

Proficiency testing for in-house and external measuring stations - results and evaluation

Proficiency testing scheme

Volatile organic compounds -VOC- with thermal desorption

September / October 2024

Summary of laboratory means

Sample 1

Laboratory	1-Butanol	Z score	1,2,4-Trimethylbenzene	Z score	4-Methyl-2-pentanone	Z score	Benzene	Z score	Cumene	Z score
Unit	µg/m³		µg/m³		µg/m³		µg/m³		µg/m³	
30			27.0	0.52	51.0	0.37	74.0	3.18 E	47.5	1.15
55	147.5	4.14 FE	23.0	-1.04	50.0	0.17	64.5	1.49	38.5	-0.97
60			25.3	-0.12			56.6	0.08		
68	56.5	-4.59 FE	17.9	-3.02 E	26.0	-4.71 FE	38.0	-3.23 E	25.8	-3.96 FE
85	101.4	-0.28	25.1	-0.22	47.0	-0.45	54.5	-0.29	42.3	-0.07
99	34.1	-6.74 FE	20.4	-2.06 E	13.0	-7.36 FE	43.1	-2.32 E	28.7	-3.26 E
103	123.9	1.87	23.2	-0.94	52.9	0.76	58.1	0.34	38.8	-0.89
105							42.6	-2.41 E		
117	185.0	7.73 FE	42.5	6.56 FE	68.5	3.93 FE	66.5	1.85	56.5	3.26 E
124	125.5	2.03 E	28.7	1.19	51.1	0.40	59.4	0.58	43.3	0.15
132	49.0	-5.30 CE	34.5	3.45 E	49.5	0.07 C	84.5	5.05 CE	65.5	5.37 FE
135	108.5	0.40	24.9	-0.28	47.3	-0.39	51.9	-0.76	41.8	-0.20
145	70.0	-3.29 E			55.0	1.19	55.0	-0.20		
148	100.0	-0.42	21.0	-1.82	40.0	-1.86	43.5	-2.25 E	40.0	-0.61
158	122.2	1.71	28.5	1.11	53.1	0.80	55.2	-0.17	46.2	0.84
167	118.0	1.31	27.5	0.72	52.0	0.58	58.5	0.42	45.0	0.56
181	70.7	-3.23 E	27.1	0.57	43.6	-1.12	56.5	0.07	44.3	0.40
183			24.5	-0.45			71.2	2.68 E		
186	106.1	0.17	28.8	1.20	39.5	-1.97	59.6	0.62	46.3	0.88
189	96.7	-0.73	28.1	0.97	49.3	0.02	51.0	-0.91	41.0	-0.38
192	104.0	-0.03	23.7	-0.76	49.3	0.03	56.3	0.03		
207	157.5	5.09 FE	35.0	3.64 E	67.0	3.63 FE	68.0	2.11 E	54.5	2.79 E
215	57.0	-4.53 FE	10.6	-5.87 FE	23.4	-5.24 FE	26.2	-5.33 FE	20.4	-5.20 FE
223	110.8	0.62 C	184.6	61.93 CE	8.7	-8.23 CE	65.3	1.63 C	47.1	1.06
237	104.4	0.00	27.7	0.80	46.2	-0.60	52.9	-0.57	43.8	0.28
238			14.8	-4.25 FE			40.3	-2.83 E	28.5	-3.31 E
248	163.5	5.67 FE	46.5	8.12 FE	57.5	1.69	60.5	0.78	41.5	-0.26
256	115.3	1.05	24.8	-0.32	51.3	0.44	52.1	-0.72	40.1	-0.60
258	105.8	0.14	23.1	-1.00	45.5	-0.75	53.8	-0.41	38.4	-1.00
261	103.5	-0.08	23.8	-0.73	46.0	-0.65	49.9	-1.11	42.8	0.04

Laboratory	1-Butanol	Z score	1,2,4-Trimethylbenzene	Z score	4-Methyl-2-pentanone	Z score	Benzene	Z score	Cumene	Z score
267			27.5	0.70			64.4	1.47	47.0	1.02
503			22.4	-1.27			63.5	1.32	41.6	-0.24
510	90.0	-1.37			55.0	1.19	62.5	1.13		
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Method	ISO 5725-2		ISO 5725-2		ISO 5725-2		ISO 5725-2		ISO 5725-2	
Assessment	Z <=2.00		Z <=2.00		Z <=2.00		Z <=2.00		Z <=2.00	
No. of laboratories that submitted results	26		30		27		33		27	
Mean	104.3		25.7		49.2		56.1		42.6	
Reproducibility s.d.	15.1		4.1		4.8		9.2		6.4	
Rel. reproducibility s.d.	14.48 %		15.83 %		9.85 %		16.43 %		15.07 %	
Reference value	121.8		28.3		47.7		59.6		43.9	
Target s.d.	10.4		2.6		4.9		5.6		4.3	
Rel. target s.d.	10.00 %		10.00 %		10.00 %		10.00 %		10.00 %	
Lower limit of tolerance	83.5		20.5		39.3		44.9		34.1	
Upper limit of tolerance	125.2		30.8		59.0		67.4		51.1	
Type B outliers										
Type C outliers	2		1		2		2			
Type F outliers	7		4		5		1		3	
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	17		25		20		30		24	
Explanation of outlier types										
A: Single outlier	Grubbs									
B: Differing laboratory mean	Grubbs									
C: Excessive laboratory s.d.	Cochran									
D: Excluded manually										
E: mean outside tolerance limits										
F: Z-Score >3.50										

Laboratory	m-Xylene Z score		n-Butylacetate Z score		n-Octane Z score		Propylbenzene Z score		Toluene Z score	
Unit	µg/m³		µg/m³		µg/m³		µg/m³		µg/m³	
30	43.5	0.94	94.5	1.74	71.0	0.81	80.5	1.41	35.5	1.60
55	41.5	0.44	98.0	2.18 E					33.5	0.95
60	37.1	-0.66	83.1	0.32	71.3	0.85			32.2	0.51
68	210.4	42.92 CE	43.7	-4.57 FE	36.9	-4.39 FE	45.2	-3.59 E	23.6	-2.27 E
85	39.8	0.02	77.3	-0.39	65.1	-0.09	73.7	0.45	30.4	-0.06
99	39.9	0.04	29.7	-6.31 FE	37.4	-4.30 FE	73.3	0.39	34.4	1.23
103	36.9	-0.73	80.9	0.05	68.8	0.48	74.7	0.59	30.5	-0.03
105									10.3	-6.63 BE
117	47.5	1.95	85.0	0.56	90.5	3.78 FE	106.5	5.10 FE	38.0	2.42 E
124	41.5	0.45	83.3	0.36	66.5	0.13	75.0	0.64	30.6	0.00
132	69.5	7.48 BE	164.0	10.38 BE	111.0	6.90 CE	138.0	9.56 BE	37.5	2.26 CE
135	39.0	-0.18	75.7	-0.60	60.8	-0.75	71.8	0.18	29.0	-0.52
145	32.5	-1.83							30.0	-0.19
148	31.5	-2.08 E	58.0	-2.79 E	50.5	-2.31 E	66.0	-0.65	20.0	-3.46 E
158	43.7	0.99	87.0	0.81	68.4	0.41	79.5	1.27	33.5	0.95
167	40.0	0.06	81.5	0.13	68.5	0.43	78.0	1.06	32.5	0.62
181	41.1	0.34			63.1	-0.40			30.0	-0.21
183	40.5	0.19 C							24.0	-2.17 E
186	44.7	1.24	59.5	-2.60 E	67.8	0.31	76.2	0.80	33.0	0.79
189	39.7	-0.02	97.0	2.05 E	68.3	0.39	72.2	0.23	34.8	1.36
192	39.2	-0.14	70.0	-1.30	69.6	0.60			28.6	-0.64
207	53.5	3.46 E	104.0	2.92 FE	81.5	2.41 E	98.0	3.89 FE	40.0	3.07 E
215	17.8	-5.52 BE	38.5	-5.22 FE	31.8	-5.17 FE	33.5	-5.24 FE	13.4	-5.60 BE
223	49.3	2.41 CE	9.3	-8.84 BE	31.6	-5.19 CE	19.1	-7.29 FE	82.0	16.80 CE
237	28.8	-2.76 E	78.9	-0.19	66.1	0.06	73.4	0.40	29.6	-0.34
238	27.3	-3.15 E					46.2	-3.45 E	23.9	-2.20 E
248	50.0	2.58 E	89.5	1.12	128.0	9.48 BE	74.0	0.49	34.5	1.28
256	37.8	-0.48	83.8	0.41	56.3	-1.43	68.8	-0.25	27.6	-0.98
258	35.3	-1.11	72.1	-1.04	59.7	-0.91	69.9	-0.10	28.3	-0.74
261	37.5	-0.57	74.8	-0.71	59.6	-0.93	72.8	0.32	26.6	-1.29
267	43.3	0.90	82.8	0.29	65.5	-0.03	79.6	1.28	28.1	-0.82
503	40.9	0.28					64.8	-0.82	35.8	1.70
510	42.5	0.69							30.0	-0.19

Laboratory	m-Xylene	Z score	n-Butylacetate	Z score	n-Octane	Z score	Propylbenzene	Z score	Toluene	Z score
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Method	ISO 5725-2		ISO 5725-2		ISO 5725-2		ISO 5725-2		ISO 5725-2	
Assessment	Z <=2.00		Z <=2.00		Z <=2.00		Z <=2.00		Z <=2.00	
No. of laboratories that submitted results	32		26		26		25		33	
Mean	39.8		80.5		65.7		70.6		30.6	
Reproducibility s.d.	6.0		10.9		6.9		9.7		4.6	
Rel. reproducibility s.d.	15.12 %		13.48 %		10.46 %		13.75 %		15.07 %	
Reference value	41.7		79.6		76.6		76.1		33.5	
Target s.d.	4.0		8.0		6.6		7.1		3.1	
Rel. target s.d.	10.00 %		10.00 %		10.00 %		10.00 %		10.00 %	
Lower limit of tolerance	31.8		64.4		52.6		56.4		24.5	
Upper limit of tolerance	47.7		96.6		78.8		84.7		36.7	
Type B outliers	2		2		1		1		2	
Type C outliers	3				2				2	
Type F outliers			4		4		4			
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	27		20		19		20		29	

Summary of laboratory means

Sample 2

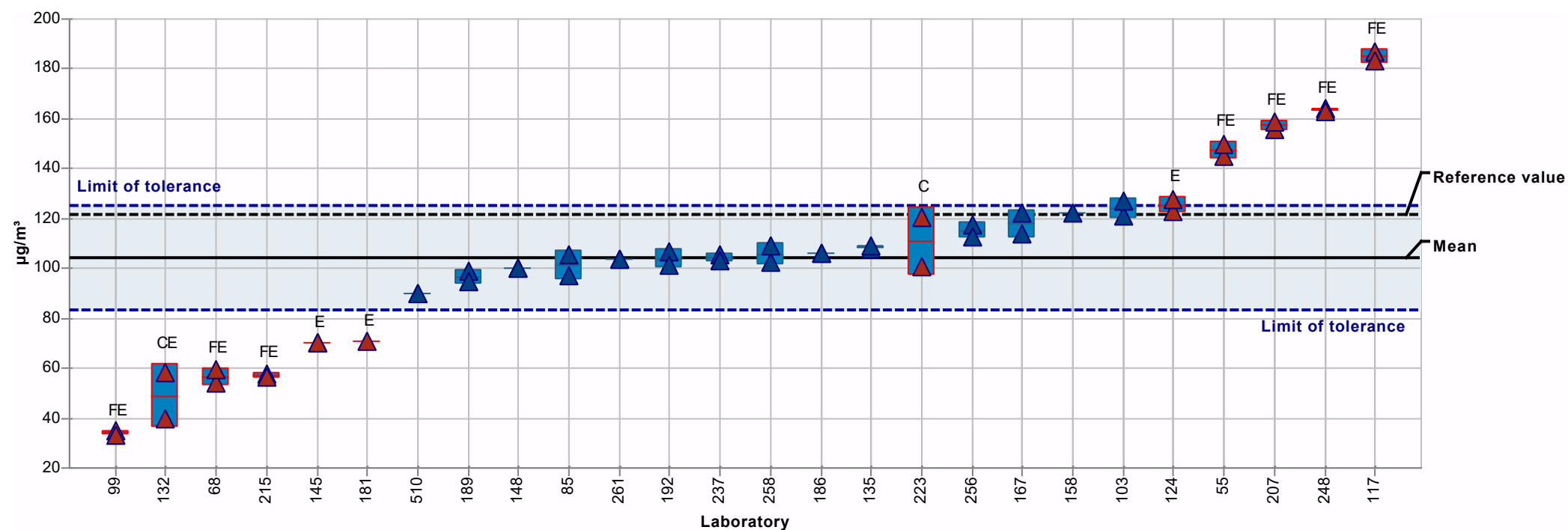
Laboratory	1-Butanol	Z score	1,2,4-Trimethylbenzene	Z score	4-Methyl-2-pentanone	Z score	Benzene	Z score	Cumene	Z score
Unit	µg/m³		µg/m³		µg/m³		µg/m³		µg/m³	
30			72.0	0.82	65.0	0.71	44.0	1.86	57.0	0.93
55	47.0	2.50 E	52.5	-2.11 E	62.5	0.30	40.0	0.78	47.0	-0.99
60			69.5	0.45			37.9	0.23		
68	19.0	-4.96 FE	40.3	-3.95 FE	30.5	-4.98 FE	23.7	-3.61 FE	28.9	-4.45 FE
85	38.0	0.10	68.5	0.30	59.0	-0.28	36.6	-0.15	50.9	-0.24
99	17.0	-5.48 FE	62.7	-0.58	15.0	-7.53 FE	35.7	-0.39	37.8	-2.75 E
103	46.5	2.35 E	73.3	1.02	74.0	2.18 E	38.7	0.43	52.1	0.00
105							28.7	-2.26 E		
117	61.5	6.35 FE	102.5	5.41 FE	86.5	4.25 FE	41.5	1.18	66.0	2.66 E
132	21.0	-4.42 FE	64.5	-0.31 C	49.5	-1.85	56.0	5.09 BE	49.0	-0.60 C
135	33.6	-1.07	63.5	-0.46	55.3	-0.89	29.4	-2.06 E	47.1	-0.97
145	25.0	-3.35 E			62.5	0.30	40.0	0.78 C		
148	35.5	-0.56	60.5	-0.91	50.0	-1.76	30.5	-1.78	49.0	-0.60
158	45.4	2.07 E	62.2	-0.65	68.0	1.20	37.0	-0.03	51.4	-0.14
167	35.0	-0.69	74.0	1.12	65.0	0.71	34.5	-0.70	55.5	0.64
181	42.5	1.30	63.5	-0.46	58.0	-0.45	34.3	-0.77	49.7	-0.47
183			81.8	2.29 CE			46.4	2.50 E		
186	42.8	1.38	74.8	1.25	50.0	-1.77	39.1	0.55	54.5	0.46
189	35.0	-0.68	77.2	1.60	67.8	1.17	37.5	0.12	55.6	0.66
192	32.4	-1.40	60.4	-0.92	59.6	-0.17	35.1	-0.54		
207	56.5	5.02 FE	90.5	3.60 FE	83.5	3.76 FE	45.0	2.13 E	65.5	2.56 E
215	18.3	-5.15 FE	32.0	-5.18 FE	29.0	-5.22 FE	14.6	-6.08 BE	25.0	-5.21 FE
223	71.2	8.94 CE	308.6	36.39 CE	7.7	-8.73 FE	30.4	-1.79 C	34.5	-3.39 CE
237	37.6	-0.01	55.1	-1.72	57.2	-0.57	35.6	-0.41	51.2	-0.19
238			53.3	-2.00			32.2	-1.32	44.7	-1.44
248	94.5	15.12 BE	82.0	2.32 E	74.0	2.19 CE	42.0	1.32	52.0	-0.03 C
256	39.6	0.53	61.5	-0.75	63.6	0.47	33.8	-0.89	46.7	-1.05
258	37.0	-0.17	68.0	0.22	61.4	0.11	36.8	-0.08	50.2	-0.37
261	38.0	0.10	67.5	0.15	58.7	-0.33	32.2	-1.32	52.7	0.10
267			73.6	1.05			40.6	0.96	55.8	0.69

Laboratory	1-Butanol	Z score	1,2,4-Trimethylbenzene	Z score	4-Methyl-2-pentanone	Z score	Benzene	Z score	Cumene	Z score
503			66.1	-0.06			41.5	1.18	54.4	0.44
510	32.5	-1.36			70.0	1.53	35.0	-0.57		
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Method	ISO 5725-2		ISO 5725-2		ISO 5725-2		ISO 5725-2		ISO 5725-2	
Assessment	Z <=2.00		Z <=2.00		Z <=2.00		Z <=2.00		Z <=2.00	
No. of laboratories that submitted results	25		29		26		32		26	
Mean	37.6		66.5		60.7		37.1		52.2	
Reproducibility s.d.	6.3		8.0		6.9		4.8		6.5	
Rel. reproducibility s.d.	16.63 %		11.98 %		11.36 %		13.06 %		12.50 %	
Reference value	42.7		72.2		61.0		35.5		52.9	
Target s.d.	3.8		6.7		6.1		3.7		5.2	
Rel. target s.d.	10.00 %		10.00 %		10.00 %		10.00 %		10.00 %	
Lower limit of tolerance	30.1		53.2		48.6		29.7		41.7	
Upper limit of tolerance	45.1		79.8		72.8		44.5		62.6	
Type B outliers	1						2			
Type C outliers	1		3		1		2		3	
Type F outliers	6		4		6		1		2	
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	17		22		19		27		21	
Explanation of outlier types										
A: Single outlier	Grubbs									
B: Differing laboratory mean	Grubbs									
C: Excessive laboratory s.d.	Cochran									
D: Excluded manually										
E: mean outside tolerance limits										
F: Z-Score >3.50										

Laboratory	m-Xylene Z score		n-Butylacetate Z score		n-Octane Z score		Propylbenzene Z score		Toluene Z score	
Unit	µg/m³		µg/m³		µg/m³		µg/m³		µg/m³	
30	103.5	0.76	36.5	0.74 C	125.5	0.79	27.0	0.90	134.0	1.02
55	109.0	1.33	42.5	2.51 E					137.5	1.31
60	85.7	-1.09	37.6	1.07	122.7	0.55			126.3	0.39
68	129.1	3.41 FE	18.8	-4.47 FE	58.1	-5.00 FE	14.7	-4.08 FE	71.0	-4.16 FE
85	95.9	-0.03	34.5	0.16	114.0	-0.19	24.9	0.06	118.4	-0.26
99	89.8	-0.66	22.6	-3.34 E	47.3	-5.93 FE	24.3	-0.17	124.7	0.25
103	103.9	0.80	38.3	1.26	140.2	2.06 E	25.1	0.13	146.0	2.00 E
105	18.5	-8.07 BE							87.4	-2.82 E
117	139.5	4.50 FE	33.0	-0.29	155.5	3.37 FE	29.5	1.91	152.5	2.54 E
132	115.5	2.00 E	47.0	3.83 CE	152.0	3.07 CE	25.0	0.10	102.5	-1.57
135	87.2	-0.94	31.3	-0.80	101.0	-1.32	22.5	-0.89	106.5	-1.24
145	85.0	-1.17							117.5	-0.34
148	82.0	-1.48	26.0	-2.35 E	89.0	-2.35 E	23.0	-0.71	110.0	-0.95
158	101.6	0.56	38.5	1.33	121.5	0.45	22.5	-0.91	128.8	0.59
167	99.0	0.29	35.0	0.30	122.5	0.53	26.5	0.70	127.5	0.48
181	90.3	-0.61			104.2	-1.04			111.2	-0.86
183	105.8	0.99							93.2	-2.34 E
186	100.5	0.45	27.3	-1.98	112.3	-0.34	26.2	0.58	118.6	-0.25
189	107.0	1.13	42.7	2.57 E	137.6	1.83	26.1	0.52	144.3	1.86
192	92.7	-0.37	28.6	-1.59	119.4	0.27			121.3	-0.02
207	122.0	2.68 E	47.5	3.98 FE	135.0	1.61	35.0	4.13 FE	141.0	1.59
215	45.1	-5.31 FE	15.6	-5.42 FE	57.2	-5.08 FE	9.7	-6.08 BE	59.4	-5.12 FE
223	64.1	-3.33 E	10.3	-6.96 FE	57.0	-5.10 FE	16.3	-3.41 CE	57.3	-5.29 FE
237	41.4	-5.70 FE	34.5	0.16	113.4	-0.25	25.4	0.26	116.5	-0.42
238	75.7	-2.14 E					17.6	-2.89 E	112.7	-0.74
248	114.0	1.85	41.5	2.21 CE	248.0	11.32 BE	27.5	1.11 C	122.5	0.07
256	87.3	-0.93	39.1	1.50	98.7	-1.51	24.0	-0.31	113.3	-0.69
258	92.7	-0.36	33.3	-0.21	115.0	-0.11	25.6	0.32	124.7	0.25
261	92.3	-0.41	33.0	-0.30	109.3	-0.60	24.3	-0.20	113.1	-0.70
267	103.3	0.74	36.3	0.67	114.8	-0.13	26.8	0.82	126.8	0.43
503	97.2	0.10					23.1	-0.68	136.6	1.23
510	97.5	0.13							115.0	-0.54
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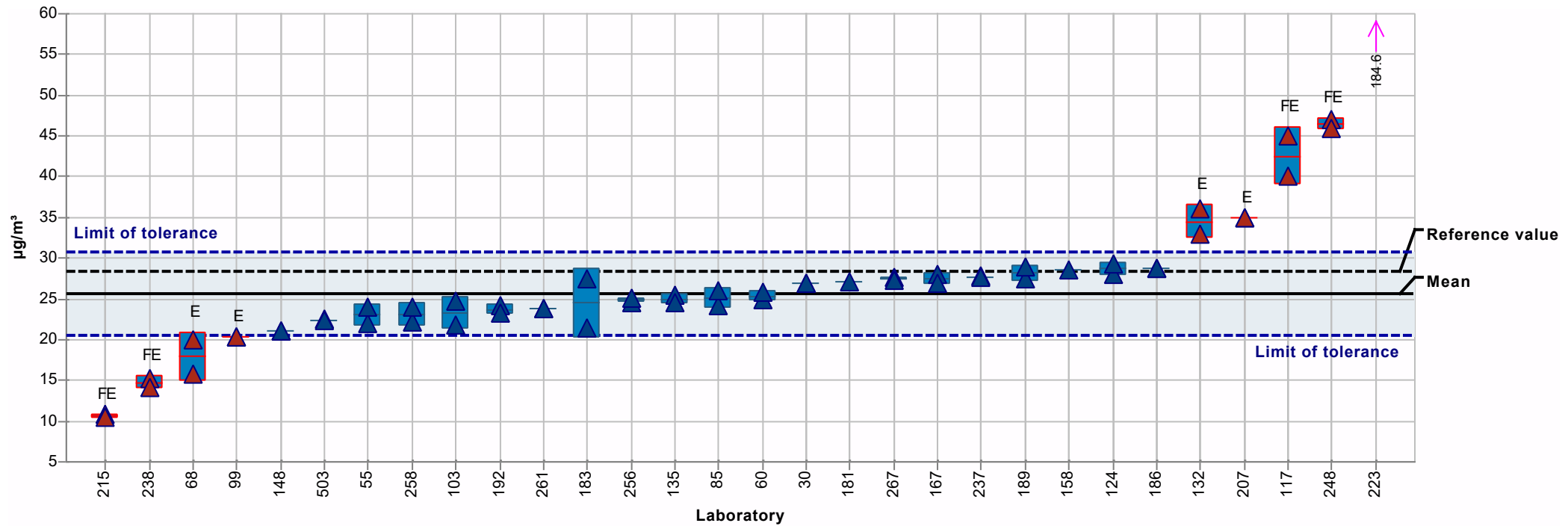
Laboratory	m-Xylene Z score	n-Butylacetate Z score	n-Octane Z score	Propylbenzene Z score	Toluene Z score
Method	ISO 5725-2	ISO 5725-2	ISO 5725-2	ISO 5725-2	ISO 5725-2
Assessment	Z <=2.00	Z <=2.00	Z <=2.00	Z <=2.00	Z <=2.00
No. of laboratories that submitted results	32	25	25	24	32
Mean	96.2	34.0	116.3	24.8	121.6
Reproducibility s.d.	13.6	5.5	13.8	2.6	15.5
Rel. reproducibility s.d.	14.08 %	16.26 %	11.86 %	10.62 %	12.72 %
Reference value	98.9	35.9	132.1	26.3	129.6
Target s.d.	9.6	3.4	11.6	2.5	12.2
Rel. target s.d.	10.00 %	10.00 %	10.00 %	10.00 %	10.00 %
Lower limit of tolerance	77.0	27.2	93.0	19.8	97.3
Upper limit of tolerance	115.5	40.8	139.6	29.7	145.9
Type B outliers	1		1	1	
Type C outliers		3	1	2	
Type F outliers	4	4	5	2	3
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	27	18	18	19	29

Sample:	1	Mean:	104.3 µg/m³
Measurand:	1-Butanol	Reproducibility s.d.:	15.1 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	14.48%
Rel. target s.d.:	10.00%	Reference value:	121.8 µg/m³
Number of laboratories in calculation + outliers:	26	Range of tolerance:	83.5 - 125.2 µg/m³ (Z-Score <= 2.00)



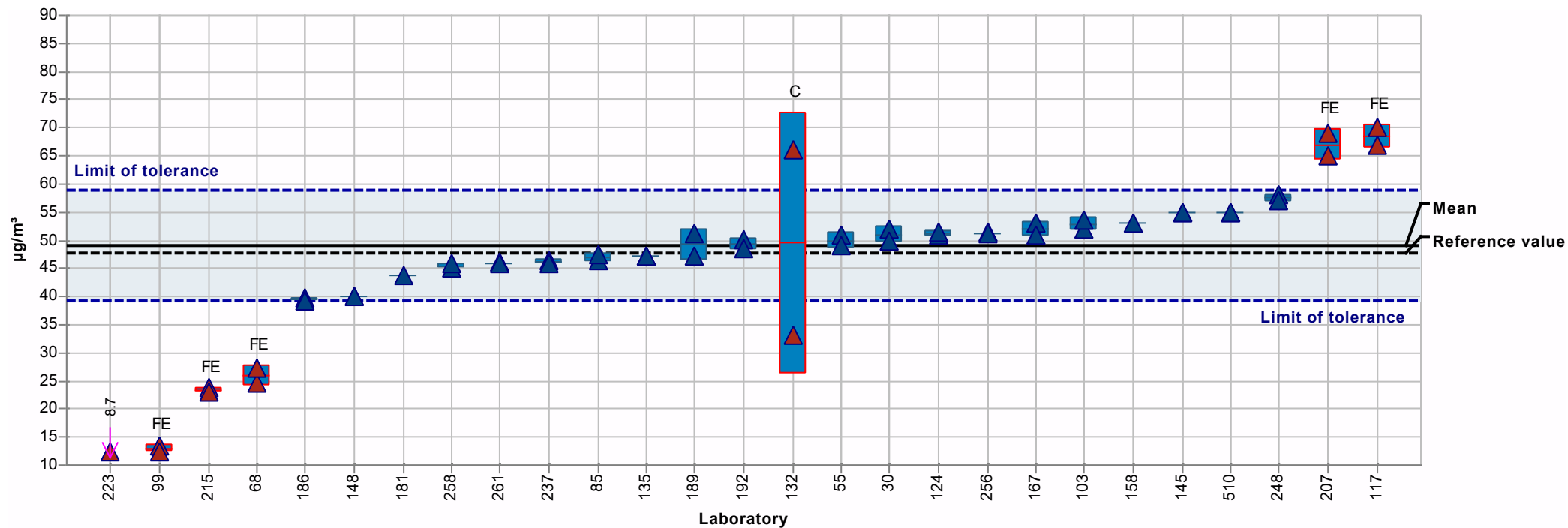
Summary results

Sample:	1	Mean:	25.7 µg/m³
Measurand:	1,2,4-Trimethylbenzene	Reproducibility s.d.:	4.1 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	15.83%
Rel. target s.d.:	10.00%	Reference value:	28.3 µg/m³
Number of laboratories in calculation + outliers:	30	Range of tolerance:	20.5 - 30.8 µg/m³ (Z-Score <= 2.00)



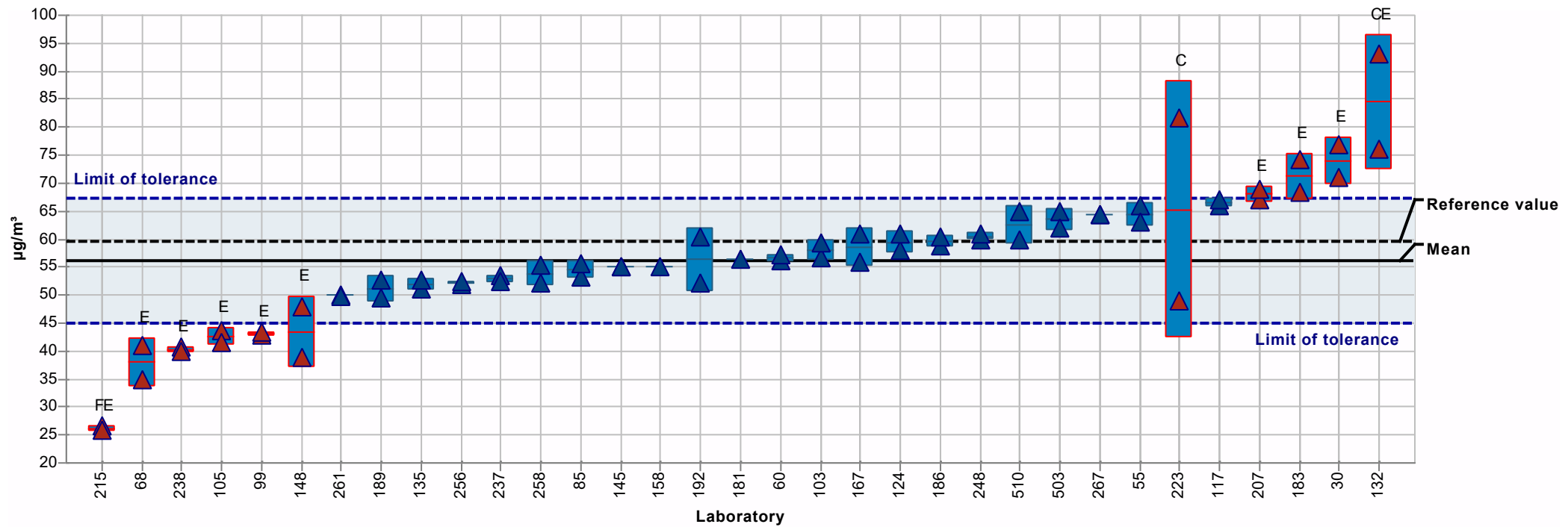
Summary results

Sample:	1	Mean:	49.2 µg/m³
Measurand:	4-Methyl-2-pentanone	Reproducibility s.d.:	4.8 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	9.85%
Rel. target s.d.:	10.00%	Reference value:	47.7 µg/m³
Number of laboratories in calculation + outliers:	27	Range of tolerance:	39.3 - 59.0 µg/m³ (Z-Score <= 2.00)



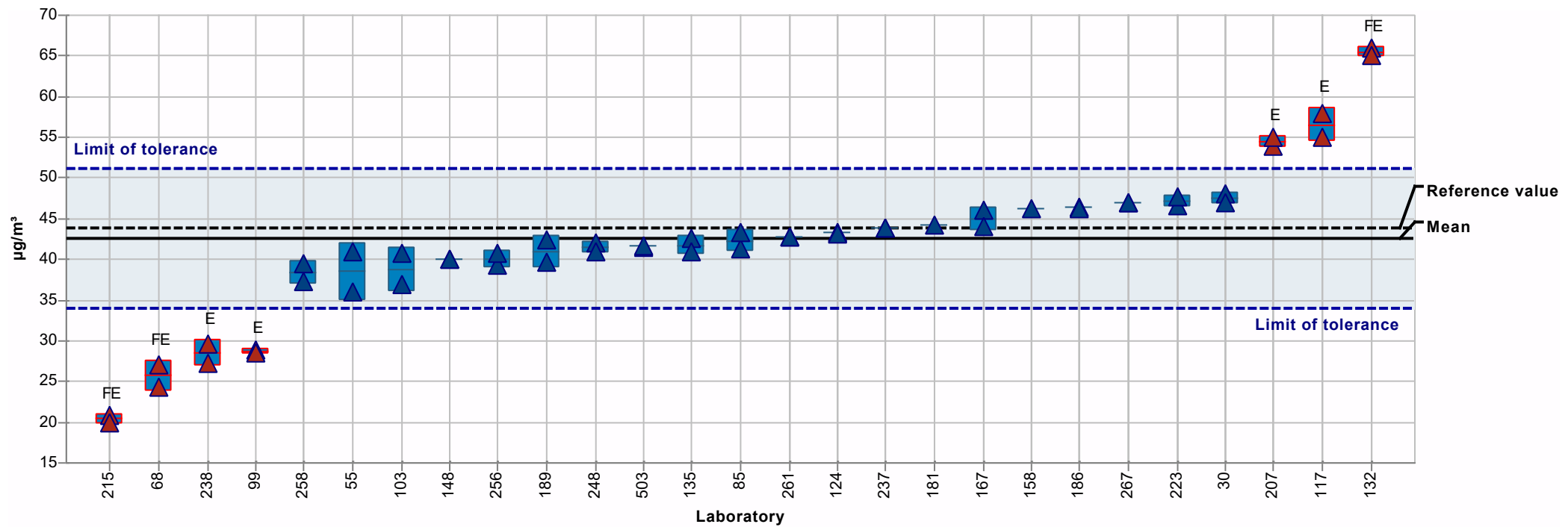
Summary results

Sample:	1	Mean:	56.1 µg/m³
Measurand:	Benzene	Reproducibility s.d.:	9.2 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	16.43%
Rel. target s.d.:	10.00%	Reference value:	59.6 µg/m³
Number of laboratories in calculation + outliers:	33	Range of tolerance:	44.9 - 67.4 µg/m³ (Z-Score <= 2.00)



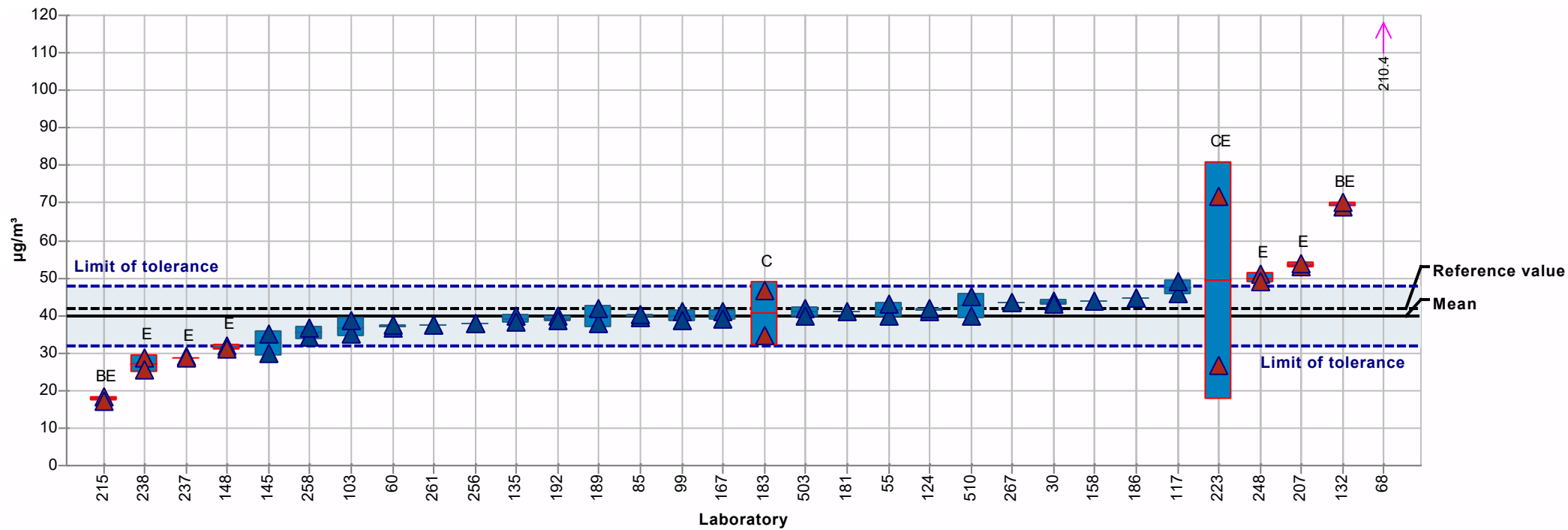
Summary results

Sample:	1	Mean:	42.6 µg/m³
Measurand:	Cumene	Reproducibility s.d.:	6.4 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	15.07%
Rel. target s.d.:	10.00%	Reference value:	43.9 µg/m³
Number of laboratories in calculation:	27	Range of tolerance:	34.1 - 51.1 µg/m³ (Z-Score <= 2.00)



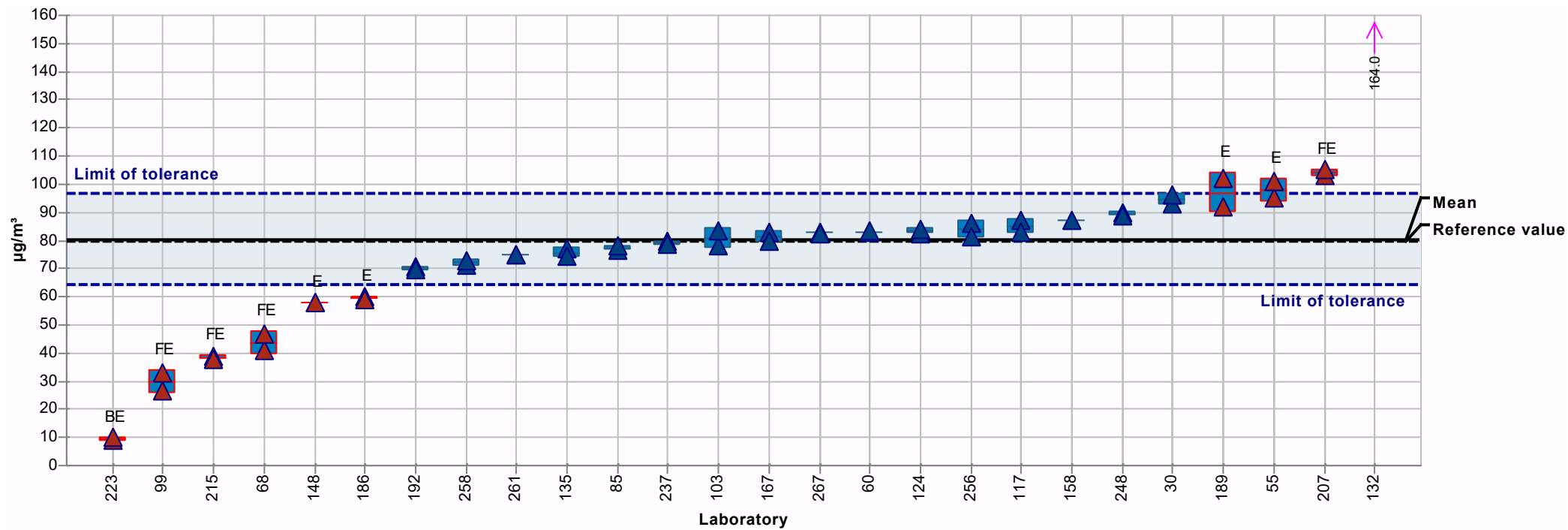
Summary results

Sample:	1	Mean:	39.8 µg/m³
Measurand:	m-Xylene	Reproducibility s.d.:	6.0 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	15.12%
Rel. target s.d.:	10.00%	Reference value:	41.7 µg/m³
Number of laboratories in calculation + outliers:	32	Range of tolerance:	31.8 - 47.7 µg/m³ (Z-Score <= 2.00)



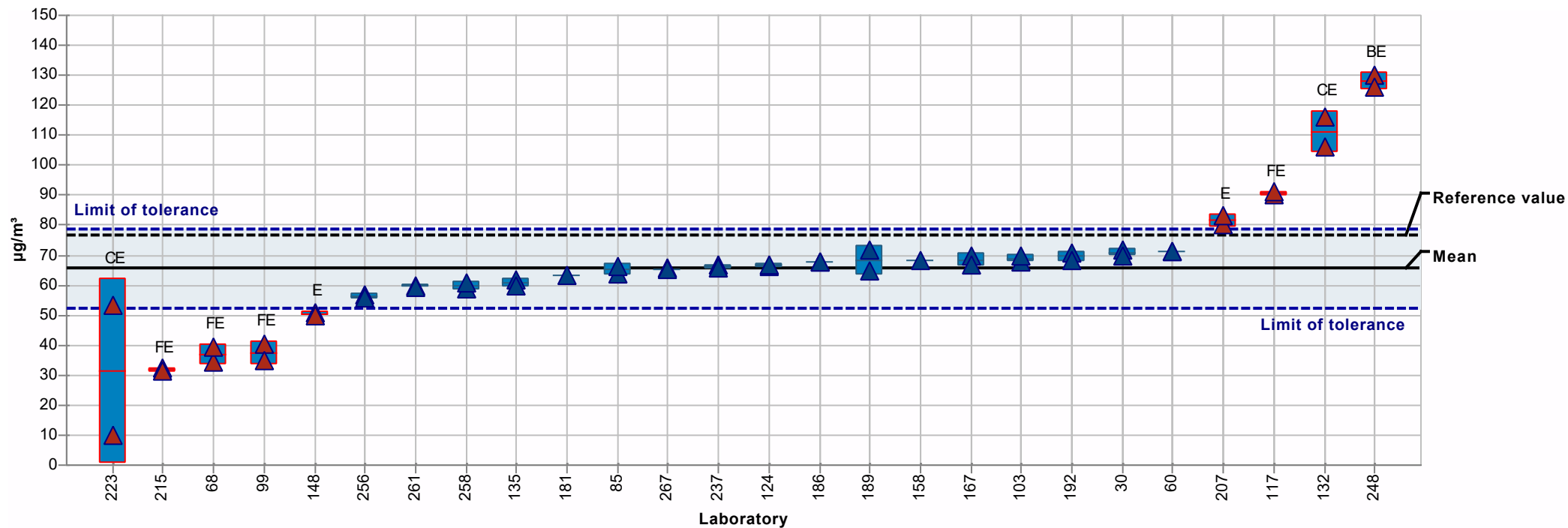
Summary results

Sample:	1	Mean:	80.5 µg/m³
Measurand:	n-Butylacetate	Reproducibility s.d.:	10.9 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13.48%
Rel. target s.d.:	10.00%	Reference value:	79.6 µg/m³
Number of laboratories in calculation + outliers: 26		Range of tolerance:	64.4 - 96.6 µg/m³ (Z-Score <= 2.00)



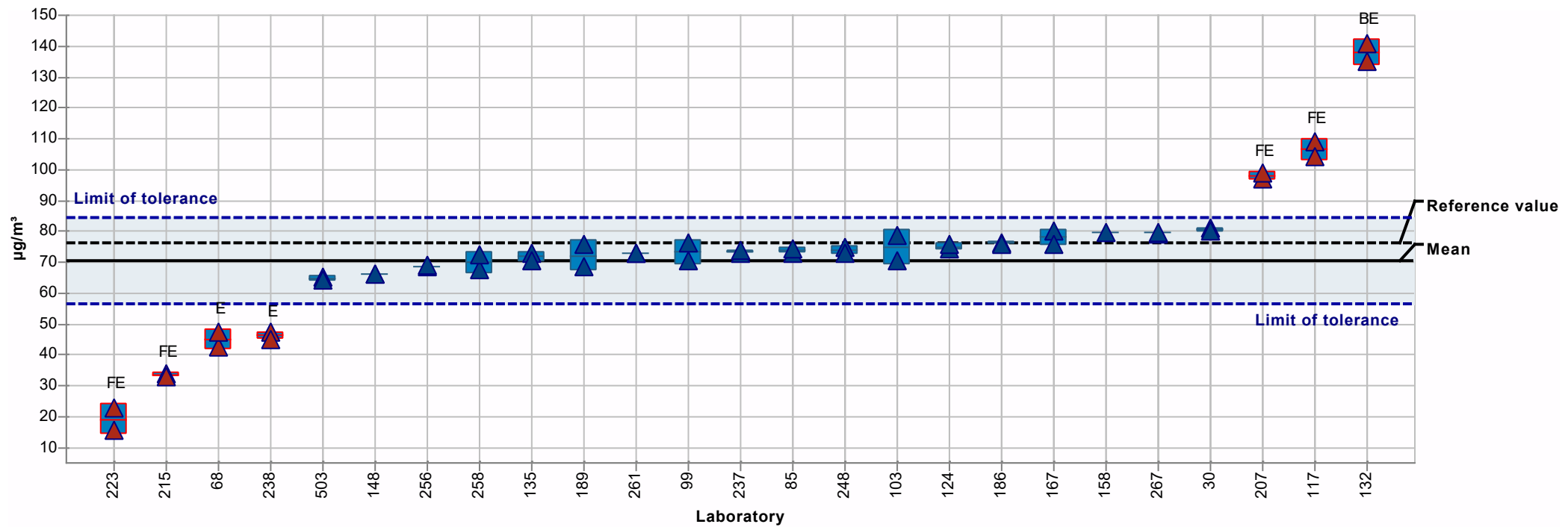
Summary results

Sample:	1	Mean:	65.7 µg/m³
Measurand:	n-Octane	Reproducibility s.d.:	6.9 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	10.46%
Rel. target s.d.:	10.00%	Reference value:	76.6 µg/m³
Number of laboratories in calculation + outliers: 26		Range of tolerance:	52.6 - 78.8 µg/m³ (Z-Score <= 2.00)



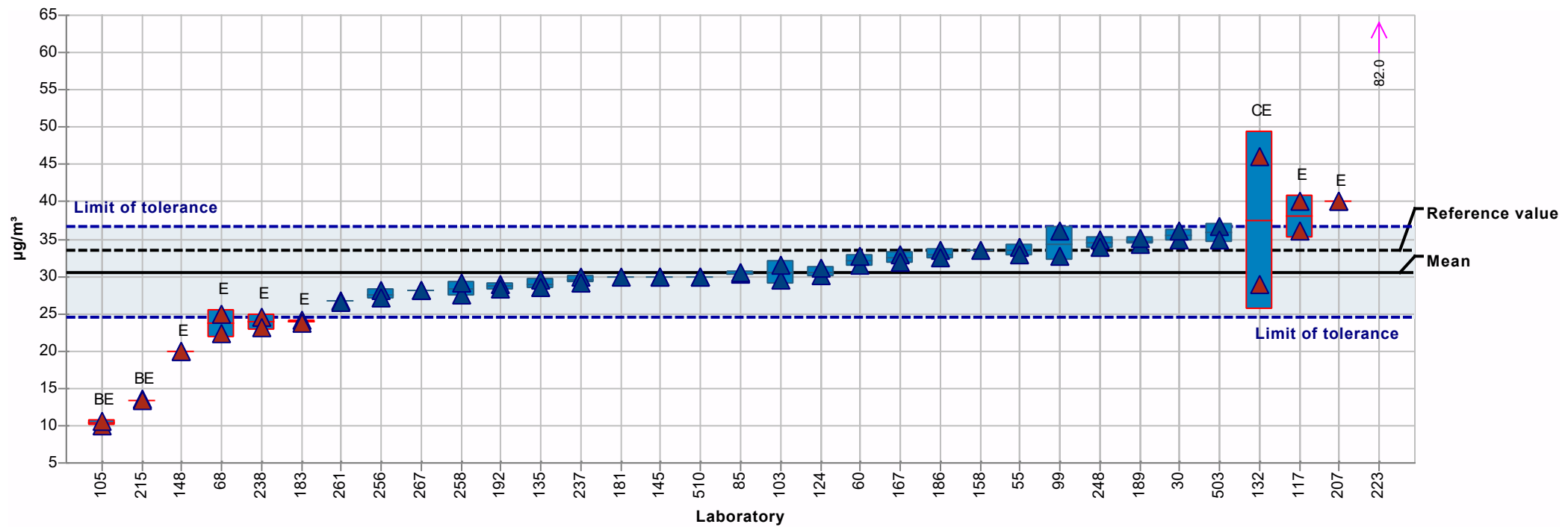
Summary results

Sample:	1	Mean:	70.6 µg/m³
Measurand:	Propylbenzene	Reproducibility s.d.:	9.7 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13.75%
Rel. target s.d.:	10.00%	Reference value:	76.1 µg/m³
Number of laboratories in calculation + outliers:	25	Range of tolerance:	56.4 - 84.7 µg/m³ (Z-Score <= 2.00)



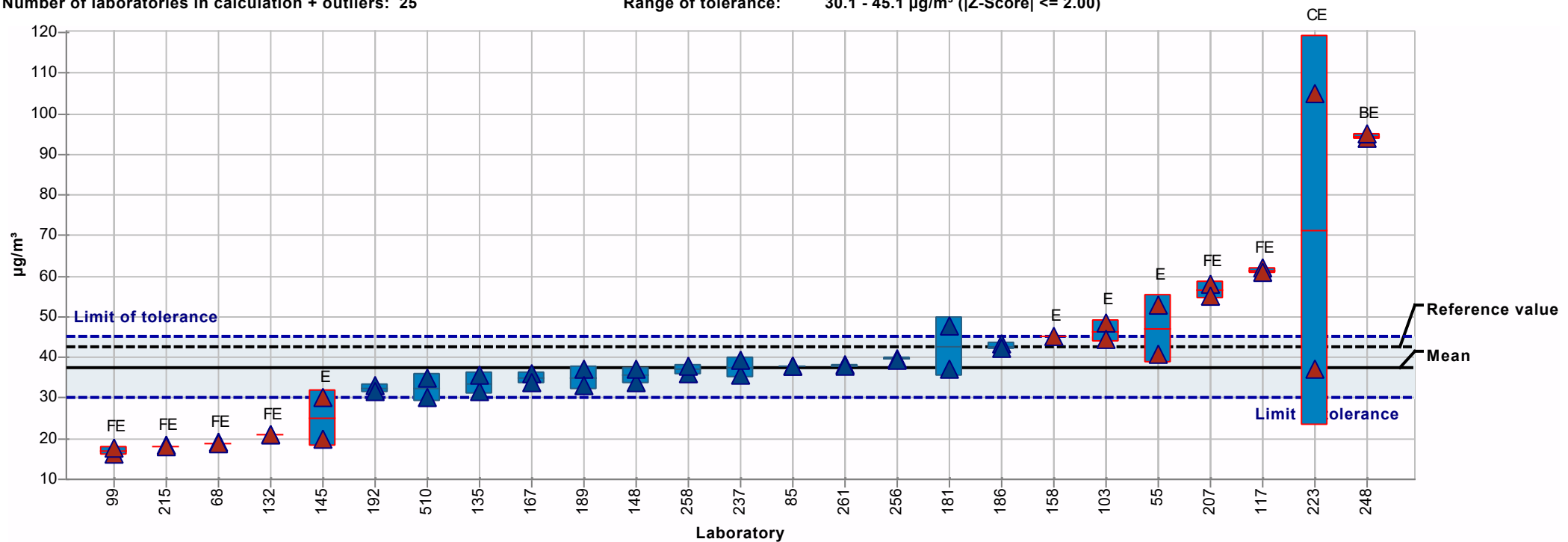
Summary results

Sample:	1	Mean:	30.6 µg/m³
Measurand:	Toluene	Reproducibility s.d.:	4.6 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	15.07%
Rel. target s.d.:	10.00%	Reference value:	33.5 µg/m³
Number of laboratories in calculation + outliers:	33	Range of tolerance:	24.5 - 36.7 µg/m³ (Z-Score <= 2.00)



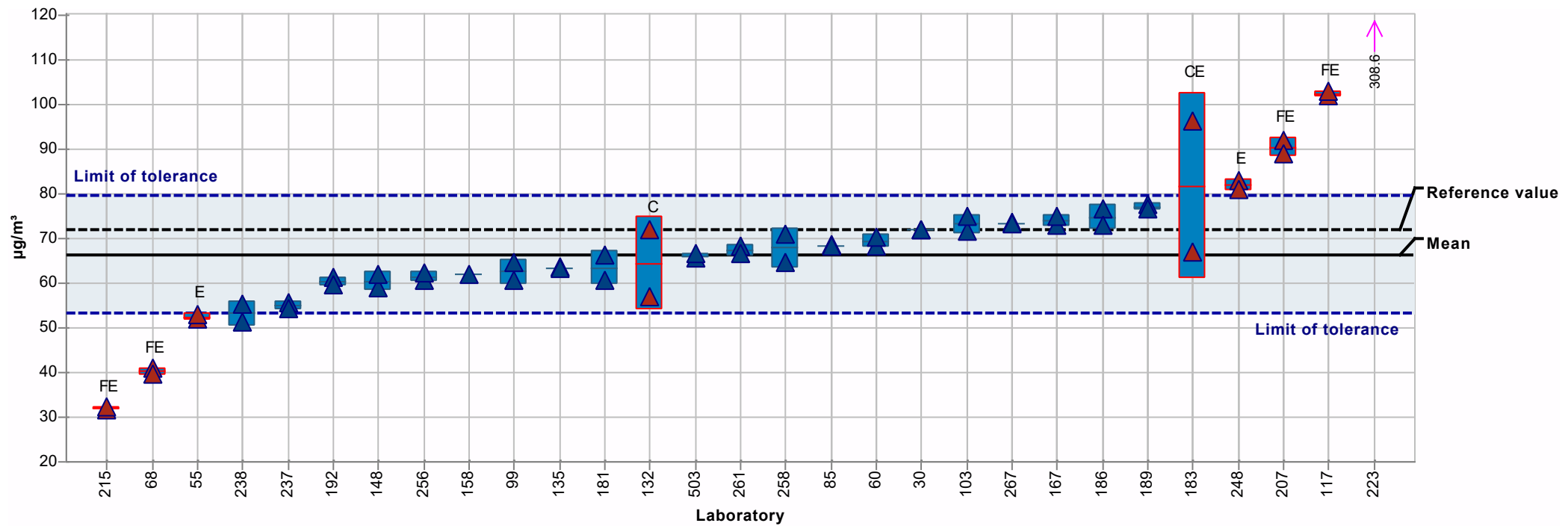
Summary results

Sample:	2	Mean:	37.6 µg/m³
Measurand:	1-Butanol	Reproducibility s.d.:	6.3 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	16.63%
Rel. target s.d.:	10.00%	Reference value:	42.7 µg/m³
Number of laboratories in calculation + outliers:	25	Range of tolerance:	30.1 - 45.1 µg/m³ (Z-Score <= 2.00)



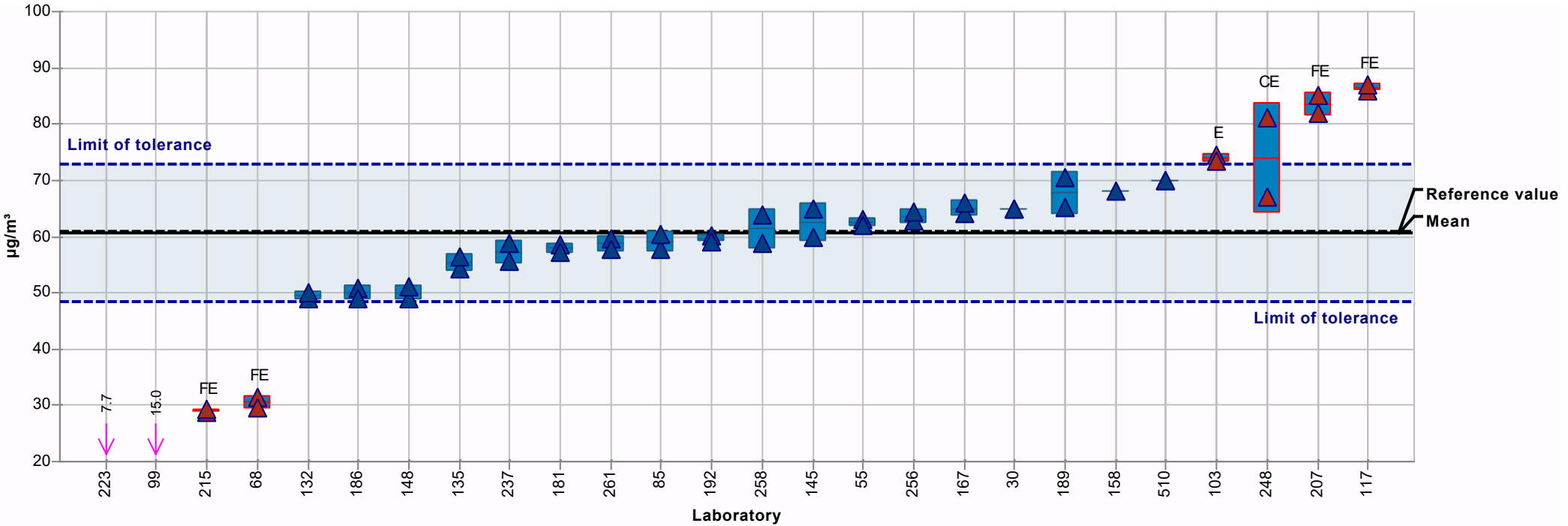
Summary results

Sample:	2	Mean:	66.5 µg/m³
Measurand:	1,2,4-Trimethylbenzene	Reproducibility s.d.:	8.0 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	11.98%
Rel. target s.d.:	10.00%	Reference value:	72.2 µg/m³
Number of laboratories in calculation + outliers:	29	Range of tolerance:	53.2 - 79.8 µg/m³ (Z-Score <= 2.00)



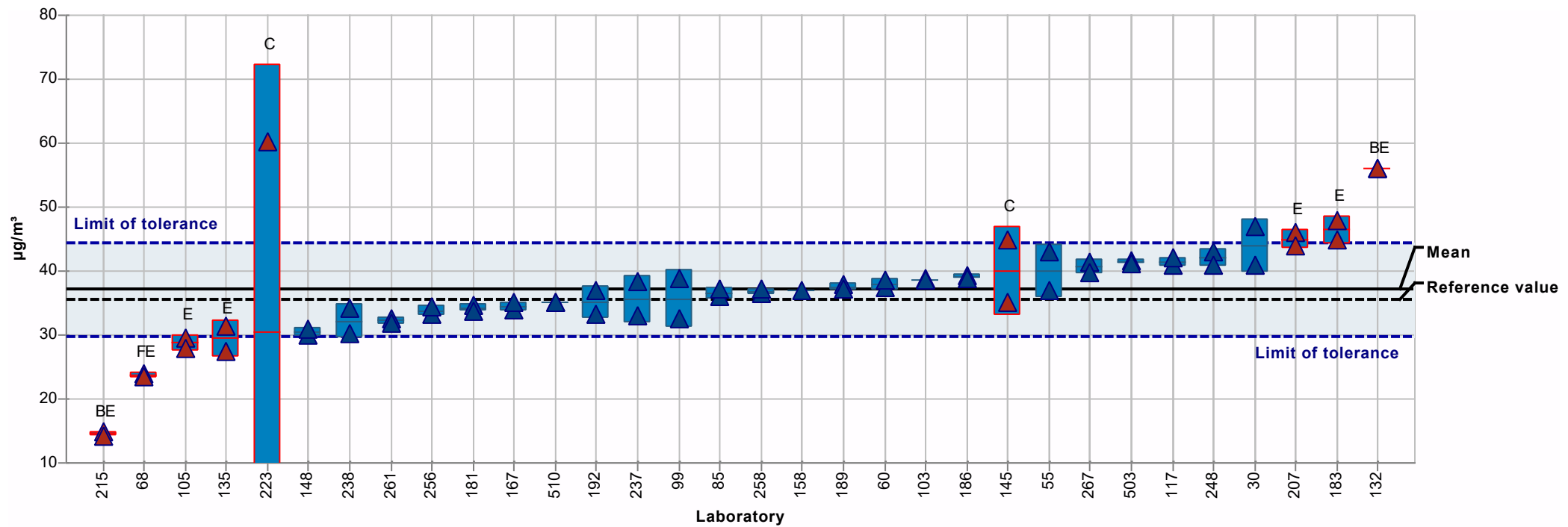
Summary results

Sample:	2	Mean:	60.7 µg/m³
Measurand:	4-Methyl-2-pentanone	Reproducibility s.d.:	6.9 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	11.36%
Rel. target s.d.:	10.00%	Reference value:	61.0 µg/m³
Number of laboratories in calculation + outliers:	26	Range of tolerance:	48.6 - 72.8 µg/m³ (Z-Score <= 2.00)



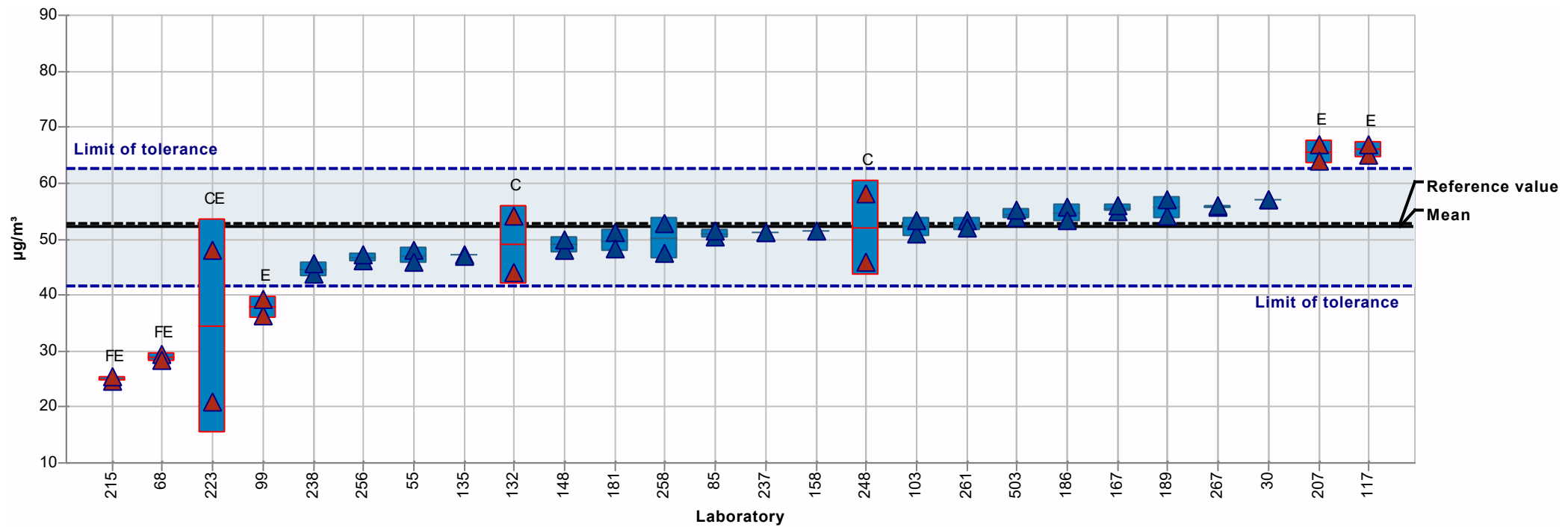
Summary results

Sample:	2	Mean:	37.1 µg/m³
Measurand:	Benzene	Reproducibility s.d.:	4.8 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13.06%
Rel. target s.d.:	10.00%	Reference value:	35.5 µg/m³
Number of laboratories in calculation + outliers:	32	Range of tolerance:	29.7 - 44.5 µg/m³ (Z-Score <= 2.00)



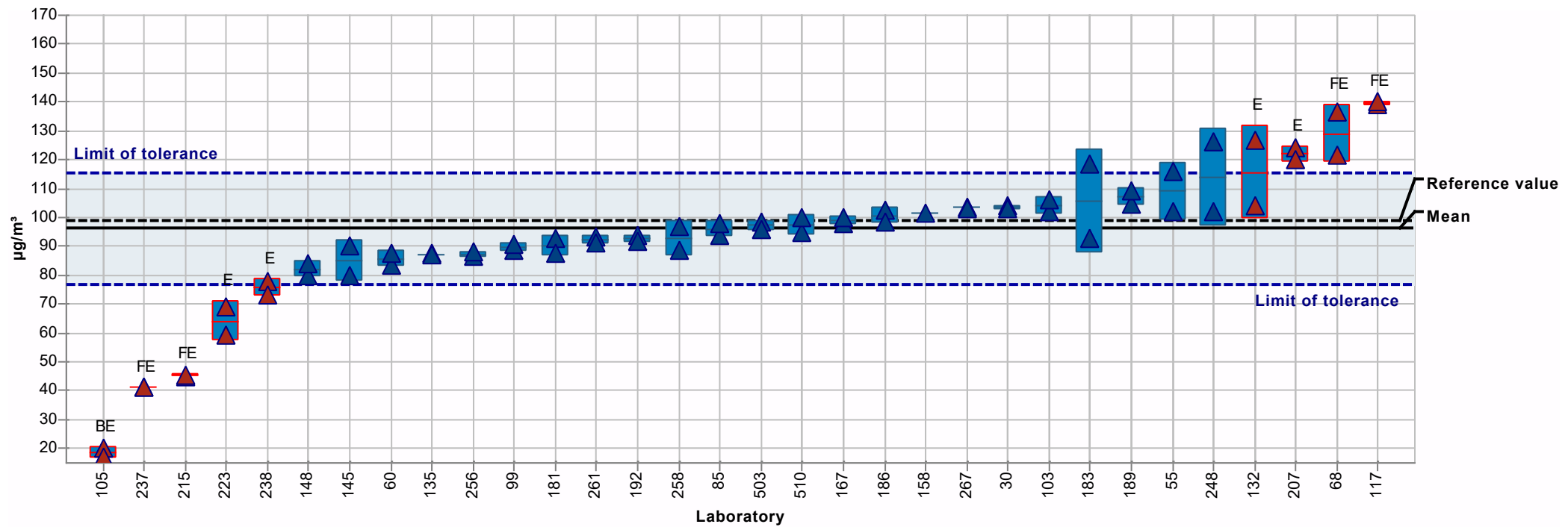
Summary results

Sample:	2	Mean:	52.2 µg/m³
Measurand:	Cumene	Reproducibility s.d.:	6.5 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	12.50%
Rel. target s.d.:	10.00%	Reference value:	52.9 µg/m³
Number of laboratories in calculation + outliers:	26	Range of tolerance:	41.7 - 62.6 µg/m³ (Z-Score <= 2.00)



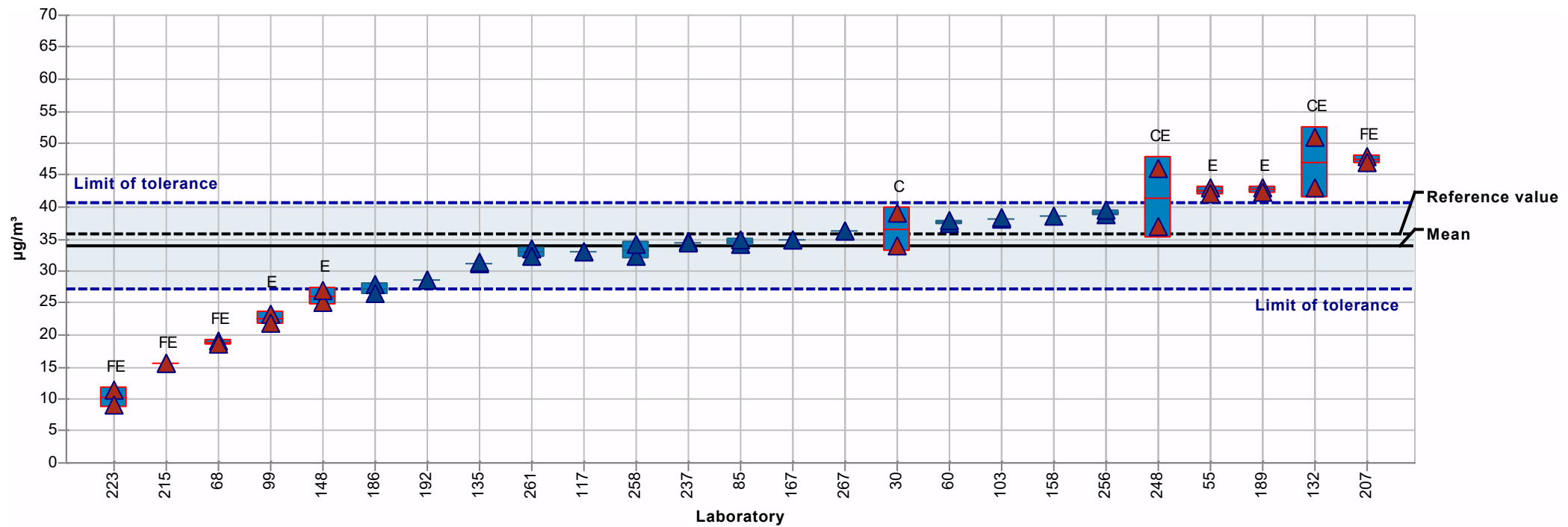
Summary results

Sample:	2	Mean:	96.2 µg/m³
Measurand:	m-Xylene	Reproducibility s.d.:	13.6 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	14.08%
Rel. target s.d.:	10.00%	Reference value:	98.9 µg/m³
Number of laboratories in calculation + outliers: 32		Range of tolerance:	77.0 - 115.5 µg/m³ (Z-Score <= 2.00)



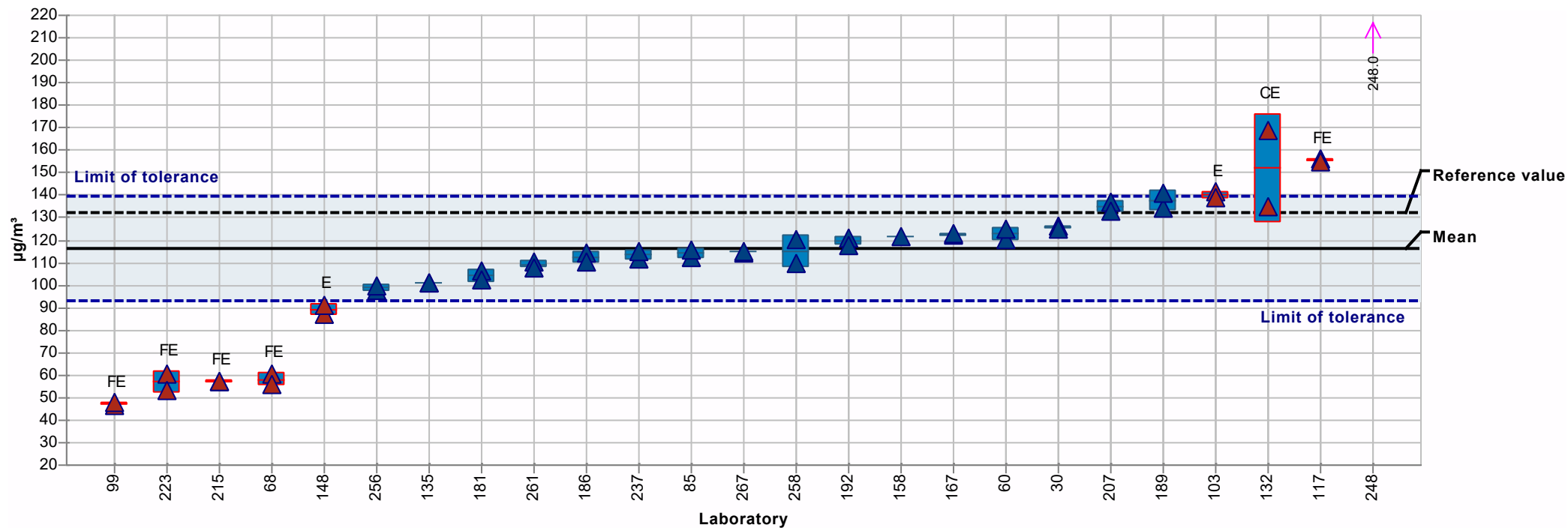
Summary results

Sample:	2	Mean:	34.0 µg/m³
Measurand:	n-Butylacetate	Reproducibility s.d.:	5.5 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	16.26%
Rel. target s.d.:	10.00%	Reference value:	35.9 µg/m³
Number of laboratories in calculation + outliers:	25	Range of tolerance:	27.2 - 40.8 µg/m³ (Z-Score <= 2.00)



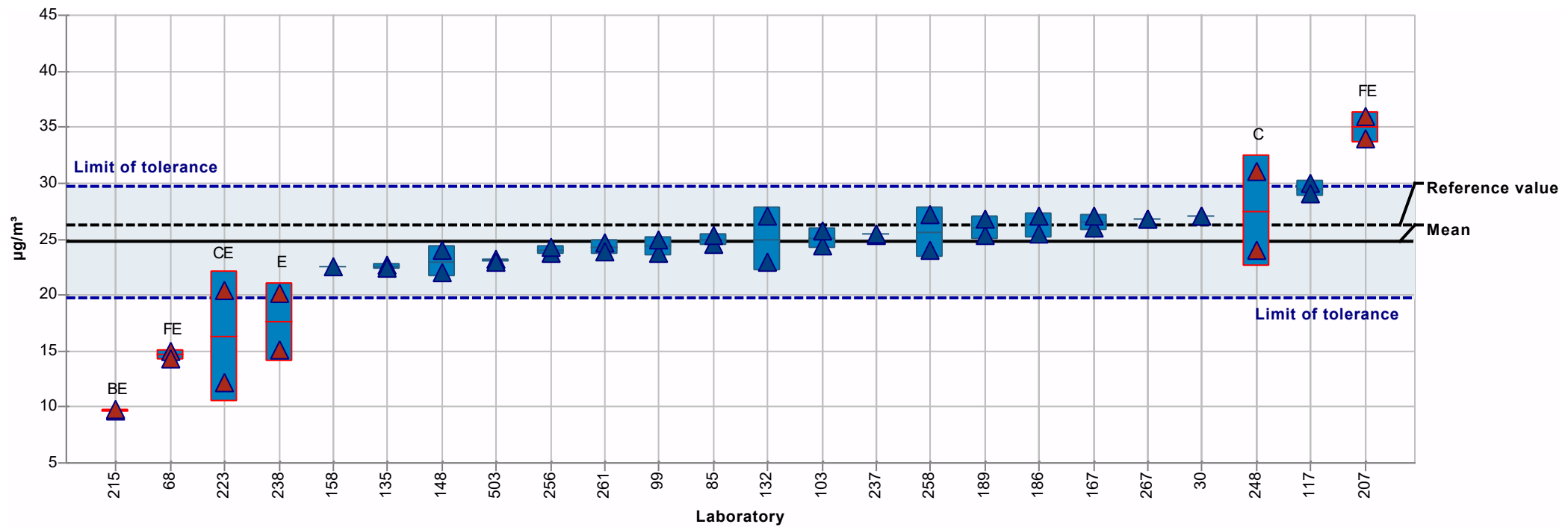
Summary results

Sample:	2	Mean:	116.3 µg/m³
Measurand:	n-Octane	Reproducibility s.d.:	13.8 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	11.86%
Rel. target s.d.:	10.00%	Reference value:	132.1 µg/m³
Number of laboratories in calculation + outliers: 25		Range of tolerance:	93.0 - 139.6 µg/m³ (Z-Score <= 2.00)



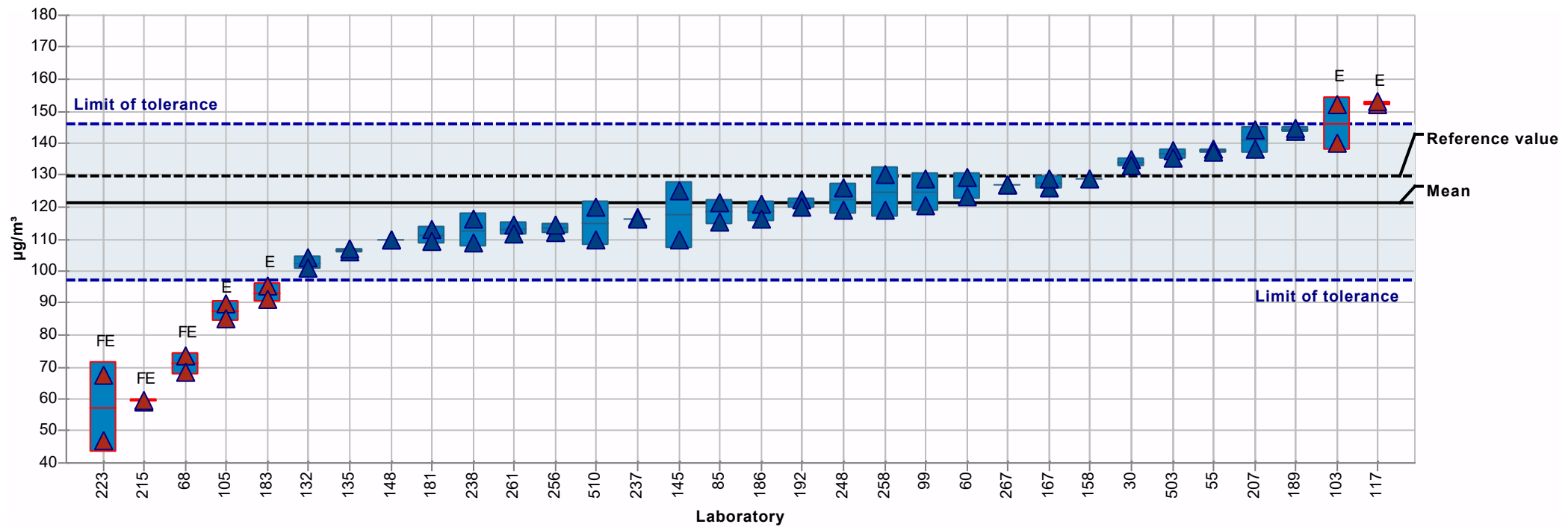
Summary results

Sample:	2	Mean:	24.8 µg/m³
Measurand:	Propylbenzene	Reproducibility s.d.:	2.6 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	10.62%
Rel. target s.d.:	10.00%	Reference value:	26.3 µg/m³
Number of laboratories in calculation + outliers:	24	Range of tolerance:	19.8 - 29.7 µg/m³ (Z-Score <= 2.00)



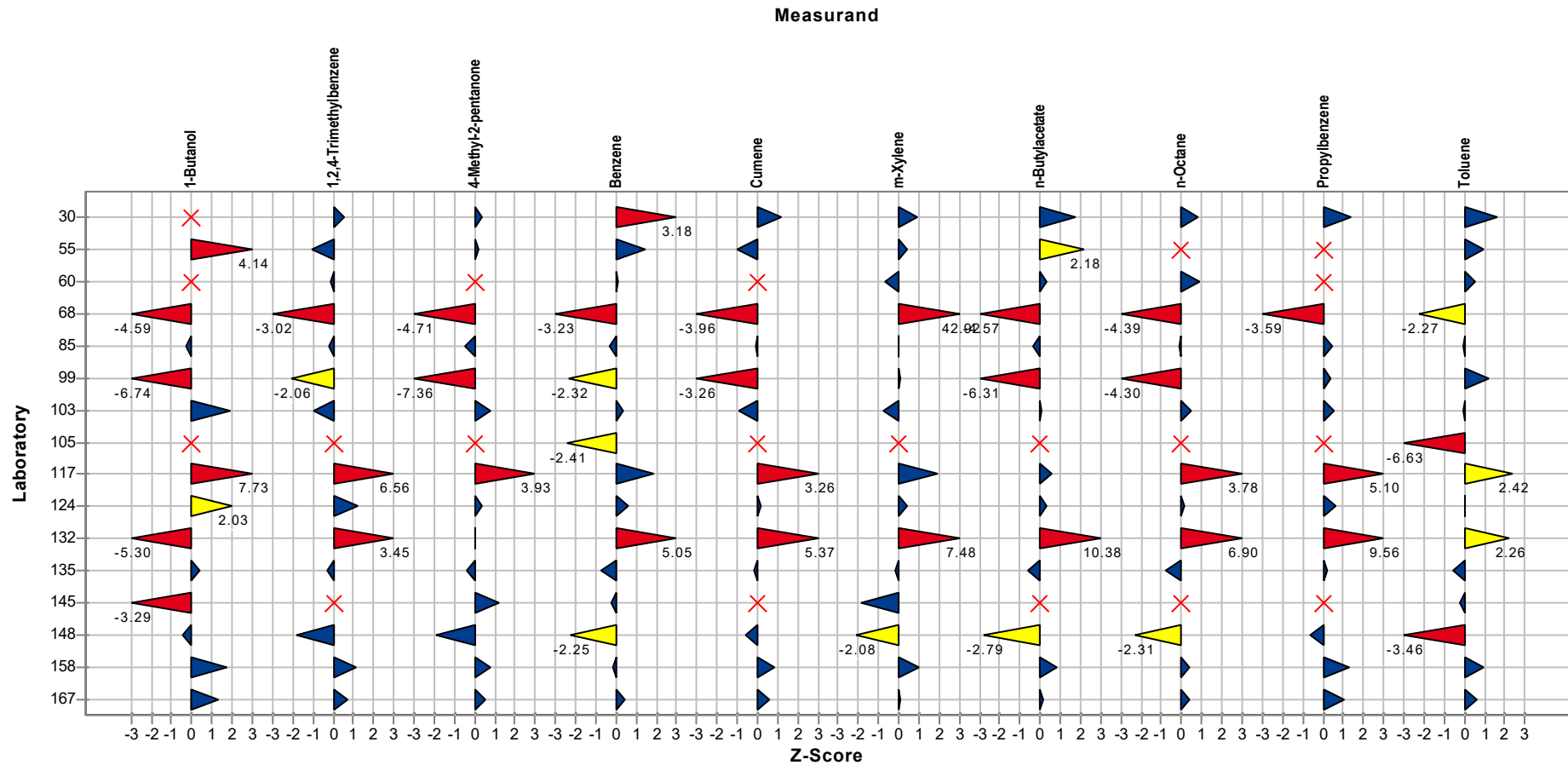
Summary results

Sample:	2	Mean:	121.6 µg/m³
Measurand:	Toluene	Reproducibility s.d.:	15.5 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	12.72%
Rel. target s.d.:	10.00%	Reference value:	129.6 µg/m³
Number of laboratories in calculation:	32	Range of tolerance:	97.3 - 145.9 µg/m³ (Z-Score <= 2.00)



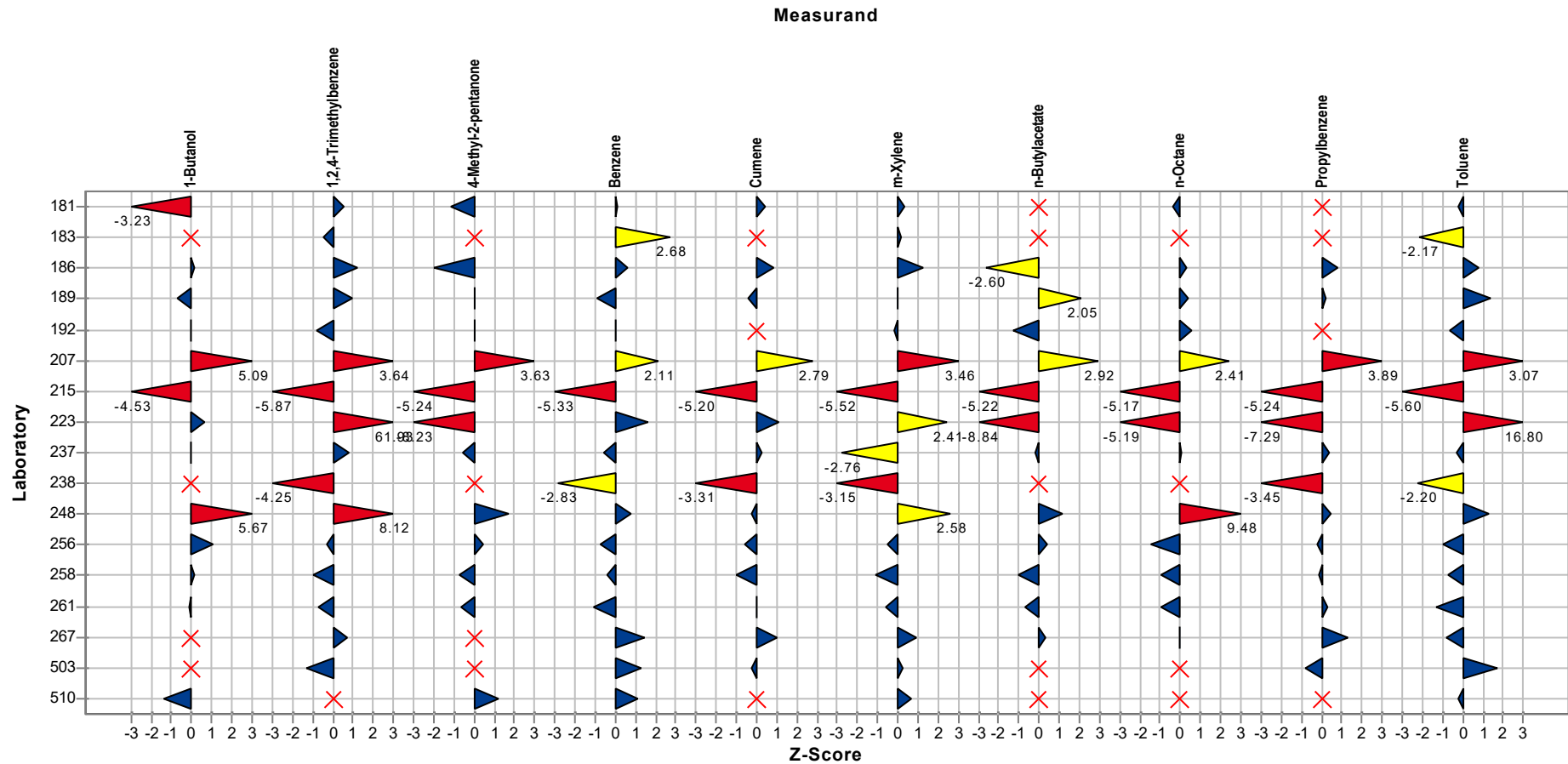
Sample chart of Z-Scores

Sample: 1



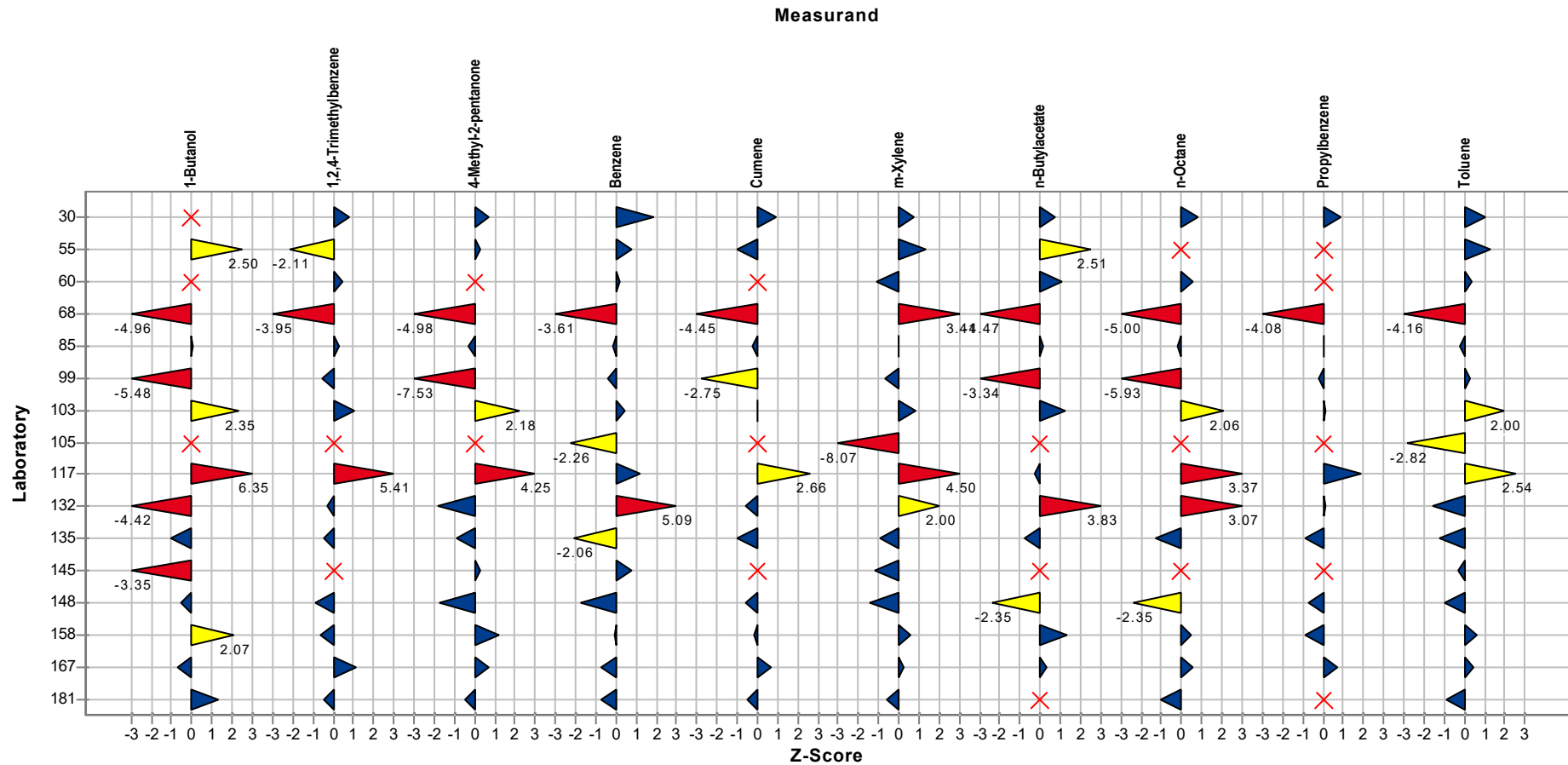
Sample chart of Z-Scores

Sample: 1



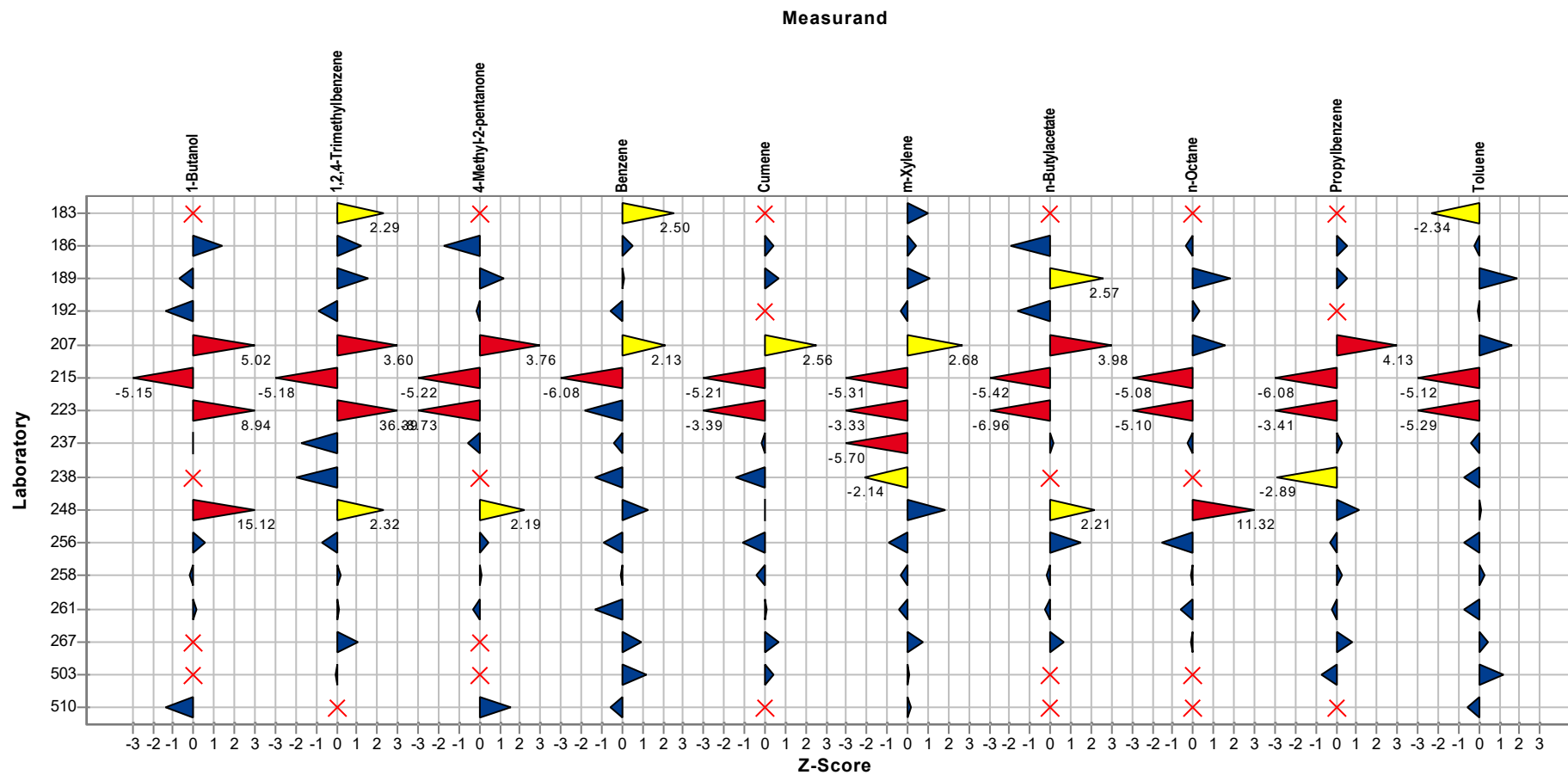
Sample chart of Z-Scores

Sample: 2



Sample chart of Z-Scores

Sample: 2



Summary of laboratory test results

System blank value sample 1

Laboratory	1-Butanol	1,2,4-Trimethylbenzene	4-Methyl-2-pentanone	Benzene	Cumene	m-Xylene	n-Butylacetate	n-Octane	Propylbenzene	Toluene
Unit	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
30	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.0	< 2.0	< 2.0	< 2.0	14.0
55										10.0
60		< 2.5		< 2.5		< 2.5	< 2.5	< 2.5		< 5.0
68				3.4		184.5				4.4
85	0.0	0.0	0.0	0.2	0.0	0.0	0.8	0.0	0.0	2.0
99	0.3	0.5	0.1	0.8	0.1	1.4	0.1	0.1	0.4	2.9
103				1.7						4.8
124	0.5	2.0	0.0	0.8	0.0	1.5	0.5	0.0	0.1	2.9
132	0.0	0.0	0.0	6.0	0.0	1.0	0.0	0.0	0.0	5.0
135	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	4.2
145	0.0		0.0	0.0		0.0				0.0
148	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
158	0.9	0.8	0.0	0.7	0.1	1.6	0.5	0.3	0.2	3.7
167	0.0	1.9	0.0	0.0	1.4	2.3	0.0	0.0	0.7	11.0
181	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0		< 5.0		< 5.0
183		0.0		0.0		0.0				3.5
186	0.8	0.8	0.1	3.8	0.1	1.2	0.4	0.5	0.2	4.3
189										9.7
192	2.7	1.0	0.3	2.3		2.1	0.6	0.7		3.6
215	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223	4.5	1.8	0.1	4.8	0.1	3.3	0.1	0.0	0.7	0.0
238		< 10.0		< 5.0	< 10.0	< 20.0			< 10.0	< 10.0
256	0.2	1.4	0.1	2.5	0.1	1.8	0.5	0.5	0.2	4.0
258	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
261	0.6	0.5		1.7		1.2	0.3			2.7
267		< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
503		< 5.0		< 5.0	< 5.0	< 5.0			< 5.0	< 5.0
510	0.0		0.0	0.0		0.0				0.0
–	–	–	–	–	–	–	–	–	–	–
No. of laboratories that submitted results	19	22	18	26	18	25	18	18	17	28

Summary of laboratory test results

System blank value sample 2

Laboratory	1-Butanol	1,2,4-Trimethylbenzene	4-Methyl-2-pentanone	Benzene	Cumene	m-Xylene	n-Butylacetate	n-Octane	Propylbenzene	Toluene
Unit	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
30	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	5.9
55										4.0
60		< 2.5		< 2.5		< 2.5	< 2.5	< 2.5		< 5.0
68				4.5		130.5				5.5
85	3.1	0.0	0.0	0.3	0.0	0.0	1.0	0.0	0.0	2.1
99	0.1	0.7	0.1	1.0	0.3	1.5	0.2	0.2	0.5	2.3
132	0.0	0.0	0.0	5.0	0.0	0.6	0.0	0.0	0.0	2.0
135	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	2.6
145	0.0		0.0	0.0		0.0				0.0
148	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
158	1.0	0.9	0.1	0.4	0.2	1.4	0.5	0.3	0.3	2.9
167	0.0	0.6	0.0	0.0	0.0	1.3	0.0	0.0	0.0	3.2
181	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0		< 5.0		< 5.0
183		0.0		0.0		0.0				0.9
186	2.0	1.1	0.1	4.7	0.1	1.2	0.8	0.7	0.2	4.8
192	3.0	0.9	0.3	1.2		1.8	0.7	0.5		3.0
215	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
223	0.2	0.4	0.0	0.6	0.0	0.5	0.1	0.0	0.3	2.6
238		< 10.0		< 5.0	< 10.0	< 20.0			< 10.0	< 10.0
256	0.5	1.0	0.1	2.4	0.1	1.4	0.6	0.3	0.2	3.0
258	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
261	0.7	0.5		1.9		0.9	0.4			2.0
267		< 2.5		< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
503		< 5.0		< 5.0	< 5.0	< 5.0			< 5.0	< 5.0
510	0.0		0.0	0.0		0.0				0.0
–	–	–	–	–	–	–	–	–	–	–
No. of laboratories that submitted results	18	21	17	24	17	24	17	17	16	25

Questions and Answers

Participant	Sample carrier	Analytical method
30	Tenax TA	ISO 16000-6
55	Tenax TA, Markes	ISO 16000-6
60	manufacturer	DIN ISO 16000-6
68	Tenax TA	ISO 16000-6
85	Tenax TA	ISO 16000-6
99	SUPELCO Tenax TA, 35/60 mesh, glass TD tube	ISO 16000-6
103	Glass, Tenax TA, Gerstel	DIN ISO 16000-6
105	Gerstel Tenax TA 60/80 + Carbosieve SIII™ Glasrohr 014752-005-00	Inhouse nach DIN 16000-6
117	Edelstahl-Rohre, Tenax TA 60-80 mesh (200mg), Firma Supelco	DIN EN ISO 16000-6
124	60/80 Tenax-TA from Camsco	reference method EPA TO-17, AbC SOP
132	GERSTEL TDS tube with glass frit packed with Tenax TA (35/60 mesh), Carbograph 1 (40/60), Carboxen 1003 (40/60)	Internal method based on ISO 16000-6
135	Tenax TA Supelco	DIN ISO 1600-6
145	Gerstel Tenax TA + Carbosieve S3	Hausmethode
148	Tenax	16000-6
158	Tenax TA	DIN ISO 16000-6
167	Markes Material Emission Tubes (Quartz Wool, Tenax TA, Carbograph 5TD)	EN 16516
181	Glas, AirToxics, PerkinElmer/Markes	DIN EN ISO 16017-1
183	Stainless steel TD tube, Tenax TA, Supelco	ISO 16000-6
186	Tenax TA	NF ISO 16000-6
189	Temax TA (Markes)	ISO 16000-6
192	TenaxTA	ISO 16000-6
207	Markes Röhrchen, Tenax	DIN ISO 16000-6
215	Tenax TA	DIN ISO 16000-6
223	tenax tube (polyphenylene oxide polymer)	ISO 17025
237	Tenax TA 60/80 Markes	Inhouse
238	tubes MARKES carbotrap 349 (CpkY/CpkB/Cbxn1003)	ISO 16017-1
248	Tenax TA	DIN EN ISO
256	Tenax TA	DIN ISO 16000-6
258	Stainless steel tubes, Tenax TA, Markes	ISO 16000-6
261	Edelstahl Adsorptionsröhrchen gefüllt mit Tenax TA, Firma Camsco	DIN ISO 16000-6
267	Stainless Steel tubes filled with Tenax TA (ref. C1-AXXX-5003, Markes International)	ISO 16000-6
503		

Volatile organic compounds -VOC- with thermal desorption 2024

Participant	Sample carrier	Analytical method			
510					
Participant	Thermal desorber	Desorption temperature	Desorption flow	Desorption time	Cryo trap
30	TD 650 Perkin Elmer	260°C	50	30	-30°C / 280°C
55	Markes TD-100	280	30	10	10-350°C, max heating rate
60	Markes	295	100	5	-10°C and 300°C
68	Markes TD100-xr	300°C	50	20	-20°C, 300°C
85	TD-30R	250 ?	60	15	10?/250?
99	Perkin Elmer TurboMatrix 350 ATD	300?	50 mL/min	10 min	5? / 300?
103	Gerstel TDS3	275 C	50	7	0 to 275C at 12 C/s
105	Gerstel TDS3C	260°C	30	16	-150°C; 12°C/s +300°C
117	Perkin Elmer TurboMatrix 650	260°C	20 ml/min	15 min	Kühlfalle: -30°C ; Heiztemperatur: 250°C
124	Shimadzu TD-30 detector	250oC	60oC	5 min	-20oC trap, 250oC desorption
132	Gerstel TDS	300°C	50	10	-120°C
135	Perkin Elmer TurboMatrix 650	250°C	31	17	-20°C; 300°C
145	Gerstel TDS3	260°C	50	21	-150°C
148	Thermodesorber von Markes TD 100	280 °C	50 mL/min	10 min	Trap Low Temp.: 25 °C ; Trap High Temp.: 315 °C
158	Markes TD 100	280 °C	75 ml/min	8 min	+ 10 °C und + 310 °C
167	Markes ATD 100XR	320	40	10	5 / 320
181	Markes TD100	300 °C	40 ml/min	7,5 min	Kühlfalle -20 °C, Heiztemperatur 300 °C
183	Markes UNITY-xr	280°C	50 mL/min.	7 min.	20-300 °C
186	Markes TD-100XR	280	50	10	-30°C / 280°C
189	PerkinElmer, Turbo Matrix Series 350 ATD	280 °C	30 ml/min	10	cryo-trap temperature: -35°C, heating temperature: 300°C
192	Markes International	270°C	30mL/min	10min	5°C / 280°C
207	Markes Unity TD 100	300°C	20	8	-25°C bis +300°C
215	Shimadzu TD30	300°C	60	10	0°C / 300°C
223	Gerstel TDA (THERMAL DESORB AUTOSAMPLER)	200 C	60	10	-70 C and 210 C
237	PE Turbomatrix	300	50	10	-20/ +270
238	TD100 XRMarks	330°C	100 mL/min	15 min	T°C cryo = 15°C; T°C heating = 300°C
248	Gerstel TD 3.5+	250°C	1,3	4,5	-10 bis 250
256	Perkin Elmer TurboMatrix 650	300 °C	50 ml/min	5 min	2°C / 300°C
258	Markes TD-100-xr	280°C	42	15	-30°C, 300
261	Perkin Elmer ATD 650	275 °C	30	15	-8 / 278 °C
267	Markes Unity-xr	280°C	50 mL/min	15 min	-5°C - 300°C

Volatile organic compounds -VOC- with thermal desorption 2024

Participant	Gas chromatograph (GC)	Analytical column
30	GC 7890 Agilent	RTX5-MS
55	Trace GC Ultra	Rxi-5Sil-MS 60 m x 0.25mm ID x 1µ film
60	Agilent 7890A	HP-5MS
68	Agilent 7890B Series GC Custom; Agilent 7000D Quadrupol MS/MS	Vocol von Supelco (L: 60 m, ID: 0.25 mm, Filmdicke: 1.5 µm)
85	QP-2020NX	Varian Capillary Column CP-Sil5CB (#CP8743)
99	Perkin Elmer Clarus 690 GC	Elite-1
103	Agilent GC 6890N	HP-5MS
105	Agilent 7890	Agilent 122-1364 DB-624 60m
117	Agilent GC/MS 7890A/5975C Triple-Axis	Agilent J&W Scientific 30 m HP 5 (0,25 mm / 0,25 µm)
124	Shimadzu GC-2030 with QP2020NX detector	624, 30m, 0.25 mm ID/1.4 micron
132	Agilent GC/MS	Agilent ULTRA 2 column 50m x 320 µm x 0.52 µm
135	Agilent 7890A	RTX 200
145	Agilent 6890N	DB-624 60x0,25x1,4
148	7890B und 5977B	Rxi-5Sil MS, 20 m, 0,18 mm ID, 0,36 µm df
158	GC/MS (Agilent 7890/5975c)	Resteck RTX-1 60m, ID 0,25 x 1µm
167	Agilent 6890N	Agilent DB-5MS UI
181	Agilent GC 7890B	DB625 60mx250µmx1,4µm
183	Agilent 8890 GC System	Agilent HP-5MS UI (30 m x 0,250 mm x 0,25 µm)
186	Agilent 8890 GC System	Agilent DB-5MS UI 0.25mm x 60m x 1µm
189	Agilent Technologies, model: 8890	OPTIMA 5 MS, 60 m L, 0.32 mm ID, 1 µm df
192	Agilent technologies	DB-5 (60m, 0.25mm id, 1.0µm df)
207	Agilent 7890B	DB 5
215	Shimadzu GC 2010 Plus	Agilent VF-5ms
223	Agilent GCMS 5977Turbo System	Agilent 19095-433 (60m X 250µm X 0.200µm film thickness100% poly-dimethylsiloxane, nonpolar) analytical column.
237	PE Clarus	Varian
238	GC 8890 / MSD5977B	RTX 624
248	Agilent 6850	DB 5 MS 60 m
256	Agilent 8890	60m Rtx / 0.25 ID / 1.4 um
258	Agilent 8890	HP-ULTRA 2, 50m x 0.32mm, 0.52µm (Agilent 19091B-115)
261	Perkin Elmer Clarus 680	Rtx-VMS
267	Agilent 8890	HP Innowax 60 m x 0.32 mm x 0.5 µm, Agilent Technologies (ref: 19091N-216)

Participant	Carrier gas	Carrier gas flow	Detector
30	helium	1.0	FID (except for benzene by MS)

Volatile organic compounds -VOC- with thermal desorption 2024

Participant	Carrier gas	Carrier gas flow	Detector
55	Helium	1.5	MS DSQ Thermo
60	Helium	2.5	MS
68	Helium	1	Quadrupol Scan
85	Helium	1.0	MS
99	Helium	N/A	Perkin Elmer Clarus SQ8
103	Helium	1	Agilent MSD 5975
105	Helium	2	HES-MSD + FID
117	Helium	12,2 ml/min	MSD
124	He	80 KPA constant pressure, 100:1 split	MS in FASST mode (TIC+SIM)
132	helium	1.3	Mass selective detector
135	Helium	28	MSD
145	Helium	2	FID/MSD
148	Helium	0,5 mL	MS
158	Helium	1 ml/min	MSD Agilent 5978C
167	Helium	1,5	Agilent 5975 MSD
181	Helium	1,4 ml/min	Agilent MSD 5977A
183	Helium	1,1 mL/min	Agilent 5977B MSD
186	helium	1.2 mL/min	Agilent 5977 GC/MSD
189	helium	0,44 ml/min	Agilent Technologies, model: 5977B
192	Helium	1.3mL/min	MSD
207	Helium	1.2	MS Agilent 5975
215	Helium	4,8	Shimadzu QP 2010 Ultra MS
223	Helium		Agilent 5975C XL Mass Selective Detector (MSD)
237	He	0,7	MS
238	helium	1mL/min	GC/MS
248	Helium	1,3	Agilent 5975C MS
256	Helium	1.2	Agilent MSD 5977B
258	Helium	1.3	Agilent 5977C MSD
261	Helium	1	Massenspektrometer Perkin Elmer Clarus SQ8
267	Helium	1.77 mL/min	Mass spectrometer (scan mode for acquisition)

Participant	Data evaluation	Recovery rate
30	external	no
55	8-point calibration curve	yes

Volatile organic compounds -VOC- with thermal desorption 2024

Participant	Data evaluation	Recovery rate
60	Scan	No
68	Excel, MS Spektrum	Ja über den Internen Standard Tetrachlorethen
85	NIST library, Calibration curves	No
99	Calibration curve method, NIST Library	No
103	External standards and MassHunter with NIST Library	No
105	quantifiziert: FID, identifiziert: MSD + NIST Datenbank	nein
117	Quantifizierung über externe Standards (Mehrpunktkalibrierung); Identifizierung über Wiley Datenbank und externe Standards	Nein
124	MS-SIM and retention time	yes, calibrators are media spikes.
132	targeted compound quantitation using a calibration curve, identified using a library match and retention time to standard	No
135	Peakflächen; externer Standard; Massenspektrenvergleich	Ja
145	Quantifizierung: FID Qualifizierung: MSD	nein
148	externer & interner Standard, Abgleich Retentionszeit, Spektrenvergleich	nein
158	Sim-Ion, Interne Std.-Methode	Es wurden Kontrollstandards eingesetzt
167	4 Point calibration curve with internal standard, match against commercial libraries with qualifier ions	No
181	Masshunter	nein
183	Scan mode acquisition, quantification with calibration curve, identification with NIST library	No
186	Identification with specific standards and quantification with internal standards	No
189	Identification by MSD and quantification using specific response factor, using calibration curve with 5 or 6 levels of concentration.	no
192	Absolute calibration curve	No
207	EIC Originalreferenzen, eigene und kommerzielle Bibliotheken	nein
215	substanzspezifische MS Kalibrierung im SIM Mode, Identifizierung im SCAN MS Mode	nein
223	SIM(ION)	yes
237	MS	Nein
238	Internal calibration + SIM & SCAN	No
248	Externe Kalibrierstandards (flüssig und gas förmig)	ja
256	Substanzspezifische 6-Punkt-Kalibrierung, Retentionszeit, Massenspektren	nein
258	External standards of specific substances for quantification, MS spectra and retention times of standards for identification	No
261	Quantifiziert nach charakteristischer Ionenspur mit internem Standard und 8-Punkt Kalibrierung, Identifikation erfolgt nach Spektrum	Nein
267	Acquisition in scan mode, quantification with one m/z quantifier and confirmation of identification with specific qualifiers and their ratio	No

Participant	Date of analysis
30	18/10/2024
55	24/09/2024
60	September 09, 2024

Volatile organic compounds -VOC- with thermal desorption 2024

Participant	Date of analysis
68	09.10.2024
85	September 11, 2024
99	2024/09/10
103	September 23, 2024
105	10.09.2024
117	12.09.2024
124	9/18/2022 and 9/27/2024. Concerned with the air oxidation of cumene, so measured the two tubes that we had 9 day apart.
132	sample 1.1 on 10/15, sample 1.2 on 10/17 and samples 2,1 and 2,2 on 10/18
135	23.09.2024
145	17.10.2024 / 18.10.2024
148	19.09.2024
158	05. bis 09.09.2024
167	17.Oct.2024
181	05.09.2024
183	16/10/2024
186	26/09/2024
189	01/10/2024 and 03/10/2024
192	10 Sep 2024
207	10.09.2024
215	12/13.09.24
223	10/20/2024
237	19.09.2024
238	17/09/2024
248	22.10.24
256	06.09.2024
258	September 06, 2024
261	25.09.2024
267	10/09/2024