Round Test on

stickiness characterization methods

Test: 2022-2

FINAL SHORT REPORT

Stickiness Task Force of the 'International Committee on Cotton Testing Methods' (ICCTM) of the 'International Textile Manufacturers Federation' (ITMF)

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Short report information about the following charts:

- NA excluded
- LabID are given in the abscissa axis at the bottom of the chart in the following charts.
- Black dashed line = Method Grand Mean per cotton (A, B, C,…)
- Red + = Laboratory mean for the given method and for the given cotton.
- Black x = Laboratory individual reading for the given method and for the given cotton.

NEW! Last page includes the calculation of Z-Scores for measuring the deviation of any results to the reference value per cotton (explanation below).

This last page was added in January 2023 for RT2022-2 report, after a presentation in Bremen ITMF-ICCTM committees in October 2022.

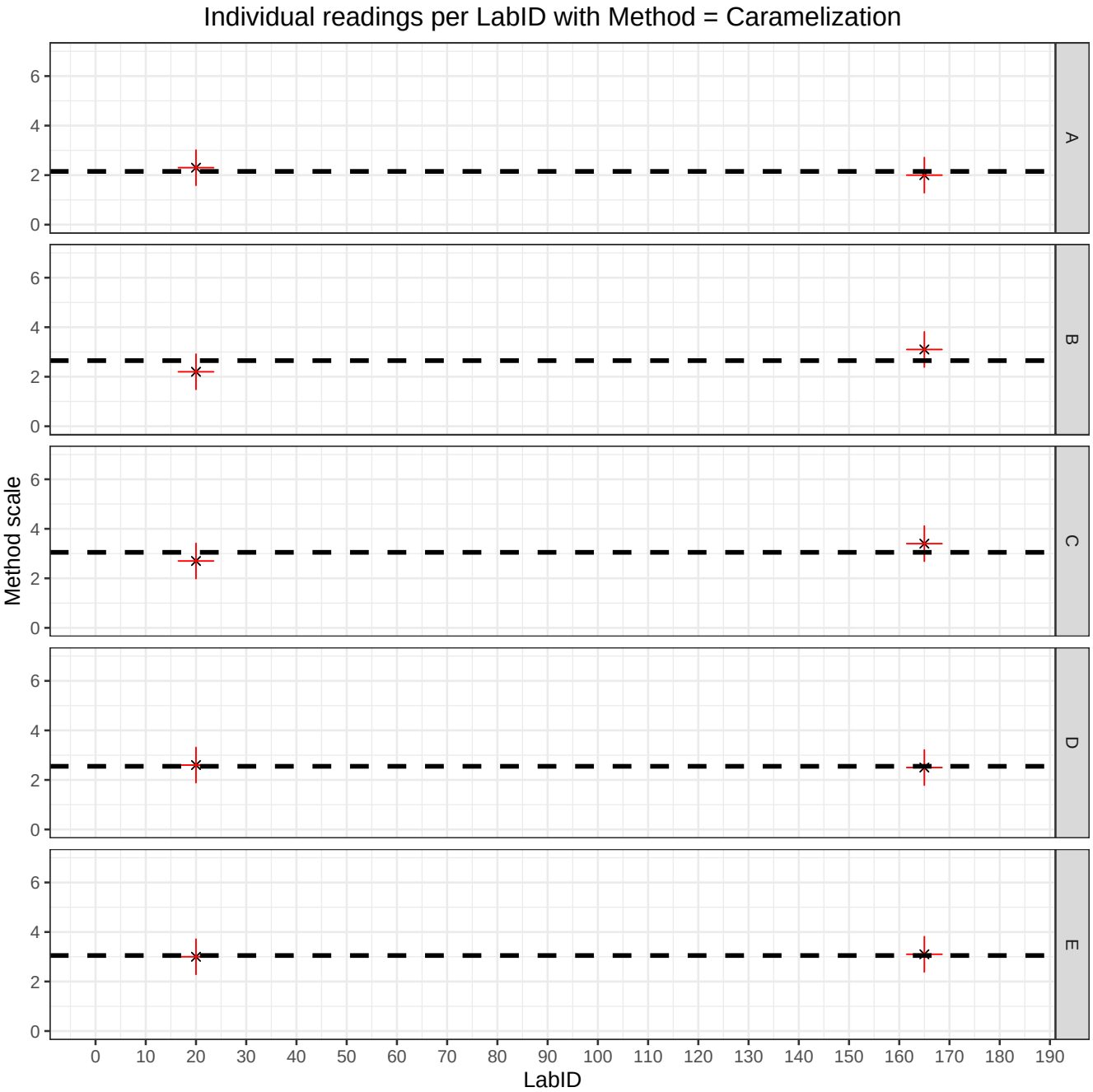
In order to alert participating laboratories when their results are deviating too much from the reference results for each cotton, it has been proposed to use the Z-Score system which is well-known and standardized value from laboratories in quality management systems, whatever material is tested or whatever characterization is measured. A Z-Score value usually belongs to the interval -3 to +3, as it is linked to a Normal-Gaussian distribution:

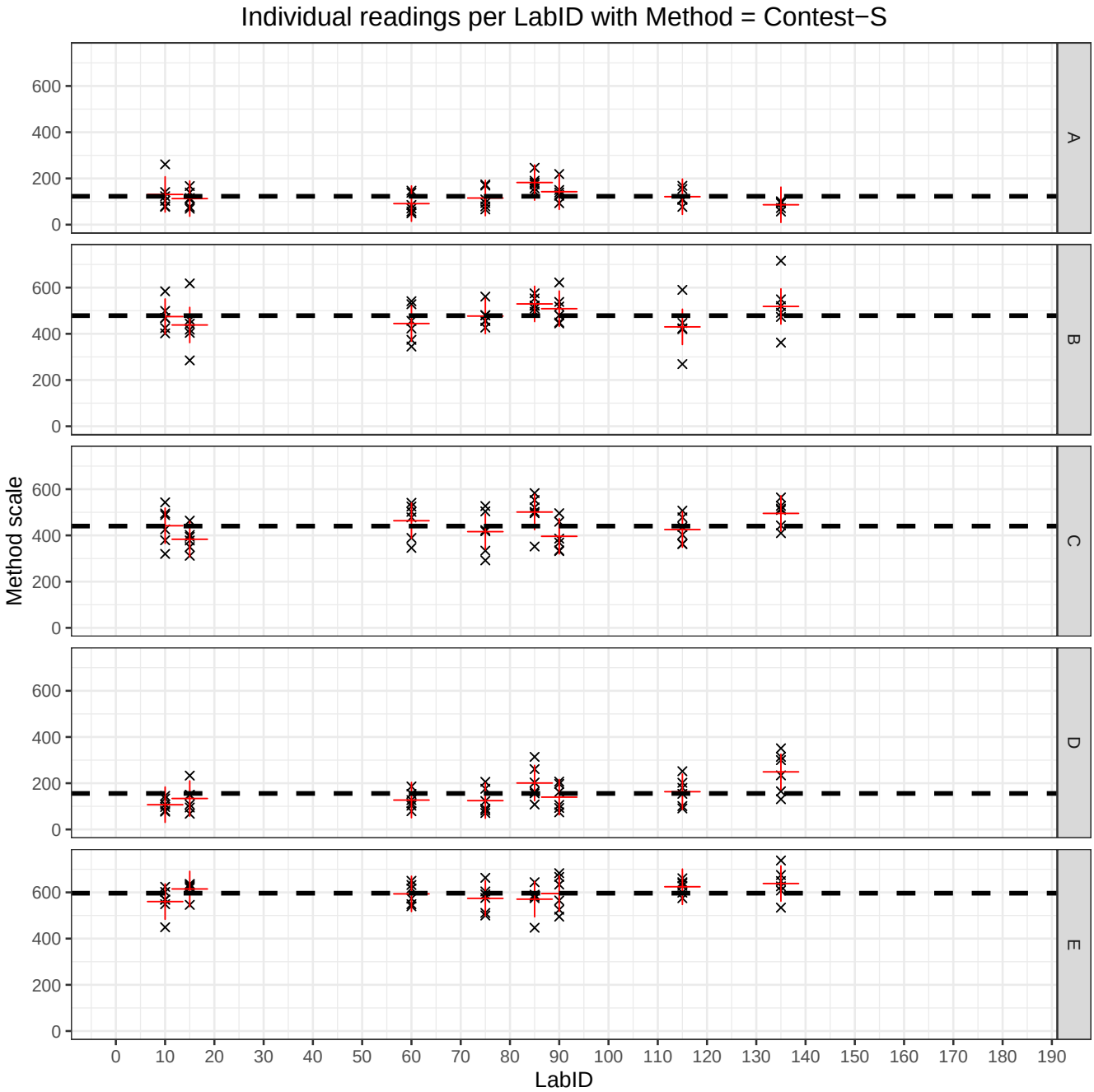
- When the value is belonging to the interval [-1,+1], the measured value given by the participating laboratory is close enough to the reference value for that material, and no alert is necessary to improve the performance of the laboratory;
- When the value is belonging to the intervals [- 2,-1[U]+1,+2], the measured value given by the participating laboratory starts to deviate from the reference value for that material, and a particular attention is demanded to the laboratory personnel to start taking care or to improve the performance of the laboratory;
- When the value is belonging to the intervals [-3,-2[U]+2,+3], the measured value given by the participating laboratory deviates too much from the reference value for that material, and a strong attention and corrections are demanded to the laboratory personnel to strongly improve the performance of the laboratory;
- When the value is belonging to the intervals]less than -3[U]more than +3[, the measured value given by the participating laboratory deviates far too much from the reference value for that material, and strong attentions and corrections are mandatory for the proper practice and better performance of the laboratory.

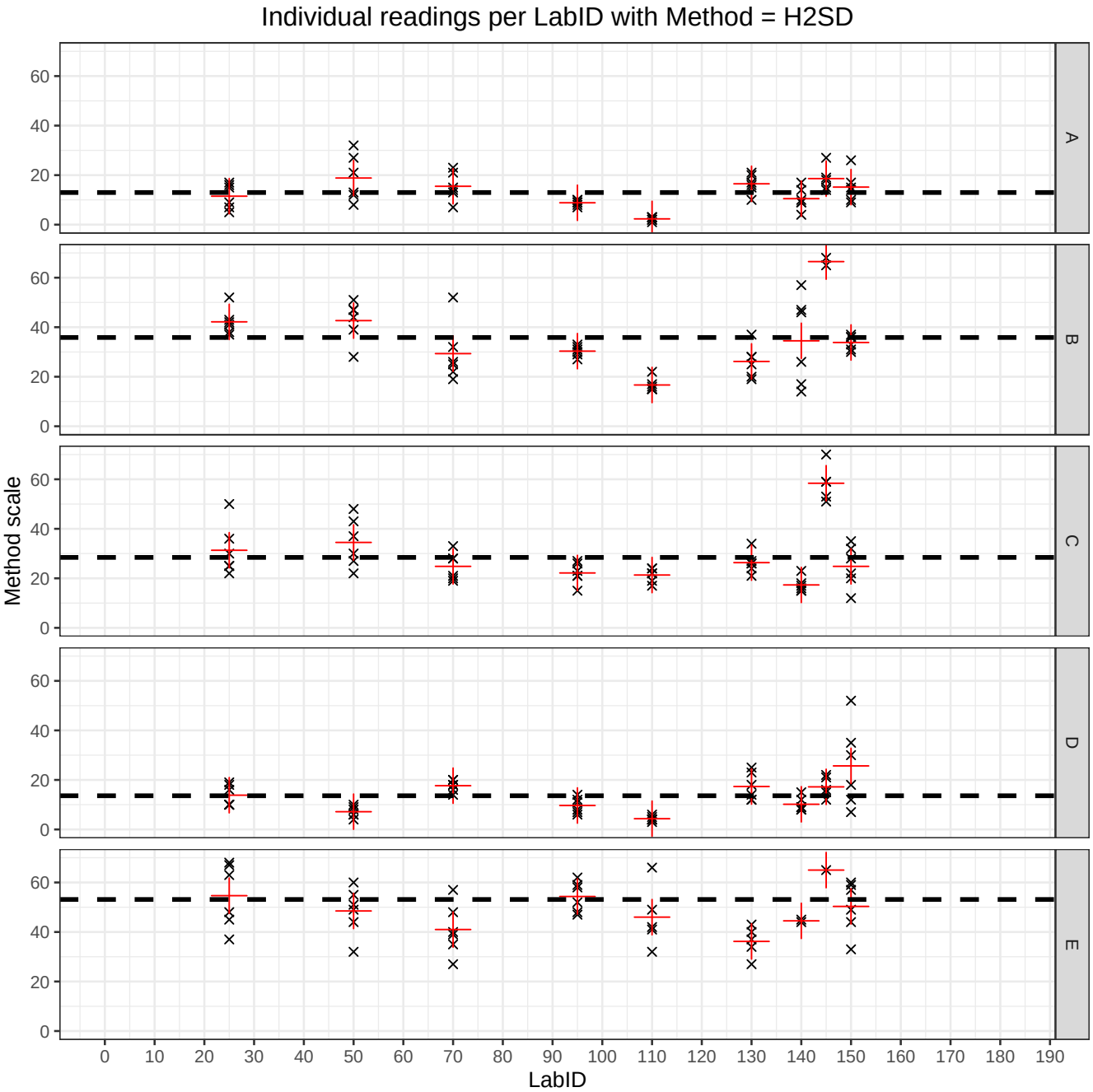
Z-Scores are calculated based on individual CommonScale results as described in some chapters above. Then, a mean CommonScale value is calculated for each LabID and each Material. Then a distribution is drawn based on these mean CommonScale values, from which Z-Score values are calculated based on Normal Standard Deviations. The reference values are based on the distribution from results of the chosen Methods in 2021 for starting the harmonization efforts, namely: Contest-S, H2SD, SCT as explained in Bremen in October 2022.

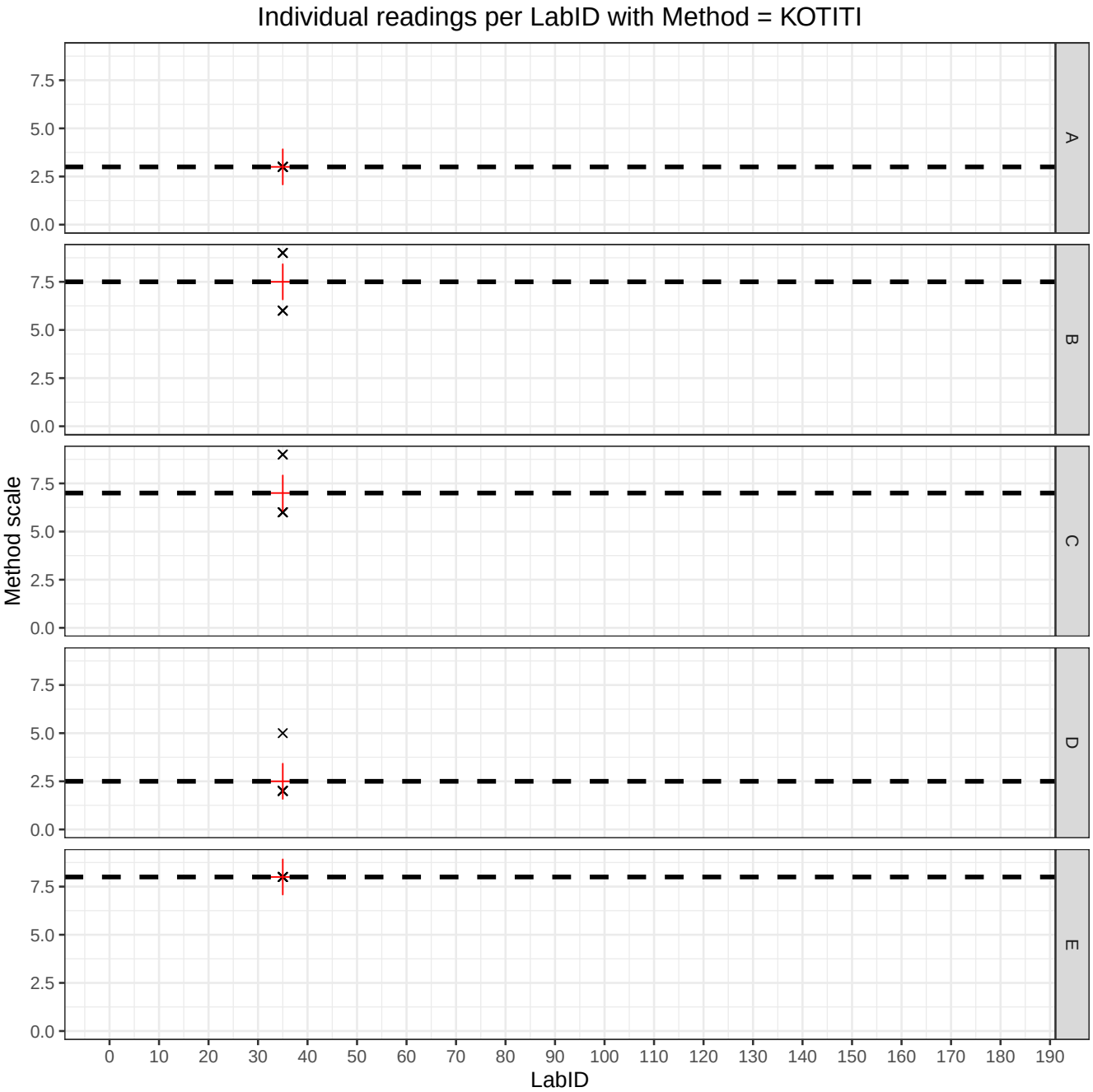
This leads to the inclusion of a new table in this Long Report. In practice, for each LabID, and for each tested material, a Z-Score value is reported in the table. Interpretation of this data is to be made with the above way of thinking (see bullet points just above).

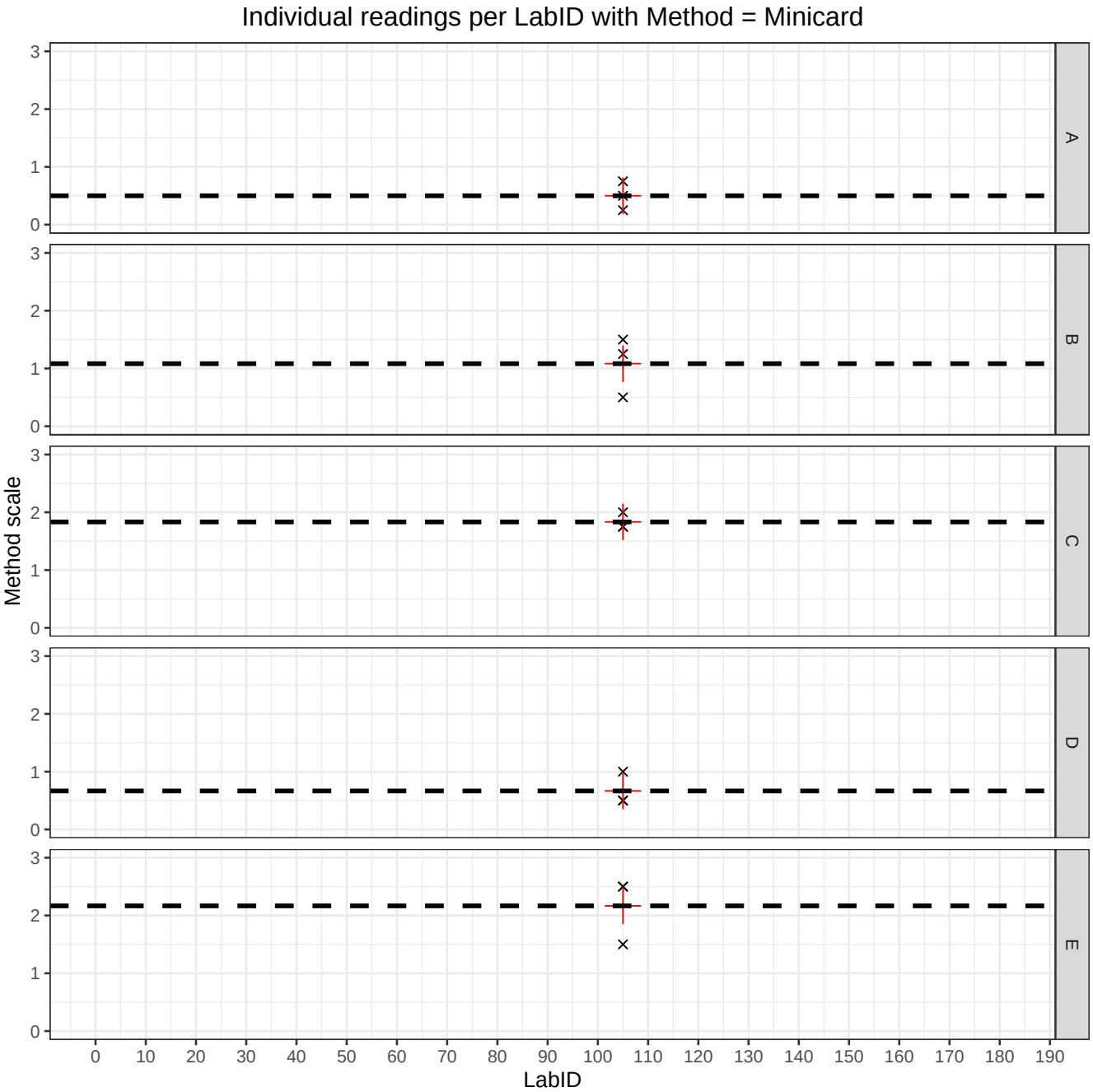
At the end of the day, Z-Score values could be the real information for laboratories in order to harmonize results at a worldwide scale.

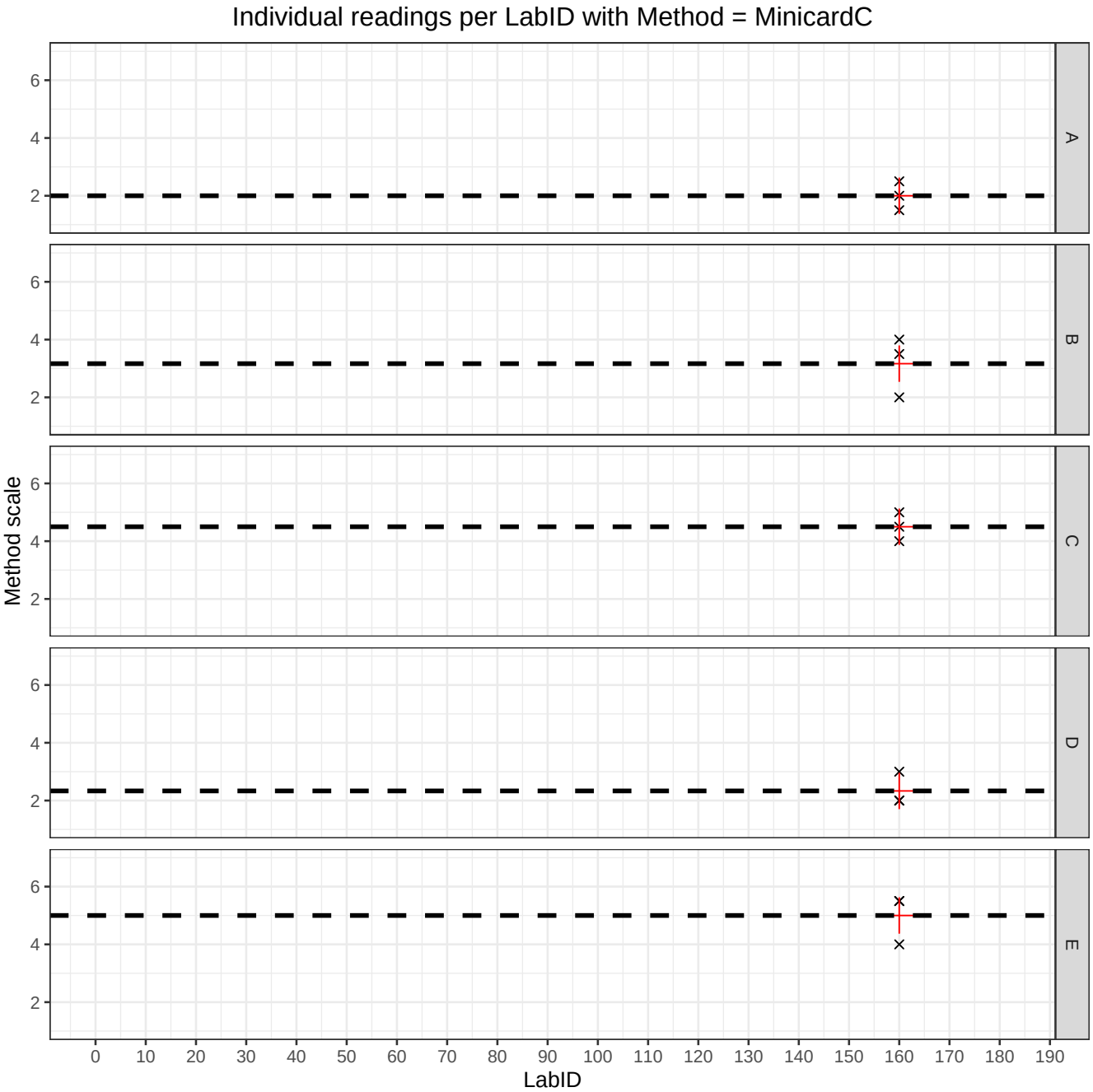

Individual readings per LabID with Method = Caramelization
Method scale
LabID
A
B
C
D
E
0
2
4
6
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190

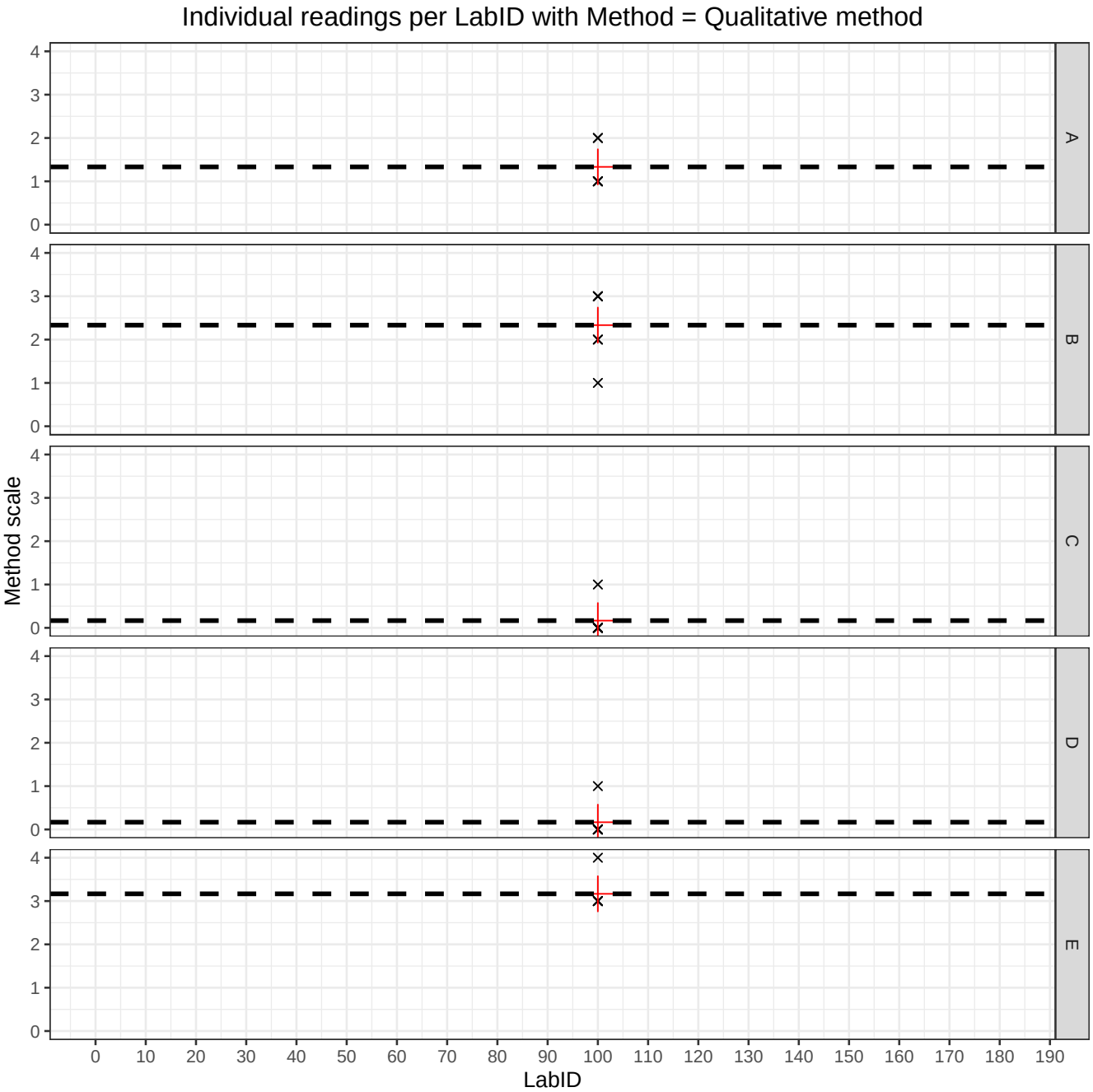

Individual readings per LabID with Method = Contest−S
Method scale
LabID
A
B
C
D
E
0
200
400
600
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190

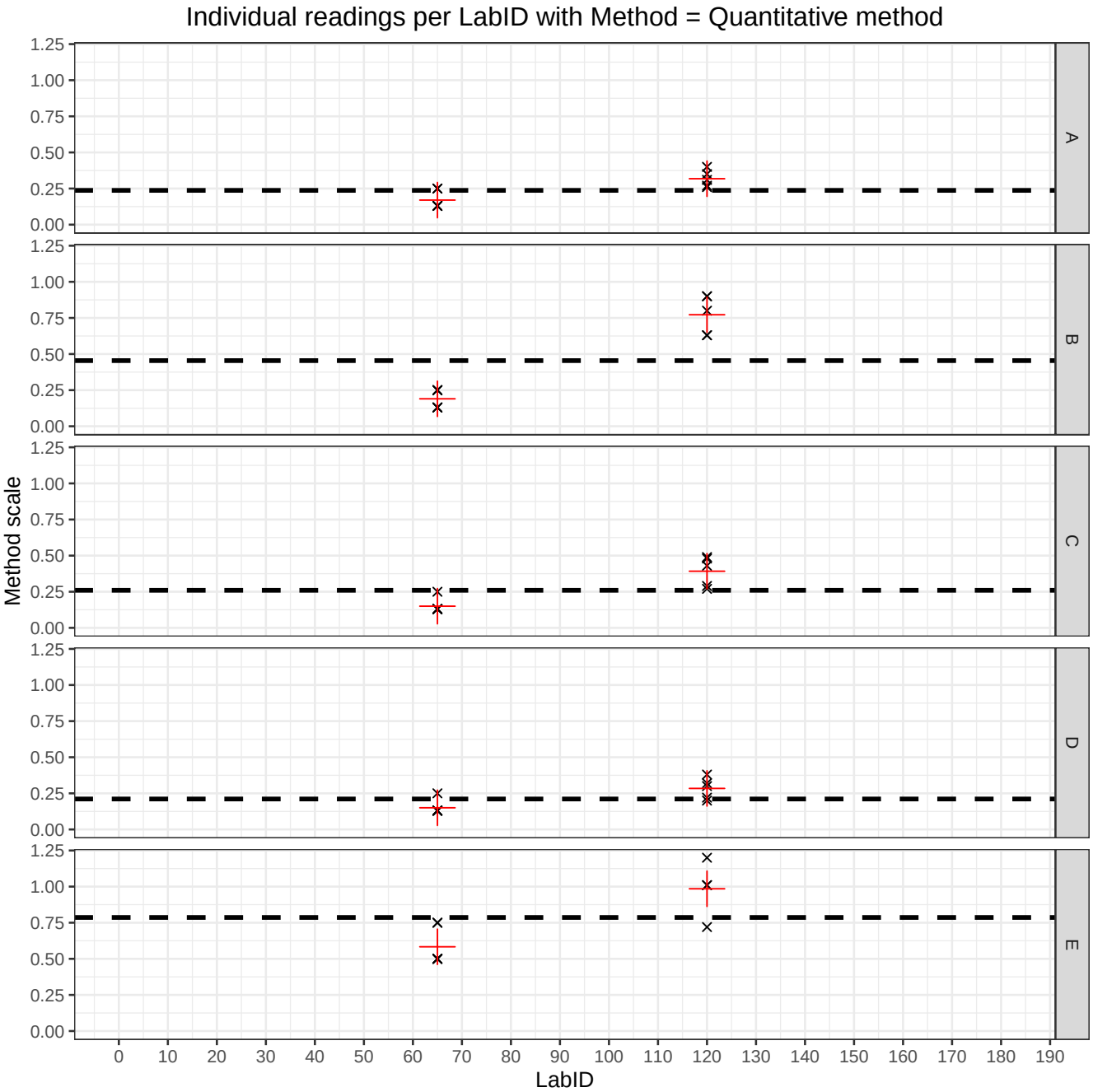

Individual readings per LabID with Method = H2SD
Method scale
LabID
A
B
C
D
E
0
20
40
60
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190

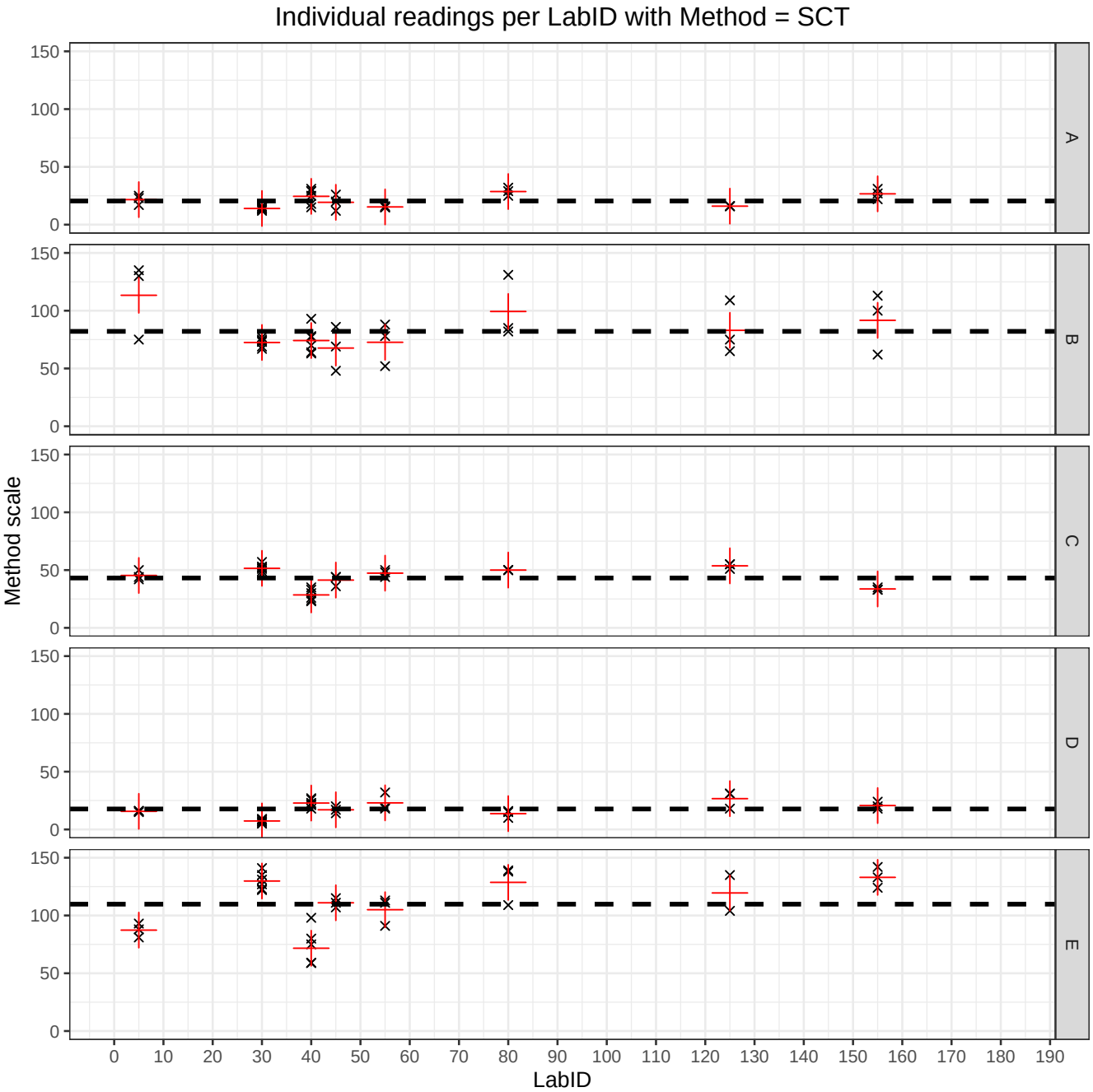

Individual readings per LabID with Method = KOTITI
Method scale
LabID
A
B
C
D
E
0.0
2.5
5.0
7.5
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190


Individual readings per LabID with Method = Minicard
Method scale
LabID
A
B
C
D
E
0
1
2
3
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190


Individual readings per LabID with Method = MinicardC
Method scale
LabID
A
B
C
D
E
2
4
6
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190


Individual readings per LabID with Method = Qualitative method
Method scale
LabID
A
B
C
D
E
0
1
2
3
4
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190


Individual readings per LabID with Method = Quantitative method
Method scale
LabID
A
B
C
D
E
0.00
0.25
0.50
0.75
1.00
1.25
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190


Individual readings per LabID with Method = SCT
Method scale
LabID
A
B
C
D
E
0
50
100
150
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190

RT2022-2 : Zscores values, based on CommonScale data and with reference to thermo-mecanic Methods (Contest-S, H2SD and SCT)

LabID	A	B	C	D	E
5	-0.35	1.20	-0.79	-0.92	-1.48
10	0.19	0.40	0.97	-0.43	-0.18
15	-0.24	0.08	0.49	0.04	0.40
20	2.91	-1.68	-0.27	2.52	-2.70
25	0.01	0.20	0.10	0.28	0.09
30	-1.24	-0.57	-0.53	-1.64	0.77
35	2.98	1.71	2.13	1.31	0.95
40	-0.01	-0.50	-1.47	-0.31	-2.32
45	-0.62	-0.78	-0.95	-0.81	-0.23
50	1.85	0.25	0.38	-0.95	-0.60
55	-1.09	-0.57	-0.71	-0.29	-0.55
60	-0.75	0.14	1.15	-0.09	0.18
65	-0.40	-2.69	-1.87	-0.66	-2.25
70	1.01	-0.99	-0.47	0.99	-1.46
75	-0.19	0.42	0.76	-0.12	-0.03
80	0.48	0.59	-0.60	-1.09	0.71
85	1.39	0.87	1.45	1.19	-0.06
90	0.46	0.69	0.60	0.14	0.19
95	-0.66	-0.90	-0.70	-0.49	0.06
100	2.98	0.08	-2.38	-1.73	0.18
105	0.05	-1.37	1.10	0.60	-0.37
110	-2.30	-2.17	-0.77	-1.47	-0.26
115	-0.05	0.01	0.83	0.54	0.50
120	1.78	0.47	-0.64	0.79	0.71
125	-1.00	-0.12	-0.45	0.03	0.77
130	1.27	-1.29	-0.33	0.92	-1.34
135	-0.87	0.78	1.41	2.02	0.65
140	-0.24	-0.51	-1.12	-0.40	1.00
145	1.79	3.09	2.47	0.90	2.65
150	0.93	-0.57	-0.47	2.46	-0.40
155	0.25	0.26	-1.26	-0.49	0.94
160	2.14	-0.78	1.30	2.03	-0.44
165	2.15	-0.84	0.34	2.33	-2.59

Highlighted values in orange indicates a quite large deviation to the expected stickiness value for that cotton. Corrective actions may be necessary.

General conclusions about the results of this round-test

At this point, some general conclusions can be drawn from the results of this round-test:

- Nine methods (one with two scales; in past RTS, up to eleven methods were participating) for measuring stickiness were used. Please see our conclusions in Bremen Conferences (see link below), for trying to make according decision for labs's future testing instrumentation and procedures.

- Thirty three instruments participated to this test. On our side, we were not able to easily deliver samples to some laboratories due to restrictions by carriers, and the final date to submit data was postponed to January 31, 2023. With all data available we prepared this report that is the only official one for ever.

- Maybe following the March 2021 meeting in Bremen, three methods are now counting a good participation (Contest-S (8), H2SD (9) and SCT (8)), while some methods now tend to reduce or disappear from some RTs already. Maybe also it is because participants had a look on past reports and Bremen ITMF-ICCTM presentations and saw our effort in the harmonization process focusing on thermo-mechanical methods mainly (see link below).

- Levels of reading as well as units to express stickiness remain quite different, confirming that maybe all methods are not exactly measuring the same property that all methods however name 'stickiness' by all methods. This could be a problem for the comparability of the measurements and the application of the results in processing.

- Variations in results are still quite high within and between laboratories using the same method, inducing somewhat low levels of reproducibility in the measurements. **It should be noticed that stickiness, due to its manifestation, has always been variable in 'real-life' samples; it also the case when 'prepared samples' as in this RT, but to a lesser degree.**

- It seems that this variation slightly reduced recently, but we need to find a criteria to measure it properly; please see last comment below;

- If one would compare methods, it would require calculating a representative result for each of the used methods; however taking care of the observed large variability levels in the results - both within laboratory and between laboratories - **a mean result or a median result per method would not be meaningful at this stage.** When these levels of variability will decrease, such a comparison will be published for each round-test occurrence.

- As discussed in Bremen (March 2018), since RT 2018-1, a new chapter appeared in the full report about the CommonScale approach as a first attempt of harmonization within and between methods (the later, at the condition that all methods do measure stickiness which will have to be proven according to a procedure to be developed).

- As discussed in Bremen (March 2021), harmonization steps will concentrate on thermo-mechanic methods and keeping the minicard as ITMF-ICCTM reference. More information will be disseminated on the harmonization steps in the future.

- As we assume that by showing their relative position of each laboratory on comparison with others will induce corrective actions to favor more harmonized results along time, we will run other occurrences of

this stickiness round-test in the coming times.

- To see the presentation that was made about this round-test in Bremen in March 2021, based on all acquired results since 2017, please visit: https://baumwollboerse.de/wp-content/uploads/2021/06/CCB_2021-T5-Gourlot-Drieling.pdf and/or https://www.itmf.org/images/dl/reports/icctm-reports/ICCTM-Report-2021.pdf .

- Lately, in Bremen (October 2022, see https://www.itmf.org/images/dl/reports/icctm-reports/ICCTM-Report-2022.pdf), it was proposed to use Z-Scores to express the distance of every individual measurement result (transformed in CommonScale) to a reference value for this cotton sample, knowing that the reference result is based on taking care on thermo-mechanic methods results only (based on 2021 decisions).

We recommend laboratories to observe their position and deduce the potential corrective actions that will lead to more grouped results in the coming round-test occurrences.

We stay available to all laboratories participating to this RT for providing any piece of information of their interest. Please note that preparing and dispatching samples has a cost and therefore we urge laboratories receiving samples to submit their results in due time.

In the same time, if you would have several kilograms of homogeneous material having a typical sticky behavior, and that you would like this cotton to participate in one or several future round-test occurrence(s), please contact Jean-Paul GOURLOT. Every thing will remain confidential at any time.

Finally, next round-test samples may be sent in a close future. Messages will be sent to the mailbox of participating laboratories contacts. **If you know other laboratories who wish to participate, please ask them to contact us...** Thanks for the cotton community.

We stay at disposal for any additional discussion; we do hope to see you again during the coming next RT later within the coming months.

Thank you again for your participation and support.