

By: A. Ouwerkerk and A.S. Noordman-de Neef

### iis memo 2301

## Reproducibility of Total Per- and Polyfluoroalkyl Substances (PFAS) in Polymers in iis PTs

Proficiency tests (PTs) for the determination of Total PFAS in Polymers have been organized by the Institute for Interlaboratory Studies (iis) since 2011. For the determination of PFOS in coated and impregnated solid articles, liquids and firefighting foams, method CEN/TS15968 is considered to be the official EC test method. However, test method CEN/TS15968 does not mention reproducibility requirements. Since 2018 iis had used as alternative a relative target standard deviation of 18% based on iis PT data of PFOA/PFOS proficiency tests from 2016 and 2017 (see report iis18P08). The choice to use only PT data of 2016 and 2017 was because the variation of earlier iis PTs was much higher.

In 2023 iis decided to collect and investigate again PT data from iis PTs conducted between 2011 and 2022 to estimate a more realistic target reproducibility over a longer period for future evaluations of the determination of Total Per- and Polyfluoroalkyl Substances (PFAS) in Polymers. As mentioned above in iis PTs before 2015 the reproducibility in the different components was much higher than in latter iis PTs and therefore not used for the estimation of a realistic target reproducibility.

Furthermore, it was observed that the relative standard deviation of the PTs and the different PFAS is not dependent on the different PFAS alone. Therefore, it was decided to use the same target reproducibility for all individual PFAS. Further it is noted that, as expected in the experience of iis, the reproducibility is dependent on the PT mean, hence iis decided to use the relative standard deviation, see figure 1.

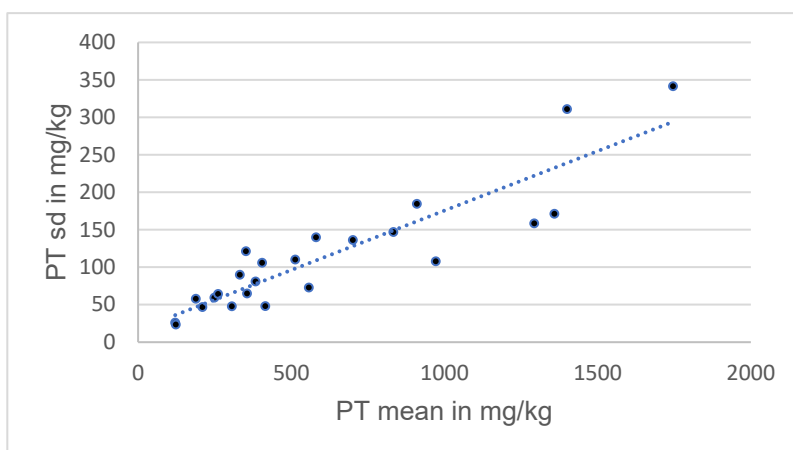


Figure 1 Overview PT Data 2015 – 2022 for all PFAS components present in iis PTs



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The average relative standard deviation over 2015-2022 iis PTs for Total Per- and Polyfluoroalkyl Substances (PFAS) in Polymers is 20%, see appendix 1.

For future iis PTs, starting from 2023 PT iis23P68, the estimated target reproducibilities can be calculated as follows for concentrations higher than 100 mg/kg:

mean of the PT \* iis target variation (RSD) \* 2.8 = mean of the PT \* 20/100 \* 2.8

#### Appendix 1

year	component	n	mean (mg/kg)	RSD (%)
2022	PFOS	19	557.4	13
2022	PFOA	23	1400.3	22
2022	PFOS	22	1293.0	12
2021	PFOS	15	700.9	19
2021	PFOA	15	306.4	16
2021	PFBS	11	415.6	12
2020	PFOS	17	332.2	27
2020	PFOA	17	210.2	22
2020	PFDoA	9	188.4	31
2019	PFOA	12	910.0	20
2019	PFOS	11	121.0	21
2019	PFOS	13	355.9	18
2019	PFBS	10	404.8	26
2018	PFOS	11	512.8	22
2018	PFOA	12	383.2	21
2018	PFNA	7	352.4	34
2017	PFOA	33	1745.8	20
2017	PFOS	30	1358.7	13
2017	PFOS	29	249.1	24
2016	PFOS	41	971.7	11
2016	PFOA	45	833.1	18
2016	PFOS	47	123.4	19
2015	PFOS	18	261.3	25
2015	PFOS	18	581.2	24
<b>average</b>				<b>20</b>

Table 1: Relative standard deviation (RSD) from 2015-2022 Total Per- and Polyfluoroalkyl Substances (PFAS) in Polymers iis PTs