

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

Proficiency testing scheme

Volatile organic compounds (VOC) with thermal desorption

September 2022

Summary of laboratory means

Sample 1

Laboratory	1,2,4-Trimethylbenzene	Z score	alpha-Pinene	Z score	Benzene	Z score	Cumene	Z score	Ethylbenzene	Z score
Unit	$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$		$\mu\text{g}/\text{m}^3$	
21	52,00	0,16	82,00	-0,80	28,00	0,51	151,00	35,31 BE	80,00	1,04
30	54,00	0,55	90,00	0,10	24,00	-0,99	34,00	0,20	75,50	0,41
52	42,30	-1,74	58,25	-3,46 E	21,50	-1,93	27,60	-1,72	62,05	-1,44
55	64,00	2,50 CE	97,50	0,94 C	32,00	2,01 E	38,00	1,40	87,50	2,07 E
60	54,55	0,66	79,35	-1,10	28,20	0,59	54,75	6,43 BE	73,00	0,07
65	59,23	1,57	95,26	0,69	26,99	0,13	37,47	1,24	76,64	0,57
68	47,15	-0,79	82,75	-0,71	24,90	-0,65	33,70	0,11	65,90	-0,91
79	48,50	-0,52	87,50	-0,18	25,00	-0,62	32,50	-0,25	64,50	-1,10
85	50,70	-0,09	87,00	-0,24	25,50	-0,43	33,40	0,02	72,60	0,01
86	49,06	-0,42	76,32	-1,44	22,72	-1,47	30,13	-0,96	67,67	-0,67
87	46,30	-0,96	82,16	-0,78	26,04	-0,23	28,83	-1,35	73,84	0,18
93	55,83	0,91 C	118,33	3,28 E	29,20	0,96	34,80	0,44	90,86	2,53 E
94	53,05	0,36	88,60	-0,06	28,55	0,72	35,15	0,55	73,45	0,13
96	62,60	2,23 E	100,85	1,32	24,55	-0,78	40,60	2,18 E	84,10	1,60
99	46,60	-0,90	111,20	2,48 E	35,29	3,25 E	41,25	2,38 E	74,54	0,28
102	43,84	-1,44	78,94	-1,14	22,75	-1,46	33,09	-0,07	63,00	-1,31
103	43,82	-1,44	70,00	-2,15 E	27,20	0,21	25,59	-2,32 E	61,25	-1,55
105					14,00	-4,74 FE			61,50	-1,52
108	56,50	1,04 C	90,25	0,13	27,65	0,38	34,90	0,47 C	81,00	1,17
119	57,69	1,27	90,94	0,20	24,87	-0,66	36,79	1,04	83,09	1,46
145					37,50	4,08 FE			47,50	-3,45 E
148	56,80	1,10	96,50	0,83	26,30	-0,13	36,30	0,89	76,75	0,59
150	59,00	1,53	101,00	1,33	30,00	1,26	37,00	1,10	84,00	1,59
151	50,00	-0,23	86,55	-0,29	23,70	-1,10	35,15	0,55	70,90	-0,22
153	60,00	1,72	112,00	2,57 E	28,50	0,70			74,00	0,21
167	47,00	-0,82	70,50	-2,09 E	24,00	-0,99	29,00	-1,30	67,50	-0,69
182	46,00	-1,01	79,00	-1,14	22,00	-1,74	32,00	-0,40	66,50	-0,83
186	59,40	1,60	97,80	0,97	33,65	2,63 E	33,95	0,19	86,55	1,94
191	42,00	-1,79	71,00	-2,03 E	25,50	-0,43	29,00	-1,30	67,00	-0,76

Laboratory	1,2,4-Trimethylbenzene	Z score	alpha-Pinene	Z score	Benzene	Z score	Cumene	Z score	Ethylbenzene	Z score
192	48,55	-0,51	84,21	-0,55	27,27	0,24			73,03	0,07
206	43,80	-1,44	116,95	3,12 E	28,20	0,59	26,80	-1,96	69,45	-0,42
207	63,50	2,41 E	95,50	0,72	30,00	1,26	38,50	1,55	84,50	1,66
237	45,86	-1,04			18,80	-2,94 E	27,81	-1,65	56,66	-2,19 E
258	51,45	0,05	101,29	1,37	27,41	0,29	56,24	6,87 BE	74,97	0,34
259	53,50	0,45	98,45	1,05	27,40	0,29	34,20	0,26	75,10	0,36
261	50,50	-0,13	80,04	-1,02	22,88	-1,41	31,67	-0,50	68,52	-0,55
267	56,75	1,09	87,45	-0,19	26,40	-0,09	36,35	0,91	72,30	-0,03
503	56,40	1,02	19,00	-7,87 BE	31,50	1,82	36,80	1,04	83,50	1,52
510					30,00	1,26			70,00	-0,34
514	41,00	-1,99	80,50	-0,97	23,00	-1,37	26,00	-2,20 E	62,50	-1,38
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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	37		36		40		35		40	
Mean	51,18		89,12		26,64		33,33		72,50	
Reproducibility s.d.	6,38		14,02		3,64		4,37		9,41	
Rel. reproducibility s.d.	12,47 %		15,73 %		13,67 %		13,10 %		12,98 %	
Reference value	55,60		86,80		27,60		37,30		73,90	
Target s.d.	5,12		8,91		2,66		3,33		7,25	
Rel. target s.d.	10,00 %		10,00 %		10,00 %		10,00 %		10,00 %	
Lower limit of tolerance	40,95		71,29		21,31		26,66		58,00	
Upper limit of tolerance	61,42		106,94		31,97		39,99		86,99	
Type B outliers			1				3			
Type C outliers	3		1				1			
Type F outliers					2					
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	34		34		38		31		40	
Explanation of outlier types										
A: Single outlier	Grubbs									
B: Differing laboratory mean	Grubbs									

Laboratory	1,2,4-Trimethylbenzene Z score	alpha-Pinene Z score	Benzene Z score	Cumene Z score	Ethylbenzene Z score
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-Butyl acetate	Z score	n-Octane	Z score	Toluene	Z score
Unit	µg/m³		µg/m³		µg/m³		µg/m³	
21	101,00	-2,56 E	42,50	1,23	62,50	-0,72	111,00	0,61
30	141,00	0,38	36,50	-0,35	69,50	0,32	108,50	0,37
52	116,35	-1,43	29,00	-2,33 E	54,10	-1,96	88,80	-1,51
55	162,00	1,93	45,00	1,89	84,00	2,48 E	129,50	2,38 E
60	126,35	-0,70	33,55	-1,13 C	64,20	-0,46	105,10	0,05
65	146,05	0,76	40,54	0,72	70,17	0,42	111,40	0,65
68	128,75	-0,52	38,60	0,20	64,70	-0,39	91,65	-1,24
79	125,00	-0,79	32,00	-1,54	71,50	0,62	100,00	-0,44
85	137,80	0,15	40,10	0,60	69,50	0,32	109,20	0,44
86	128,30	-0,55	36,79	-0,28	59,61	-1,15	96,88	-0,74
87	138,41	0,19	41,63	1,00	61,01	-0,94	109,00	0,42
93	89,46	-3,41 E	38,82	0,26	76,75	1,40		
94	129,10	-0,49	37,80	-0,01	61,70	-0,84	104,10	-0,05
96	149,10	0,98	28,55	-2,45 E	66,30	-0,15	111,15	0,62
99	146,38	0,78	20,93	-4,47 FE	89,95	3,36 E	116,59	1,14
102	125,88	-0,73	36,86	-0,26	59,83	-1,11	96,56	-0,77
103	129,33	-0,48	34,51	-0,88	69,33	0,30	100,78	-0,37
105	57,00	-5,80 BE					96,00	-0,82
108	153,00	1,27 C	43,75	1,56 C	71,55	0,63 C	117,50	1,23 C
119	151,76	1,18	38,75	0,24 C	62,56	-0,71	111,97	0,70
145							85,00	-1,88
148	139,50	0,27	45,10	1,92	70,35	0,45	108,00	0,32
150	160,00	1,78	45,00	1,89	81,00	2,03 E	120,00	1,47
151	134,35	-0,11	38,60	0,20	66,25	-0,16	101,95	-0,26
153	160,00	1,78	52,00	3,74 FE			128,50	2,28 E
167	132,50	-0,24	38,50	0,18	70,00	0,40	102,50	-0,20
182	125,00	-0,79	34,00	-1,01	66,50	-0,12	92,50	-1,16
186	143,50	0,57	28,40	-2,49 E	53,55	-2,05 E	95,20	-0,90
191	123,00	-0,94	35,00	-0,75	62,50	-0,72	102,50	-0,20
192	142,05	0,46	38,70	0,23	80,42	1,95	107,33	0,26
206	134,35	-0,11	34,00	-1,01	64,60	-0,40	96,95	-0,73
207	159,50	1,75	44,00	1,63	80,50	1,96	119,50	1,42
237	135,01	-0,06			44,33	-3,42 E	83,23	-2,04 E
258	141,00	0,38	38,55	0,19	68,54	0,18	104,29	-0,03

Laboratory	m-Xylene	Z score	n-Butyl acetate	Z score	n-Octane	Z score	Toluene	Z score
259	142,00	0,46	49,45	3,07 E	70,85	0,52		
261	131,48	-0,32	38,59	0,20	63,30	-0,60	97,32	-0,70
267	142,00	0,46	39,10	0,33	67,80	0,07	108,00	0,32
503	159,95	1,78	15,55	-5,89 BE	68,65	0,20	118,35	1,31
510							105,00	0,04
514	120,50	-1,13	33,00	-1,28	64,00	-0,49	103,00	-0,16
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Method	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	
No. of laboratories that submitted results	38		36		36		38	
Mean	135,79		37,83		67,32		104,63	
Reproducibility s.d.	16,03		5,15		8,95		10,82	
Rel. reproducibility s.d.	11,80 %		13,60 %		13,29 %		10,34 %	
Reference value	133,70		41,90		68,10		103,60	
Target s.d.	13,58		3,78		6,73		10,46	
Rel. target s.d.	10,00 %		10,00 %		10,00 %		10,00 %	
Lower limit of tolerance	108,63		30,27		53,86		83,70	
Upper limit of tolerance	162,94		45,40		80,79		125,55	
Type B outliers	1		1					
Type C outliers	1		3		1		1	
Type F outliers			2					
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	36		30		35		37	

Summary of laboratory means

Sample 2

Laboratory	1,2,4-Trimethylbenzene	Z score	alpha-Pinene	Z score	Benzene	Z score	Cumene	Z score	Ethylbenzene	Z score
Unit	µg/m³		µg/m³		µg/m³		µg/m³		µg/m³	
21	27,00	0,15	65,00	-0,27 C	68,00	0,91	28,50	-1,10	47,50	1,22
30	28,50	0,72	63,00	-0,57	54,50	-1,26	33,00	0,30	42,50	0,04
52	22,15	-1,67	51,05	-2,35 E	56,50	-0,94	27,15	-1,52	37,70	-1,10
55	30,50	1,47	70,50	0,56	66,00	0,58	36,50	1,40	47,50	1,22
60	27,60	0,38	62,55	-0,63	66,95	0,74	51,45	6,06 FE	44,00	0,39
65	33,23	2,50 E	80,63	2,08 E	66,49	0,66	38,78	2,11 E	49,92	1,79
68	26,20	-0,15	62,95	-0,57	53,40	-1,44	29,65	-0,74	38,95	-0,80
79	24,50	-0,79	65,50	-0,19	66,50	0,67	32,50	0,15	39,50	-0,67
85	26,55	-0,02	67,85	0,16	62,45	0,02	32,40	0,12	43,55	0,29
86	25,56	-0,39	57,86	-1,33	54,33	-1,29	29,28	-0,86	39,42	-0,69
87	20,52	-2,28 E	52,02	-2,21 E	58,77	-0,58	23,47	-2,67 E	38,05	-1,01
93	30,27	1,38	96,83	4,50 FE	78,30	2,56 E	35,73	1,16	54,06	2,77 CE
94	28,95	0,88	71,75	0,75	70,10	1,24	34,10	0,65	44,35	0,47
96	34,55	2,99 E	81,50	2,21 E	60,35	-0,32	41,85	3,07 E	53,55	2,65 E
99	22,89	-1,39	79,83	1,95	76,31	2,24 E	38,50	2,02 E	41,15	-0,28
102	22,78	-1,44	59,26	-1,13	54,32	-1,29	31,76	-0,08	37,31	-1,19
103	23,91	-1,01	56,27	-1,57	74,39	1,93	27,48	-1,42	39,42	-0,69
105					43,00	-3,10 E			33,50	-2,09 E
108	30,45	1,45	72,55	0,87	69,80	1,19	35,45	1,07	50,55	1,94
119	31,06	1,68	68,46	0,25	59,71	-0,42	35,97	1,23	47,05	1,11
145					51,60	-1,72			31,95	-2,45 E
148	29,55	1,11	74,80	1,20	61,70	-0,10	34,95	0,91	46,30	0,94
150	32,00	2,03 E	80,00	1,98	78,00	2,51 E	37,00	1,55	52,00	2,28 E
151	25,70	-0,34	68,50	0,26	57,80	-0,73	33,65	0,51	41,55	-0,19
153	30,00	1,28	83,00	2,43 E	72,00	1,55 C			42,00	-0,08
167	23,50	-1,16	53,00	-2,06 E	60,00	-0,38	28,00	-1,26	38,50	-0,91
182	24,00	-0,98	62,50	-0,64	49,50	-2,06 E	32,00	-0,01	40,00	-0,55
186	29,50	1,09	66,50	-0,04	73,75	1,83	30,20	-0,57	51,00	2,05 E
191	22,00	-1,73	52,50	-2,14 E	60,50	-0,30	28,00	-1,26	39,50	-0,67

Laboratory	1,2,4-Trimethylbenzene	Z score	alpha-Pinene	Z score	Benzene	Z score	Cumene	Z score	Ethylbenzene	Z score
192	24,22	-0,89	63,35	-0,51	66,08	0,60			42,67	0,08
206	21,05	-2,09 E	85,85	2,86 E	69,30	1,11	25,95	-1,90	39,90	-0,58
207	32,00	2,03 E	71,00	0,63	69,50	1,15	36,00	1,24	48,00	1,34
237	19,20	-2,78 E			43,47	-3,03 E	25,85	-1,93	29,59	-3,01 E
258	24,55	-0,77	70,54	0,56	60,74	-0,26	50,05	5,63 FE	40,55	-0,42
259	30,55	1,49	80,20	2,01 E	70,55	1,31	33,60	0,49	47,55	1,23
261	24,69	-0,72	58,17	-1,29	54,84	-1,21	29,75	-0,71	38,91	-0,81
267	27,65	0,40	56,70	-1,51	60,00	-0,38	32,60	0,18	41,40	-0,22
503	28,95	0,88	21,60	-6,77 CE	74,35	1,92	35,25	1,01	49,75	1,75
510					59,25	-0,50			44,45	0,50
514	20,50	-2,29 E	60,00	-1,01	58,50	-0,62	24,50	-2,35 E	35,00	-1,73
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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	37		36		40		35		40	
Mean	26,60		66,77		62,35		32,03		42,34	
Reproducibility s.d.	3,97		9,95		8,82		4,46		5,59	
Rel. reproducibility s.d.	14,94 %		14,90 %		14,14 %		13,91 %		13,20 %	
Reference value	31,60		66,90		62,80		36,00		45,50	
Target s.d.	2,66		6,68		6,24		3,20		4,23	
Rel. target s.d.	10,00 %		10,00 %		10,00 %		10,00 %		10,00 %	
Lower limit of tolerance	21,28		53,42		49,88		25,62		33,87	
Upper limit of tolerance	31,92		80,13		74,82		38,43		50,81	
Type B outliers										
Type C outliers			2		1				1	
Type F outliers			1				2			
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	37		33		39		33		39	
Explanation of outlier types										
A: Single outlier	Grubbs									
B: Differing laboratory mean	Grubbs									

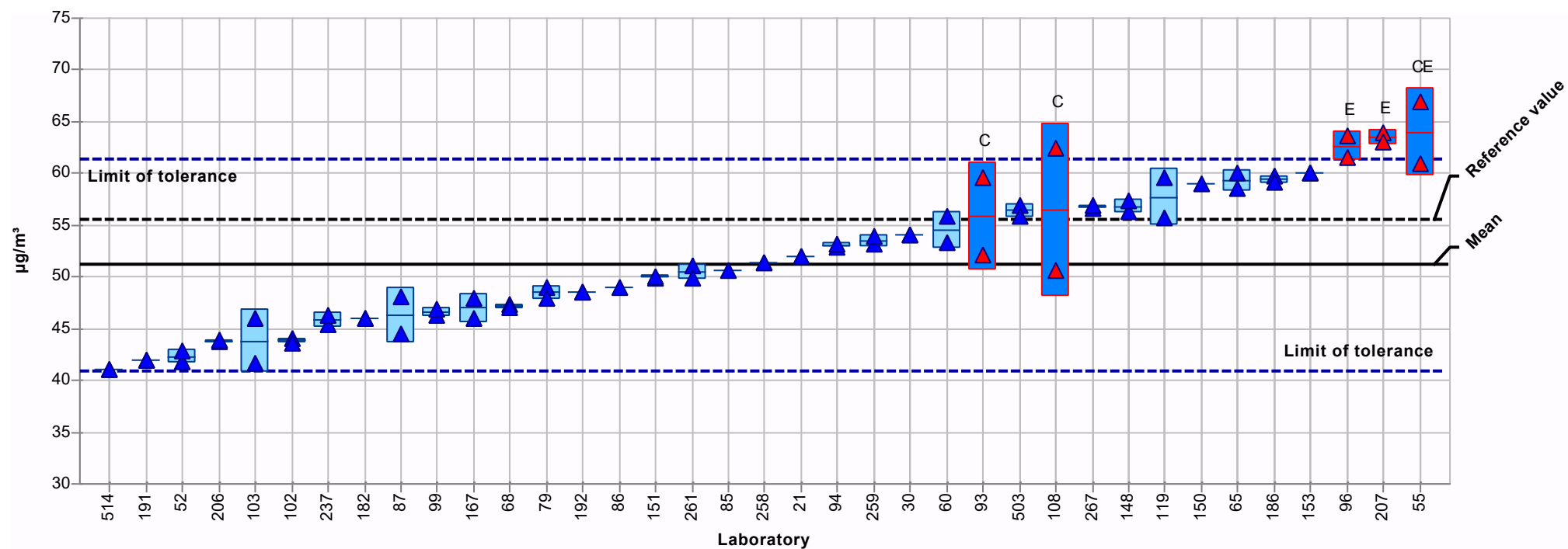
Laboratory	1,2,4-Trimethylbenzene Z score	alpha-Pinene Z score	Benzene Z score	Cumene Z score	Ethylbenzene Z score
C: Excessive laboratory s.d.	Cochran				
D: Excluded manually					
E: mean outside tolerance limits					
F: Z-Score >3,50					

Laboratory	m-Xylene	Z score	n-Butyl acetate	Z score	n-Octane	Z score	Toluene	Z score
Unit	µg/m³		µg/m³		µg/m³		µg/m³	
21	98,50	0,98	133,50	-0,21	112,00	-1,53	54,50	0,91
30	91,00	0,15	154,50	1,33	138,50	0,47	50,00	0,01
52	76,50	-1,47	106,90	-2,16 E	112,95	-1,46	44,40	-1,11
55	100,00	1,15	167,00	2,25 E	155,50	1,76	57,00	1,42
60	87,50	-0,24	135,95	-0,03 C	132,75	0,04	53,30	0,67
65	101,26	1,29	143,83	0,55	146,38	1,07	58,80	1,78
68	84,70	-0,56	122,25	-1,03	119,65	-0,95	40,55	-1,88
79	84,00	-0,63	125,00	-0,83	145,00	0,97	49,50	-0,09
85	90,50	0,09	146,15	0,72	143,65	0,86	63,05	2,63 CE
86	82,88	-0,76	134,59	-0,13	120,34	-0,90	46,53	-0,68
87	78,19	-1,28	125,59	-0,79	108,12	-1,82	42,55	-1,48
93	103,97	1,59	104,05	-2,37 E	98,68	-2,54 E		
94	86,90	-0,31	125,25	-0,81	120,50	-0,89	55,20	1,06
96	104,45	1,65	106,20	-2,21 E	135,60	0,25	58,20	1,66
99	85,52	-0,46	137,14	0,06	188,31	4,24 FE	51,99	0,41
102	81,60	-0,90	133,95	-0,18	123,11	-0,69	47,23	-0,54
103	86,38	-0,37	162,75	1,94	175,66	3,28 E	58,54	1,72
105	34,00	-6,21 BE					44,50	-1,09
108	103,00	1,48	159,00	1,66	152,00	1,49	58,70	1,76
119	93,86	0,47	149,30	0,95	129,00	-0,24	52,68	0,55
145							46,65	-0,66
148	92,90	0,36	151,50	1,11	135,50	0,25	53,20	0,65
150	105,00	1,71	170,00	2,47 E	170,00	2,86 E	59,00	1,82
151	85,30	-0,49	137,35	0,07	131,25	-0,07	48,25	-0,34
153	98,00	0,93	218,50	6,02 CE			58,00	1,62
167	83,00	-0,75	136,50	0,01	136,00	0,28	47,50	-0,49
182	81,50	-0,91	116,00	-1,49	127,50	-0,36	44,00	-1,19
186	89,85	0,02	98,45	-2,78 E	101,85	-2,30 E	39,75	-2,04 E
191	81,00	-0,97	126,50	-0,72	123,00	-0,70	49,50	-0,09
192	90,70	0,11	146,92	0,77	166,26	2,57 E	50,15	0,04
206	84,65	-0,56	146,15	0,72	134,30	0,16	45,00	-0,99
207	99,50	1,09	150,50	1,04	151,50	1,46	57,00	1,42
237	81,17	-0,95			97,11	-2,66 E	36,08	-2,77 E
258	82,97	-0,75	138,23	0,14	135,47	0,24	45,11	-0,97

Laboratory	m-Xylene	Z score	n-Butyl acetate	Z score	n-Octane	Z score	Toluene	Z score
259	98,25	0,96	174,50	2,80 E	147,00	1,12		
261	84,25	-0,61	135,49	-0,06	126,24	-0,45	45,30	-0,93
267	85,40	-0,48	124,35	-0,88	128,00	-0,32	43,30	-1,33
503	104,80	1,69	93,85	-3,12 CE	135,70	0,26	58,70	1,76
510							54,35	0,88
514	77,00	-1,41	127,00	-0,69	131,00	-0,09	47,00	-0,59
-	-	--	-	--	-	--	-	--
Method	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	
No. of laboratories that submitted results	38		36		36		38	
Mean	89,68		136,35		132,23		49,93	
Reproducibility s.d.	8,68		18,84		18,43		6,31	
Rel. reproducibility s.d.	9,68 %		13,82 %		13,93 %		12,64 %	
Reference value	87,70		141,40		132,70		51,90	
Target s.d.	8,97		13,64		13,22		4,99	
Rel. target s.d.	10,00 %		10,00 %		10,00 %		10,00 %	
Lower limit of tolerance	71,75		109,08		105,79		39,95	
Upper limit of tolerance	107,62		163,62		158,68		59,92	
Type B outliers	1							
Type C outliers			3				1	
Type F outliers					1			
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	37		33		35		37	

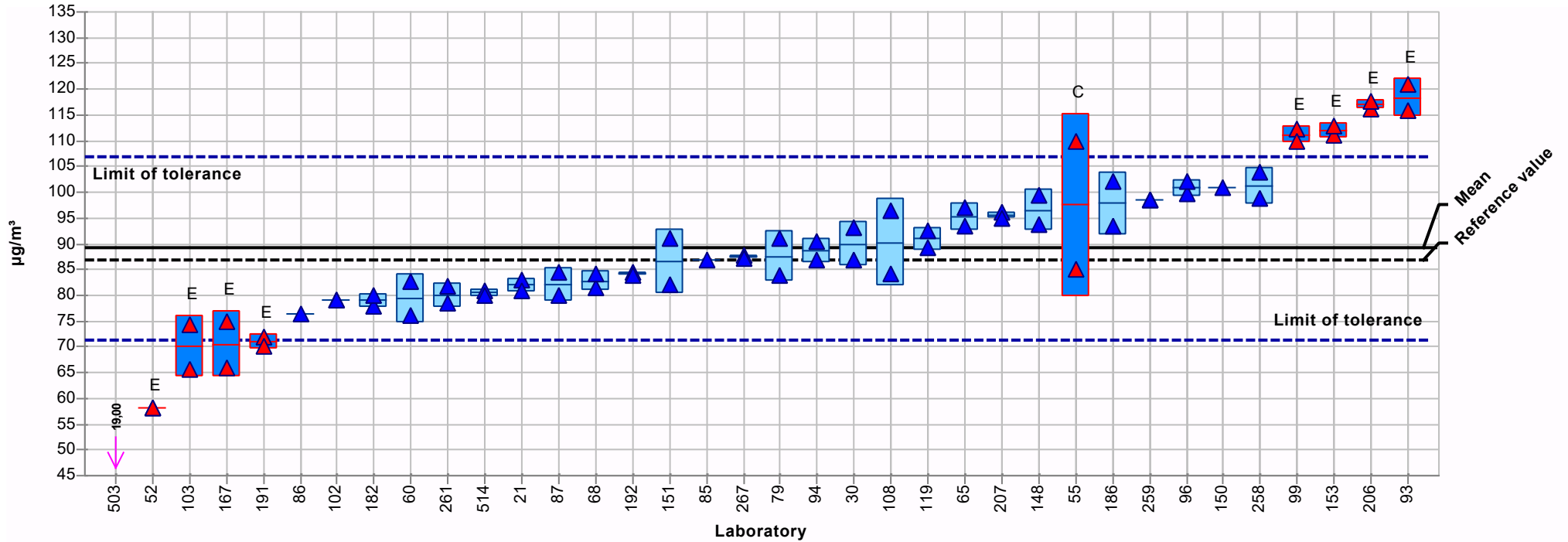
Summary results

Sample:	1	Mean:	51,18 µg/m ³
Measurand:	1,2,4-Trimethylbenzene	Reproducibility s.d.:	6,38 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	12,47%
Rel. target s.d.:	10,00%	Reference value:	55,60 µg/m ³
Number of laboratories in calculation + outliers:	37	Range of tolerance:	40,95 - 61,42 µg/m ³ (Z-Score <= 2,00)



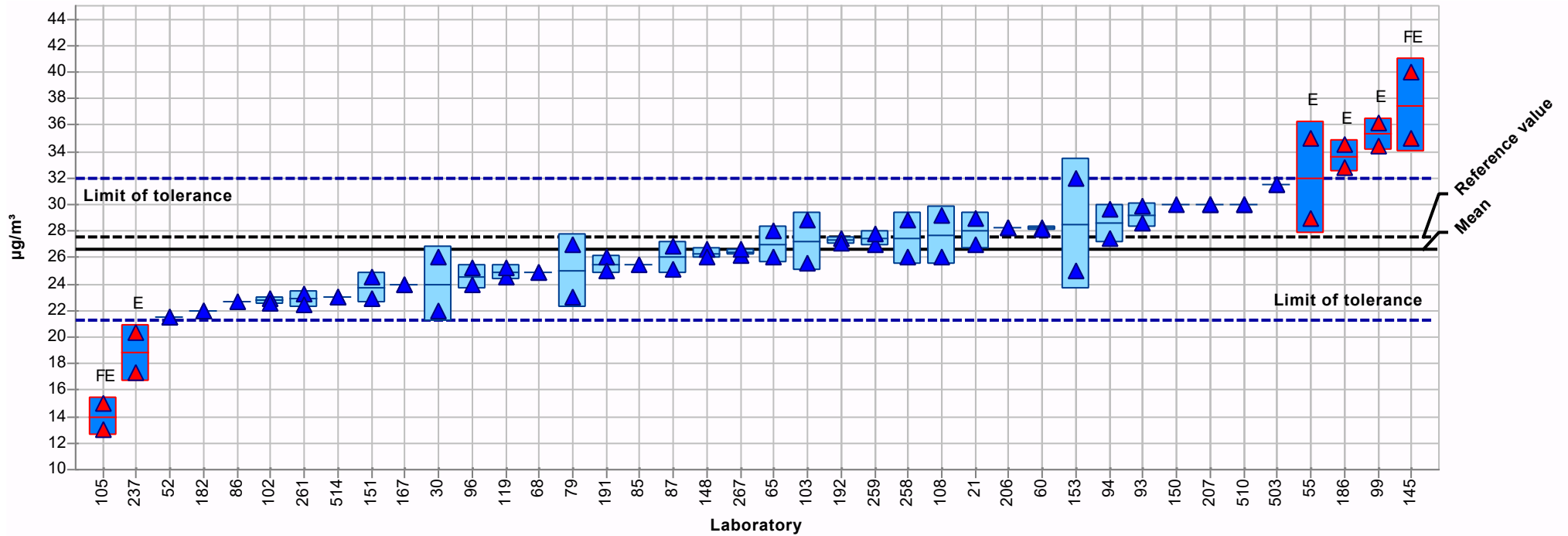
Summary results

Sample:	1	Mean:	89,12 µg/m ³
Measurand:	alpha-Pinene	Reproducibility s.d.:	14,02 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	15,73%
Rel. target s.d.:	10,00%	Reference value:	86,80 µg/m ³
Number of laboratories in calculation + outliers:	36	Range of tolerance:	71,29 - 106,94 µg/m ³ (Z-Score <= 2,00)



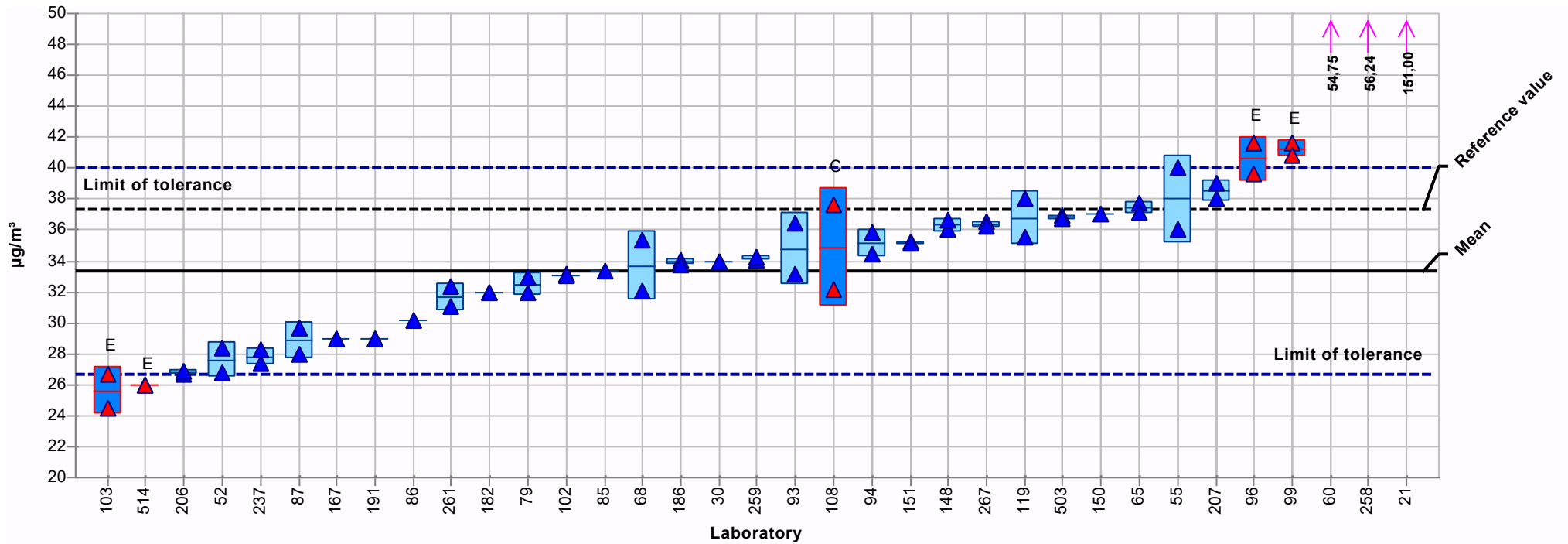
Summary results

Sample:	1	Mean:	26,64 µg/m ³
Measurand:	Benzene	Reproducibility s.d.:	3,64 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13,67%
Rel. target s.d.:	10,00%	Reference value:	27,60 µg/m ³
Number of laboratories in calculation:	38	Range of tolerance:	21,31 - 31,97 µg/m ³ (Z-Score <= 2,00)



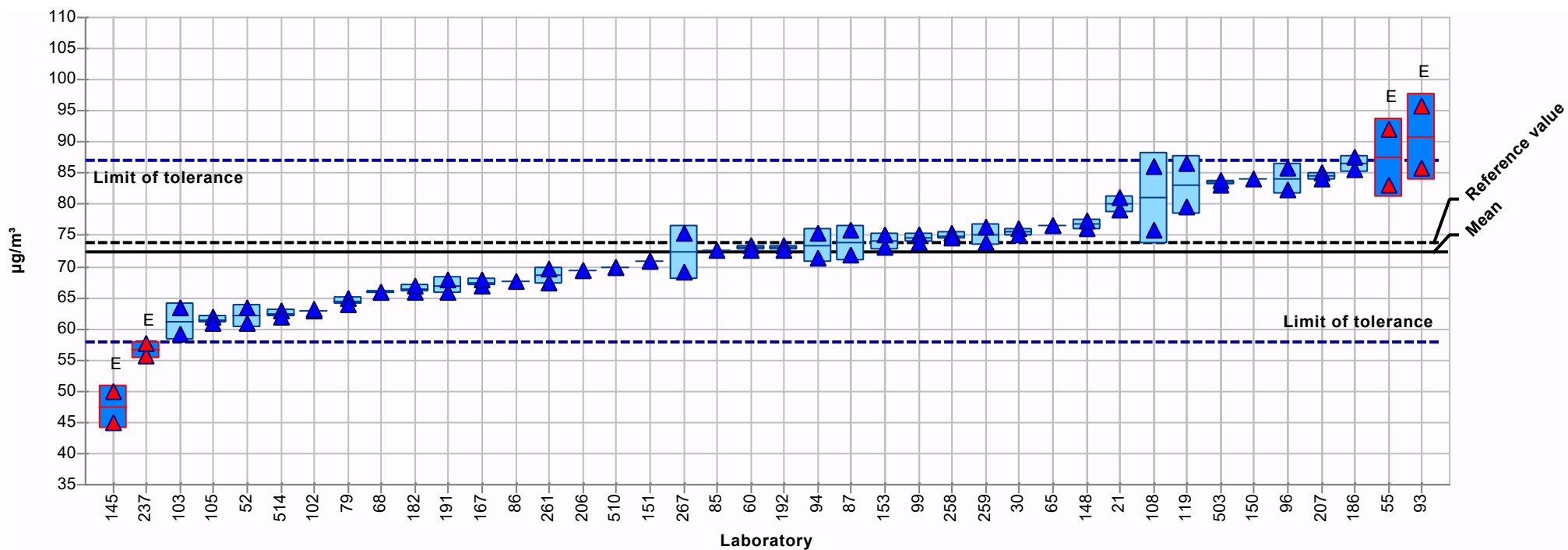
Summary results

Sample:	1	Mean:	33,33 µg/m ³
Measurand:	Cumene	Reproducibility s.d.:	4,37 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13,10%
Rel. target s.d.:	10,00%	Reference value:	37,30 µg/m ³
Number of laboratories in calculation + outliers:	35	Range of tolerance:	26,66 - 39,99 µg/m ³ (Z-Score <= 2,00)



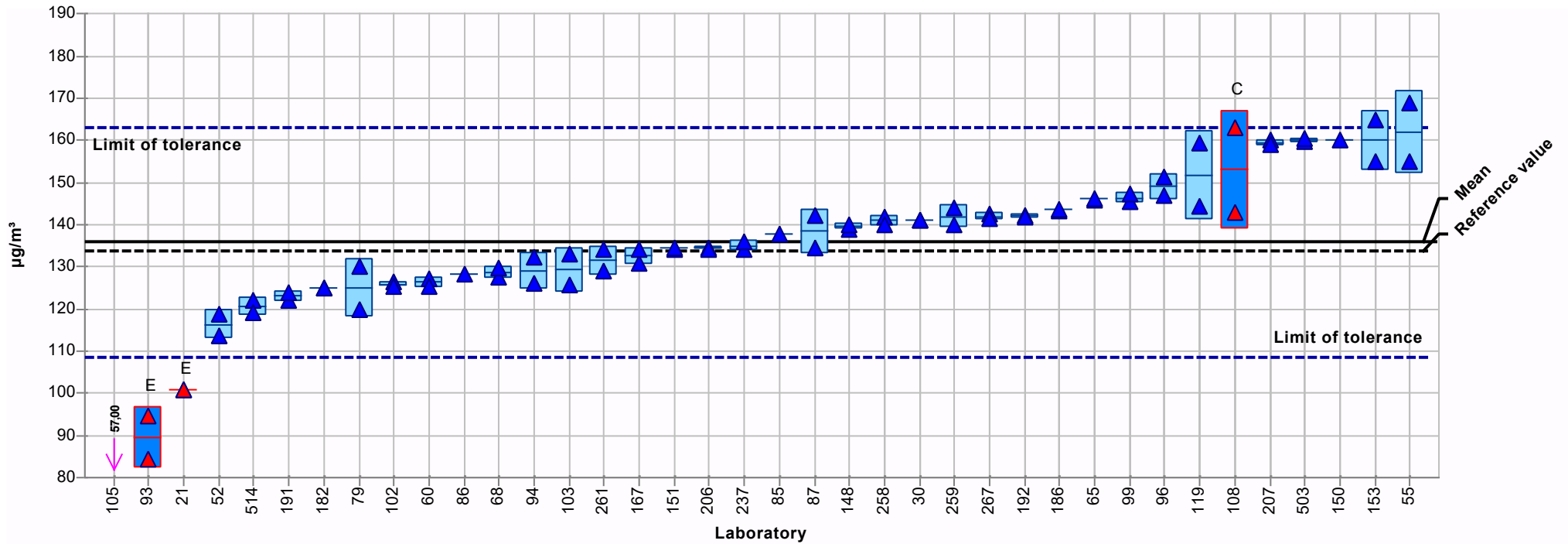
Summary results

Sample:	1	Mean:	72,50 µg/m³
Measurand:	Ethylbenzene	Reproducibility s.d.:	9,41 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	12,98%
Rel. target s.d.:	10,00%	Reference value:	73,90 µg/m³
Number of laboratories in calculation:	40	Range of tolerance:	58,00 - 86,99 µg/m³ (Z-Score <= 2,00)



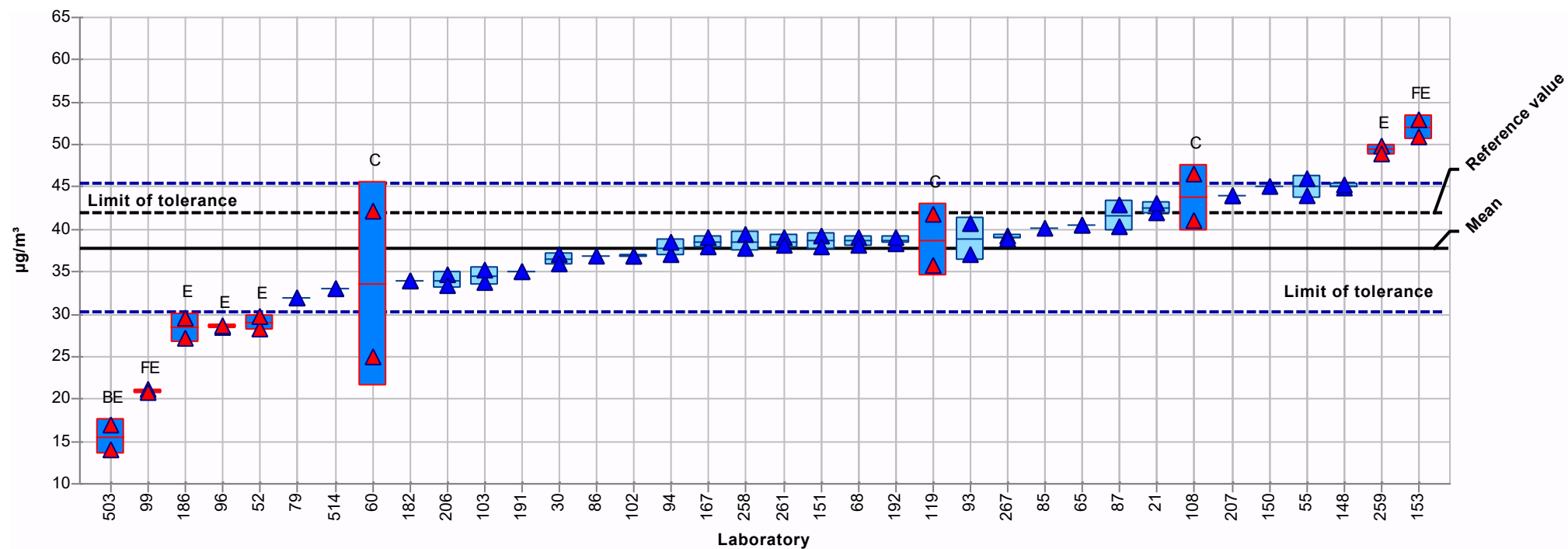
Summary results

Sample:	1	Mean:	135,79 µg/m ³
Measurand:	m-Xylene	Reproducibility s.d.:	16,03 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	11,80%
Rel. target s.d.:	10,00%	Reference value:	133,70 µg/m ³
Number of laboratories in calculation + outliers:	38	Range of tolerance:	108,63 - 162,94 µg/m ³ (Z-Score ≤ 2,00)



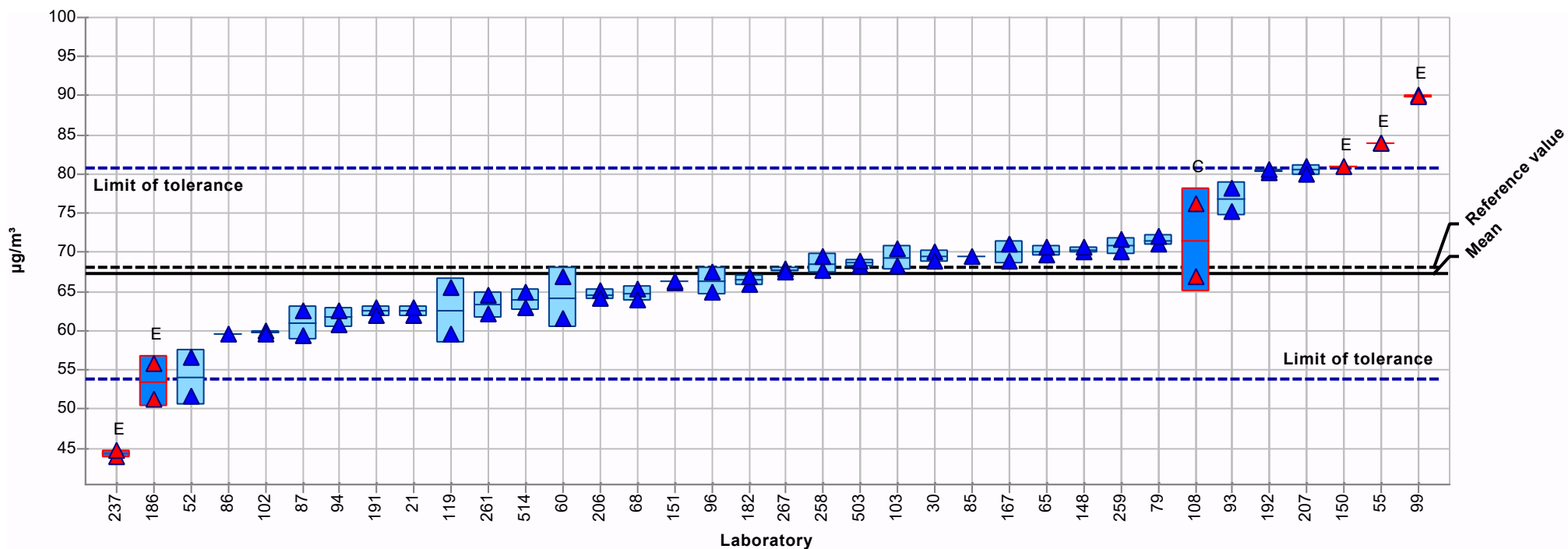
Summary results

Sample:	1	Mean:	37,83 µg/m ³
Measurand:	n-Butyl acetate	Reproducibility s.d.:	5,15 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13,60%
Rel. target s.d.:	10,00%	Reference value:	41,90 µg/m ³
Number of laboratories in calculation + outliers:	34	Range of tolerance:	30,27 - 45,40 µg/m ³ (Z-Score <= 2,00)



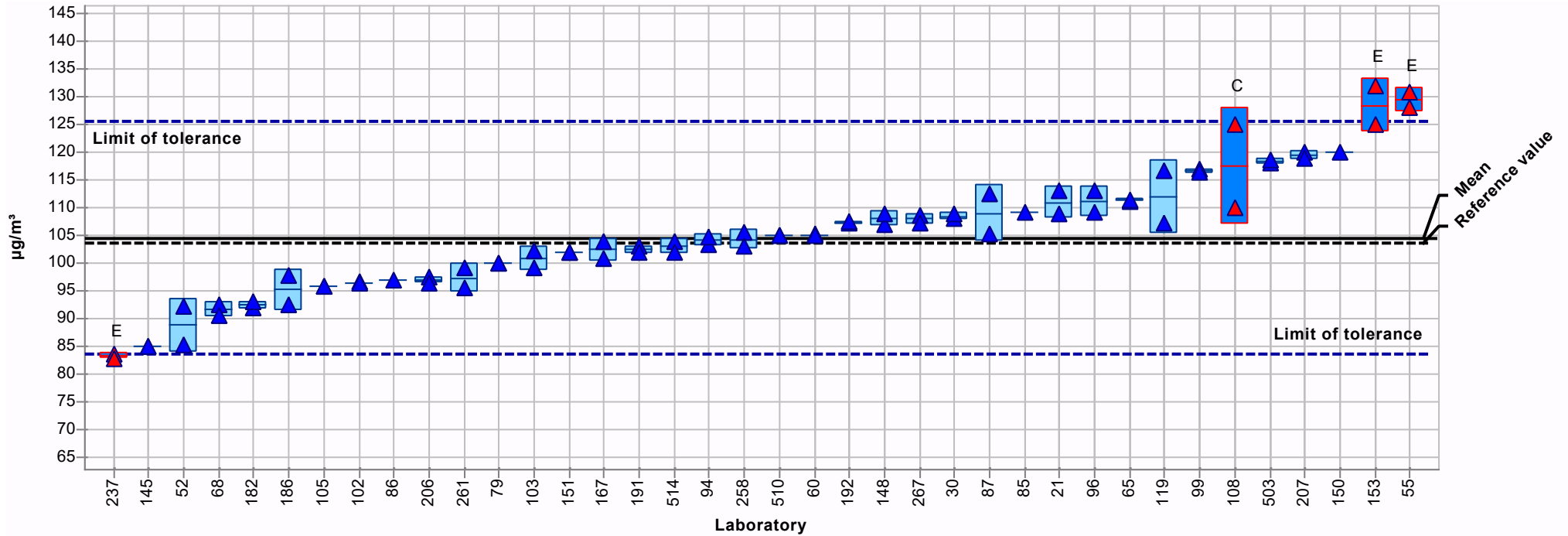
Summary results

Sample:	1	Mean:	67,32 µg/m ³
Measurand:	n-Octane	Reproducibility s.d.:	8,95 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13,29%
Rel. target s.d.:	10,00%	Reference value:	68,10 µg/m ³
Number of laboratories in calculation + outliers:	36	Range of tolerance:	53,86 - 80,79 µg/m ³ (Z-Score <= 2,00)



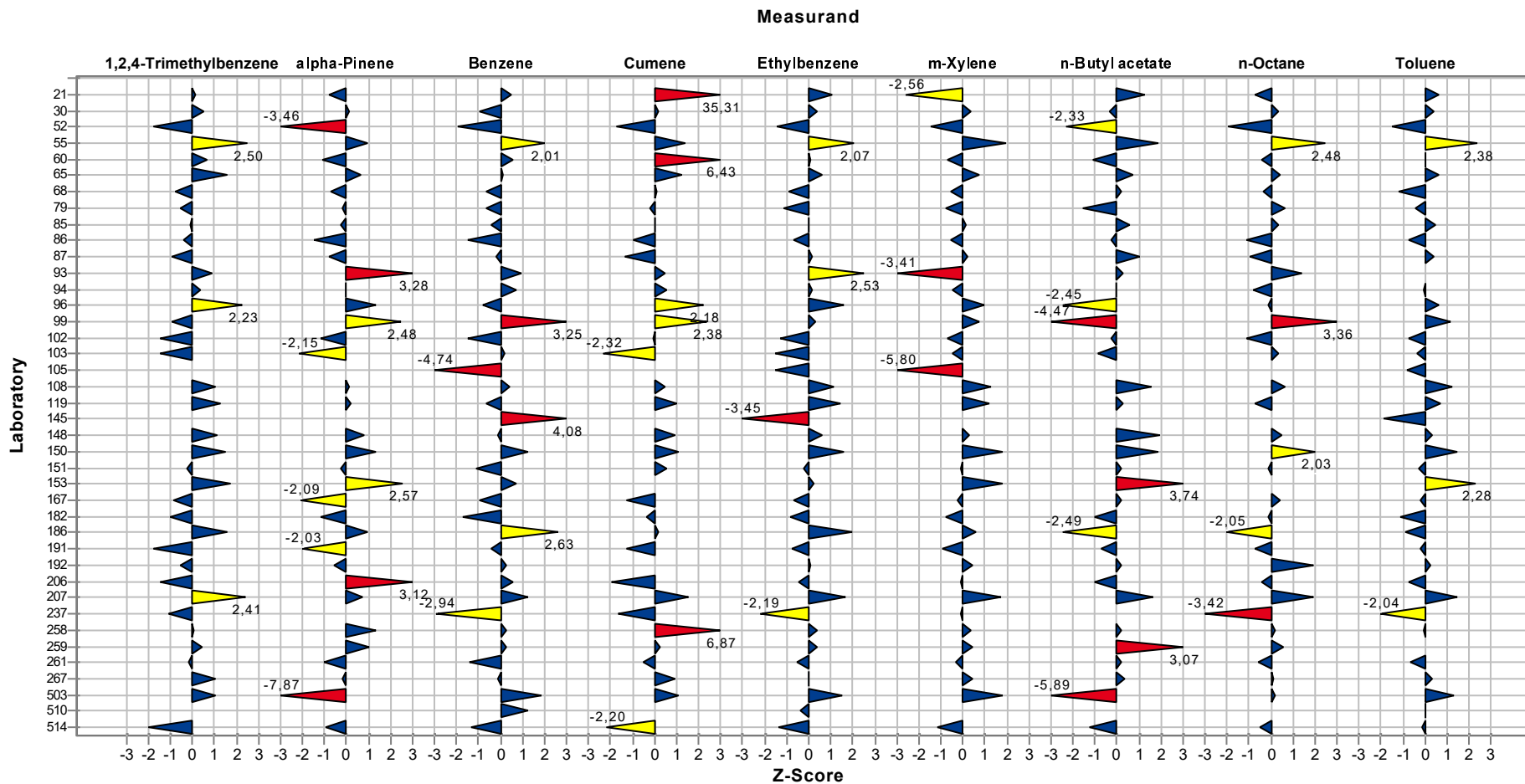
Summary results

Sample:	1	Mean:	104,63 µg/m ³
Measurand:	Toluene	Reproducibility s.d.:	10,82 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	10,34%
Rel. target s.d.:	10,00%	Reference value:	103,60 µg/m ³
Number of laboratories in calculation + outliers:	38	Range of tolerance:	83,70 - 125,55 µg/m ³ (Z-Score ≤ 2,00)



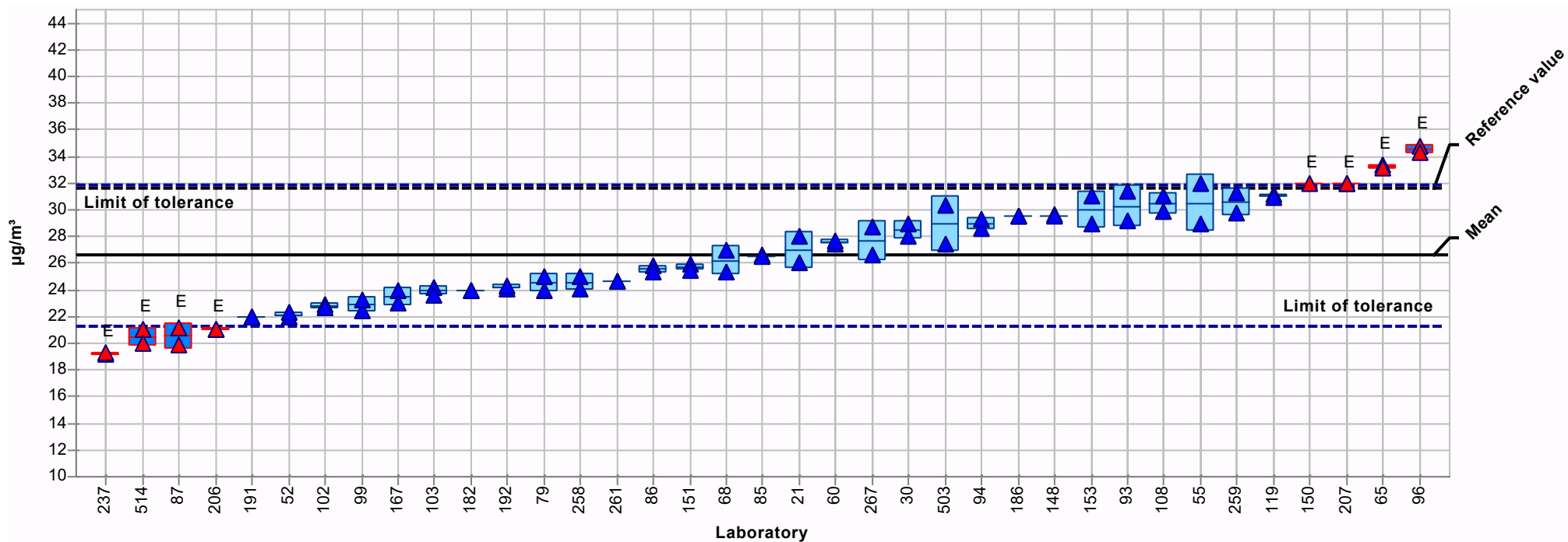
Sample chart of Z-Scores

Sample: 1



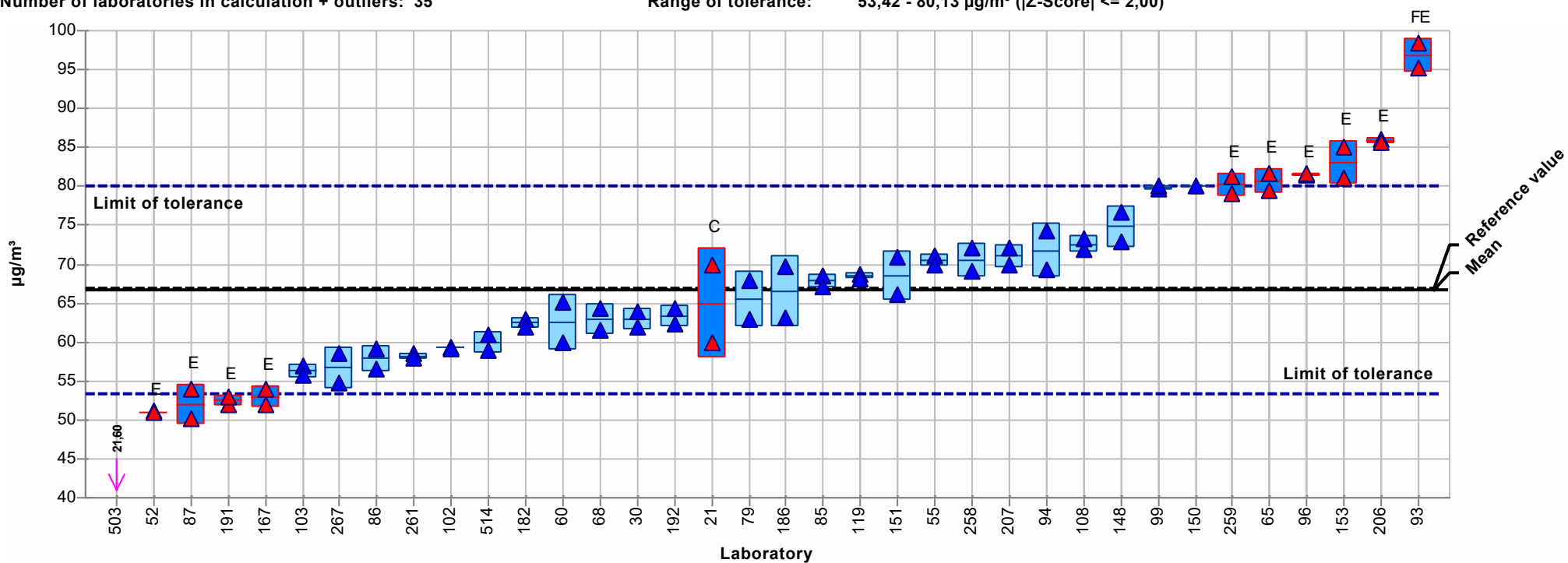
Summary results

Sample:	2	Mean:	26,60 µg/m ³
Measurand:	1,2,4-Trimethylbenzene	Reproducibility s.d.:	3,97 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	14,94%
Rel. target s.d.:	10,00%	Reference value:	31,60 µg/m ³
Number of laboratories in calculation:	37	Range of tolerance:	21,28 - 31,92 µg/m ³ (Z-Score <= 2,00)



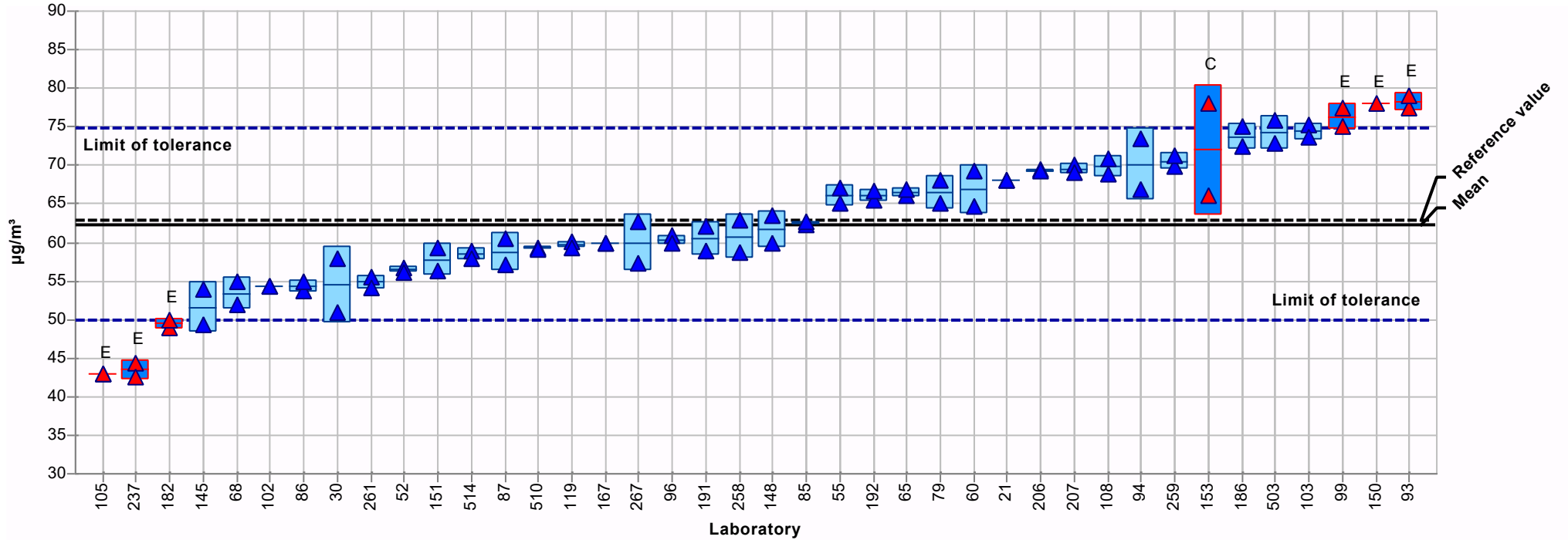
Summary results

Sample:	2	Mean:	66,77 µg/m ³
Measurand:	alpha-Pinene	Reproducibility s.d.:	9,95 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	14,90%
Rel. target s.d.:	10,00%	Reference value:	66,90 µg/m ³
Number of laboratories in calculation + outliers:	35	Range of tolerance:	53,42 - 80,13 µg/m ³ (Z-Score <= 2,00)



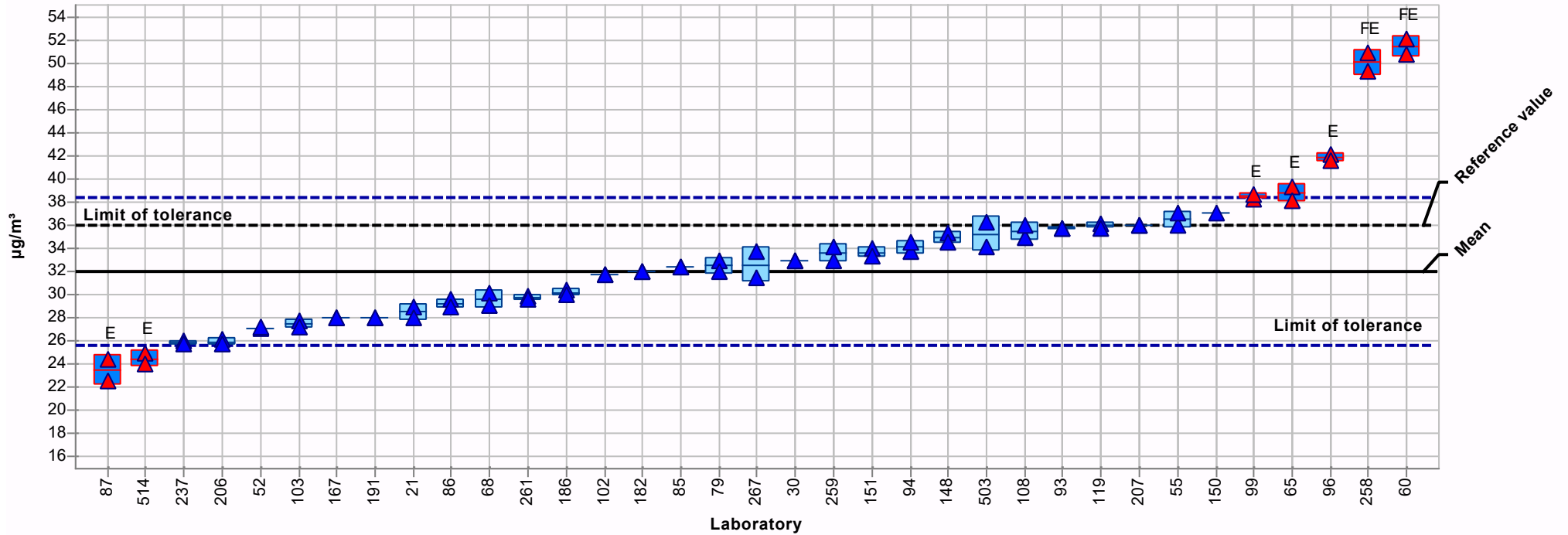
Summary results

Sample:	2	Mean:	62,35 µg/m ³
Measurand:	Benzene	Reproducibility s.d.:	8,82 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	14,14%
Rel. target s.d.:	10,00%	Reference value:	62,80 µg/m ³
Number of laboratories in calculation + outliers:	40	Range of tolerance:	49,88 - 74,82 µg/m ³ (Z-Score <= 2,00)



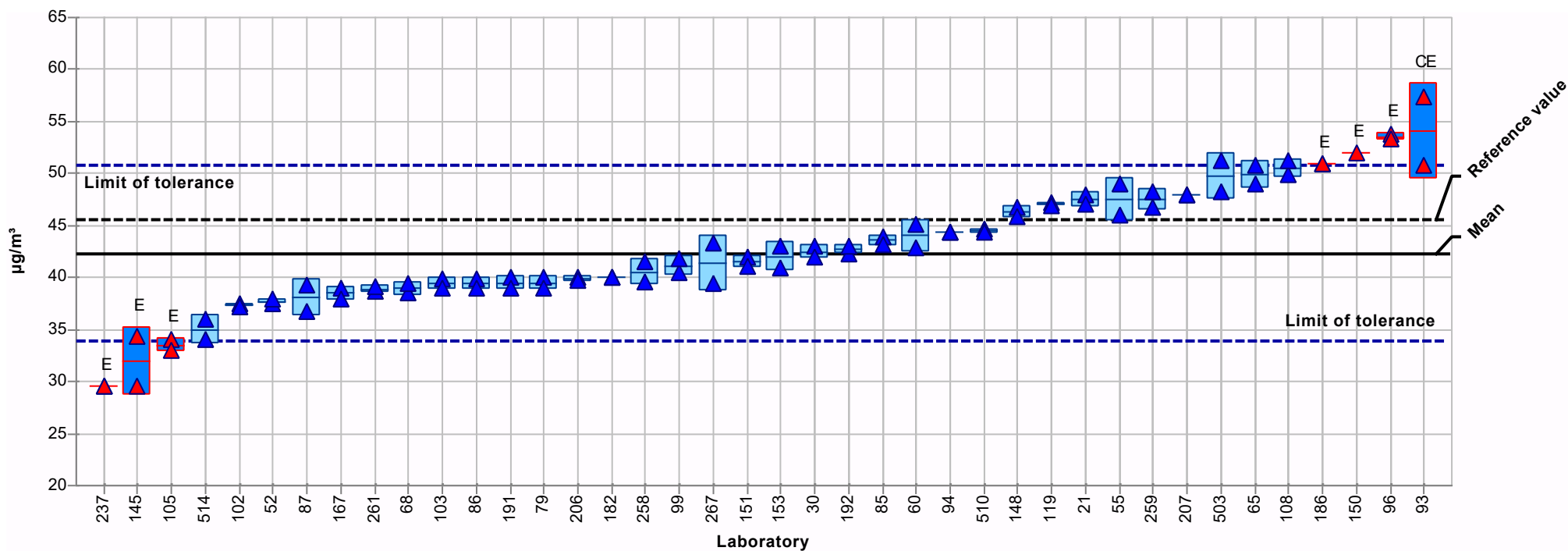
Summary results

Sample:	2	Mean:	32,03 µg/m ³
Measurand:	Cumene	Reproducibility s.d.:	4,46 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13,91%
Rel. target s.d.:	10,00%	Reference value:	36,00 µg/m ³
Number of laboratories in calculation:	33	Range of tolerance:	25,62 - 38,43 µg/m ³ (Z-Score <= 2,00)



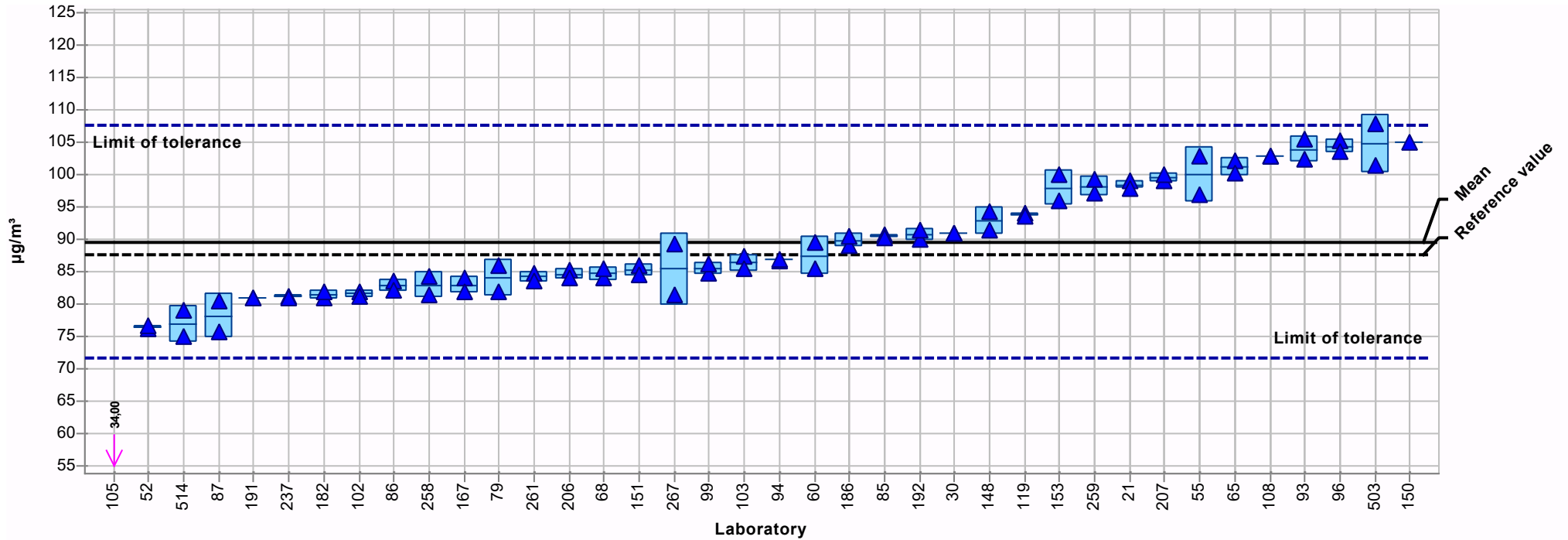
Summary results

Sample:	2	Mean:	42,34 µg/m ³
Measurand:	Ethylbenzene	Reproducibility s.d.:	5,59 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13,20%
Rel. target s.d.:	10,00%	Reference value:	45,50 µg/m ³
Number of laboratories in calculation + outliers:	40	Range of tolerance:	33,87 - 50,81 µg/m ³ (Z-Score <= 2,00)



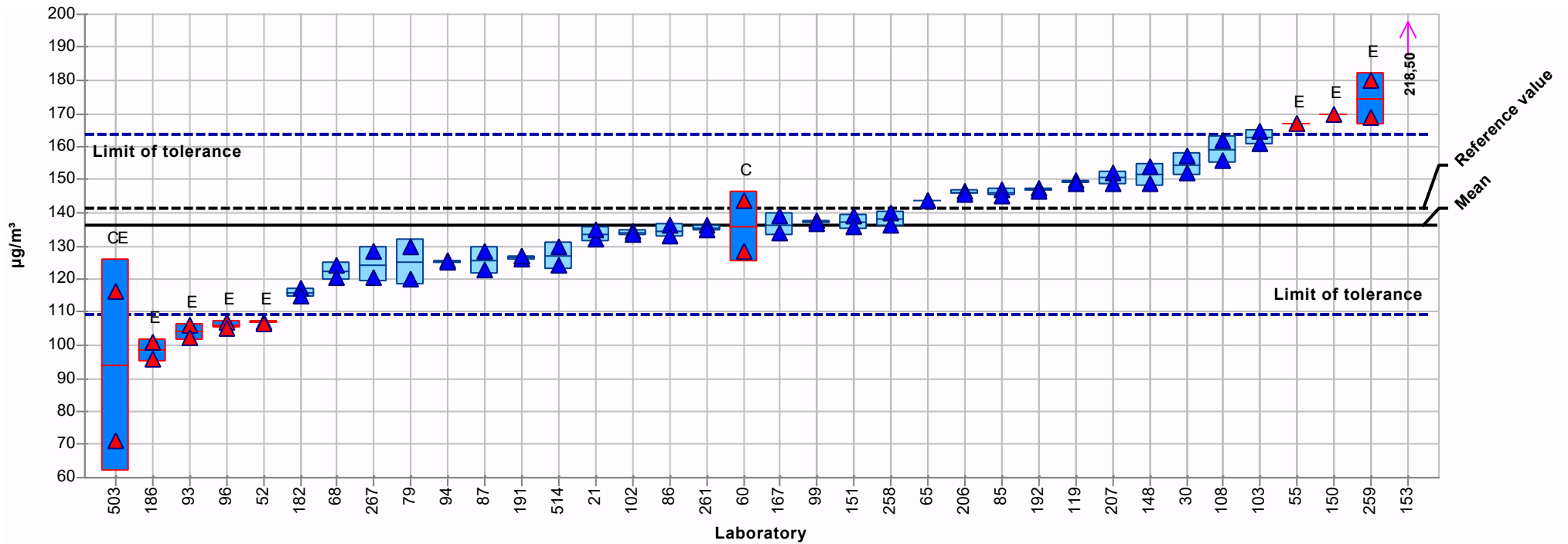
Summary results

Sample:	2	Mean:	89,68 µg/m ³
Measurand:	m-Xylene	Reproducibility s.d.:	8,68 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	9,68%
Rel. target s.d.:	10,00%	Reference value:	87,70 µg/m ³
Number of laboratories in calculation + outliers:	38	Range of tolerance:	71,75 - 107,62 µg/m ³ (Z-Score ≤ 2,00)



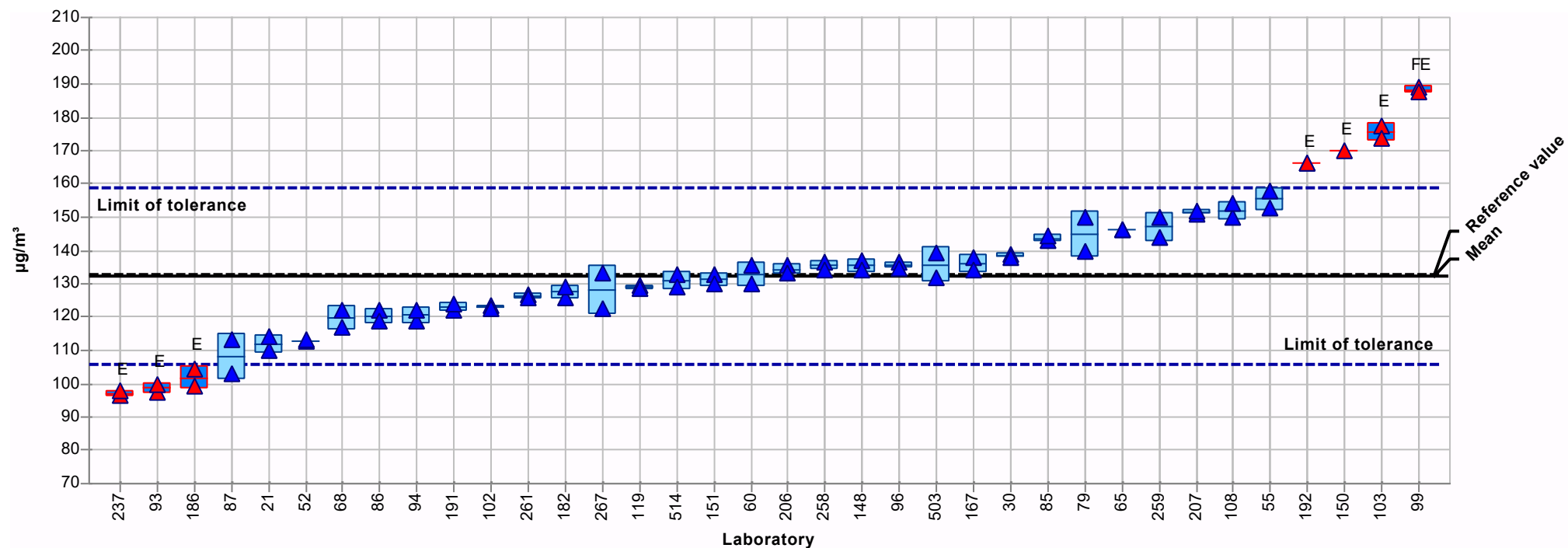
Summary results

Sample:	2	Mean:	136,35 µg/m ³
Measurand:	n-Butyl acetate	Reproducibility s.d.:	18,84 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13,82%
Rel. target s.d.:	10,00%	Reference value:	141,40 µg/m ³
Number of laboratories in calculation + outliers:	36	Range of tolerance:	109,08 - 163,62 µg/m ³ (Z-Score ≤ 2,00)



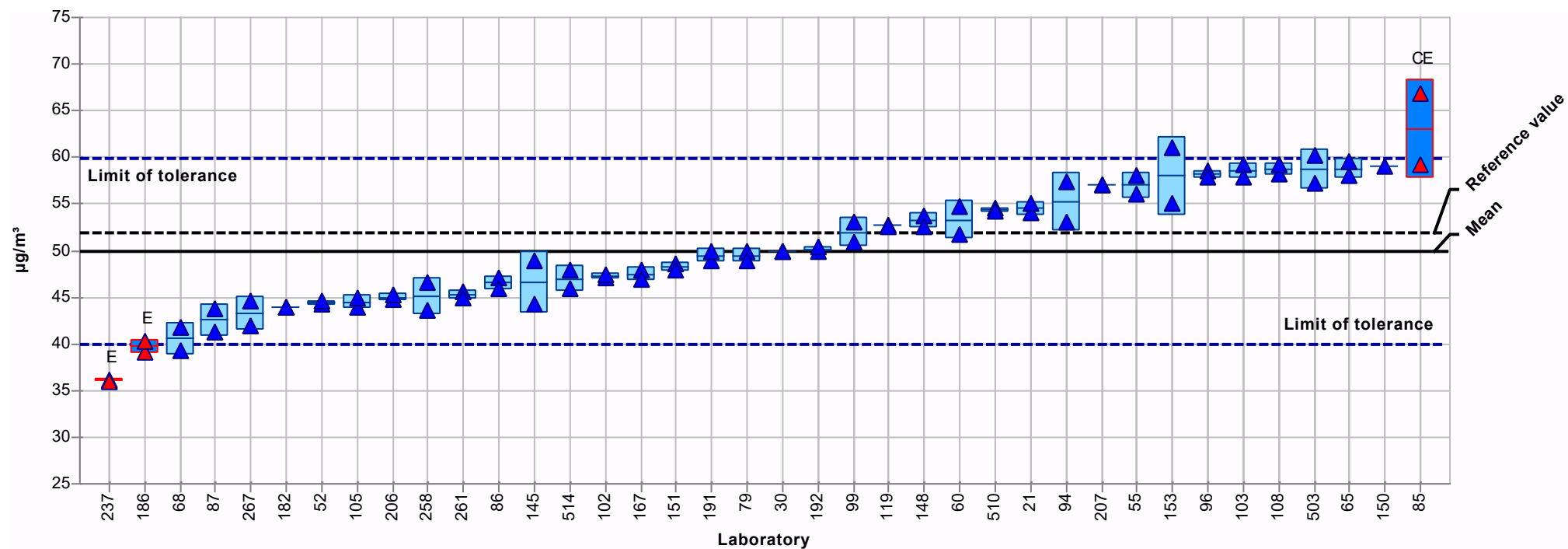
Summary results

Sample:	2	Mean:	132,23 µg/m³
Measurand:	n-Octane	Reproducibility s.d.:	18,43 µg/m³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	13,93%
Rel. target s.d.:	10,00%	Reference value:	132,70 µg/m³
Number of laboratories in calculation:	35	Range of tolerance:	105,79 - 158,68 µg/m³ (Z-Score ≤ 2,00)



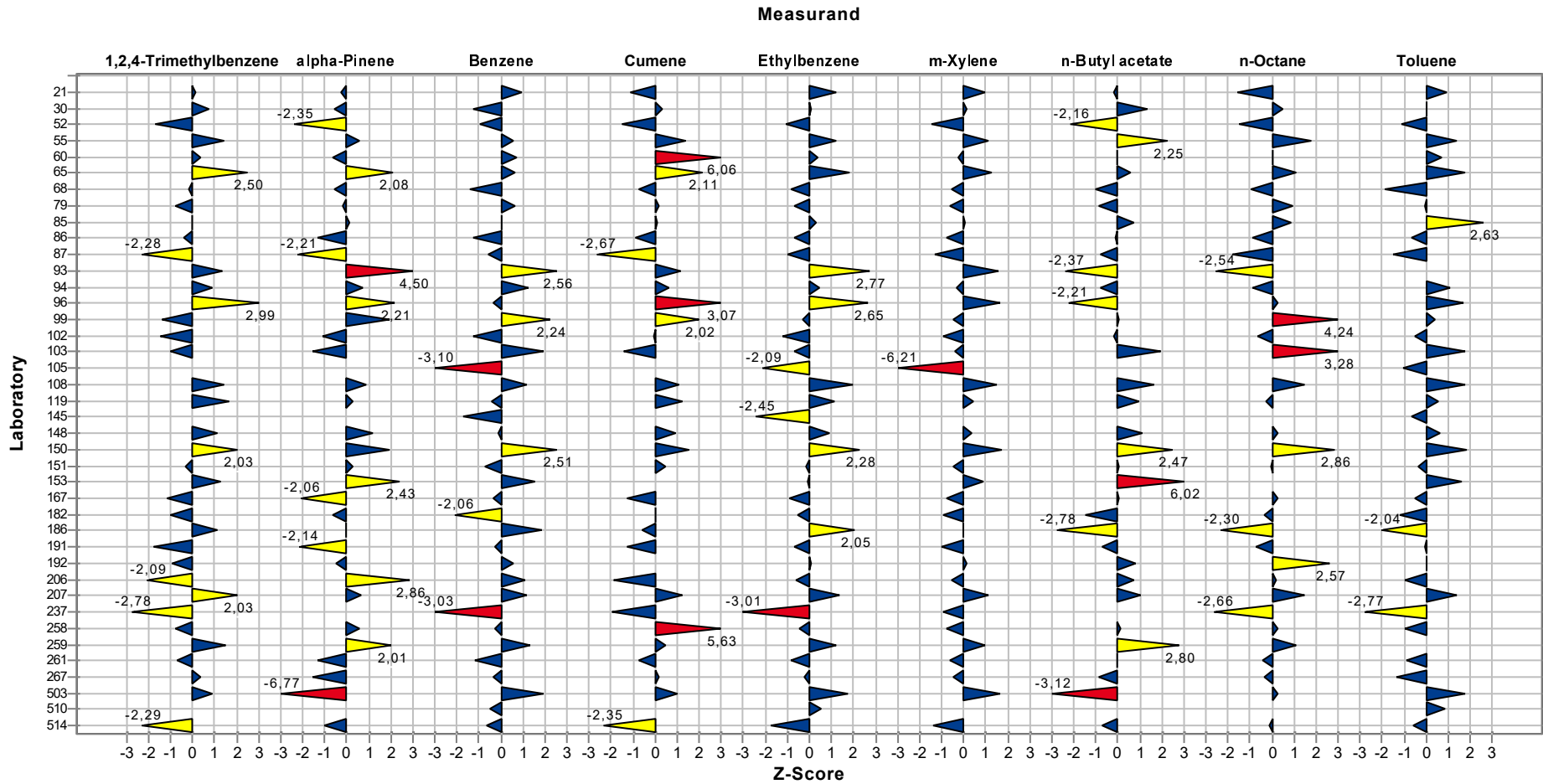
Summary results

Sample:	2	Mean:	49,93 µg/m ³
Measurand:	Toluene	Reproducibility s.d.:	6,31 µg/m ³
Method:	ISO 5725-2	Rel. reproducibility s.d.:	12,64%
Rel. target s.d.:	10,00%	Reference value:	51,90 µg/m ³
Number of laboratories in calculation + outliers:	38	Range of tolerance:	39,95 - 59,92 µg/m ³ (Z-Score <= 2,00)



Sample chart of Z-Scores

Sample: 2



Summary of laboratory test results

Blank sample 1

Laboratory	1,2,4-Trimethylbenzene	alpha-Pinene	Benzene	Cumene	Ethylbenzene	m-Xylene	n-Butylacetate	n-Octane	Toluene
Unit	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
21	< 1,00	< 1,00	3,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	2,00
30	< 2,00	< 2,00	< 2,00	< 2,00	< 2,00	< 2,00	< 2,00	< 2,00	2,20
52	0,00	0,00	2,20	0,00	0,00	0,00	0,00	1,00	1,90
55	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00
60	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	2,60
65	2,29		0,89		0,27	0,56	4,15	0,95	1,79
68	< 0,10	< 0,10	1,50	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10	< 0,10
79	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	2,50
85	0,20	0,00	0,20	0,00	0,20	0,40	0,00	0,00	2,00
86									1,78
87			0,00						1,40
93	0,76	1,94	0,97	0,00	0,36	0,00	0,00	0,38	
94		0,20	1,00						1,90
96	0,30	0,40	0,50	< 0,10	0,30	0,50	0,30	0,20	1,60
99	0,33	1,79	1,17	0,16	0,29	0,28	0,13	0,27	1,99
102	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	3,27
103	< 0,50	< 0,50	1,79	0,00	0,00	0,00	0,00	0,00	1,10
108						0,58			1,85
119	0,31	0,27	0,29	0,03	0,23	0,44	0,14	0,28	1,66
145			0,00		0,00				0,00
148	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	1,80
150	< 1,00	< 1,00	1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	2,00
151	0,20	0,30	0,90	0,00	0,10	0,30	0,00	0,60	1,60
153	< 1,00	< 1,00	< 1,00		< 1,00	< 1,00	< 1,00		< 1,00
167	0,00	1,00	0,00	0,00	0,00	0,00	0,00	0,00	1,00
182									1,40
186	1,70	0,70	1,20	0,10	0,50	0,90	0,30	0,80	1,80
191	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
192	0,56	0,89	0,47		0,55	1,36	0,21	0,71	1,64

Laboratory	1,2,4-Trimethylbenzene	alpha-Pinene	Benzene	Cumene	Ethylbenzene	m-Xylene	n-Butylacetate	n-Octane	Toluene
206	0,20	0,30	0,60	0,00	0,20	0,30	0,50	0,40	4,50
207									3,00
258	< 1,00	< 1,00	3,74	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	3,09
259	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	
261			1,55			0,45			1,81
267	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 1,00	< 2,50	< 2,50
503	< 2,43	< 2,43	< 2,43	< 2,43	< 2,43	< 2,43	< 2,43	< 2,43	< 2,43
510			0,00		0,00				0,00
514	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
-	-	-	-	-	-	-	-	-	-
No. of laboratories that submitted results	29	29	34	26	31	31	29	28	36

Summary of laboratory test results

Blank sample 2

Laboratory	1,2,4-Trimethylbenzene	alpha-Pinene	Benzene	Cumene	Ethylbenzene	m-Xylene	n-Butylacetate	n-Octane	Toluene
Unit	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
21	< 1,00	< 1,00	3,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	2,00
30	< 2,00	< 2,00	< 2,00	< 2,00	< 2,00	< 2,00	< 2,00	< 2,00	2,00
52	0,00	0,00	2,30	0,00	0,00	0,00	0,00	0,00	1,90
55	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00
60	< 2,52	< 2,53	< 2,52	< 2,53	< 2,52	< 2,52	< 2,52	< 2,53	2,60
65	1,15		0,95		0,44	0,77	3,77	0,68	2,00
68	< 0,10	< 0,10	1,30	< 0,10	< 0,10	1,00	< 0,10	< 0,10	< 0,10
79	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50
85	0,20	0,00	0,10	0,00	0,30	0,50	0,00	0,00	1,80
86									1,63
87			0,00		1,57	2,45			4,01
93	1,06	4,09	1,04	0,00	0,59	1,41	0,00	0,59	
94	0,10	0,30	1,00						2,00
96	0,80	0,70	0,90	< 0,10	0,80	1,30	0,60	0,40	3,30
99	0,41	1,64	0,91	0,15	0,38	0,41	0,19	0,38	1,75
102	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	1,11	< 1,00	< 1,00	3,55
103	< 0,50	< 0,50	3,64	0,00	0,00	0,00	0,00	< 0,50	3,59
108	0,55		0,58			0,92			2,21
119	0,48	0,34	0,37	0,05	0,47	0,81	0,40	0,31	2,48
145			0,00		0,00				0,00
148	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	2,10
150	< 1,00	< 1,00	1,00	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	2,00
151	0,40	0,30	0,70	0,00	0,30	0,20	0,00	0,70	1,80
153	< 1,00	< 1,00	< 1,00		< 1,00	< 1,00	< 1,00		< 1,00
167	0,00	1,00	0,00	0,00	0,00	1,00	0,00	0,00	2,00
182									1,60
186	1,20	0,30	1,00	0,00	0,50	0,80	0,30	0,50	1,80
191	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
192	0,61	0,96	0,59		0,72	1,69	0,50	1,01	1,77

Laboratory	1,2,4-Trimethylbenzene	alpha-Pinene	Benzene	Cumene	Ethylbenzene	m-Xylene	n-Butylacetate	n-Octane	Toluene
206	0,20	0,20	0,60	0,00	0,20	0,30	0,50	0,40	1,60
207									3,00
258	< 1,00	< 1,00	2,90	< 1,00	< 1,00	< 1,00	< 1,00	< 1,00	3,34
259	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	< 5,00	
261			1,73			0,51			1,83
267	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 2,50	< 1,00	< 2,50	< 2,50
503	< 2,45	< 2,45	< 2,45	< 2,45	< 2,45	< 2,45	< 2,45	< 2,45	< 2,45
510			0,00		0,00				0,00
514	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
-	-	-	-	-	-	-	-	-	-
No. of laboratories that submitted results	31	29	35	26	32	32	29	28	36

Questions and Answers

Participant	Sample carrier	Analytical method
21	Tenax TA; (Markes 35/60)	EN 16516
30	Tenax TA	ISO 16000-6
52	Tenax	DIN ISO 16000-6
55	Tenax TA Markes	EN 16516
60	manufacturer	DIN ISO 16000-6
65	Markes, TenaxTA	DIN ISO 16000-6
68	Tenax TA	Auf Basis von EN ISO 16000-5 und ISO 16000-6 wurde eigene Labormethode entwickelt
79	Glass tube, Tenax TA, Supelco	ISO 16000-6
85	Tenax TA	ISO16000-6
86	Tenax TA	DIN ISO 16000- 6
87	Tenax TA	DIN ISO 16000-6
93	Tenax-TA 60/80 , Merck KGaA	DIN ISO 16017-1
94	Tenax TA, 200 mg, Gerstel	ISO 16000-6
96	Supelco stainless steel desorption tubes containing Tenax GR as absorbent.	Custom method
99	SUPELCO Tenax TA, 35/60 mesh, glass TD tube	ISO 16000-6
102	Glass tube with Tenax TA made by Shimadzu Corporation	DIN ISO 16000-6
103	Tenax TA	DIN ISO 16000-6
105	Gerstel Carbosieve/Tenax	in House Methode
108	TENAX Markes	DIN ISO 16000-6
119	TD-Tubes aus Glas von Camsco gefüllt mit Tenax	DIN ISO 16000-6
145	Gerstel Tenax TA + Carbosieve S3	Hausmethode
148	Tenax TA (Markes)	DIN ISO 16000-6, DIN EN 16516
150	Tenax TA, 60/80, Fa. Perkin Elmer	DIN ISO 16000-6
151	Tenax TA	16017-1
153	Supelco Brand Thermal Desorption Glass Tube 6,35mm x 89mm Long , Tenax TA	ISO 16000-6
167	Markes Material Emission Tubes (Quartz Wool, Tenax TA, Carbograph 5TD)	EN 16516
182	Tenax Röhrchen von MARKES	16000-6
186	Tenax TA	DIN ISO 16000-6
191	He 6.0 Air Products	ISO 16000-6
192	TenaxTA	ISO 16000-6
206	Tenax TA	DIN ISO 16000-6

Volatile organic compounds (VOC) with thermal desorption 2022

Participant	Sample carrier	Analytical method
207	Tenax, Markes Röhrchen	DIN ISO 16000-6
237	Tenax TA 60/80 Mesh Markes	Inhouse
258	Tenax TA (Markes)	ISO16000-6
259	Tenax TA (60/80), Supelco	DIN 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	manufacturer	DIN EN ISO 16017-1
510	Gerstel Tenax TA + Carbosieve S3	Hausmethode
514	He 6.0 Air Products	ISO 16000-6

Participant	Gas chromatograph (GC)	Thermal desorber	Desorption temperature	Desorption flow	Desorption time
21	Agilent 7820A	Markes TD-100xr	300 °C	25	10
30	GC 7890 Agilent	TD 650 Perkin Elmer	260°C	50	30
52	Perkin Elmer Clarus 600	Perkin Elmer ATD	280°C	20ml/min.	30 Min.
55	Trace GC Ultra; Thermo	Markes TD-100	300°C	30	10
60	Agilent 7890A	MARKES	295 °C	100	5
65	Trace1300, ISQ700, ,	Markes TD100XD	260	50	7
68	Agilent 7890B Series GC Custom	TD100-xr (ATD) von Markes	300°C	50 ml/min	20 min.
79	Agilent 7890B-5977A (GC/MS)	Gerstel TDSA2-TDS3	280 degC	50 mL/min	5 min
85	QP-2010	TD-20	220		5 min
86	Shimadzu	Shimadzu	250 ?	60 mL/min	10 min
87	GC8890 (Agilent Technologies)	TD100-xr (Markes International Ltd.)	290	50	10
93	GCMS-QP2020 , Shimadzu Corporation	JTD-505? , JAPAN Analytical Industry Co.Ltd	250?	1ml/min	15min
94	Agilent 7890N	Gerstel TDS3C	260	30	5
96	Agilent 7890	Gertel TDSA			
99	Perkin Elmer Clarus 600GC	Perkin Elmer Tarbo Matrix 650	300?	50 mL/min	10 min
102	"GC-2010 Plus" made by Shimadzu Corporation	"TD-20" made by Shimadzu Corporation	280 ?	60 mL/min	10 min
103	Agilent GC 6890N	Gerstel TDS3	275 C	50	7
105	GC 7890B	Gerstel TDS 3C	260°C	4,6 ml/min	16 min
108	Shimadzu GC 2030	Shimadzu TD-30R	250 °C	60 mL/min	7 Minuten
119	Shimadzu Nexis GC-2030	Shimadzu TD-30R	190°C	60 ml/min	5 min
145	Agilent 6890N	Gerstel TDS3	260°C	50	21
148	Agilent GC 7890B	Markes TD100	280°C	50	10

Volatile organic compounds (VOC) with thermal desorption 2022

Participant	Gas chromatograph (GC)	Thermal desorber	Desorption temperature	Desorption flow	Desorption time
150	Clarus 600, Fa. Perkin Elmer	Turbo Matrix 650, Fa. Perkin Elmer	280 °C	40	15 (tube) 3 (trap)
151	Perkin Elmer Clarus 580	Perkin Elmer TD350	280	75	8
153	SHIMADZU GC-2010 Plus	SHIMADZU TD-20	250 C	60	5
167	Agilent 6890N	Markes ATD 100XR	320	40	10
182	Shimadzu GC-2010 Plus	MARKES TD100-xr			
186	Perkin Elmer Gold	Perkin Elmer Turbomatrix 650	280°C	50 mL/min	10 min
191	AGILENT 7890	MARKES TD100	300°C	40 mL/min	20 min
192	Agilent technologies	Markes International	270°C	30mL/min	10min
206	Agilent 7890A	Perkin-Elmer Turbomatrix 650	275	50	5
207	Agilent 7890	Markes Unity TD 100	300		
237	PE	PE	300	30	10
258	Agilent 8890	Markes TD-100	280°C	20	15 min
259	Shimadzu GCMS-QP2010Plus	Shimadzu TD-30	250 °C	60	5
261	Perkin Elmer Clarus 680	Perkin Elmer ATD 650	270 °C	30	15
267	Agilent 8890	Markes Unity-xr	280°C	50 mL/min	15 min
503	Agilent 7890A	MARKES	295	100	10
510	Agilent 7890B	Gerstel TDS3C	260°C	50	21
514	AGILENT 7890A	GERSTEL TDS3	300°C		

Participant	Cryo-trap	Carrier gas
21	10 °C and 320 °C	He
30	-30°C/280°C	He
52	-30°C/280°C	Helium
55	10-350°C, max heating rate	He
60	-10°C to 300°C	Helium
65	-1°C / 300°C	Helium
68	-20°C / 300°C	Helium
79	-150 to 290 deg C	Helium
85	10?/220?	Helium
86	-20 ? / 250 ?	Helium
87	30, 320	He
93	cryo- trap temperature is -40? , heating temperature is 250?	Helium
94	-30°C, 260°C, 12°C/min	He

Volatile organic compounds (VOC) with thermal desorption 2022

Participant	Cryo-trap	Carrier gas
99	5? / 300?	Helium
102	-10 ? (cryo-trap), 250 ? heating	Helium
103	0 to 275 °C at 12 °C/s	Helium
105	-150°C und 12°C/s bis 300°C	He
108	Kühlfalle: - 10 °C; Heiztemperatur: 250 °C	Helium
119	Kühlfalle -20°C, Heiztemp. Trap 200°C	Helium
145	-150°C	Helium
148	-20 /315	Helium
150	-30 °C / 280 °C	Helium
151	-30 to 300	Helium
153	The cryo- trap temperature -14 C and the heating temperature 280 C	Helium
167	5 / 320	Helium
182		Helium
186	-30°C to 280°C at 40°C/sec	Helium
191	-30°C , , 40°C/s	He 6..0
192	5°C / 280°C	Helium
206	-30 bis +280	Helium
207	-25	Helium
237	-20/ +270	He
258	-30°C; 300°C	Helium
259	-15 °C, 250 °C	Helium
261	-8 / 275 °C	Helium
267	-5°C - 300°C	Helium
503	20°C - 300°C	Helium
510	-150°C	Helium
514	-150°C, , 12°C/s	He 6.0

Participant	Carrier gas flow
21	1.6
30	1
52	4,8ml/min.
55	1.5
60	2.5

Volatile organic compounds (VOC) with thermal desorption 2022

Participant	Carrier gas flow
65	1ml
68	15 ml/min
79	1.0 mL/min
85	1.0mL/min
86	1.3 mL/min
87	2
93	1ml/min
94	1.2 ml/min
99	N/A
102	Linear velocity control 30 cm/sec
103	1
105	2 ml/min
108	24,2 mL/min
119	Linear Velocity 30 ml/s und Purge Flow 1 ml/min wurde vorgegeben > Pressure 149,6 kPa, Column Flow 1,38 ml/min, Total Flow 30,1 ml/min
145	2
148	0,5
150	1,6
151	1.0
153	Total flow 7,8mL/min, column flow 0,71mL/min
167	1,5
186	1.8 mL/min
192	1.3mL/min
206	1,5
207	1,2
237	0,5
258	1.3
259	1,18
261	1
267	1.77 mL/min
503	2ml /min
510	2

Participant	Analytical column	Detector
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Volatile organic compounds (VOC) with thermal desorption 2022

Participant	Analytical column	Detector
21	Restek Rxi-5Sil MS (60 m x 250 µm x 1 µm)	Agilent 5977E MSD
30	RTX5-MS	FID for all substances (except benzene by MS)
52	Zebron 1-MS	FID-MS
55	Rxi-5Sil-ms 60m x 0.25 mm id x 1µ film	DSQ II MS
60	HP-5MS	MS
65	TG5-MS	MSD
68	Vocal von Supelco	7000D Quadrupol MS/MS von Agilent
79	Agilent HP-1 0.25 mm x 60m, 0.25 µm	MS
85	Varian Capillary Column CP-Sil5CB (#CP8743)	MS
86		MS
87	HP-1 60m*0.250mm*0.25µm(Agilent Technologies)	MSD (JEOL)
93	HP-1MS , Length 60m , Diam 0.250mm , Film 0.25µm , Agilent Technologies	Mass spectrometer (Shimadzu Corporation GCMS-QP2020 ; EI quadrupole mass analyzer)
94	Agilent DB-5MS UI, 60m	Agilent 5977B MSD
96	Agilent DB1-MS, 0.25*1.0*30	MSD
99	Elite-1	Perkin Elmer Clarus 600T
102	non-polar column (SH-Rxi-1ms)	MS
103	HP-5MS	Agilent MSD 5975
105	J&W 122-1364 DB-624	FID zur Quantifizierung MS Qualifizierung
108	Rtx5, 60 m, 0,25 mm, 0,5 µm	Massenspektrometer
119	Rxi 5Sil MS 60m 0,25 mm ID 0,25 µm df von Restek	Shimadzu GCMS-QP2020 NX
145	DB-624; 60x0,25x1,4	FID / MSD
148	Restek Rxi-5Sil MS, 20m x 0,18mm id x 0,36µm df	Agilent 5977B MSD
150	DB 5-ms, 60 m x 0,25 mm, 1 µm Film	MSD/FID
151	30m BP5	FID
153	Restek Rxi 5Sil MS 0,25µm df 0,25mm ID 30 m lenght	Mass spectrometry MS
167	Agilent DB-5MS UI	Agilent 5975 MSD
182	Optima 5MS Accent	Shimadzu GC-MS QP 2010 Ultra
186	HP-5MS	MS
191	HP Ultra 2 (50mx0,32 mm; 0,52 µm ft)	AGILENT 5977A
192	InertCap1 (60m, 0.25mm id, 1.5µm df)	MSD
206	Restek Rxi-5Sil-MS	MS
207	DB 5	MS Agilent 5975
237	Varian	MS
258	Agilent HP-Ultra 2; 50m*0.32mm; 0.52µm film	Agilent 5977B

Volatile organic compounds (VOC) with thermal desorption 2022

Participant	Analytical column	Detector
259	VF-624ms (60m, 0.32mm ID, 1.8µm Film, Agilent)	MS
261	Rtx-VMS	Massenspektrometer Perkin Elmer Clarus SQ8
267	HP Innowax 60 m x 0.32 mm x 0.5 µm, Agilent Technologies (ref: 19091N-216)	Mass spectrometer (scan mode for acquisition)
503	HP-5MS	MS
510	DB-624; 60x0,25x1,4	FID / MS
514	DN 624 (60 m x 0.32 mm; 1.8 µm ft)	AGILENT 5975C Triple a (G3172A)

Participant	Data evaluation
21	Calibration Curve
30	External
52	FID/MS
55	7 point calibration curve, identification through eluting and specific m/e
60	SIM
65	Standard-Mix und Einzelstoffkalibrierung
68	Identifikation mit MS; Quantifizierung mit entspr. Berechnung in einem Excelfile
79	Identified by using standards and quantified by the internal standard method
85	NIST library, calibration curves
86	Internal calibration
87	identification by NIST library, quantification by 12 point calibration curve
93	A calibration curve was created using standard substances with cyclodecane as an internal standard, and quantitative and qualitative measurements were performed.
94	externe Kalibration, Identifizierung durch Massenspektrum
96	toluene equivalent sensitivity/MSD
99	Calibration curve method, NIST Library
102	Calibration curve using standard solution and NIST library
103	External standards and MassHunter with NIST Library
105	FID
108	Kalibrierung, NIST Datenbank
119	identifiziert: über MS (NIST-Bibliothek), quantifiziert: alle Substanzen als externer Standard, über Verdünnungen Kalibriergeraden für alle Substanzen erstellt
145	Quantifizierung: FID, Qualifizierung MSD
148	Identifizierung und Quantifizierung mittels GC-MSD und Toluol d8 als Interner Standard, Mehrpunktkalibrierung der Analyten
150	Identifizierung über MSD, Quantifizierung über FID
151	external standards, methanol solutions
153	NIST14 Mass Spectral Library

Volatile organic compounds (VOC) with thermal desorption 2022

Participant	Data evaluation
167	4 Point calibration curve with internal standard, match against commercial libraries with qualifier ions
186	Internal calibration
191	SIM with specific substance
192	Absolute calibration curve
206	externe Standardkalibration, MS
207	EIC Originalreferenzen, eigene und kommerzielle Bibliotheken
237	MS, MS
258	Quantification by external standards of each component, identification on retention of external standards and MS spectra
259	Target- und Qualifierionen
261	Quantifiziert nach charakteristischer Ionenspur mit internem Standard und 6-Punkt Kalibrierung, Identifikation erfolgt nach Spektrum
267	Acquisition in scan mode, quantification with one m/z quantifier and confirmation of identification with specific qualifiers and their ratio
503	SIM
510	Quantifizierung: FID Qualifizierung: MSD
514	SIM with specific substance

Participant	Recovery rates	Date of analysis
21	No	7/10/22; 14/10/22
30	no	14/10/2022
52	nein	12.09.2022
55	yes	16/09/2022
60	no	09/09/2022
65	nein	22.09.2022
68	Nein	21./22.09.2022
79	no	2022/09/14
85	No	September 14, 2022
86	No	27.09.2022 and 29.09.2022
87	no	September 14, and 16
93	NO	16/Sep/2022
94	nein	23.09.2022
96	No	08-09-2022
99	No	2022/09/14
102	yes	September 16, 2022 (sample receipt September 15, 2022)
103	No	16.09.2022

Volatile organic compounds (VOC) with thermal desorption 2022

Participant	Recovery rates	Date of analysis
105	nein	16.09.2022
108	nein	13.09.22
119	nein	29.09.2022
145	nein	26.10.2022 / 27.10.2022
148	nein	09.09.2022
150	nein	21. bzw. 27.9.22
151	No	16/09/2022
153	No	25.10.2022
167	Yes	16.Sep.2022
182		28.09.2022
186	No	04/10/2022
191	yes	09/15/2022
192	No	15,16 Sep 2022
206	nein	10.10.2022
207	nein	12.09.2022
237	Nein	14.09.2022
258	No	30-09-2022
259	nein	10.09.2022
261	Nein	06.10.2022
267	No	27/09/2022
503	no	09/09/2022
510	nein	20.10.2022
514	yes	09/19/2022