



**International Cotton Advisory Committee**



**CSITC**  
**Global - Round Trial 2019 - 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 2019 - 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)			4.364	4.230	4.262	4.992	
Reference Values for Evaluation			4.364	4.230	4.262	4.992	
Number Of Instruments			133	133	133	133	<b>133</b>
Inter-Instrument Variation	based on 30 tests	SD	0.055	0.056	0.058	0.059	<b>0.057</b>
		CV %	1.3	1.3	1.4	1.2	<b>1.3</b>
		SD	0.064	0.063	0.063	0.064	<b>0.064</b>
	based on 6 tests	CV %	1.5	1.5	1.5	1.3	<b>1.4</b>
		SD	0.072	0.070	0.073	0.076	<b>0.073</b>
		CV %	1.7	1.7	1.7	1.5	<b>1.6</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.027	0.026	0.023	0.028	<b>0.026</b>
		CV %	0.6	0.6	0.5	0.6	<b>0.6</b>
	between single tests on one day	SD	0.035	0.034	0.036	0.039	<b>0.036</b>
		CV %	0.8	0.8	0.8	0.8	<b>0.8</b>
	between all tests on different days	SD	0.046	0.044	0.044	0.048	<b>0.045</b>
		CV %	1.1	1.0	1.0	1.0	<b>1.0</b>

Strength							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			27.837	30.554	28.168	27.605	
Reference Values for Evaluation			27.837	30.554	28.168	27.605	
Number Of Instruments			133	133	133	133	<b>133</b>
Inter-Instrument Variation	based on 30 tests	SD	0.640	0.775	0.588	0.694	<b>0.674</b>
		CV %	2.3	2.5	2.1	2.5	<b>2.4</b>
		SD	0.732	0.875	0.697	0.782	<b>0.772</b>
	based on 6 tests	CV %	2.6	2.9	2.5	2.8	<b>2.7</b>
		SD	0.878	1.056	0.883	0.925	<b>0.935</b>
		CV %	3.2	3.5	3.1	3.4	<b>3.3</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.325	0.372	0.333	0.322	<b>0.338</b>
		CV %	1.2	1.2	1.2	1.2	<b>1.2</b>
	between single tests on one day	SD	0.497	0.636	0.549	0.518	<b>0.550</b>
		CV %	1.8	2.1	2.0	1.9	<b>1.9</b>
	between all tests on different days	SD	0.591	0.717	0.644	0.601	<b>0.638</b>
		CV %	2.1	2.3	2.3	2.2	<b>2.2</b>

Length							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			1.0567	1.1383	1.0174	1.1313	
Reference Values for Evaluation			1.0567	1.1383	1.0174	1.1313	
Number Of Instruments			133	133	133	133	<b>133</b>
Inter-Instrument Variation	based on 30 tests	SD	0.0076	0.0094	0.0104	0.0078	<b>0.0088</b>
		CV %	0.7	0.8	1.0	0.7	<b>0.8</b>
		SD	0.0099	0.0109	0.0112	0.0099	<b>0.0105</b>
	based on 6 tests	CV %	0.9	1.0	1.1	0.9	<b>1.0</b>
		SD	0.0142	0.0153	0.0144	0.0135	<b>0.0144</b>
		CV %	1.3	1.3	1.4	1.2	<b>1.3</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.0062	0.0065	0.0052	0.0056	<b>0.0059</b>
		CV %	0.6	0.6	0.5	0.5	<b>0.5</b>
	between single tests on one day	SD	0.0104	0.0117	0.0091	0.0097	<b>0.0102</b>
		CV %	1.0	1.0	0.9	0.9	<b>0.9</b>
	between all tests on different days	SD	0.0115	0.0130	0.0104	0.0107	<b>0.0114</b>
		CV %	1.1	1.1	1.0	0.9	<b>1.0</b>

Uniformity							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			80.854	80.186	79.444	82.722	
Reference Values for Evaluation			80.854	80.186	79.444	82.722	
Number Of Instruments			133	133	133	133	<b>133</b>
Inter-Instrument Variation	based on 30 tests	SD	0.412	0.337	0.451	0.314	<b>0.379</b>
		CV %	0.5	0.4	0.6	0.4	<b>0.5</b>
		SD	0.508	0.465	0.532	0.431	<b>0.484</b>
	based on 6 tests	CV %	0.6	0.6	0.7	0.5	<b>0.6</b>
		SD	0.679	0.726	0.714	0.669	<b>0.697</b>
		CV %	0.8	0.9	0.9	0.8	<b>0.9</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.243	0.278	0.271	0.259	<b>0.263</b>
		CV %	0.3	0.3	0.3	0.3	<b>0.3</b>
	between single tests on one day	SD	0.491	0.561	0.475	0.525	<b>0.513</b>
		CV %	0.6	0.7	0.6	0.6	<b>0.6</b>
	between all tests on different days	SD	0.542	0.606	0.552	0.573	<b>0.568</b>
		CV %	0.7	0.8	0.7	0.7	<b>0.7</b>

Color Rd							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			74.423	77.251	76.763	68.020	
Reference Values for Evaluation			74.423	77.251	76.763	68.020	
Number Of Instruments			132	132	132	132	<b>132</b>
Inter-Instrument Variation	based on 30 tests	SD	0.455	0.444	0.447	0.504	<b>0.462</b>
		CV %	0.6	0.6	0.6	0.7	<b>0.6</b>
		SD	0.492	0.484	0.497	0.548	<b>0.505</b>
	based on 6 tests	CV %	0.7	0.6	0.6	0.8	<b>0.7</b>
		SD	0.539	0.507	0.507	0.589	<b>0.536</b>
		CV %	0.7	0.7	0.7	0.9	<b>0.7</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.169	0.164	0.147	0.209	<b>0.172</b>
		CV %	0.2	0.2	0.2	0.3	<b>0.2</b>
	between single tests on one day	SD	0.169	0.133	0.122	0.182	<b>0.152</b>
		CV %	0.2	0.2	0.2	0.3	<b>0.2</b>
	between all tests on different days	SD	0.244	0.227	0.211	0.307	<b>0.247</b>
		CV %	0.3	0.3	0.3	0.5	<b>0.3</b>

Color +b							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			13.218	10.194	12.269	7.989	
Reference Values for Evaluation			13.218	10.194	12.269	7.989	
Number Of Instruments			132	132	132	132	<b>132</b>
Inter-Instrument Variation	based on 30 tests	SD	0.313	0.220	0.265	0.182	<b>0.245</b>
		CV %	2.4	2.2	2.2	2.3	<b>2.2</b>
		SD	0.320	0.235	0.283	0.200	<b>0.259</b>
	based on 6 tests	CV %	2.4	2.3	2.3	2.5	<b>2.4</b>
		SD	0.341	0.256	0.295	0.216	<b>0.277</b>
		CV %	2.6	2.5	2.4	2.7	<b>2.6</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.093	0.073	0.083	0.080	<b>0.082</b>
		CV %	0.7	0.7	0.7	1.0	<b>0.8</b>
	between single tests on one day	SD	0.101	0.075	0.079	0.066	<b>0.080</b>
		CV %	0.8	0.7	0.6	0.8	<b>0.7</b>
	between all tests on different days	SD	0.150	0.114	0.131	0.105	<b>0.125</b>
		CV %	1.1	1.1	1.1	1.3	<b>1.2</b>

Optional Parameters

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

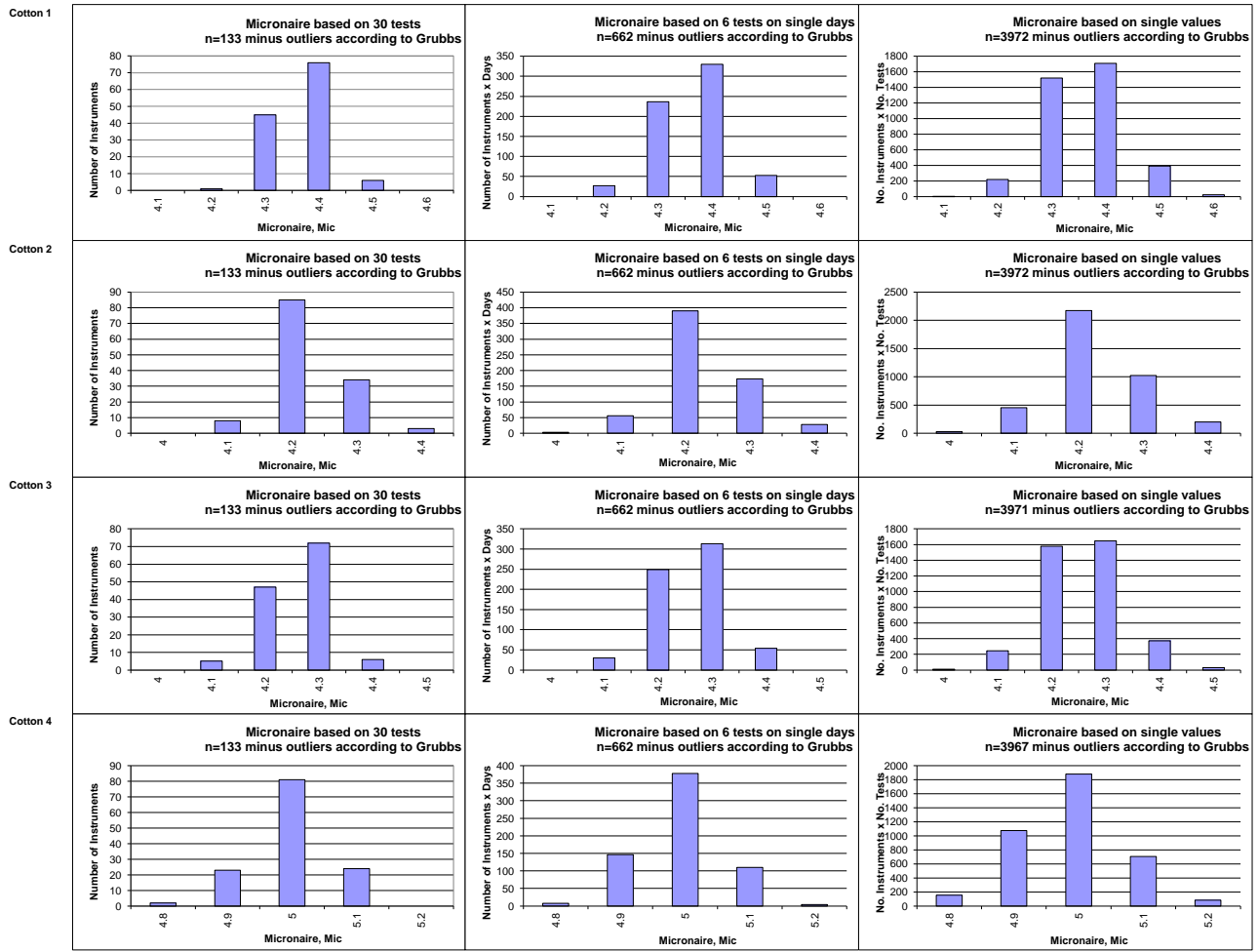
Trash Count							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			12.77	23.64	16.20	33.53	
Reference Values for Evaluation			12.77	23.64	16.20	33.53	
Number Of Instruments			87	87	87	87	<b>87</b>
Inter-Instrument Variation	based on 30 tests	SD	3.15	5.60	2.44	7.63	<b>4.70</b>
		CV %	24.7	23.7	15.1	22.7	<b>21.5</b>
		SD	4.01	6.09	4.02	7.76	<b>5.47</b>
	based on 6 tests	CV %	31.4	25.8	24.8	23.1	<b>26.3</b>
		SD	4.53	6.60	4.60	8.43	<b>6.04</b>
		CV %	35.4	27.9	28.4	25.1	<b>29.2</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	1.69	2.25	1.87	3.02	<b>2.21</b>
		CV %	13.2	9.5	11.5	9.0	<b>10.8</b>
	between single tests on one day	SD	1.85	2.38	2.04	3.29	<b>2.39</b>
		CV %	14.5	10.1	12.6	9.8	<b>11.7</b>
	between all tests on different days	SD	2.51	3.58	3.03	4.41	<b>3.38</b>
		CV %	19.6	15.1	18.7	13.2	<b>16.6</b>

Trash Area							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			0.138	0.243	0.148	0.430	
Reference Values for Evaluation			0.138	0.243	0.148	0.430	
Number Of Instruments			87	87	87	87	<b>87</b>
Inter-Instrument Variation	based on 30 tests	SD	0.036	0.061	0.029	0.120	<b>0.062</b>
		CV %	26.0	25.1	19.9	28.0	<b>24.7</b>
		SD	0.042	0.068	0.039	0.127	<b>0.069</b>
	based on 6 tests	CV %	30.3	27.8	26.4	29.6	<b>28.5</b>
		SD	0.047	0.078	0.046	0.143	<b>0.078</b>
		CV %	34.1	32.0	31.0	33.2	<b>32.5</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.018	0.029	0.021	0.059	<b>0.032</b>
		CV %	12.9	11.9	13.9	13.7	<b>13.1</b>
	between single tests on one day	SD	0.023	0.040	0.019	0.059	<b>0.035</b>
		CV %	17.1	16.4	12.7	13.8	<b>15.0</b>
	between all tests on different days	SD	0.034	0.052	0.033	0.090	<b>0.052</b>
		CV %	24.3	21.2	22.4	20.8	<b>22.2</b>

Maturity							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
Average of Instruments (Grubbs)			85.46	86.01	85.91	87.21	
Reference Values for Evaluation			85.46	86.01	85.91	87.21	
Number Of Instruments			84	84	84	84	<b>84</b>
Inter-Instrument Variation	based on 30 tests	SD	0.69	0.69	0.58	0.70	<b>0.66</b>
		CV %	0.8	0.8	0.7	0.8	<b>0.8</b>
		SD	0.67	0.71	0.64	0.70	<b>0.68</b>
	based on 6 tests	CV %	0.8	0.8	0.7	0.8	<b>0.8</b>
		SD	0.80	0.75	0.70	0.77	<b>0.76</b>
		CV %	0.9	0.9	0.8	0.9	<b>0.9</b>
Typical within-instrument Variation (Median)	between different days with each 6 tests	SD	0.12	0.09	0.09	0.15	<b>0.11</b>
		CV %	0.1	0.1	0.1	0.2	<b>0.1</b>
	between single tests on one day	SD	0.19	0.14	0.11	0.16	<b>0.15</b>
		CV %	0.2	0.2	0.1	0.2	<b>0.2</b>
	between all tests on different days	SD	0.30	0.25	0.19	0.31	<b>0.26</b>
		CV %	0.4	0.3	0.2	0.3	<b>0.3</b>

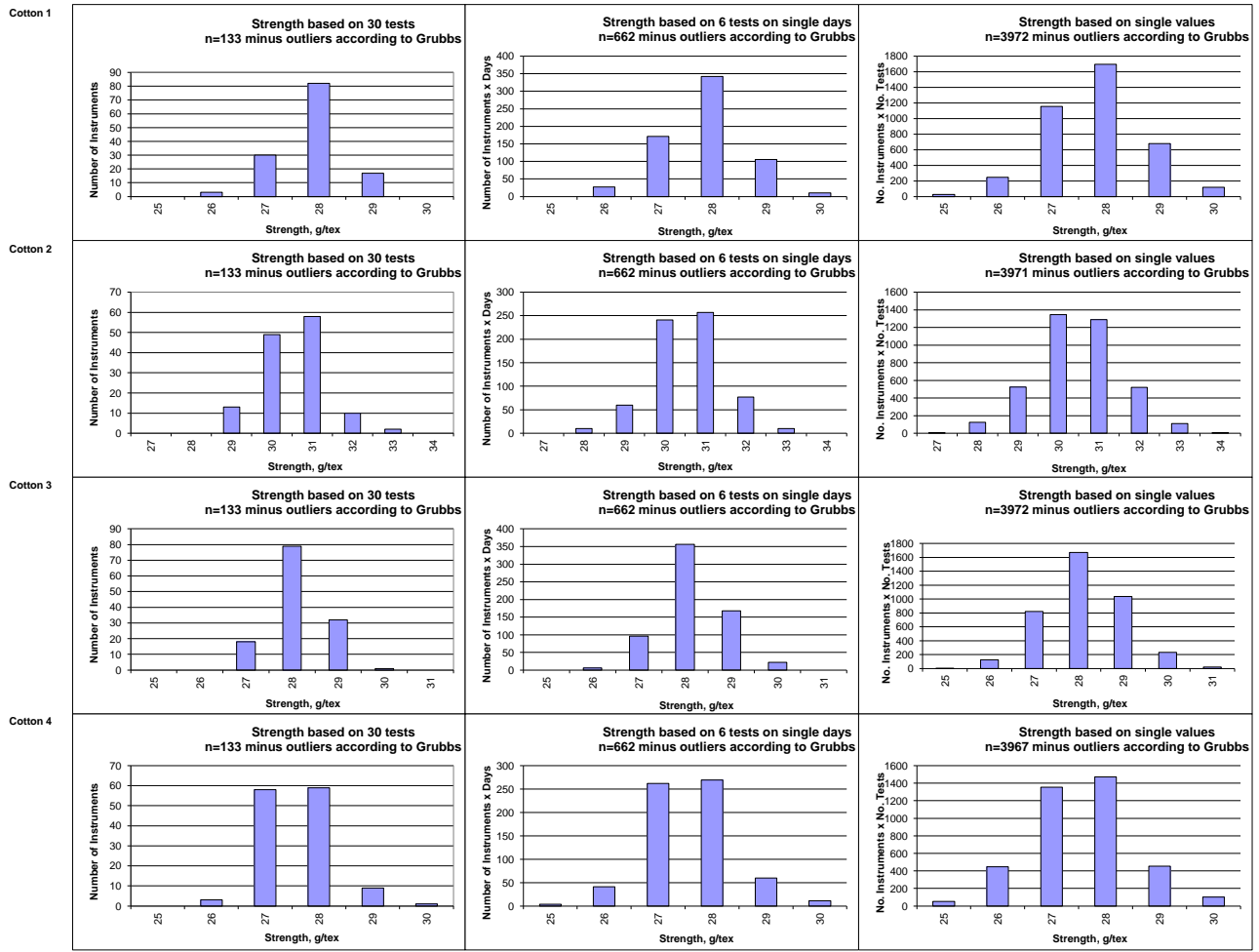
SFI							
			Cotton 1	Cotton 2	Cotton 3	Cotton 4	Average
<b>Average of Instruments (Grubbs)</b>			9.39	10.35	12.39	8.44	
<b>Reference Values for Evaluation</b>			9.39	10.35	12.39	8.44	
<b>Number Of Instruments</b>			89	89	89	89	<b>89</b>
<b>Inter-Instrument Variation</b>	based on 30 tests	SD	0.64	0.89	1.24	0.54	<b>0.83</b>
		CV %	6.8	8.6	10.0	6.3	<b>8.0</b>
	based on 6 tests	SD	0.78	0.93	1.26	0.64	<b>0.90</b>
		CV %	8.3	9.0	10.1	7.6	<b>8.8</b>
	based on single tests	SD	0.99	1.09	1.41	0.79	<b>1.07</b>
		CV %	10.6	10.6	11.4	9.3	<b>10.5</b>
<b>Typical within-instrument Variation (Median)</b>	between different days	SD	0.26	0.30	0.36	0.23	<b>0.29</b>
		CV %	2.8	2.9	2.9	2.7	<b>2.9</b>
	between single tests on one day	SD	0.49	0.55	0.64	0.45	<b>0.53</b>
		CV %	5.3	5.3	5.1	5.4	<b>5.3</b>
	between all tests on different days	SD	0.57	0.61	0.70	0.51	<b>0.60</b>
		CV %	6.0	5.9	5.6	6.0	<b>5.9</b>

Test Result Distributions  
Micronaire



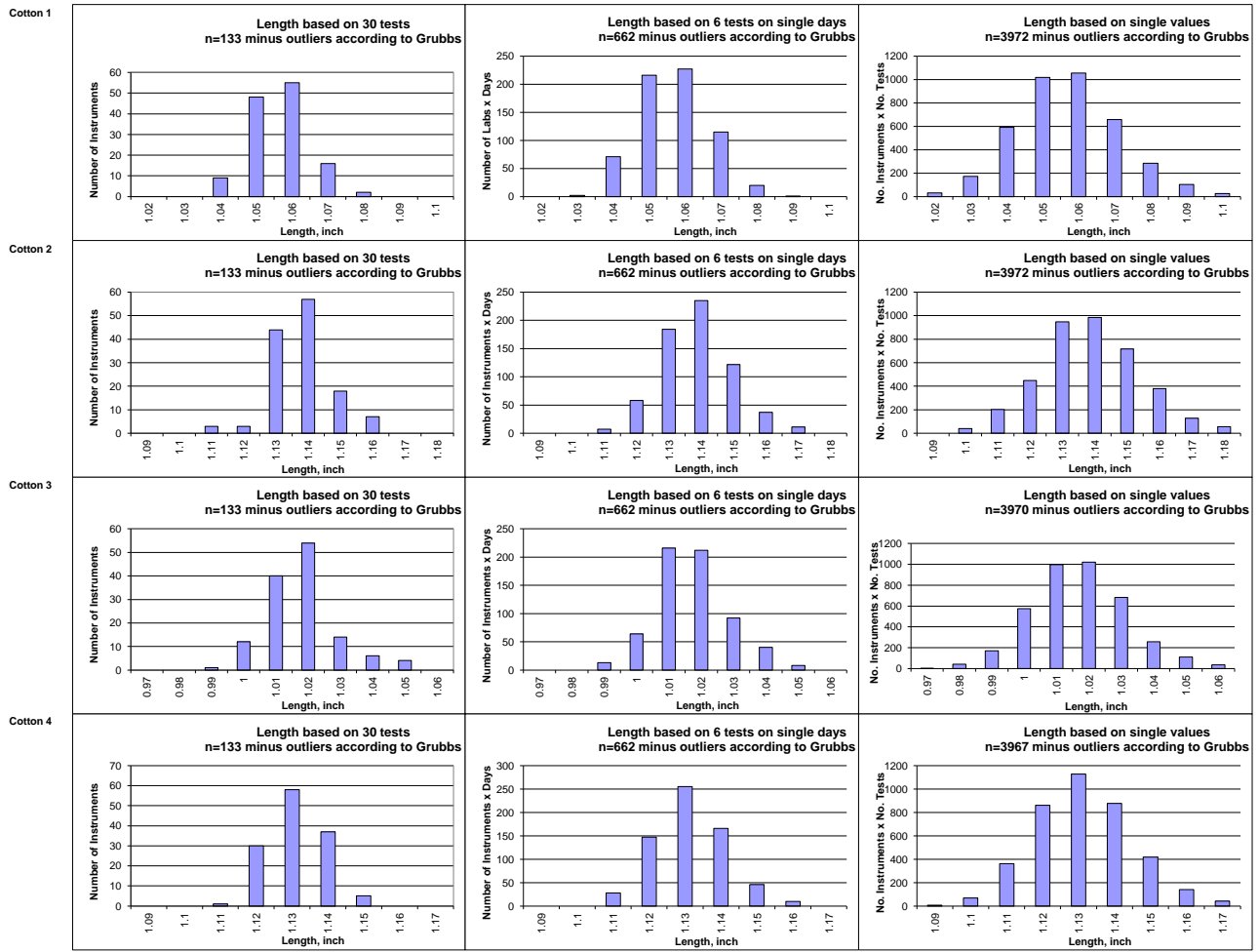
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method.)  
(classes are defined as > lower limit and <= upper limit)

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)

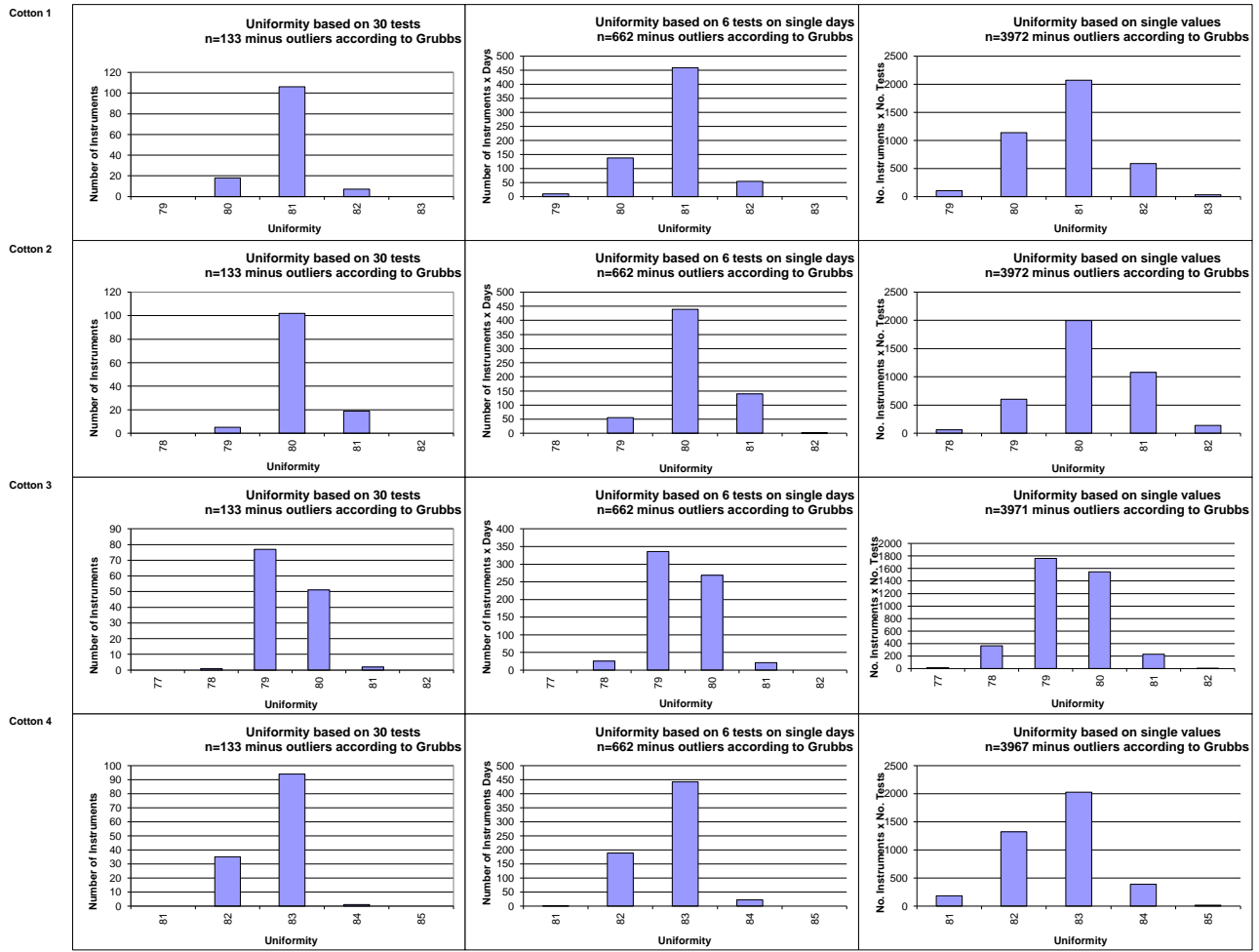
Test Result Distributions  
Length



(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)

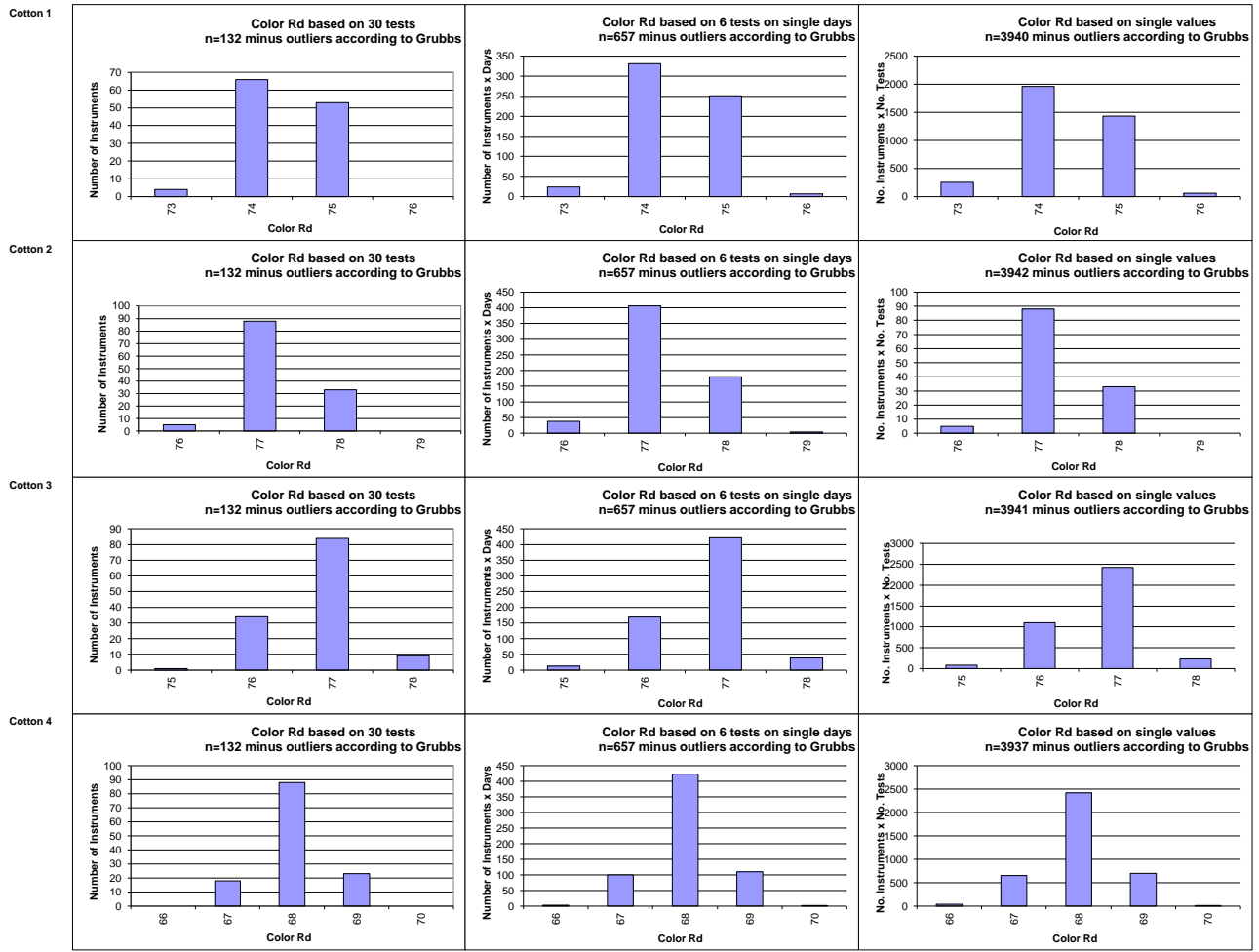


Test Result Distributions  
Uniformity



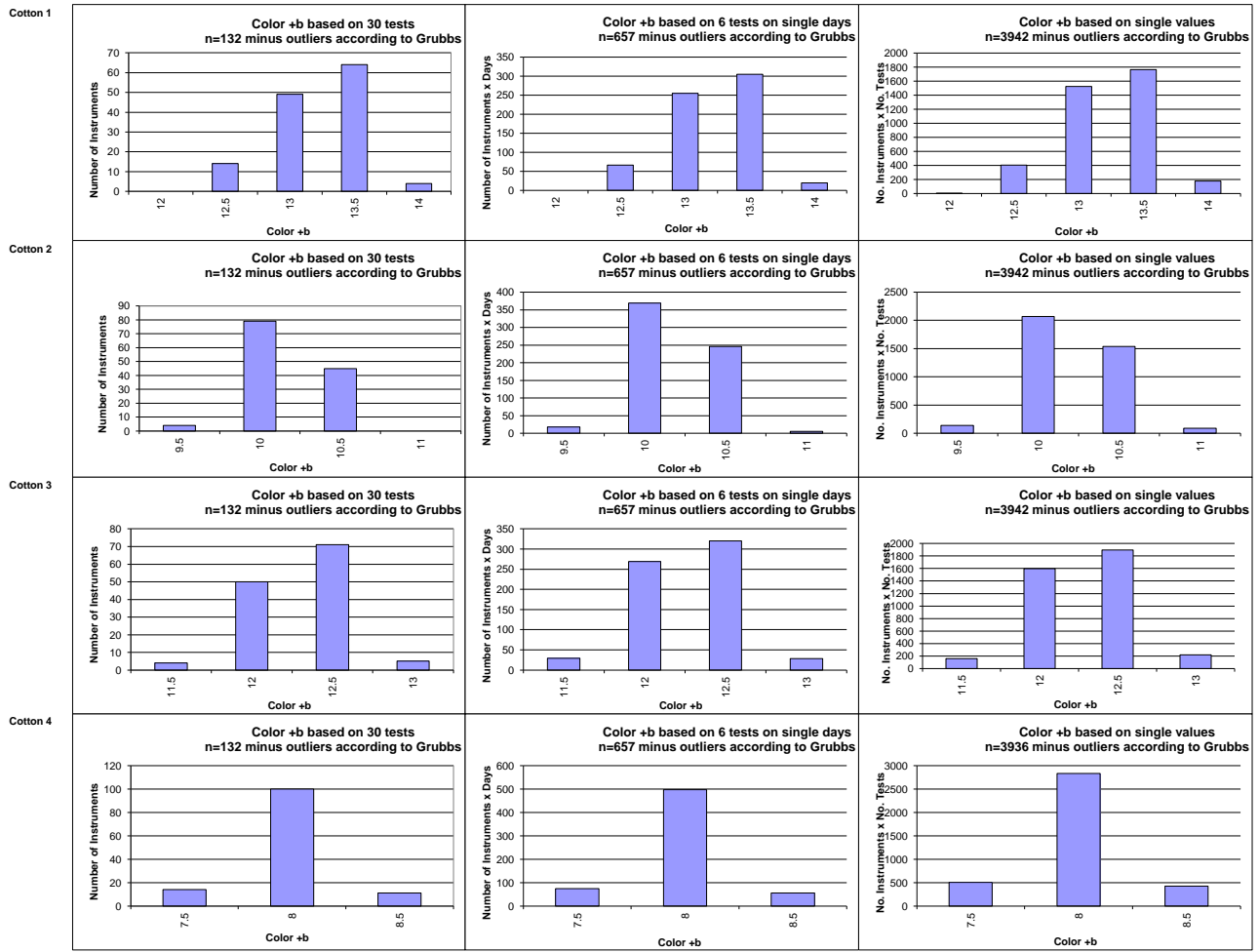
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Color Rd



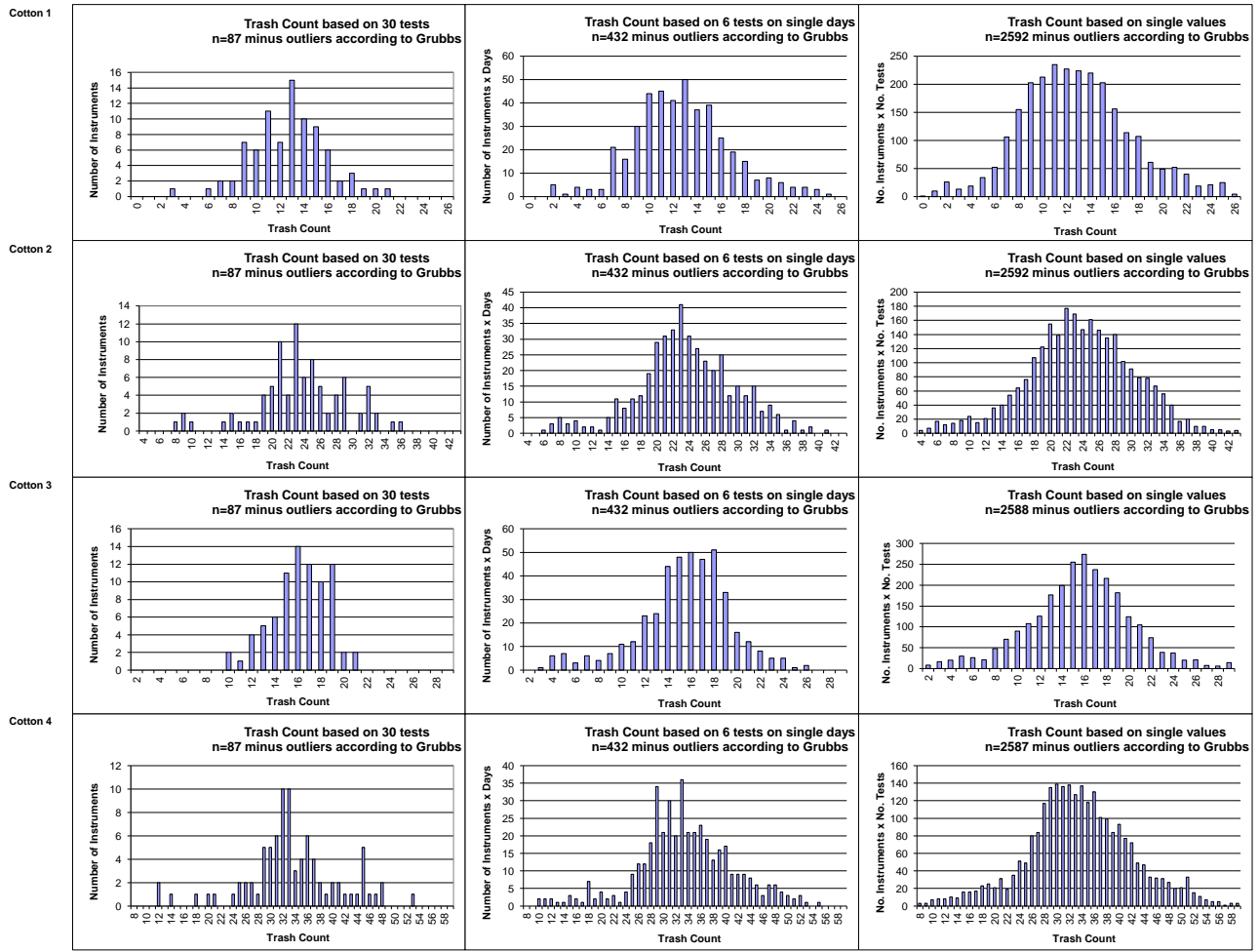
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method) (classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Color +b



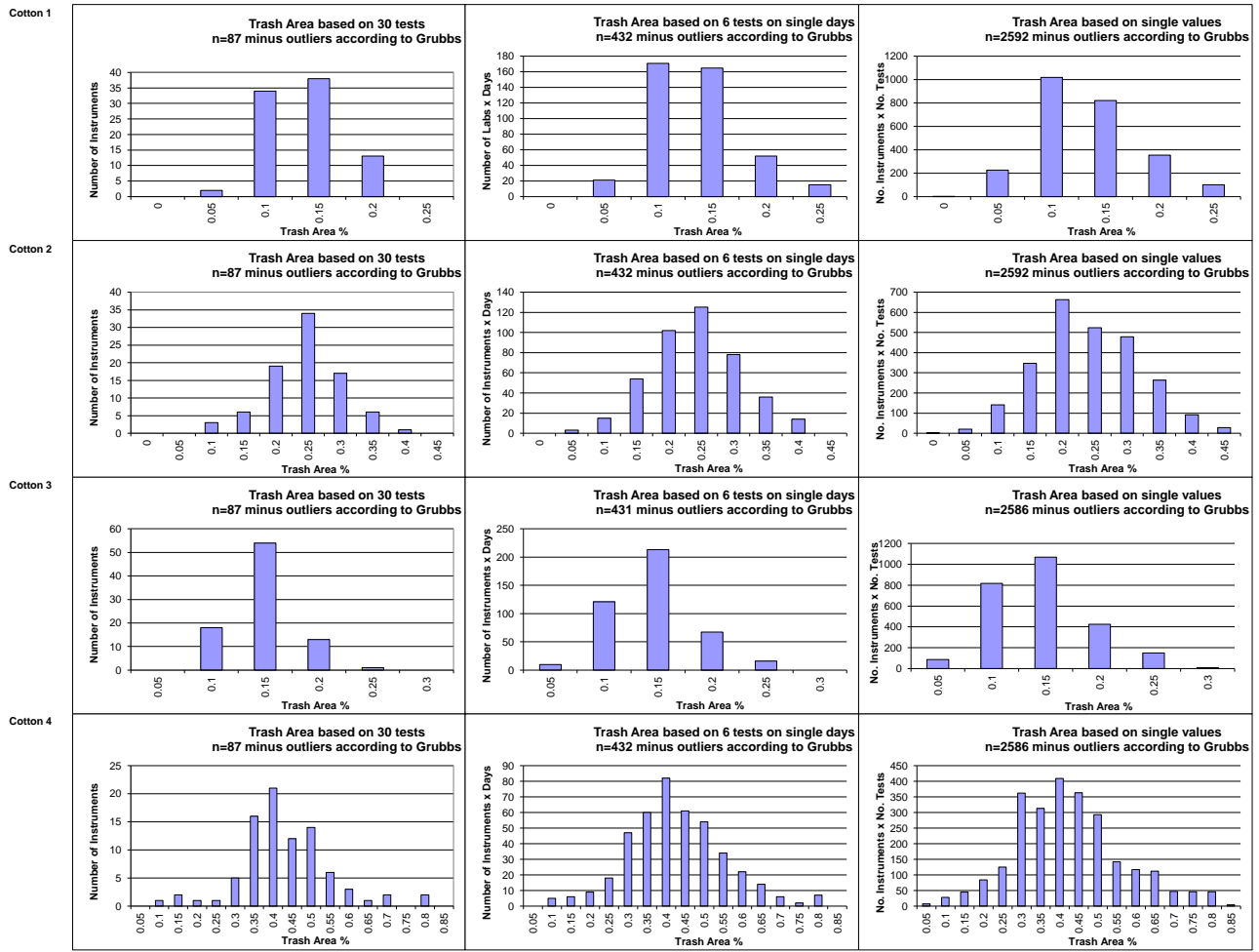
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Trash Count



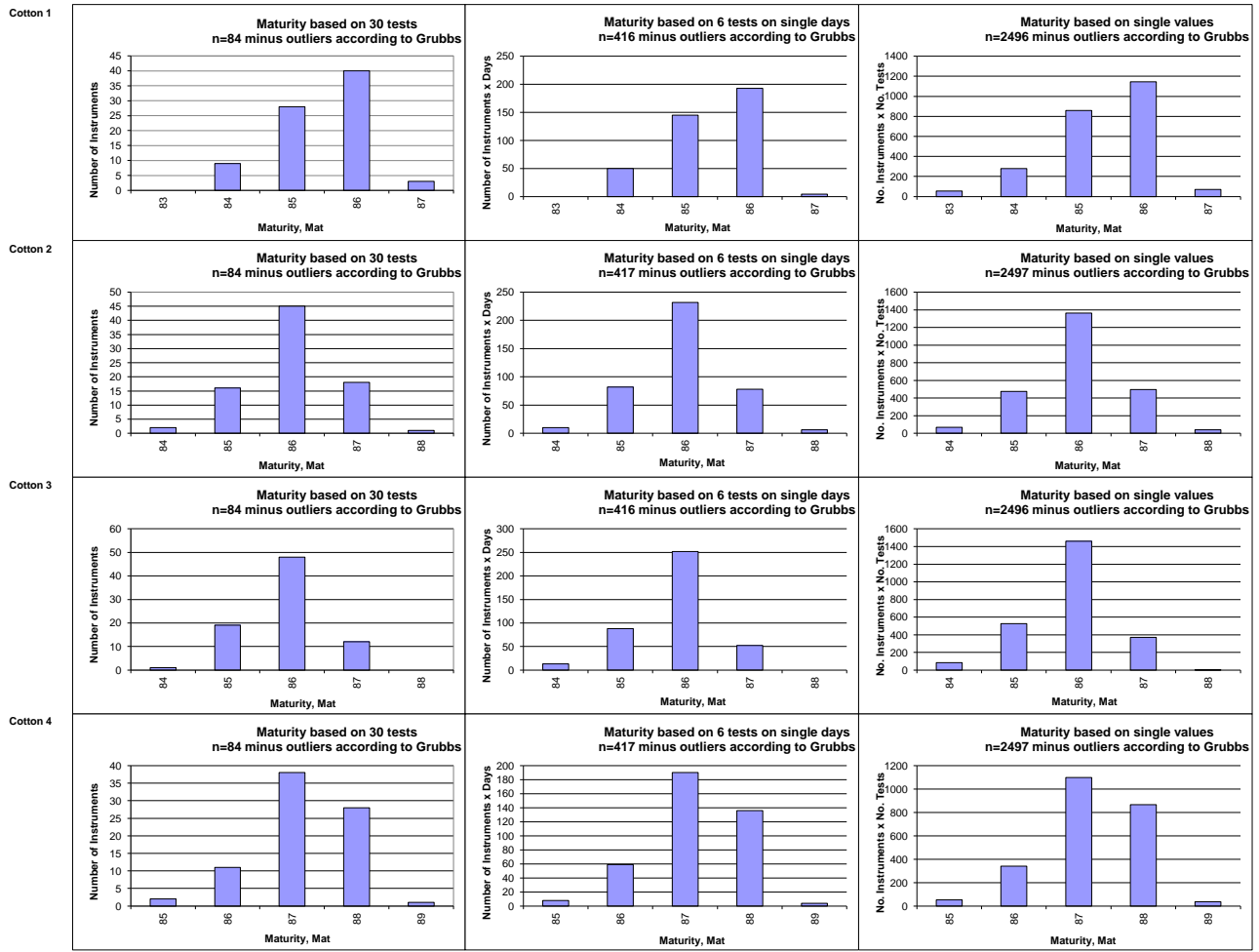
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method)  
(classes are defined as > lower limit and <= upper limit)

Test Result Distributions  
Trash Area



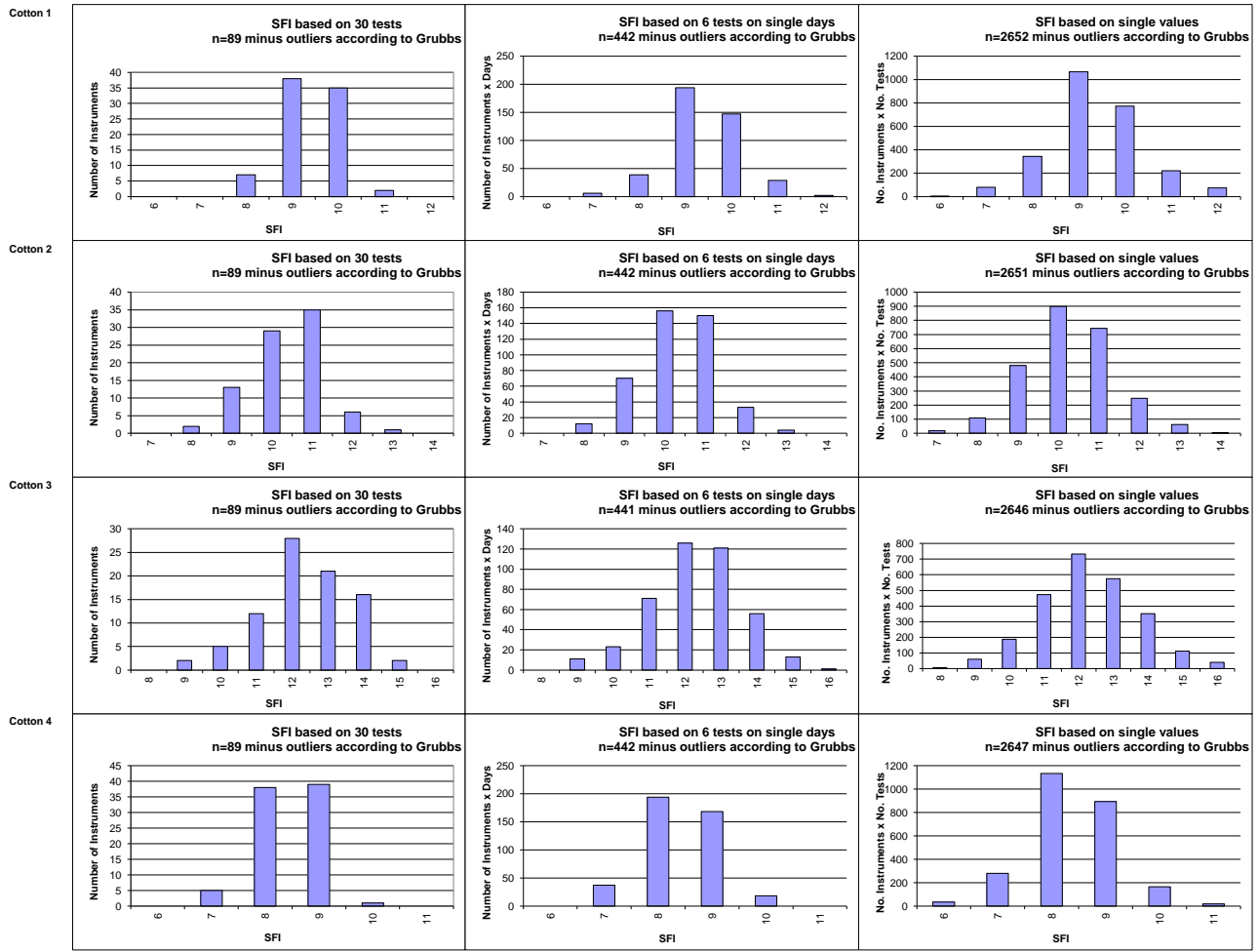
(Only results from instruments/days/single tests that are not regarded as outliers according to Grubbs' method) (classes are defined as > lower limit and <= upper limit)

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 2019 - 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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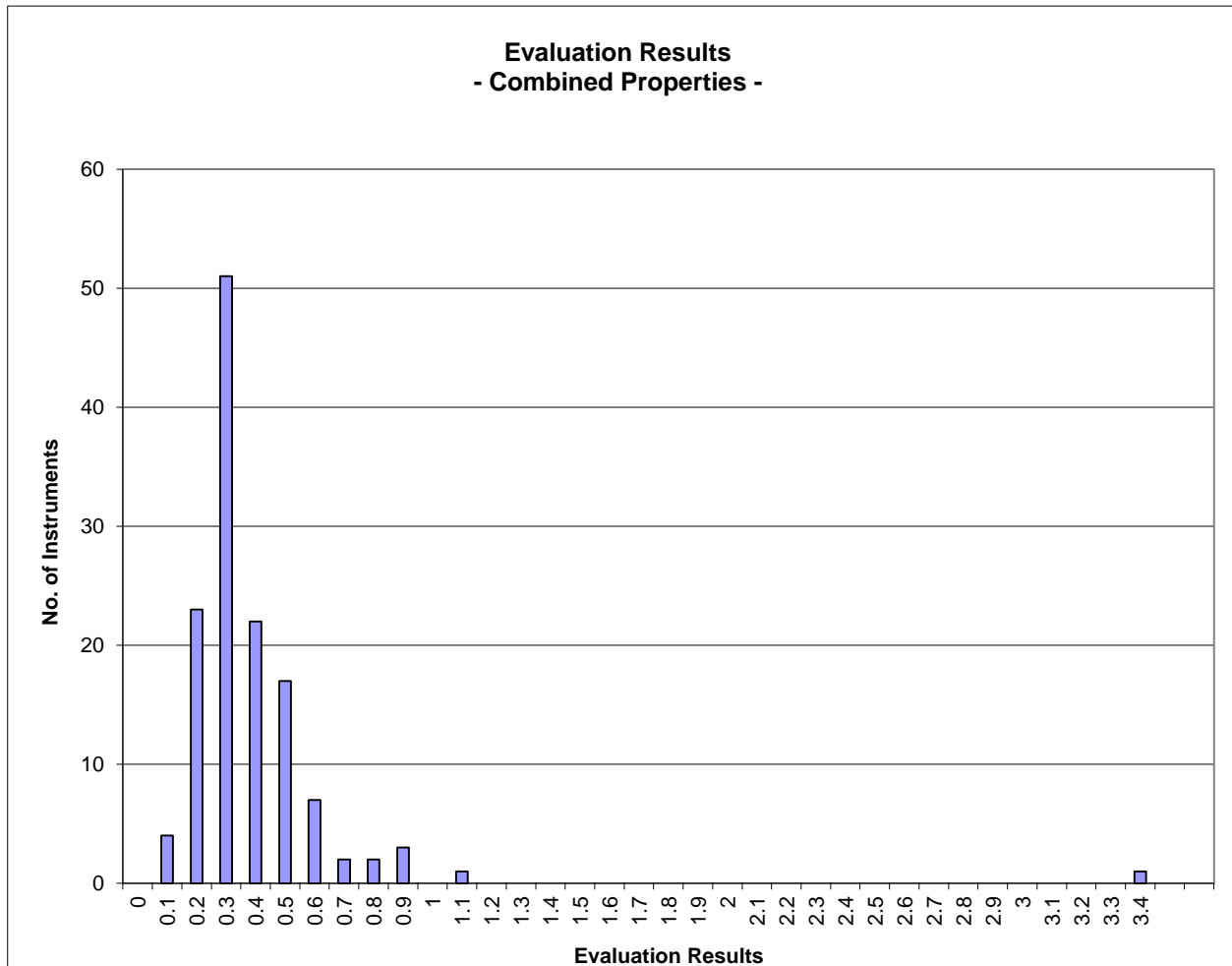
Instrument Evaluation

- Graph of Combined Properties -

According to ICAC CSITC Task Force Recommendations

Global - Round Trial 2019 - 3

		<b>Evaluation Combined Prop.</b>
<b>Statistics</b>	Average	0.39
	Median	0.32
	Best Instrument	0.13
	Worst Instrument	3.36



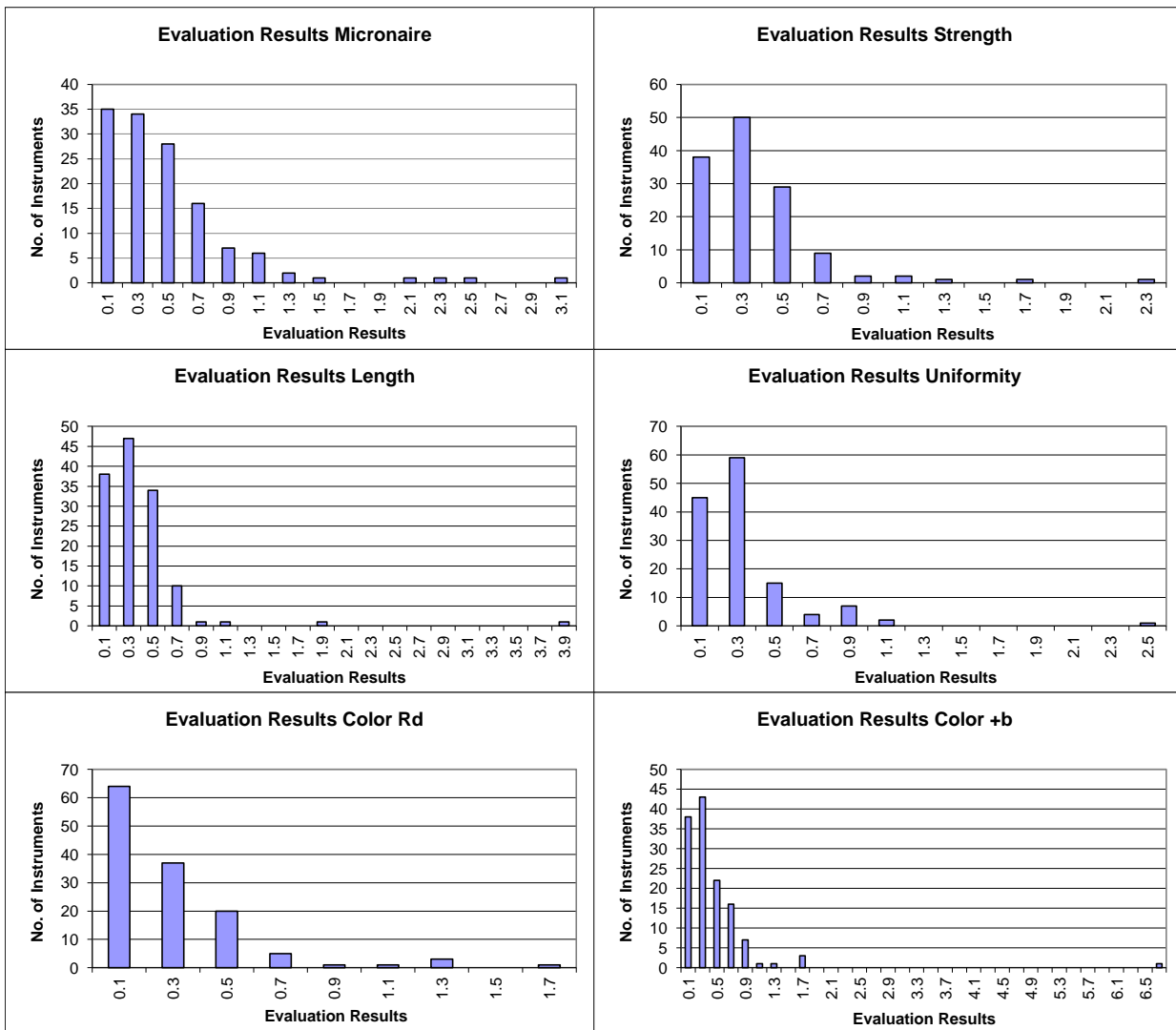
x-Axis shows midpoints of classes

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 2019 - 3

	Evaluation Micronaire	Evaluation Strength	Evaluation Length	Evaluation Uniformity	Evaluation Color Rd	Evaluation Color +b
<b>Statistics</b>	Average 0.50	0.38	0.38	0.33	0.30	0.46
	Median 0.35	0.31	0.31	0.24	0.21	0.32
	Best Instr. 0.03	0.02	0.05	0.06	0.04	0.05
	Worst Instr. 3.12	2.22	3.81	2.60	1.79	6.63



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



International Cotton Advisory Committee



# CSITC Global - Round Trial 2019 - 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

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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	97.9	97.9	98.5	99.2	96.2	91.9
Completely within limits	97.0	95.5	97.7	98.5	91.7	82.6
% of Instruments $\geq 75\%$ within limits	97.0	97.0	98.5	99.2	96.2	91.7
% of Instruments $\geq 50\%$ within limits	97.7	99.2	98.5	99.2	97.0	95.5

## 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	96.7	94.7	96.6	98.3	95.3	89.2
% of Instruments 100% within limits	66.2	30.1	35.3	57.9	68.9	40.9
% of Instruments $\geq 95\%$ within limits	87.2	75.2	88.0	94.0	86.4	65.2
% of Instruments $\geq 75\%$ within limits	96.2	96.2	97.7	99.2	92.4	84.8
% of Instruments $\geq 65\%$ within limits	97.0	97.7	98.5	99.2	95.5	90.9
% of Instruments $\geq 50\%$ within limits	97.7	97.7	99.2	99.2	96.2	96.2