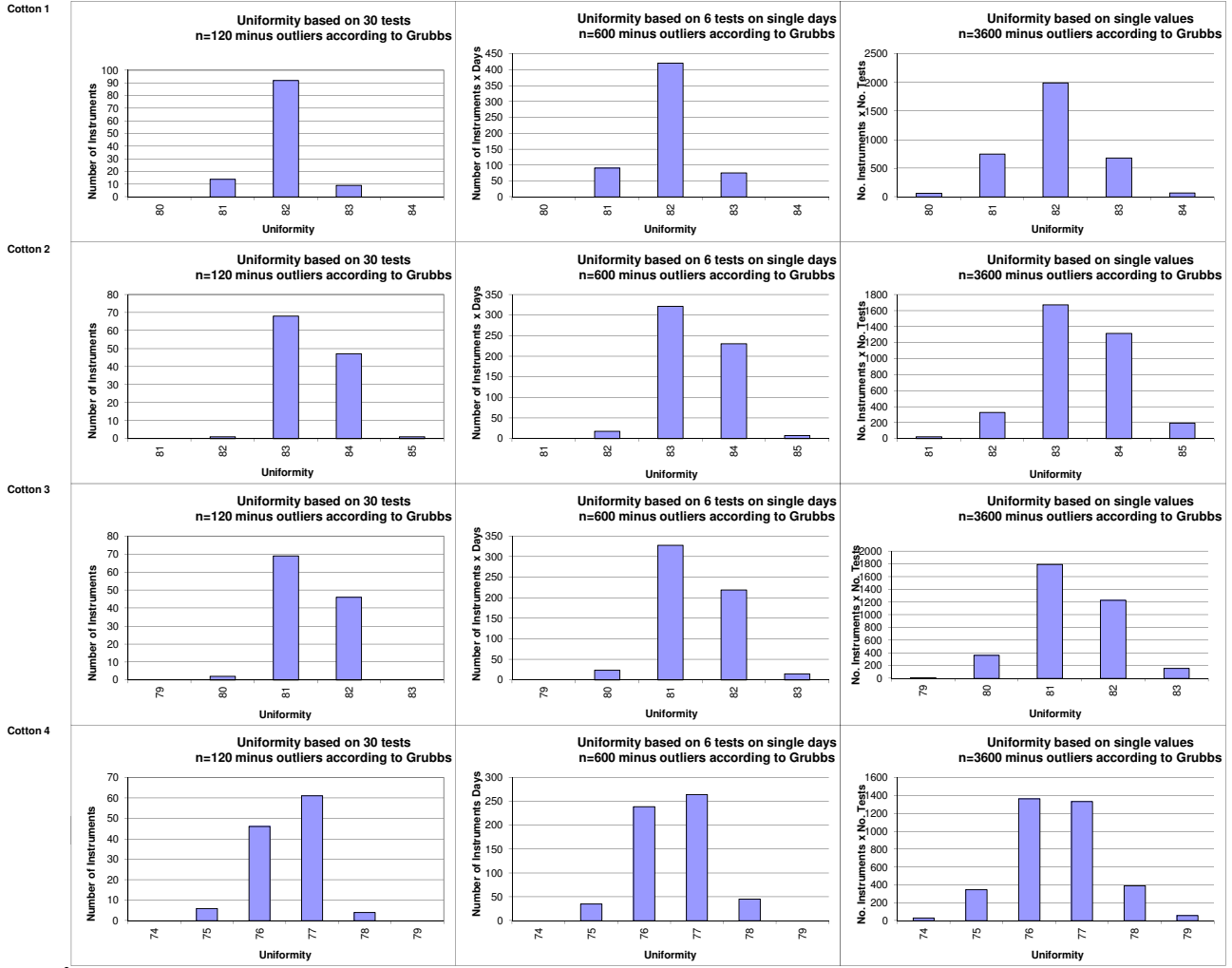
Test Result Distributions  
Length



(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)

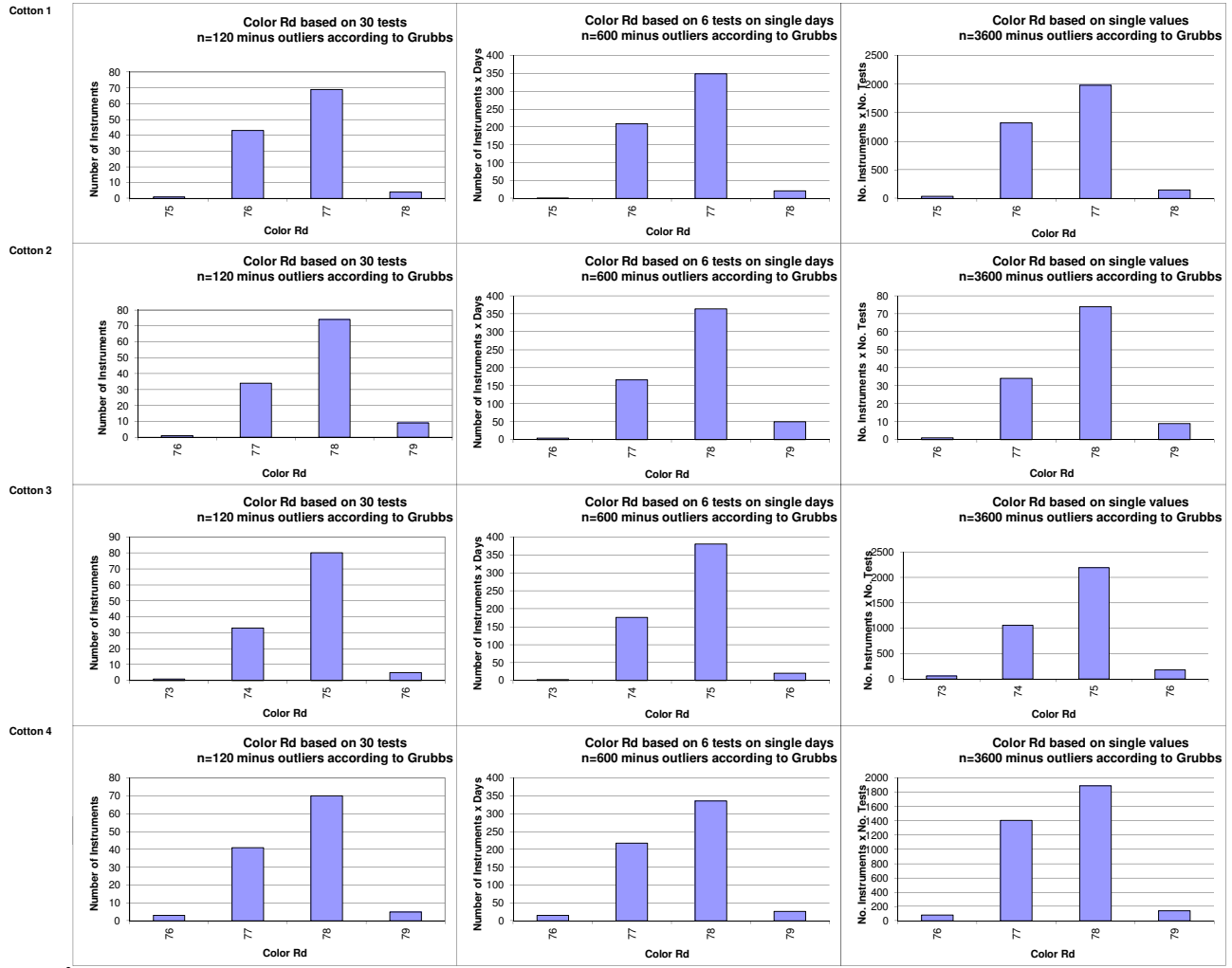


Test Result Distributions  
Uniformity



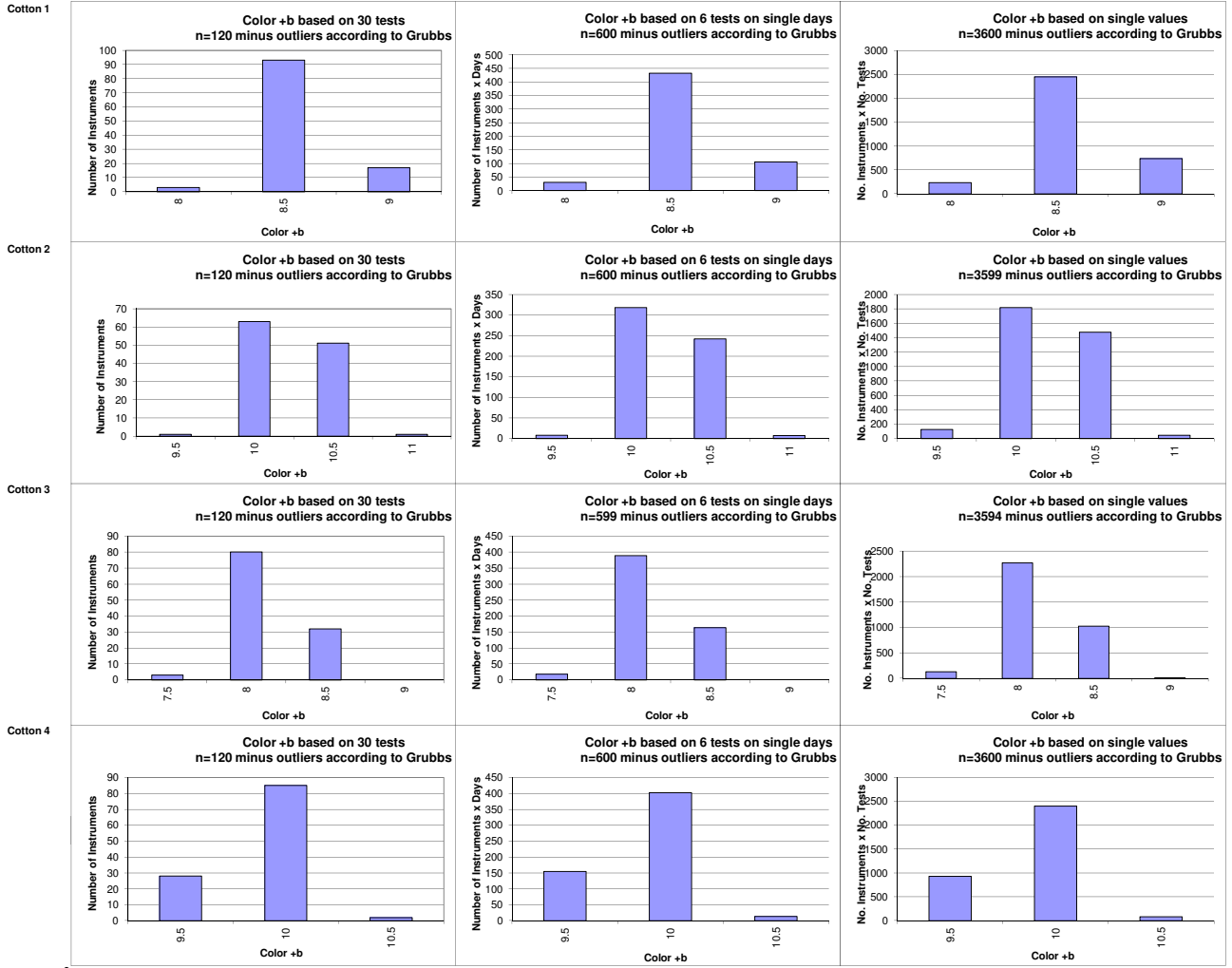
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Color Rd



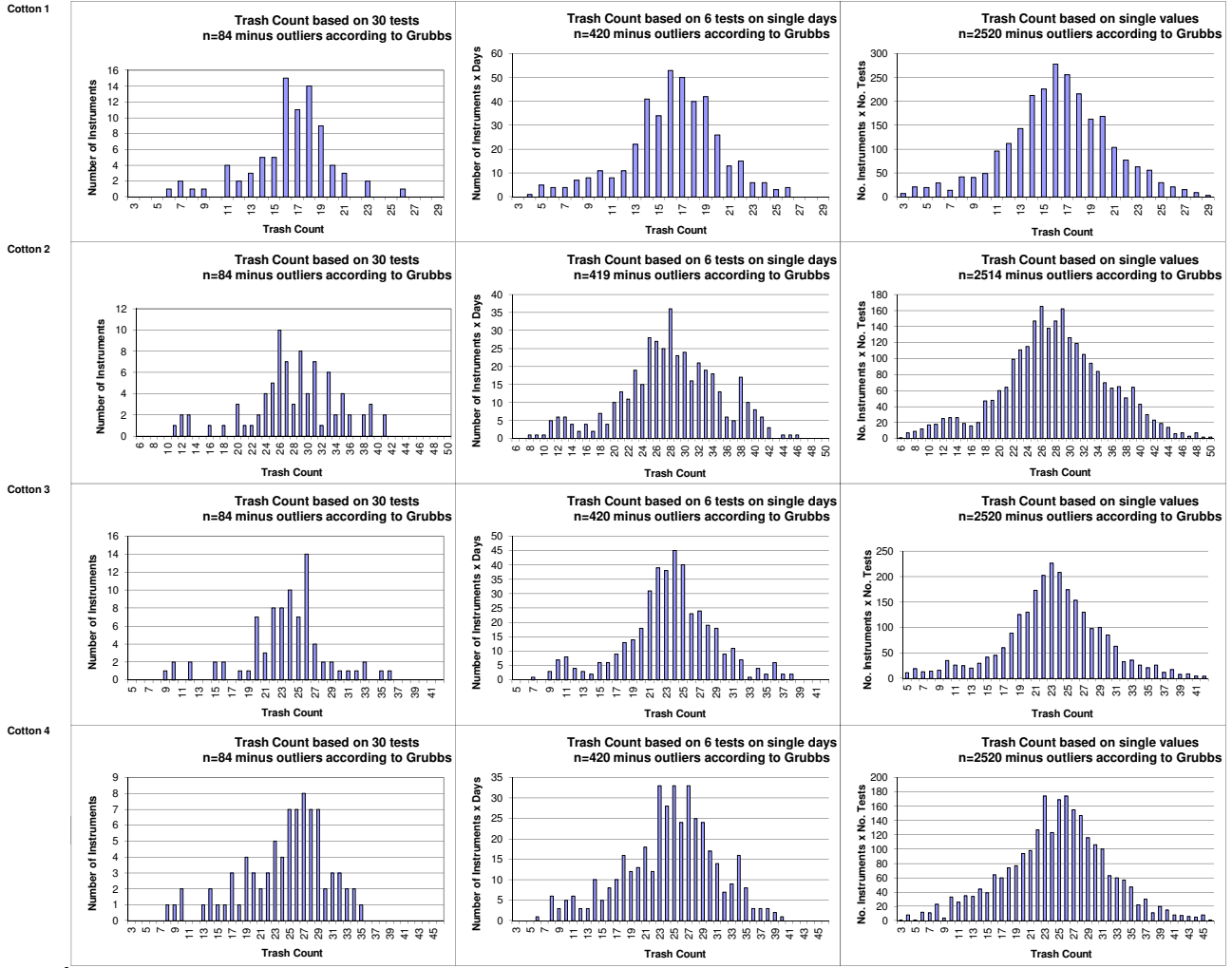
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Color +b



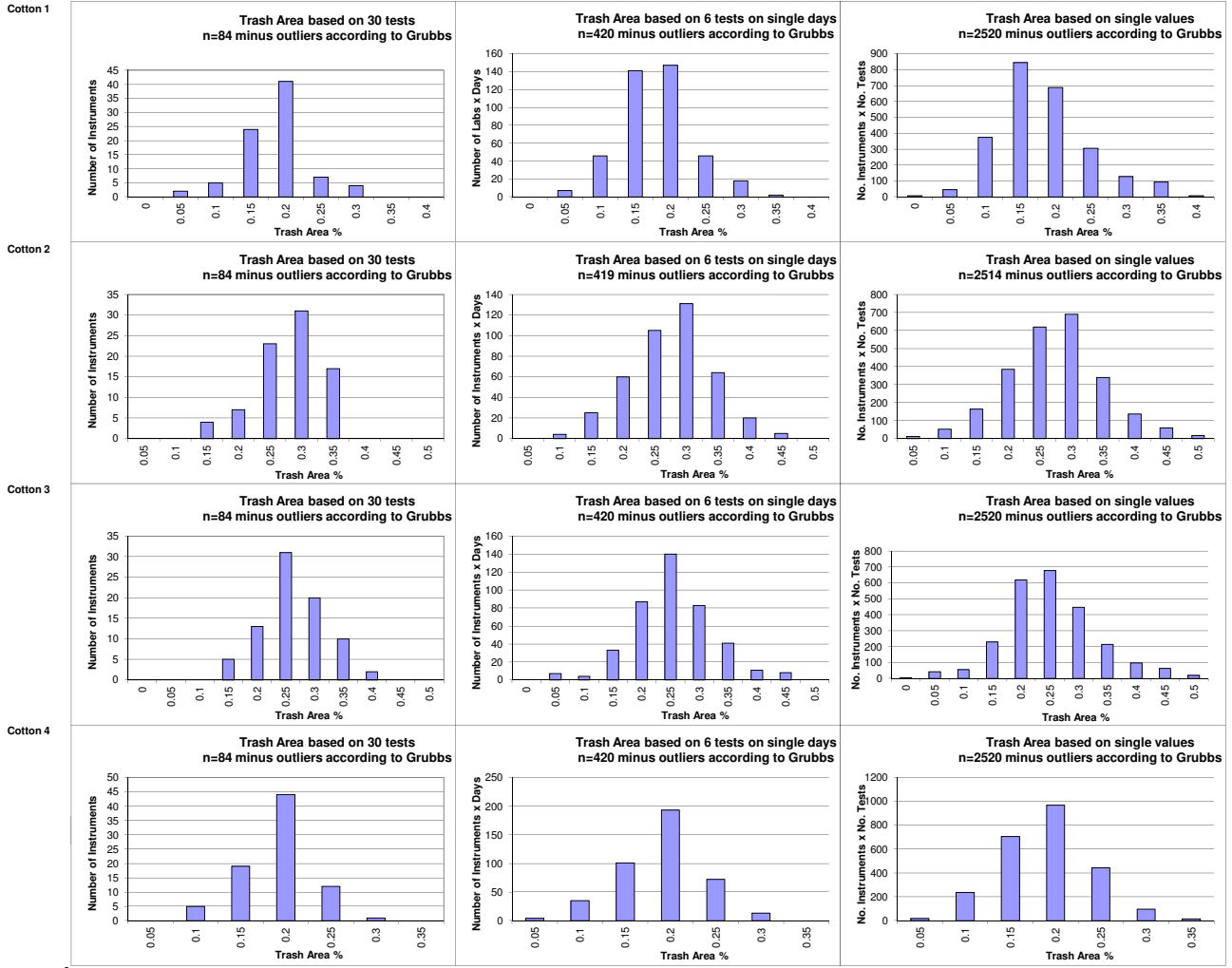
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Trash Count



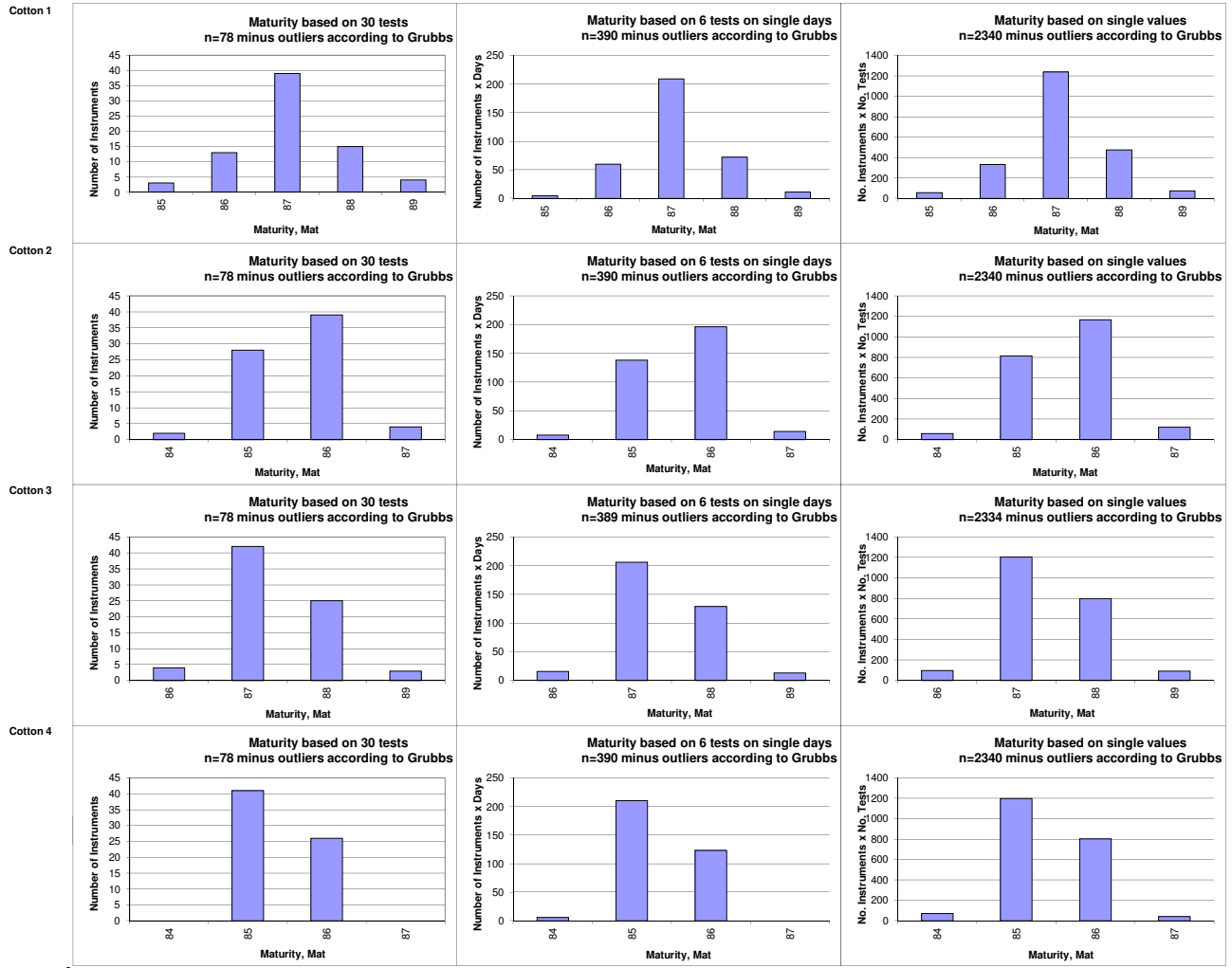
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Trash Area



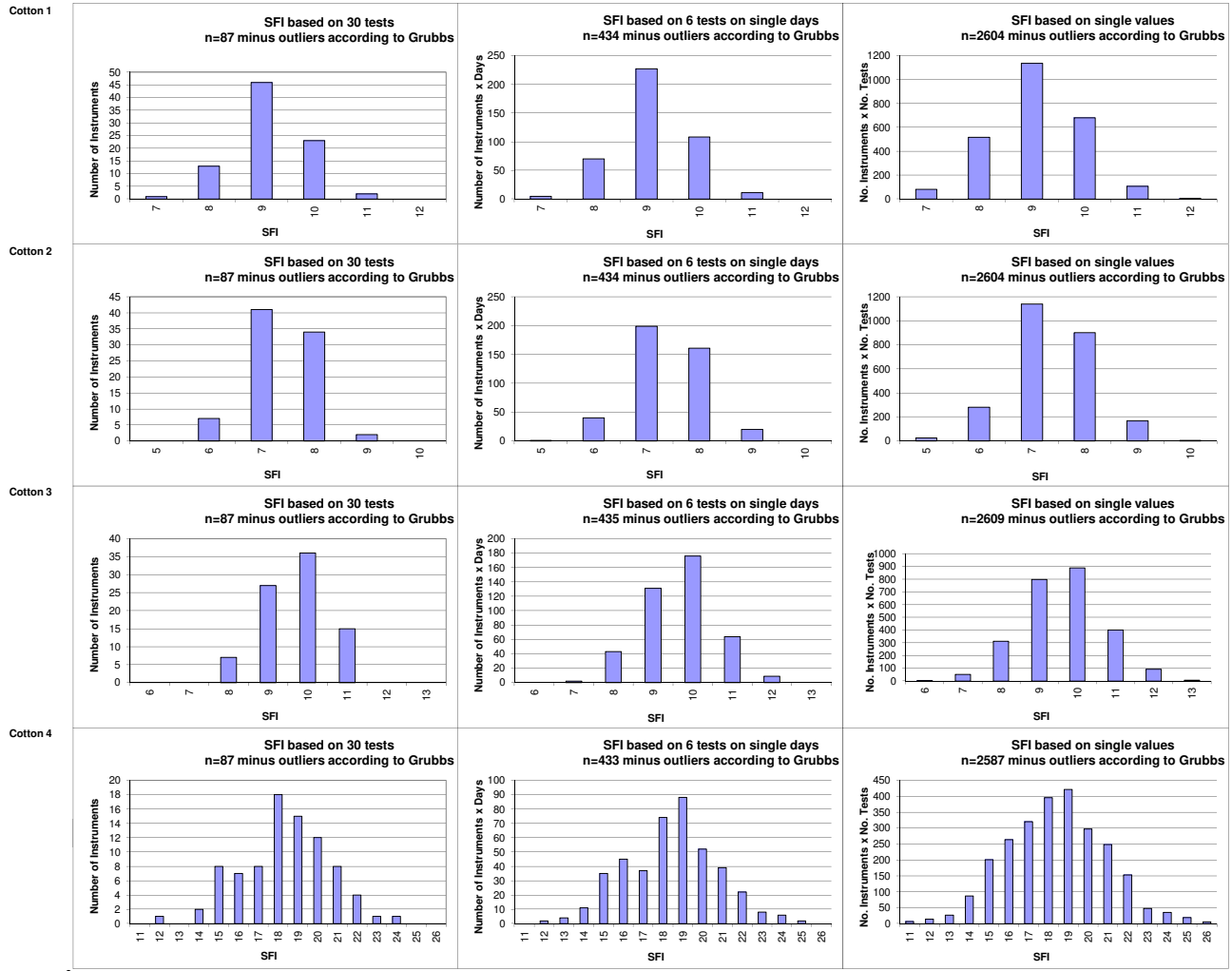
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

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 2021 - 4 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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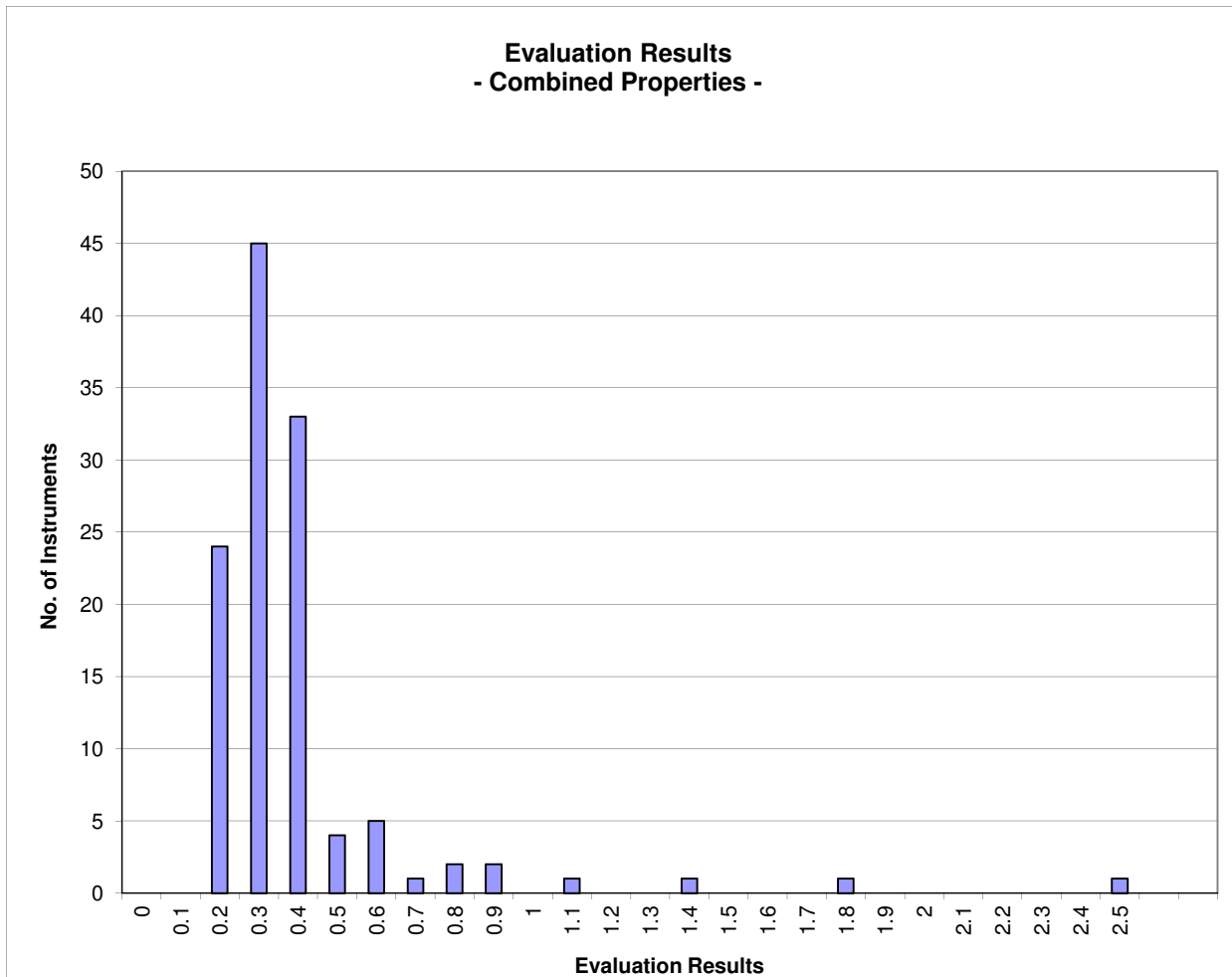
Instrument Evaluation

- Graph of Combined Properties -

According to ICAC CSITC Task Force Recommendations

Global - Round Trial 2021 - 4

		Evaluation Combined Prop.
<b>Statistics</b>	Average	0.39
	Median	0.32
	Best Instrument	0.15
	Worst Instrument	2.49

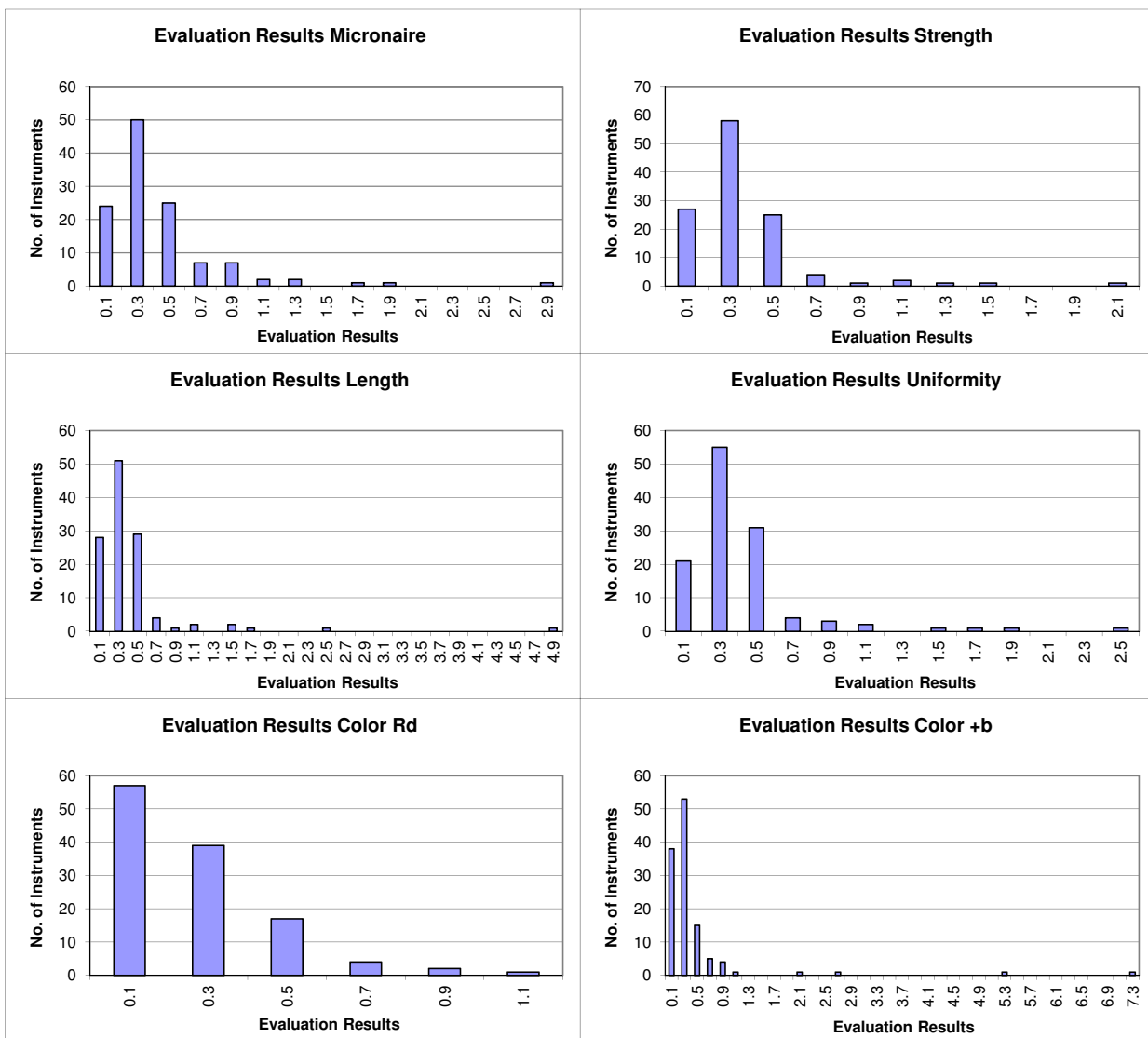


x-Axis shows midpoints of classes

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 2021 - 4

		Evaluation Micronaire	Evaluation Strength	Evaluation Length	Evaluation Uniformity	Evaluation Color Rd	Evaluation Color +b
Statistics	Average	0.44	0.36	0.42	0.40	0.27	0.45
	Median	0.35	0.30	0.31	0.30	0.21	0.28
	Best Instr.	0.08	0.05	0.05	0.02	0.04	0.04
	Worst Instr.	2.83	2.18	4.86	2.53	1.11	7.26



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



International Cotton Advisory Committee



## CSITC Global - Round Trial 2021 - 4 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	98.3	97.7	96.5	99.2	98.5	94.8
Completely within limits	96.7	94.2	94.2	97.5	95.8	91.7
% of Instruments $\geq 75\%$ within limits	98.3	97.5	95.8	99.2	98.3	94.2
% of Instruments $\geq 50\%$ within limits	99.2	99.2	97.5	100.0	100.0	95.8

## 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	97.2	95.4	95.6	97.4	96.7	92.6
% of Instruments 100% within limits	70.0	42.5	45.0	56.7	78.3	60.0
% of Instruments $\geq 95\%$ within limits	90.8	82.5	82.5	90.0	88.3	81.7
% of Instruments $\geq 75\%$ within limits	96.7	94.2	95.8	97.5	95.0	90.8
% of Instruments $\geq 65\%$ within limits	97.5	95.8	96.7	98.3	97.5	91.7
% of Instruments $\geq 50\%$ within limits	98.3	99.2	98.3	100.0	97.5	95.0