CONTRACTS & SPECIFICATIONS COMMITTEE **BRUSSELS CONGRESS**

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Chairman: Mr. W. Heath (South Africa) **Report No: TSG 01**

Report on Independent Laboratory Round Trial 3531 - 3634: January 2020 to December 2020

By

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SUMMARY

This ILRT Group Report covers 104 trials (3531 - 3634) for the period January 2020 to December 2020. The range of wool variables covered by this series is similar to the range covered in the previous series, and the source of sample material was similar. The ILRT Group attempts to ensure that the samples tested in the trials are representative of the wool types produced in the home nations of the participating laboratories and in proportion to the quantity of wool tested.

The data in the report includes Wool Base, VM Base, Airflow Mean Fibre Diameter, LASERSCAN Mean Fibre Diameter and LASERSCAN Standard Deviation of Fibre Diameter.

Overall the mean, within-lab and between lab standard deviation for the parameters reported are similar to the previous 6 trials, indicating continuing consistent performance of the member laboratories. Calculations of the 95% Confidence Limits confirm that the ILRT laboratories are producing results within the Confidence Limits reported in the respective IWTO Test Methods for most parameters.

For the reporting period two (2) outliers were due to difference in Wool Base and nineteen (19) to difference in VM Base. Further examination of the results showed that 4 of the 5 laboratories were outliers for trial 3576 and two of the 5 laboratories were outliers for trial 3589. A review of sampling procedures suggested an issue with clumpy VM and age of stored samples and it was decided to modify the sampling methodology to improve the blending of samples. It was also noted that trial 3536 was an outlier for both Wool Base and VM base in one laboratory.

Other outliers were identified for WB trial 3629 and for Airflow Mean Fibre Diameter trial 3578. These outliers were within theoretical expectations. There was also one outlier for LASERSCAN SD during the reporting period.

In September a significant review of the sampling and testing system was conducted to address the higher than expected number of VM outliers. The review included:

- An evaluation of procedures for producing trial samples which suggested VM was not uniformly spread throughout the sample. A modified sampling and blending protocol was implemented to reduce variation between samples.
- The laboratories have reviewed all of their internal procedures and work was undertaken to identify possible causes of outliers and steps were taken to address the outliers.

Since this review there have been 46 trials and two VM outliers for the period 1st September 2020 to 5th February 2021. This meets the theoretical numbers of VM outliers (46 trials x 5 labs x 1% = 2.3) that could be expected from this numbers of trials

By reporting[1-14] the results of its round trials the ILRT Group is providing commercial participants in the industry with a basis for confidence in the IWTO Certificates produced by its members. The ILRT Group is unique in reporting its technical performance and the series of trials provides a mechanism for ensuring that the member laboratories are harmonised and when differences are identified they can be addressed by the member laboratories.

INTRODUCTION

This report is prepared on behalf of the Independent Laboratories Round Trials (ILRT) Group. It covers 104 trials tested at a frequency of 2 per week over 52 weeks for the period January 2020 to December 2020.

The 5 laboratories currently participating in the first series ILRT are:

- Australian Wool Testing Authority Ltd - Fremantle Laboratory;
- Australian Wool Testing Authority Ltd - Melbourne Laboratory;
- New Zealand Wool Testing Authority Ltd, (NZWTA Ltd), Napier;
- Wool Testing Bureau S.A., (WTB), Port Elizabeth; and
- Wool Testing Authority Europe Ltd (WTAE Ltd), United Kingdom.

The ILRT Group Members comprise Members from the largest independent wool testing laboratories in the world. The objectives and aims of the Group are:

- to develop co-operation between the Members' laboratories, with a view to ensuring the most correct and uniform application of approved testing and sampling methods as may be set out in the Specifications of the International Wool Textile Organisation (IWTO) and in any associated IWTO Regulations;
- to ensure that the Members' laboratories obtain accurate test results having a high level of precision, in their application of those specific IWTO Test Methods and procedures which are relevant to the Group's agreed annual work programme;
- to collect such precision data, with respect to those IWTO specifications being utilised in the ILRT programme, as is required or desirable, but having regard to the principle ILRT functions of harmonising and monitoring the technical performance of the Members' laboratories;
- to assist Members' laboratories in resolving disputes arising from differences in test results, by ascertaining the causes of any discrepancies; and
- to the extent feasible, allow non-competing commercial laboratories to become Participating Laboratories in the inter-laboratory round trials from time to time.

The ILRT Group report is presented to every IWTO Congress.

SOURCE OF SAMPLE MATERIAL

The ILRT attempts to ensure that the samples tested in the trials are representative of the wool types produced in the home nations of the participating laboratories and in proportion to the quantity of wool tested. Table 1 summarises the countries of origin for the samples used in this series.

TABLE 1

SOURCE OF SAMPLE MATERIAL

COUNTRY OF ORIGIN	NUMBER OF SAMPLES
Australia	76
New Zealand	13
South Africa	13
United Kingdom	2
TOTAL	104

RANGE OF WOOL TESTED

Sample material covers a similar range of Wool Base, Vegetable Matter Base, Mean Fibre Diameter and Standard Deviation of Fibre Diameter to that reported at previous meetings (Table 2).

TABLE 2

RANGES OF PARAMETERS OF WOOLS TESTED

(TRIALS 3531 - 3634)

PARAMETER	MEAN	RANGE		
Wool Base (%)	56.66	43.00	to	67.81
Vegetable Matter Base (%)	1.77	0.10	to	8.70
Mean Fibre Diameter (µm) (Based on IWTO-28)	24.95	15.68	to	37.78
Mean Fibre Diameter (µm) (Based on IWTO-12)	24.81	15.25	to	37.53
Standard Deviation of Fibre Diameter (µm) (Based on IWTO-12)	5.70	3.10	to	9.50

OVERALL RESULTS

Means & Standard Deviations

The between sub-samples within-laboratory and between-laboratory variation for Wool Base, Vegetable Matter Base are compared, by calculating the Standard Deviation for each and comparing them with data from previous ILRT Reports. Similarly, for Mean Fibre Diameter the between test specimens within-laboratory and between-laboratory variation is compared. Comparisons of the overall values for each parameter against values obtained in the 6 previous reporting periods are reported in Table 3 for yield and Table 4 for diameter.

TABLE 3

WITHIN AND BETWEEN LABORATORY STANDARD DEVIATIONS FOR YIELD PARAMETERS

TRIAL PERIOD	WOOL BASE			VEGETABLE MATTER BASE		
	MEAN	BETWEEN SUBS WITHIN LABS	BETWEEN LABS	MEAN	BETWEEN SUBS WITHIN LABS	BETWEEN LABS
3009 - 3112	58.25	0.37	0.24	1.92	0.22	0.16
3113 - 3216	58.43	0.36	0.23	1.85	0.20	0.15
3217 - 3320	59.11	0.38	0.19	1.94	0.22	0.14
3321 - 3426	58.10	0.37	0.22	1.93	0.22	0.15
3427 - 3530	56.85	0.36	0.26	1.87	0.23	0.18
3531 - 3634	56.66	0.39	0.23	1.77	0.20	0.18
OVERALL MEAN	**57.90**	**0.37**	**0.23**	**1.88**	**0.22**	**0.16**

TABLE 4

WITHIN AND BETWEEN LABORATORY STANDARD DEVIATIONS FOR DIAMETER PARAMETERS

TRIAL PERIOD	MEAN FIBRE DIAMETER AIRFLOW			MEAN FIBRE DIAMETER LASERSCAN			SD OF FIBRE DIAMETER LASERSCAN		
	TRIAL PERIOD MEAN	BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS	TRIAL PERIOD MEAN	BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS	TRIAL PERIOD MEAN	BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS
3009 - 3112	25.10	0.16	0.16	24.88	0.27	0.07	5.68	0.23	0.08
3113 - 3216	25.19	0.16	0.22	24.95	0.29	0.08	5.58	0.24	0.08
3217 - 3320	25.17	0.16	0.20	24.93	0.29	0.07	5.53	0.22	0.06
3321 - 3426	25.13	0.15	0.15	24.96	0.30	0.06	5.61	0.23	0.06
3427 - 3530	24.97	0.16	0.18	24.83	0.29	0.07	5.77	0.24	0.05
3531 - 3634	24.95	0.15	0.17	24.81	0.32	0.07	5.70	0.24	0.06
OVERALL MEAN	**25.09**	**0.16**	**0.18**	**24.89**	**0..29**	**0.07**	**5.64**	**0.23**	**0.06**

From the variances reported for each trial in Tables 3 and 4 above, the 95% confidence limits for a normal presale test can be calculated. For the purposes of calculation, in the case of Wool Base and VM Base a 2 sub-sample test is assumed. In the case of Mean Fibre Diameter, a 2 test specimen test (with 2 readings per test specimen) is assumed. For the Laserscan results, a 4 test specimen test is assumed. These assumptions are the minimum requirements that must be met to issue an IWTO Certificate.

The calculated 95% Confidence Limits are presented in Table 5, along with the Confidence Limits for the respective IWTO Test Method (calculated for the overall mean for each parameter). Comparing the Overall

Confidence Limit to the Test Method Confidence Limit confirms that the ILRT laboratories are producing results within the limits of the respective IWTO Test Methods.

TABLE 5

95% CONFIDENCE LIMITS

TRIAL PERIOD	WOOL BASE		VM BASE		AIRFLOW Mean Fibre Diameter		LASERSCAN Mean Fibre Diameter		LASERSCAN Fibre Diameter SD	
	Mean	Con. Limit	Mean	Con. Limit	Mean	Con. Limit	Mean	Con. Limit	Mean	Con. Limit
3009 - 3112	58.25	0.69	1.92	0.43	25.10	0.39	24.88	0.40	5.68	0.27
3113 - 3216	58.43	0.67	1.85	0.41	25.19	0.48	24.95	0.43	5.58	0.28
3217 - 3320	59.11	0.64	1.94	0.42	25.17	0.45	24.93	0.42	5.53	0.25
3321 - 3426	58.10	0.67	1.93	0.43	25.13	0.35	24.96	0.42	5.61	0.25
3427 - 3530	56.85	0.72	1.87	0.48	24.97	0.42	24.83	0.42	5.77	0.26
3531 - 3634	**56.66**	**0.70**	**1.77**	**0.45**	**24.95**	**0.40**	**24.81**	**0.47**	**5.70**	**0.26**
OVERALL MEAN	**57.90**	**0.68**	**1.88**	**0.44**	**25.09**	**0.42**	**24.89**	**0.43**	**5.64**	**0.26**
(TEST METHOD)		**(1.10)**		**(0.42)**		**(0.57)**		**(0.47)**		**(0.25)**

For any given parameter, the consistency of the confidence limits indicates the laboratory performance has been stable over the periods reported in Tables 3 to 5 inclusive.

Data for IWTO-19 and IWTO-28 for each trial and over all trials in the current reporting period are summarised in Table 6. Corresponding data for IWTO-12 is reported in Table 7.

TABLE 6

WITHIN AND BETWEEN LABORATORY STANDARD DEVIATION DATA FOR IWTO 19 & IWTO 28

TRIAL	WOOL BASE			VEGETABLE MATTER BASE			MEAN FIBRE DIAMETER		
	GRAND MEAN	STANDARD DEVIATION		GRAND MEAN	STANDARD DEVIATION		GRAND MEAN	STANDARD DEVIATION	
		BETWEEN SUBS WITHIN LABS	BETWEEN LABS		BETWEEN SUBS WITHIN LABS	BETWEEN LABS		BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS
3531	50.44	0.64	0.48	4.9	0.53	0.42	28.1	0.12	0.31
3532	51.55	0.37	0.00	4.4	0.26	0.08	21.3	0.09	0.14
3533	67.81	0.30	0.20	0.2	0.05	0.07	32.7	0.21	0.11
3534	62.63	0.32	0.28	0.4	0.07	0.03	30.1	0.22	0.22
3535	50.12	0.63	0.00	0.7	0.11	0.09	20.5	0.17	0.18
3536	43.25	0.64	1.20	8.7	0.65	1.05	20.0	0.12	0.21
3537	50.91	0.24	0.13	0.7	0.12	0.00	21.3	0.12	0.07
3538	52.46	0.44	0.44	3.5	0.35	0.00	20.5	0.08	0.08
3539	64.59	0.27	0.13	0.1	0.04	0.07	37.8	0.29	0.16
3540	54.93	0.21	0.16	0.5	0.11	0.05	22.2	0.15	0.11
3541	67.13	0.19	0.15	0.1	0.04	0.02	36.4	0.25	0.15
3542	60.74	0.25	0.26	0.4	0.08	0.06	24.6	0.10	0.29
3543	60.74	0.49	0.31	0.6	0.12	0.20	16.5	0.14	0.15
3544	46.16	0.85	0.61	6.8	0.70	0.68	17.4	0.21	0.19
3545	58.54	0.25	0.11	1.4	0.17	0.18	28.1	0.15	0.28
3546	46.38	0.53	0.68	3.0	0.50	0.57	25.8	0.10	0.27
3547	61.33	0.24	0.20	0.3	0.07	0.07	31.2	0.21	0.33
3548	51.21	0.50	0.30	1.4	0.21	0.21	26.0	0.20	0.20
3549	62.58	0.16	0.13	0.4	0.08	0.07	27.5	0.11	0.37
3550	48.70	0.35	0.31	4.0	0.27	0.46	22.0	0.11	0.11
3551	62.29	0.39	0.06	0.5	0.16	0.11	25.3	0.27	0.18
3552	67.67	0.85	0.00	0.2	0.08	0.12	31.5	0.14	0.40
3553	54.47	0.42	0.44	2.5	0.38	0.27	17.6	0.11	0.09
3554	48.23	0.50	0.69	7.6	0.58	0.64	20.3	0.15	0.08
3555	59.43	0.42	0.00	0.4	0.05	0.09	23.1	0.10	0.16
3556	59.73	0.39	0.00	1.4	0.17	0.18	24.1	0.11	0.19
3557	67.25	0.15	0.09	0.2	0.05	0.00	33.2	0.13	0.21
3558	54.82	0.41	0.00	1.3	0.28	0.14	25.3	0.16	0.20
3559	58.49	0.39	0.18	0.6	0.09	0.06	19.3	0.10	0.12
3560	62.83	0.20	0.25	0.3	0.13	0.07	30.1	0.13	0.17
3561	60.84	0.22	0.08	0.4	0.05	0.10	22.3	0.09	0.28
3562	47.38	0.34	0.35	6.9	0.43	0.05	21.6	0.13	0.32
3563	56.29	0.40	0.48	1.3	0.21	0.06	20.3	0.11	0.22
3564	60.41	0.42	0.23	0.2	0.07	0.08	33.9	0.29	0.36
3565	57.36	0.29	0.16	0.7	0.14	0.00	21.4	0.10	0.07
3566	65.61	0.20	0.11	0.7	0.08	0.12	34.8	0.16	0.15
3567	56.99	0.29	0.00	0.6	0.10	0.15	20.4	0.12	0.12
3568	60.60	0.17	0.19	0.5	0.11	0.11	30.9	0.23	0.09
3569	61.46	0.53	0.20	0.4	0.05	0.10	31.4	0.21	0.22
3570	61.72	0.33	0.09	0.2	0.05	0.07	36.0	0.23	0.37
3571	54.31	0.44	0.00	3.4	0.27	0.13	22.6	0.14	0.16

TABLE 6

WITHIN AND BETWEEN LABORATORY STANDARD DEVIATION DATA FOR IWTO 19 & IWTO 28

TRIAL	WOOL BASE			VEGETABLE MATTER BASE			MEAN FIBRE DIAMETER		
	GRAND MEAN	STANDARD DEVIATION		GRAND MEAN	STANDARD DEVIATION		GRAND MEAN	STANDARD DEVIATION	
		BETWEEN SUBS WITHIN LABS	BETWEEN LABS		BETWEEN SUBS WITHIN LABS	BETWEEN LABS		BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS
3572	55.72	0.35	0.14	1.7	0.12	0.12	22.2	0.10	0.21
3573	53.63	0.53	0.00	0.3	0.08	0.15	23.1	0.17	0.11
3574	60.53	0.36	0.22	0.3	0.05	0.08	20.4	0.12	0.18
3575	57.88	0.40	0.25	1.6	0.20	0.34	30.6	0.15	0.14
3576	50.50	0.32	0.25	0.8	0.22	0.41	23.4	0.10	0.17
3577	60.92	0.23	0.18	0.5	0.08	0.01	34.3	0.17	0.05
3578	43.00	0.80	0.56	7.6	0.83	0.28	21.0	0.11	0.32
3579	61.48	0.19	0.10	0.5	0.07	0.11	22.3	0.10	0.11
3580	51.67	0.24	0.00	4.9	0.25	0.22	20.3	0.11	0.09
3581	61.38	0.50	0.00	0.6	0.10	0.04	33.4	0.14	0.29
3582	52.19	0.26	0.20	0.3	0.08	0.10	20.3	0.10	0.01
3583	50.10	0.42	0.15	0.8	0.21	0.20	21.1	0.15	0.13
3584	61.01	0.26	0.35	0.2	0.05	0.06	17.5	0.12	0.00
3585	62.91	0.37	0.14	0.5	0.10	0.05	35.8	0.24	0.20
3586	47.28	0.44	0.54	3.2	0.44	0.58	26.0	0.10	0.32
3587	60.45	0.24	0.10	0.4	0.09	0.26	25.1	0.13	0.09
3588	53.29	0.46	0.40	3.5	0.37	0.52	17.6	0.11	0.09
3589	43.50	0.62	1.29	6.3	0.62	1.11	20.1	0.12	0.14
3590	49.86	0.32	0.28	0.3	0.12	0.00	22.2	0.10	0.10
3591	57.18	0.33	0.20	0.6	0.11	0.20	19.3	0.13	0.10
3592	49.80	0.59	0.47	5.0	0.36	0.61	25.0	0.17	0.09
3593	58.92	0.41	0.11	1.6	0.23	0.15	27.2	0.19	0.21
3594	48.22	0.63	0.72	3.1	0.32	0.81	25.7	0.17	0.18
3595	53.59	0.54	0.00	0.2	0.07	0.07	20.5	0.12	0.15
3596	63.95	0.22	0.11	0.1	0.05	0.04	32.6	0.15	0.22
3597	57.82	0.34	0.23	1.4	0.14	0.27	30.0	0.14	0.21
3598	61.41	0.34	0.01	0.4	0.08	0.07	27.9	0.10	0.32
3599	54.57	0.53	0.00	1.8	0.23	0.11	20.3	0.11	0.00
3600	46.45	0.61	0.58	7.0	0.68	0.41	21.2	0.16	0.14
3601	65.16	0.25	0.13	0.3	0.07	0.04	25.2	0.11	0.19
3602	52.35	0.57	0.57	1.5	0.16	0.22	26.2	0.16	0.36
3603	52.50	0.31	0.00	1.1	0.15	0.09	20.3	0.12	0.14
3604	54.20	0.53	0.37	1.2	0.24	0.18	17.4	0.15	0.13
3605	60.47	0.29	0.16	0.5	0.10	0.04	27.0	0.12	0.20
3606	66.17	0.16	0.15	0.1	0.06	0.00	34.8	0.27	0.09
3607	57.90	0.32	0.28	1.9	0.20	0.22	24.2	0.13	0.19
3608	63.75	0.35	0.06	0.2	0.05	0.03	28.0	0.20	0.29
3609	56.37	0.38	0.36	1.8	0.16	0.19	19.4	0.13	0.09
3610	51.20	0.21	0.00	0.9	0.23	0.00	21.2	0.12	0.13
3611	45.42	0.49	0.61	8.1	0.65	0.51	18.4	0.13	0.13
3612	65.76	0.19	0.15	0.1	0.05	0.04	33.6	0.23	0.18

TABLE 6

WITHIN AND BETWEEN LABORATORY STANDARD DEVIATION DATA FOR IWTO 19 & IWTO 28

TRIAL	WOOL BASE			VEGETABLE MATTER BASE			MEAN FIBRE DIAMETER		
	GRAND MEAN	STANDARD DEVIATION		GRAND MEAN	STANDARD DEVIATION		GRAND MEAN	STANDARD DEVIATION	
		BETWEEN SUBS WITHIN LABS	BETWEEN LABS		BETWEEN SUBS WITHIN LABS	BETWEEN LABS		BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS
3613	53.72	0.38	0.22	0.8	0.08	0.08	19.5	0.11	0.20
3614	55.18	0.27	0.28	1.6	0.18	0.11	15.8	0.13	0.07
3615	47.03	0.89	0.00	5.6	0.61	0.00	19.3	0.14	0.08
3616	60.01	0.35	0.00	1.8	0.21	0.14	30.9	0.34	0.30
3617	53.42	0.26	0.27	0.5	0.07	0.09	23.1	0.16	0.26
3618	63.20	0.25	0.20	0.3	0.08	0.09	28.8	0.14	0.39
3619	67.34	0.24	0.19	0.2	0.06	0.01	34.5	0.19	0.25
3620	62.47	0.31	0.26	0.4	0.08	0.05	25.0	0.23	0.01
3621	49.74	0.18	0.26	0.9	0.18	0.17	22.4	0.13	0.09
3622	56.08	0.42	0.35	3.4	0.37	0.00	24.2	0.13	0.24
3623	46.87	0.64	0.26	3.7	0.51	0.70	26.7	0.24	0.10
3624	63.78	0.29	0.00	0.4	0.05	0.09	27.0	0.18	0.19
3625	45.77	0.59	0.14	6.3	0.44	0.14	20.9	0.14	0.21
3626	63.08	0.20	0.25	0.2	0.05	0.10	28.1	0.20	0.00
3627	60.24	0.27	0.00	0.4	0.10	0.14	24.1	0.15	0.08
3628	60.41	0.34	0.24	1.0	0.13	0.09	30.0	0.18	0.10
3629	64.90	0.32	0.50	0.1	0.04	0.02	32.2	0.27	0.07
3630	59.25	0.35	0.07	0.2	0.05	0.06	20.2	0.10	0.12
3631	61.59	0.36	0.00	0.7	0.15	0.09	15.7	0.13	0.16
3632	55.68	0.42	0.28	3.3	0.30	0.28	25.4	0.23	0.29
3633	57.69	0.39	0.30	2.4	0.35	0.30	22.1	0.11	0.18
3634	54.82	0.91	0.00	3.5	0.49	0.00	22.2	0.12	0.13
Mean	**56.66**	**0.39**	**0.23**	**1.77**	**0.20**	**0.18**	**24.95**	**0.15**	**0.17**
Min	**43.00**	**0.15**	**0.00**	**0.10**	**0.04**	**0.00**	**15.68**	**0.08**	**0.00**
Max	**67.81**	**0.91**	**1.29**	**8.70**	**0.83**	**1.11**	**37.78**	**0.34**	**0.40**

TABLE 7

WITHIN AND BETWEEN LABORATORY STANDARD DEVIATION DATA FOR IWTO-12

TRIAL	LASERSCAN MFD			LASERSCAN SD		
	GRAND MEAN	STANDARD DEVIATION		GRAND MEAN	STANDARD DEVIATION	
		BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS		BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS
3531	27.8	0.55	0.00	7.6	0.22	0.00
3532	21.1	0.24	0.00	4.4	0.36	0.00
3533	33.0	0.46	0.26	8.5	0.27	0.14
3534	29.8	0.30	0.21	6.8	0.29	0.24
3535	20.1	0.14	0.08	4.1	0.19	0.00
3536	20.0	0.24	0.17	4.0	0.25	0.24
3537	20.9	0.36	0.00	4.2	0.19	0.00
3538	20.1	0.20	0.00	4.4	0.17	0.00
3539	37.5	0.91	0.43	8.9	0.51	0.00
3540	21.9	0.27	0.00	4.6	0.16	0.00
3541	36.0	0.96	0.14	8.8	0.58	0.00
3542	24.3	0.31	0.16	5.8	0.23	0.00
3543	16.1	0.11	0.10	3.3	0.20	0.00
3544	17.1	0.21	0.08	3.7	0.25	0.16
3545	27.9	0.34	0.00	6.4	0.28	0.00
3546	25.9	0.81	0.00	5.8	0.26	0.00
3547	31.1	0.32	0.13	7.2	0.22	0.06
3548	25.9	0.29	0.11	6.3	0.23	0.10
3549	27.1	0.31	0.15	6.6	0.19	0.06
3550	21.5	0.25	0.00	4.6	0.18	0.06
3551	25.2	0.36	0.00	6.3	0.23	0.00
3552	32.1	0.42	0.15	8.5	0.23	0.21
3553	17.1	0.16	0.00	3.6	0.23	0.11
3554	19.9	0.21	0.00	4.3	0.22	0.08
3555	23.0	0.27	0.00	5.0	0.19	0.10
3556	23.9	0.33	0.00	6.1	0.16	0.00
3557	33.7	0.41	0.22	8.5	0.21	0.00
3558	25.0	0.55	0.00	6.1	0.20	0.08
3559	19.0	0.15	0.00	4.1	0.15	0.00
3560	30.0	0.29	0.13	7.2	0.17	0.38
3561	22.2	0.22	0.00	4.7	0.23	0.00
3562	21.2	0.27	0.00	4.5	0.29	0.00
3563	19.9	0.20	0.08	4.0	0.20	0.00
3564	34.5	0.58	0.00	9.2	0.39	0.00
3565	21.0	0.21	0.11	4.4	0.22	0.07
3566	34.7	0.57	0.16	8.5	0.36	0.00
3567	20.0	0.22	0.05	4.2	0.23	0.13
3568	30.9	0.43	0.15	7.7	0.31	0.00
3569	31.6	0.33	0.07	8.0	0.24	0.00
3570	36.5	0.40	0.17	9.5	0.27	0.15
3571	22.1	0.18	0.11	4.8	0.25	0.00

TABLE 7

WITHIN AND BETWEEN LABORATORY STANDARD DEVIATION DATA FOR IWTO-12

TRIAL	LASERSCAN MFD			LASERSCAN SD		
	GRAND MEAN	STANDARD DEVIATION		GRAND MEAN	STANDARD DEVIATION	
		BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS		BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS
3572	22.0	0.28	0.00	4.7	0.21	0.02
3573	23.1	0.20	0.16	5.2	0.29	0.00
3574	20.2	0.27	0.00	3.9	0.15	0.05
3575	30.2	0.30	0.00	7.0	0.23	0.04
3576	23.2	0.30	0.00	5.2	0.28	0.00
3577	34.3	0.73	0.00	8.2	0.31	0.00
3578	20.8	0.25	0.18	4.1	0.26	0.00
3579	21.9	0.19	0.00	4.8	0.18	0.06
3580	20.0	0.15	0.00	4.2	0.19	0.11
3581	33.7	1.06	0.00	8.4	0.44	0.07
3582	20.0	0.21	0.08	4.2	0.16	0.02
3583	20.8	0.21	0.00	5.1	0.37	0.00
3584	17.3	0.13	0.08	3.5	0.22	0.00
3585	35.9	0.41	0.21	8.9	0.29	0.00
3586	26.1	0.30	0.05	5.8	0.27	0.00
3587	25.0	0.20	0.00	6.0	0.14	0.12
3588	17.3	0.13	0.01	3.7	0.18	0.00
3589	20.2	0.10	0.00	4.0	0.23	0.00
3590	22.2	0.16	0.12	4.8	0.12	0.09
3591	18.9	0.15	0.03	4.1	0.20	0.00
3592	25.0	0.35	0.00	6.3	0.15	0.18
3593	27.1	0.53	0.00	6.2	0.21	0.00
3594	25.9	0.27	0.11	5.7	0.27	0.00
3595	20.2	0.19	0.00	3.9	0.20	0.00
3596	32.7	0.25	0.22	8.2	0.24	0.21
3597	29.9	0.35	0.00	6.8	0.22	0.13
3598	27.9	0.52	0.16	6.4	0.32	0.00
3599	19.9	0.15	0.05	4.1	0.19	0.13
3600	21.0	0.18	0.00	4.4	0.21	0.11
3601	25.1	0.23	0.00	6.3	0.21	0.14
3602	26.0	0.34	0.13	6.6	0.24	0.00
3603	20.0	0.25	0.08	4.3	0.18	0.04
3604	17.2	0.27	0.19	3.6	0.29	0.00
3605	26.9	0.24	0.00	6.2	0.19	0.13
3606	35.0	1.44	0.00	8.3	0.63	0.16
3607	24.1	0.27	0.00	6.0	0.15	0.07
3608	28.1	0.38	0.00	6.4	0.28	0.00
3609	19.1	0.19	0.00	3.9	0.24	0.00
3610	21.2	0.25	0.00	4.8	0.20	0.05
3611	18.1	0.19	0.00	4.0	0.24	0.15
3612	33.8	0.44	0.19	8.3	0.24	0.00

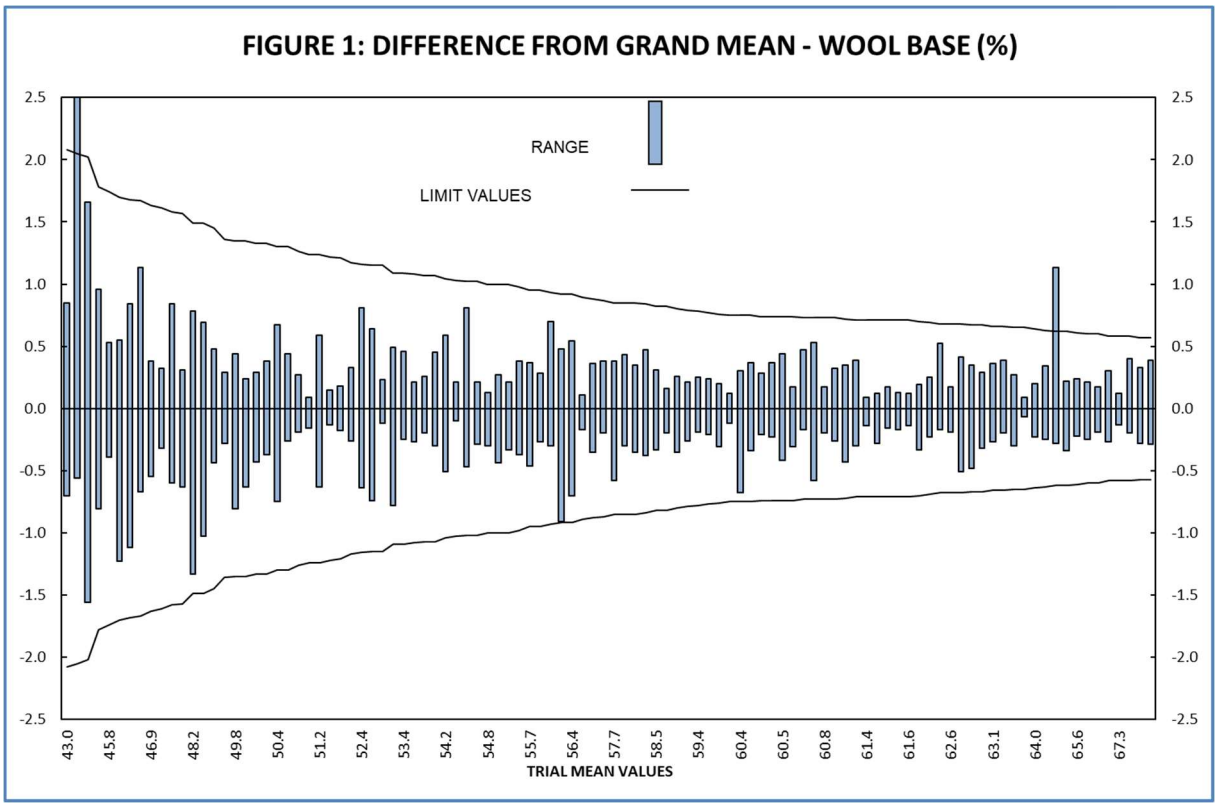
TABLE 7

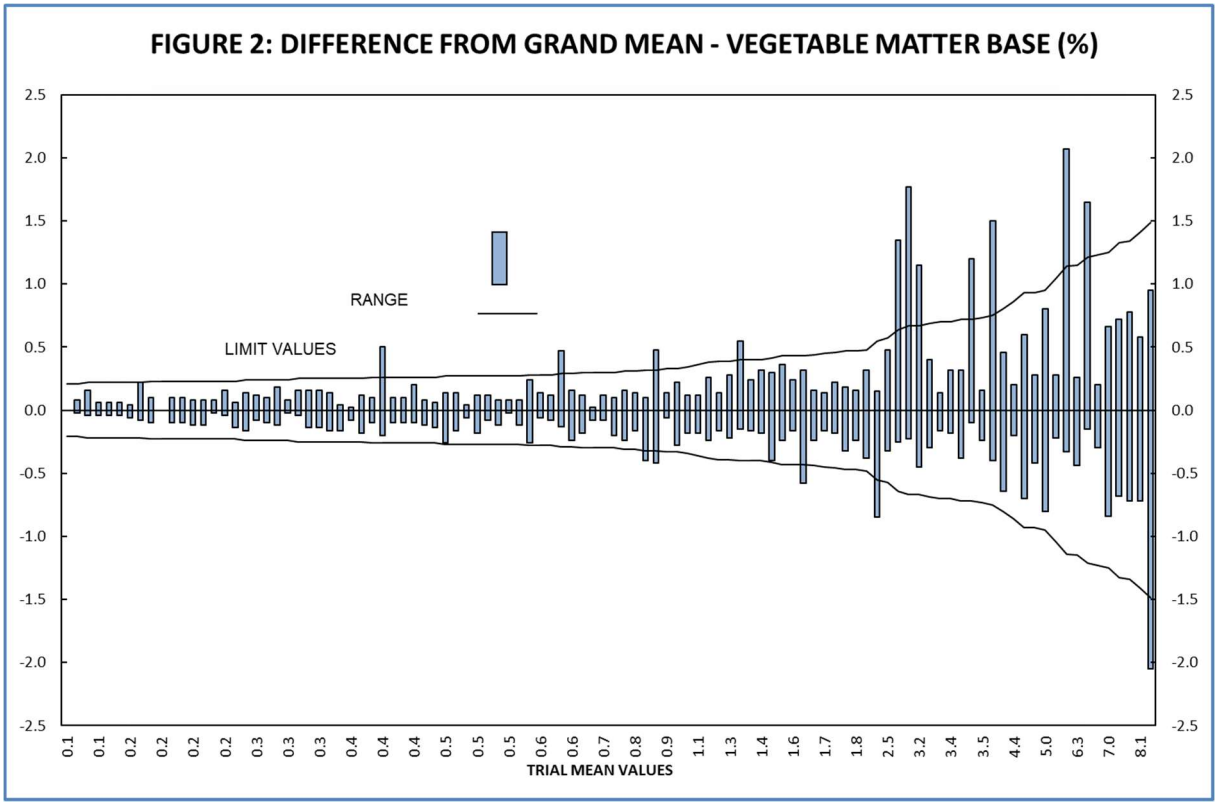
WITHIN AND BETWEEN LABORATORY STANDARD DEVIATION DATA FOR IWTO-12

TRIAL	LASERSCAN MFD			LASERSCAN SD		
	GRAND MEAN	STANDARD DEVIATION		GRAND MEAN	STANDARD DEVIATION	
		BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS		BETWEEN TEST SPEC WITHIN LABS	BETWEEN LABS
3613	19.1	0.17	0.14	3.8	0.17	0.00
3614	15.3	0.14	0.08	3.3	0.23	0.10
3615	18.8	0.26	0.19	4.1	0.22	0.07
3616	30.9	0.49	0.00	7.6	0.25	0.15
3617	22.8	0.13	0.08	4.6	0.17	0.00
3618	28.8	0.34	0.00	6.8	0.19	0.10
3619	34.7	0.62	0.00	8.4	0.37	0.07
3620	25.1	0.24	0.12	5.8	0.19	0.00
3621	22.3	0.26	0.07	5.4	0.33	0.00
3622	24.1	0.22	0.20	6.0	0.18	0.00
3623	26.8	0.42	0.00	6.0	0.25	0.00
3624	26.9	0.34	0.09	6.1	0.28	0.11
3625	20.8	0.17	0.00	4.5	0.16	0.04
3626	27.9	0.22	0.16	6.1	0.77	0.27
3627	23.9	0.30	0.00	5.3	0.29	0.00
3628	29.8	0.28	0.14	6.7	0.16	0.12
3629	32.7	0.48	0.32	8.1	0.24	0.17
3630	20.1	0.23	0.00	3.9	0.18	0.09
3631	15.3	0.12	0.00	3.1	0.14	0.00
3632	25.3	0.42	0.00	6.3	0.24	0.00
3633	22.0	0.14	0.11	4.4	0.18	0.00
3634	22.0	0.24	0.00	4.4	0.17	0.00
Mean	**24.81**	**0.32**	**0.07**	**5.70**	**0.24**	**0.06**
Min	**15.25**	**0.10**	**0.00**	**3.10**	**0.12**	**0.00**
Max	**37.53**	**1.44**	**0.43**	**9.50**	**0.77**	**0.38**

Ranges of Laboratory Differences

The overall ranges of laboratory differences from the Grand Mean for five parameters are reported in Figures 1-5 together with the statistical limit values of these differences. In the case of Figure 4, which presents the ranges for LASERSCAN, the Airflow statistical limit values have been employed to enable easy comparison with the Airflow. The data are arranged in ascending order of Grand Mean for ease of interpretation, rather than on a trial-by-trial basis. Note also that to ensure easy reading of the graphs the Trial Mean Values for every third value only are printed on the horizontal axes.





NOTE: For trial 3576 four laboratories were outside the control limits and for trial 3589 two laboratories were outside the control limits.

FIGURE 3: DIFFERENCE FROM GRAND MEAN - MEAN FIBRE DIAMETER (µm)
IWTO-28

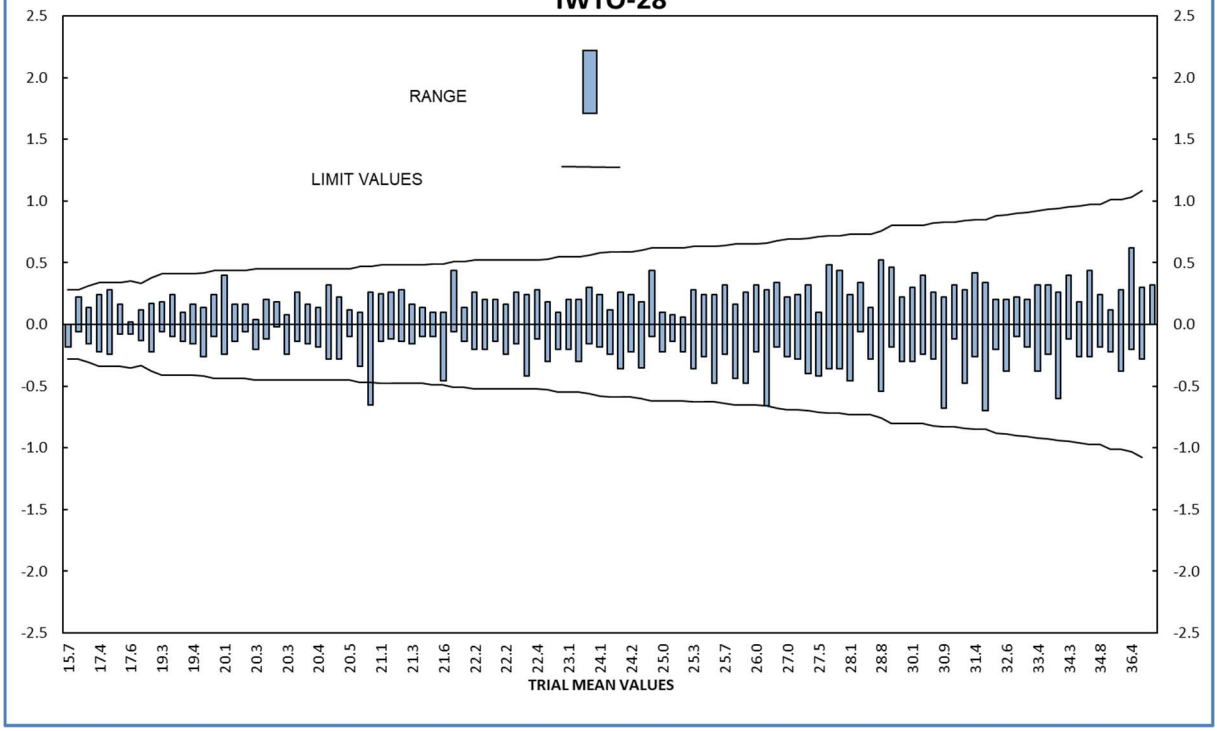
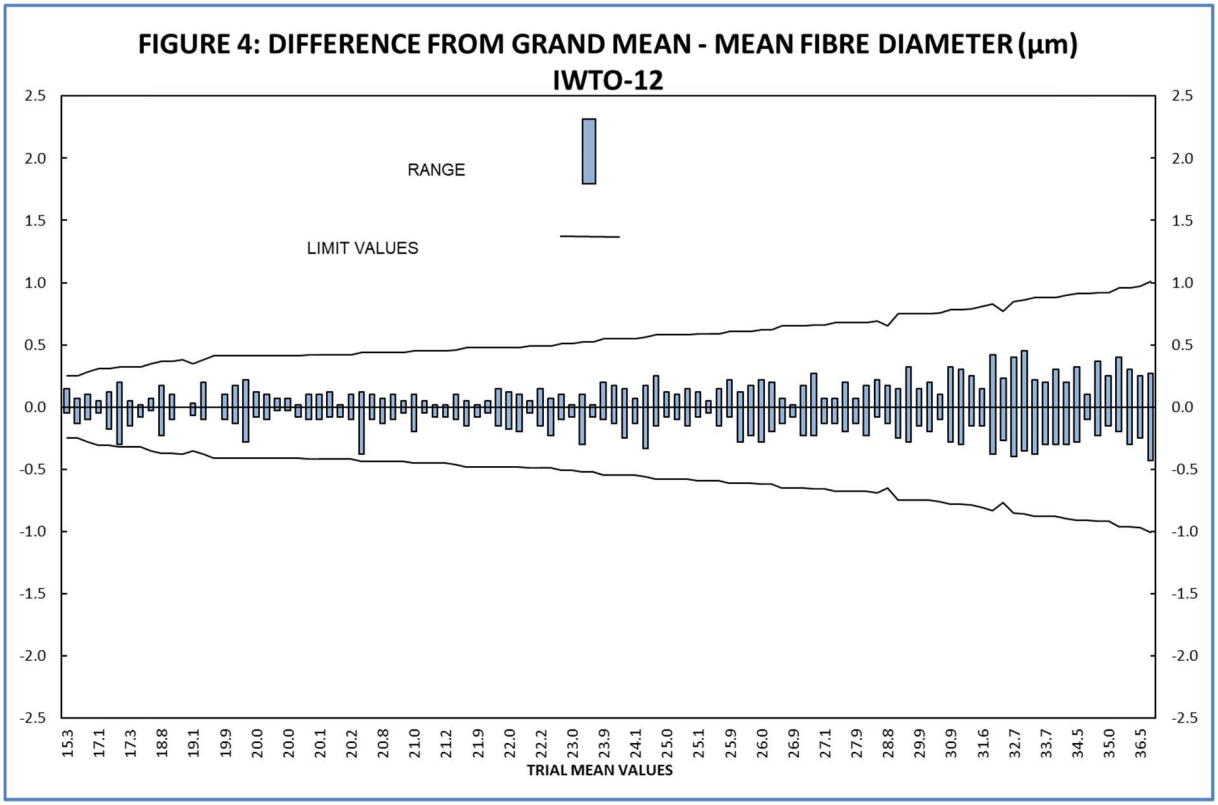
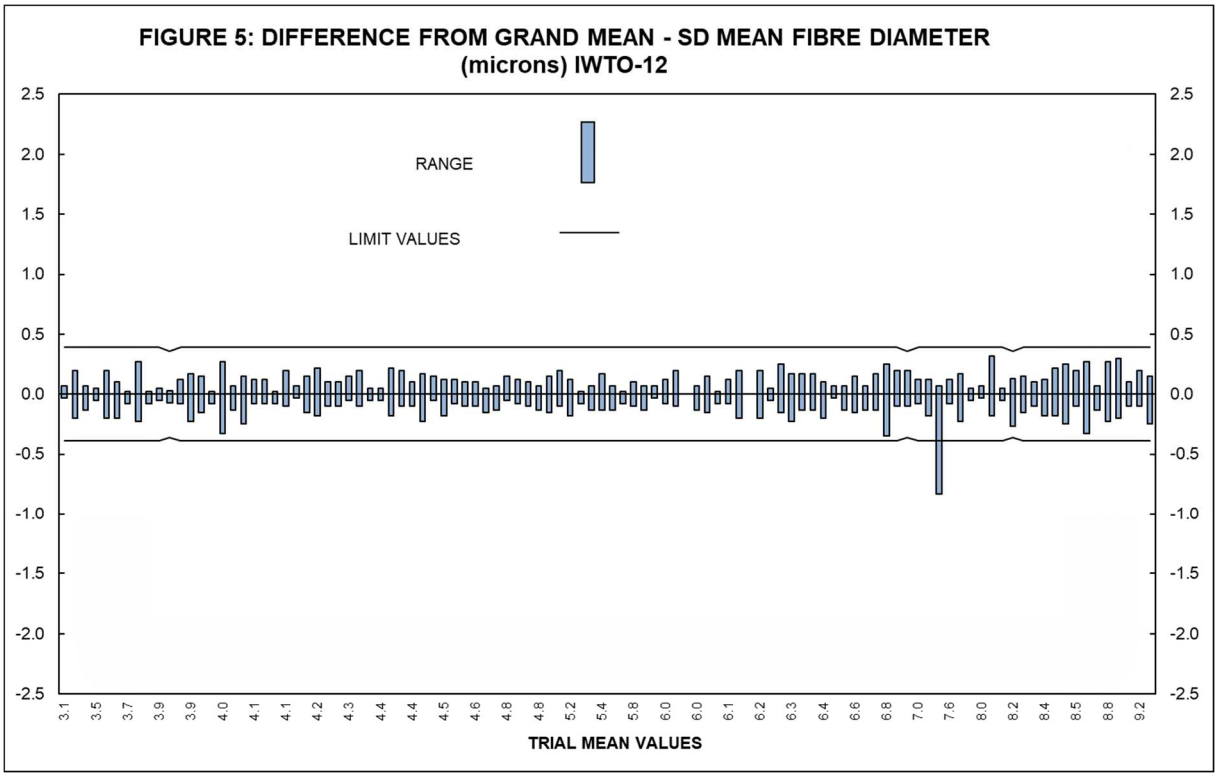


FIGURE 4: DIFFERENCE FROM GRAND MEAN - MEAN FIBRE DIAMETER (µm)
IWTO-12





Overall the mean, within-lab and between lab standard deviation for the parameters reported are similar to the previous 6 trials, indicating continuing consistent performance of the member laboratories. Calculations of the 95% Confidence Limits confirm that the ILRT laboratories are producing results within the Confidence Limits reported in the respective IWTO Test Methods for most parameters.

For the reporting period two (2) outliers were due to difference in Wool Base and nineteen (19) to difference in VM Base. Further examination of the results showed that 4 of the 5 laboratories were outliers for trial 3576 and two of the 5 laboratories were outliers for trial 3589. A review of sampling procedures suggested an issue with clumpy VM and age of stored samples and it was decided to modify the sampling methodology to improve the blending of samples. It was also noted that trial 3536 was an outlier for both Wool Base and VM base in one laboratory.

Other outliers were identified for WB trial 3629 and for Airflow Mean Fibre Diameter trial 3578. These outliers were within theoretical expectations. There was also one outlier for LASERSCAN SD during the reporting period.

In September a significant review of the sampling and testing system was conducted to address the higher than expected number of VM outliers. The review included:

- An evaluation of procedures for producing trial samples which suggested VM was not uniformly spread throughout the sample. A modified sampling and blending protocol was implemented to reduce variation between samples.
- The laboratories have reviewed all of their internal procedures and work was undertaken to identify possible causes of outliers and steps were taken to address the outliers.

Since this review there have been 46 trials and two VM outliers for the period 1st September 2020 to 5th February 2021. This meets the theoretical numbers of VM outliers (46 trials x 5 labs x 1% = 2.3) that could be expected from this numbers of trials

By reporting[1-15] the results of its round trials the ILRT Group is providing commercial participants in the industry with a basis for confidence in the IWTO Certificates produced by its members. The ILRT Group is unique in reporting its technical performance and the series of trials provides a mechanism for ensuring that the member laboratories are harmonised and when differences are identified they can be addressed by the member laboratories.

REFERENCES

1. ILRT Group. (2007) *Report on Independent Laboratory Round Trials 2135 - 2186: October 2006 to February 2007.* IWTO T&S Committee, Edinburgh, Report RWG01.
2. ILRT Group. (2008) *Report on Independent Laboratory Round Trials 2177 - 2280: January 2007 to February 2008.* IWTO T&S Committee, Beijing, Report RWG01.
3. ILRT Group. (2009) *Report on Independent Laboratory Round Trials 2281 - 2384: February 2008 to February 2009.* IWTO T&S Committee, Frankfurt, Report RWG01.
4. ILRT Group. (2010) *Report on Independent Laboratory Round Trials 2385 - 2488: February 2009 to January 2010.* IWTO T&S Committee, Paris, Report RWG01.
5. ILRT Group. (2011) *Report on Independent Laboratory Round Trial 2489 - 2592: January 2010 to December 2010.* IWTO T&S Committee, Hangzhou, Report RWG01.
6. ILRT Group. (2012) *Report on Independent Laboratory Round Trial 2593 - 2696: January 2011 to December 2011.* IWTO T&S Committee, New York, Report RWG01.
7. ILRT Group. (2013) *Report on Independent Laboratory Round Trial 2697 - 2800: January 2012 to December 2012.* IWTO C&S Committee, Biella, Report RWG01.
8. ILRT Group. (2014) *Report on Independent Laboratory Round Trial 2801 - 2904: January 2013 to December 2013.* IWTO C&S Committee, Cape Town, Report RMG01.
9. ILRT Group. (2015) *Report on Independent Laboratory Round Trials 2905 - 3008: January 2014 to December 2014.* IWTO C&S Committee, Zhangjigang, Report RMG01.
10. ILRT Group. (2016) *Report on Independent Laboratory Round Trials 3009 - 3112: January 2015 to December 2015*. IWTO C&S Committee, Sydney, Report RMG01.
11. ILRT Group. (2017) *Report on Independent Laboratory Round Trials 3113- 3216: January 2016 to December 2016*. IWTO C&S Committee, Harrogate, Report RMG01.
12. ILRT Group. (2018) *Report on Independent Laboratory Round Trials 3217- 3320: January 2017 to December 2017*. IWTO C&S Committee, Hong Kong, Report RMG01.
13. ILRT Group. (2019) *Report on Independent Laboratory Round Trials 3321- 3426: January 2018 to December 2018*. IWTO C&S Committee, Venice, Report TSG01.
14. ILRT Group. (2020) *Report on Independent Laboratory Round Trials 3427- 3530: January 2019 to December 2019*. IWTO C&S Committee, Brussels, Report TSG01.
15. ILRT Group. (2021) *Report on Independent Laboratory Round Trials 3531- 3634: January 2020 to December 2020*. IWTO C&S Committee, Brussels, Report TSG01.