

Institute for  
Interlaboratory Studies

## IIS MEMO 1901: Development of reproducibility of Free and Released Formaldehyde in textile determination based on iis-proficiency tests over the years

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Proficiency tests for Free and/or Released Formaldehyde in textile have been organized by the Institute for Interlaboratory Studies since 2008.

In ISO14184-1:11 and ISO14184-2:11 some information on precision data is given. In table B.1 of ISO14184-1 and table C.2 of ISO14184-2 precision values are mentioned, but they were obtained using slightly different methods for calibration or performance than the ISO14184 methods. Therefore, it was concluded that reliable reproducibility data cannot be estimated from the ISO14184 methods. Instead, target reproducibilities estimated from the Horwitz equation were used for statistical evaluation, until now.

In other PT's for other determinations, a quality improvement is visible over the years as a decrease of the variation is observed, see for example the article "Reliability of proficiency test results for metals and Phthalates in plastics, Accred Qual Assur, 14:29-34 (2009)" by R.G. Visser. However, in the case of Free and Released Formaldehyde in textile a quality improvement is not clearly visible and therefore it is doubtful whether the target reproducibility based on the Horwitz equation will ever be met.

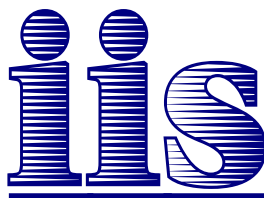
Therefore, it was now decided to use the iis PT data gathered since 2008 to estimate a more realistic target reproducibility. The PT data from 11 PT's for Free Formaldehyde and 6 PT's for Released Formaldehyde are presented in appendix 1. From these data a linear equation between the average PT Formaldehyde concentration and the calculated reproducibility per PT was prepared to estimate the target reproducibilities:

*Free Formaldehyde:*  $R(iis\ memo\ 1901) = 0.2447 * c + 2.6294$

*Released Formaldehyde:*  $R(iis\ memo\ 1901) = 0.2535 * c + 8.8557$

For future PT's on Free and Released Formaldehyde in textile, starting the 2019 PT iis19A13, iis will use these linear equations to estimate the target reproducibilities to be used for the evaluation of the quality of the test results.

This document can be downloaded from the iis website [www.iisnl.com](http://www.iisnl.com)



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## Appendix 1:

### Free Formaldehyde in textile:

Report	iis sample	n	outliers	Average mg/kg	R(calc) mg/kg	R(Horwitz) mg/kg	R(iis memo1901) mg/kg
iis08A06	#0868	77	2	121.68	22.62	26.46	32.40
iis08A06	#0869	78	1	42.42	17.97	10.81	13.01
iis08A06	#0870	76	3	84.74	21.13	19.46	23.37
iis09A06	#0981	84	8	173.08	42.28	35.70	44.98
iis09A06	#0982	86	6	76.48	25.48	17.84	21.34
iis10A06	#1078	124	4	158.85	33.26	33.19	41.50
iis10A06	#1079	125	3	187.16	45.55	38.15	48.43
iis11A04	#11087	138	4	78.66	24.72	18.27	21.88
iis11A04	#11089	141	1	169.56	69.27	35.08	44.12
iis12A04	#12122	163	6	166.07	38.48	34.47	43.27
iis12A04	#12123	163	6	103.73	25.78	23.11	28.01
iis13A04	#13190	169	3	308.03	84.08	58.25	78.00
iis13A04	#13191	167	4	83.28	29.14	19.18	23.01
iis14A04	#14207	170	6	158.01	36.61	33.04	41.29
iis15A05	#15207	182	8	46.12	11.02	11.61	13.91
iis15A05	#15208	181	4	109.32	29.81	24.16	29.38
iis16A08	#16330	178	9	93.36	20.17	21.13	25.47
iis16A08	#16331	180	7	318.61	76.35	59.95	80.59
iis17A09	#17635	178	6	80.48	22.00	18.63	22.32
iis17A09	#17636	179	4	133.27	32.40	28.59	35.24
iis18A11	#18635	177	4	27.49	9.60	7.48	9.36
iis18A11	#18636	177	4	67.73	24.98	16.09	19.20

Table 1: Free Formaldehyde in textile

### Released Formaldehyde in textile:

Report	iis sample	n	outliers	Average mg/kg	R(calc) mg/kg	R(Horwitz) mg/kg	R(iis memo1901) mg/kg
iis13A04	#13190	11	4	823.46	210.59	134.30	217.60
iis13A04	#13191	14	2	200.78	53.76	40.50	59.75
iis14A04	#14207	15	2	225.13	60.77	44.63	65.93
iis15A05	#15207	19	0	73.92	45.17	17.33	27.59
iis15A05	#15208	14	2	319.19	151.29	60.04	89.77
iis16A08	#16330	33	2	147.16	42.21	31.10	46.16
iis16A08	#16331	27	4	914.99	233.51	146.88	240.81
iis17A09	#17635	70	3	135.35	29.59	28.97	43.17
iis17A09	#17636	69	2	170.92	33.40	35.32	52.18
iis18A11	#18635	72	2	43.32	13.86	11.01	19.84
iis18A11	#18636	75	1	112.40	34.75	24.74	37.35

Table 2: Released Formaldehyde in textile