IFA
Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung

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

Proficiency testing scheme organic solvents

March 2023

Institute for Occupationial Safety and Health of the
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Summary of laboratory test results

Sample 1

	1-Butanol	Z score	1-Methoxy-2-propanol	Z score	1-Propanol	Z score	2-Butanol	Z score
Unit	mg/m³		mg/m³		mg/m³		mg/m³	
68	153,60	-0,62	90,94	0,26	61,29	1,63	57,52	-1,04
73	164,90	0,07	91,10	0,28	55,70	0,57	66,45	0,35
82	160,00	-0,23	73,20	-1,74			67,40	0,49
118	175,87	0,73			61,34	1,64	70,17	0,92
199	195,00	1,90 B	92,30	0,42	56,30	0,68	75,90	1,82
208	167,00	0,19	99,00	1,17	56,00	0,63	66,00	0,28
238	163,50	-0,02	48,30	-4,55 BE	38,50	-2,70 E	65,40	0,18
256	165,80	0,12	81,70	-0,78	39,80	-2,45 E	45,00	-2,99 E
512	160,00	-0,23	92,10	0,39				
–	–	– –	–	– –	–	– –	–	– –
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	9		8		7		8	
Mean	163,83		88,62		52,70		64,23	
Reprod. s.d.	6,48		8,47		9,57		9,30	
Rel. reproducibility s.d.	3,96 %		9,56 %		18,16 %		14,48 %	
Reference value	171,10		95,90		58,60		74,40	
Target s.d.	16,38		8,86		5,27		6,42	
Rel. target s.d.	10,00 %		10,00 %		10,00 %		10,00 %	
Low er limit of tolerance	131,07		70,90		42,16		51,38	
Upper limit of tolerance	196,60		106,34		63,25		77,08	
Type B outliers	1		1					
No. of laboratories after elimination of outliers type A-D and F (w ithout laboratories that only gave states but no measured values)	8		7		7		8	
Explanation of outlier types								
A: Single outlier	Grubbs							

	1-Butanol	Z score	1-Methoxy-2-propanol	Z score	1-Propanol	Z score	2-Butanol	Z score
B: Differing laboratory mean	Grubbs							
C: Excessive laboratory s.d.	Cochran							
D: Excluded manually								
E: mean outside tolerance limits								
F: |Z-Score|>3,50								

	i-Butanol	Z score
Unit	mg/m³	
68	66,05	-0,65
73	69,99	-0,10
82	72,50	0,26
118	74,50	0,54
199	82,90	1,73 B
208	69,00	-0,24
238	71,40	0,10
256	47,20	-3,32 BE
512	71,20	0,08
–	–	– –
Method	ISO 5725-2	
Assessment	|Z|<=2,00	
No. of laboratories that submitted results	9	
Mean	70,66	
Reprod. s.d.	2,69	
Rel. reproducibility s.d.	3,81 %	
Reference value	72,50	
Target s.d.	7,07	
Rel. target s.d.	10,00 %	
Low er limit of tolerance	56,53	
Upper limit of tolerance	84,80	
Type B outliers	2	
No. of laboratories after elimination of outliers type A-D and F (w ithout	7	

	i-Butanol	Z score
laboratories that only gave states but no measured values)		

Summary of laboratory test results

Sample 2

	1,2,4-Trimethylbenzene	Z score	Cumene	Z score	Ethylbenzene	Z score	m-Xylene	Z score
Unit	mg/m³		mg/m³		mg/m³		mg/m³	
55	57,30	-0,32	11,40	-0,70	20,60	-0,42	60,40	-0,27
68	59,44	0,04	12,47	0,18	22,03	0,24	63,01	0,15
73	55,59	-0,61	10,99	-1,03	20,44	-0,50	56,68	-0,87
82	52,70	-1,10	13,00	0,61	21,00	-0,24	57,20	-0,78
118	54,87	-0,73	10,81	-1,18	20,20	-0,61	58,97	-0,50
167	66,00	1,15	14,00	1,43	24,00	1,16	66,00	0,64
199	65,60	1,08	13,40	0,94	22,80	0,60	63,70	0,26
208	61,00	0,31	13,00	0,61	21,00	-0,24	60,00	-0,33
238	67,70	1,44	13,20	0,77	23,20	0,79	71,90	1,59
239					22,01	0,23	58,93	-0,50
256	55,30	-0,66	9,50	-2,25 E	19,40	-0,98	61,10	-0,15
512	55,50	-0,62	13,00	0,61	21,40	-0,05	66,80	0,76
–	–	– –	–	– –	–	– –	–	– –
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	11		11		12		12	
Mean	59,18		12,25		21,51		62,06	
Reprod. s.d.	5,19		1,38		1,35		4,45	
Rel. reproducibility s.d.	8,77 %		11,24 %		6,26 %		7,18 %	
Reference value	61,90		11,40		21,50		62,00	
Target s.d.	5,92		1,23		2,15		6,21	
Rel. target s.d.	10,00 %		10,00 %		10,00 %		10,00 %	
Low er limit of tolerance	47,35		9,80		17,21		49,65	
Upper limit of tolerance	71,02		14,70		25,81		74,47	
Type B outliers								
No. of laboratories after elimination of outliers type A-D and F (w ithout laboratories that only gave states but no measured values)	11		11		12		12	

	1,2,4-Trimethylbenzene	Z score	Cumene	Z score	Ethylbenzene	Z score	m-Xylene	Z score

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	

	n-Hexane	Z score	n-Octane	Z score	Toluene	Z score
Unit	mg/m³		mg/m³		mg/m³	
55	42,90	0,43	175,00	0,43	85,80	0,19
68	41,90	0,26	173,07	0,32	91,44	0,86
73	38,46	-0,31	152,90	-0,89	76,82	-0,88
82	43,40	0,51	170,00	0,13	78,80	-0,64
118	34,86	-0,90	164,71	-0,18	83,97	-0,03
167	67,00	4,41 BE	180,00	0,73	91,00	0,81
199			172,60	0,29	81,10	-0,37
208	40,00	-0,05	157,00	-0,64	80,00	-0,50
238	49,50	1,52	203,20	2,11 E	95,90	1,39
239					77,13	-0,84
256	31,60	-1,44	138,70	-1,73	83,30	-0,11
512			158,10	-0,58	85,10	0,11
–	–	– –	–	– –	–	– –
Method	ISO 5725-2		ISO 5725-2		ISO 5725-2	
Assessment	|Z|<=2,00		|Z|<=2,00		|Z|<=2,00	
No. of laboratories that submitted results	9		11		12	
Mean	40,33		167,75		84,20	
Reprod. s.d.	5,51		16,73		6,03	
Rel. reproducibility s.d.	13,66 %		9,97 %		7,17 %	
Reference value	41,60		160,70		85,10	
Target s.d.	6,05		16,78		8,42	

	n-Hexane	Z score	n-Octane	Z score	Toluene	Z score
Rel. target s.d.	15,00 %		10,00 %		10,00 %	
Low er limit of tolerance	28,23		134,20		67,36	
Upper limit of tolerance	52,42		201,30		101,04	
Type B outliers	1					
No. of laboratories after elimination of outliers type A-D and F (w ithout laboratories that only gave states but no measured values)	8		11		12	

Summary of laboratory test results

Sample 3

	1,2,4-Trimethylbenzene	Z score	Cumene	Z score	Ethylbenzene	Z score	m-Xylene	Z score
Unit	mg/m³		mg/m³		mg/m³		mg/m³	
55	26,70	-0,99	19,70	-1,08	14,30	-1,17	25,40	-0,88
68	32,08	0,83	23,21	0,51	17,08	0,55	29,00	0,42
73	28,65	-0,33	20,24	-0,83	15,99	-0,12	26,18	-0,60
82	26,50	-1,06	21,30	-0,35	16,00	-0,12	25,70	-0,77
118	28,37	-0,43	19,81	-1,03	15,41	-0,48	26,96	-0,32
167	34,00	1,47	26,00	1,78	18,00	1,12	30,00	0,78
199	31,70	0,70	23,30	0,55	16,50	0,19	28,30	0,17
208	32,00	0,80	24,00	0,87	17,00	0,50	28,00	0,06
238	30,90	0,43	22,30	0,10	16,90	0,44	28,50	0,24
239					24,12	4,90 BE	39,68	4,25 BE
256	26,00	-1,23	19,40	-1,21	14,70	-0,92	26,80	-0,37
512	29,10	-0,18	23,60	0,69	16,20	0,01	31,40	1,28
–	–	– –	–	– –	–	– –	–	– –
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	11		11		12		12	
Mean	29,64		22,08		16,19		27,84	
Reprod. s.d.	2,66		2,15		1,09		1,86	
Rel. reproducibility s.d.	8,99 %		9,73 %		6,71 %		6,67 %	
Reference value	31,70		21,10		16,50		28,50	
Target s.d.	2,96		2,21		1,62		2,78	
Rel. target s.d.	10,00 %		10,00 %		10,00 %		10,00 %	
Low er limit of tolerance	23,71		17,66		12,95		22,27	
Upper limit of tolerance	35,56		26,49		19,43		33,41	
Type B outliers					1		1	
No. of laboratories after elimination of outliers type A-D and F (w ithout laboratories that only gave states but no measured values)	11		11		11		11	

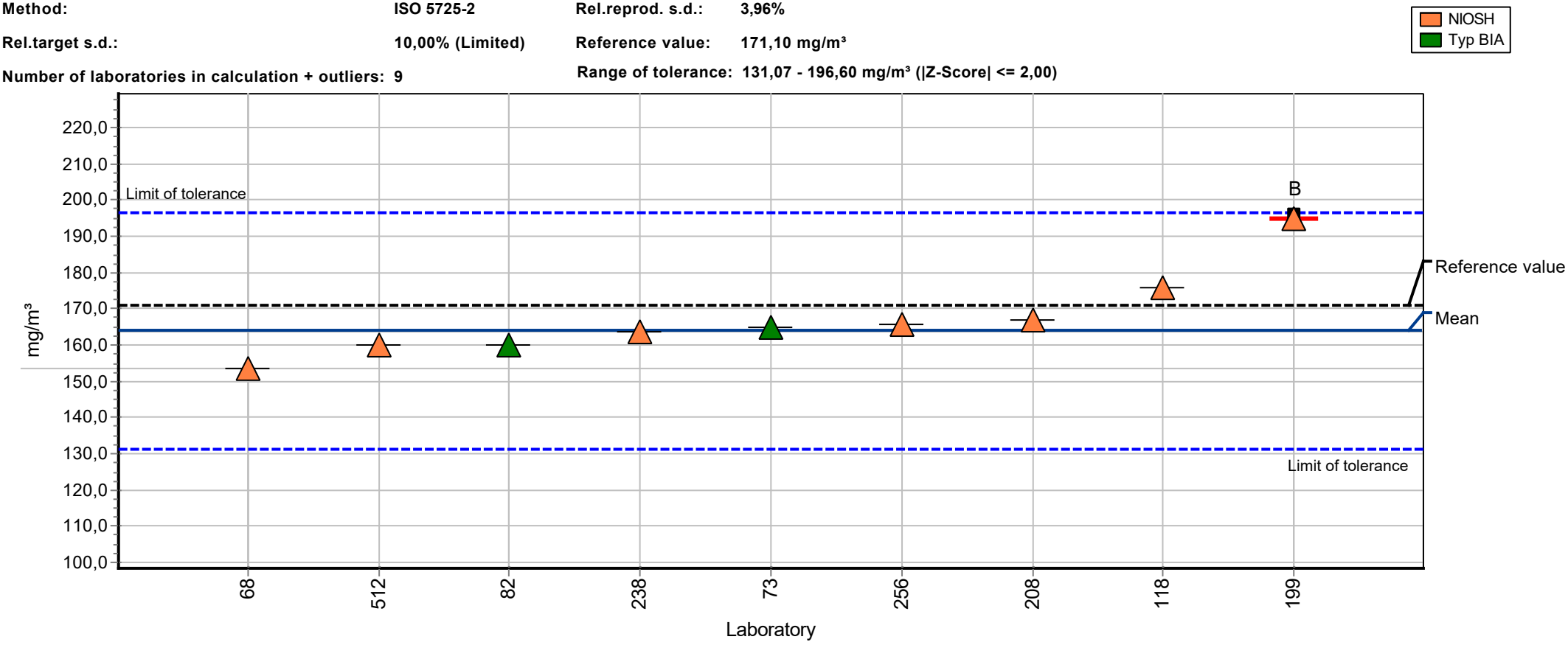
	1,2,4-Trimethylbenzene	Z score	Cumene	Z score	Ethylbenzene	Z score	m-Xylene	Z score
Explanation of outlier types								
A: Single outlier		Grubbs						
B: Differing laboratory mean		Grubbs						
C: Excessive laboratory s.d.		Cochran						
D: Excluded manually								
E: mean outside tolerance limits								
F: |Z-Score|>3,50								

	n-Hexane	Z score	n-Octane	Z score	Toluene	Z score
Unit	mg/m³		mg/m³		mg/m³	
55	27,40	0,23	205,00	-0,25	42,30	-0,76
68	26,42	-0,02	228,92	0,89	48,70	0,63
73	25,38	-0,28	195,70	-0,69	42,15	-0,80
82	31,00	1,14	225,00	0,70	43,80	-0,44
118	23,42	-0,77	210,31	0,00	45,71	-0,02
167	46,00	4,91 BE	228,00	0,84	50,00	0,92
199			205,00	-0,25	42,70	-0,68
208	27,00	0,13	202,00	-0,39	44,00	-0,39
238	30,30	0,96	243,40	1,58	51,50	1,25
239					70,30	5,35 BE
256	21,00	-1,38	170,40	-1,90	45,50	-0,06
512			199,10	-0,53	47,40	0,35
–	–	– –	–	– –	–	– –
Method	ISO 5725-2		ISO 5725-2		ISO 5725-2	
Assessment	|Z|<=2,00		|Z|<=2,00		|Z|<=2,00	
No. of laboratories that submitted results	9		11		12	
Mean	26,49		210,26		45,80	
Reprod. s.d.	3,31		20,07		3,22	
Rel. reproducibility s.d.	12,50 %		9,54 %		7,03 %	
Reference value	27,20		204,60		46,40	
Target s.d.	3,97		21,03		4,58	

	n-Hexane	Z score	n-Octane	Z score	Toluene	Z score
Rel. target s.d.	15,00 %		10,00 %		10,00 %	
Low er limit of tolerance	18,54		168,21		36,64	
Upper limit of tolerance	34,44		252,31		54,96	
Type B outliers	1				1	
No. of laboratories after elimination of outliers type A-D and F (w ithout laboratories that only gave states but no measured values)	8		11		11	

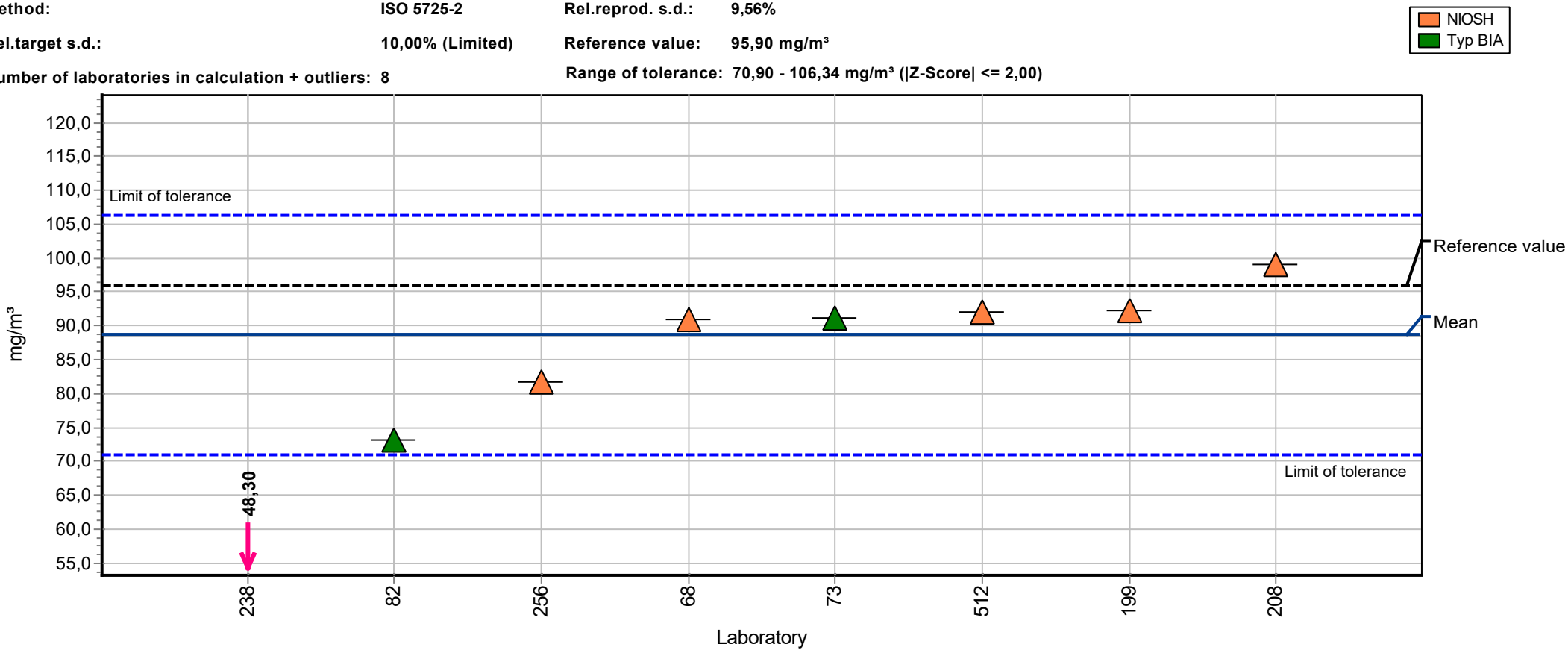
Summary results

Sample:	**1**	**Mean:**	**163,83 mg/m³**
Measurand:	**1-Butanol**	**Reprod. s.d.:**	**6,48 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**3,96%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**171,10 mg/m³**
Number of laboratories in calculation + outliers:	**9**	**Range of tolerance:**	**131,07 - 196,60 mg/m³ (|Z-Score| <= 2,00)**



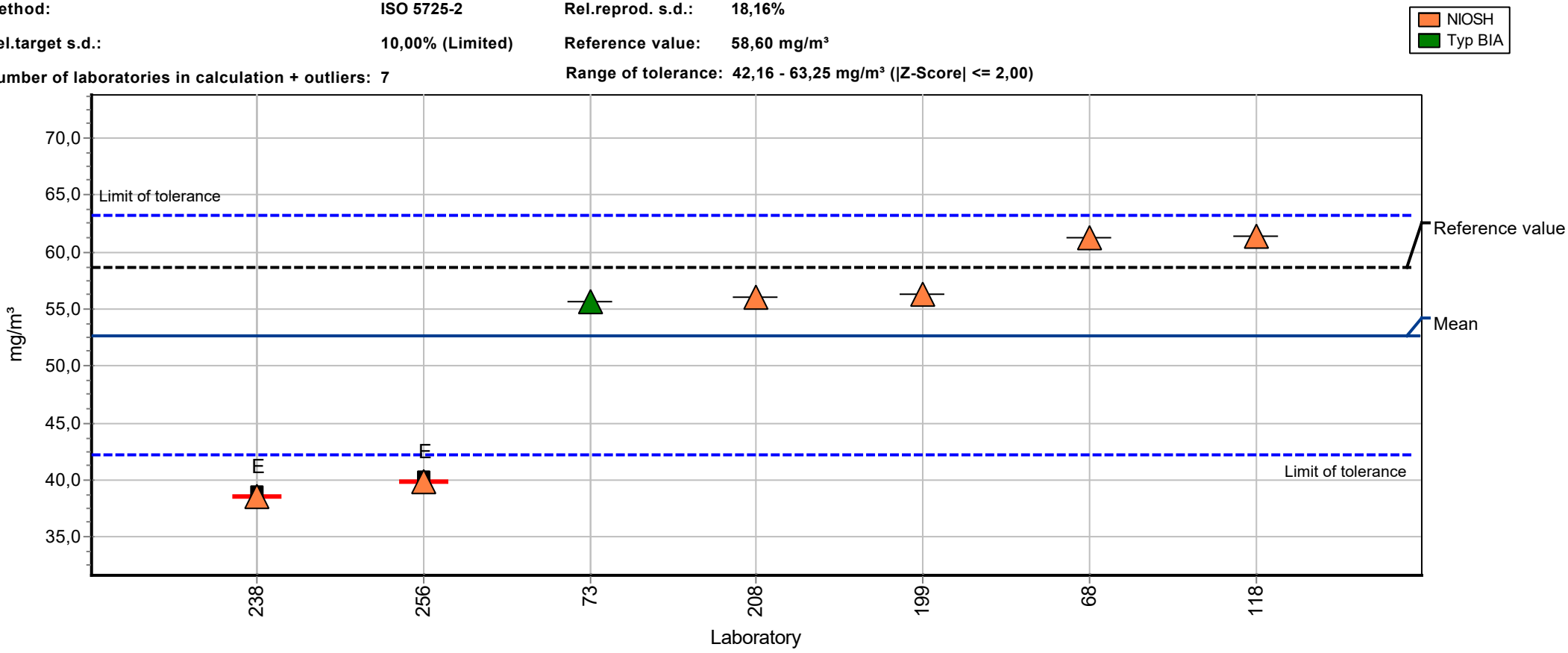
Summary results

Sample:	**1**	**Mean:**	**88,62 mg/m³**
Measurand:	**1-Methoxy-2-propanol**	**Reprod. s.d.:**	**8,47 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**9,56%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**95,90 mg/m³**
Number of laboratories in calculation + outliers:	**8**	**Range of tolerance:**	**70,90 - 106,34 mg/m³ (|Z-Score| <= 2,00)**



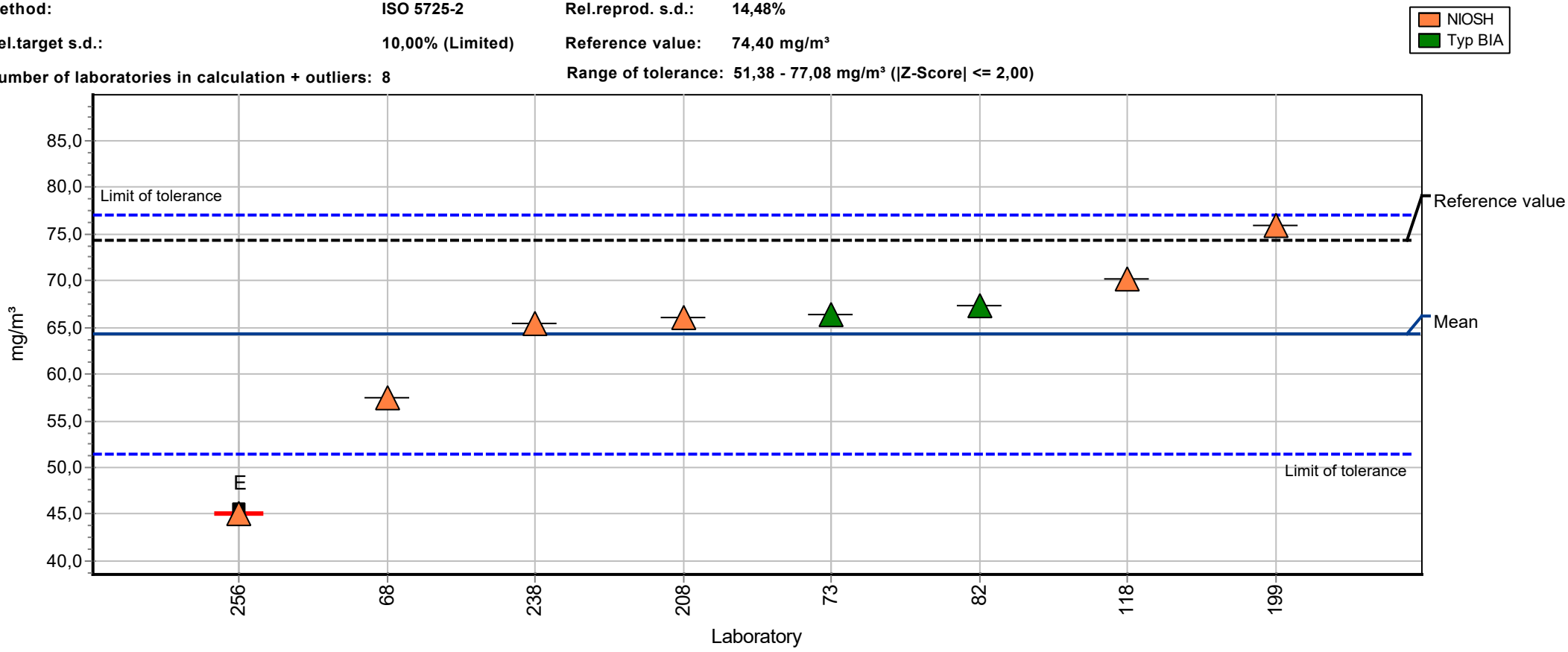
Summary results

Sample:	**1**	**Mean:**	**52,70 mg/m³**
Measurand:	**1-Propanol**	**Reprod. s.d.:**	**9,57 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**18,16%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**58,60 mg/m³**
Number of laboratories in calculation + outliers:	**7**	**Range of tolerance:**	**42,16 - 63,25 mg/m³ (|Z-Score| <= 2,00)**



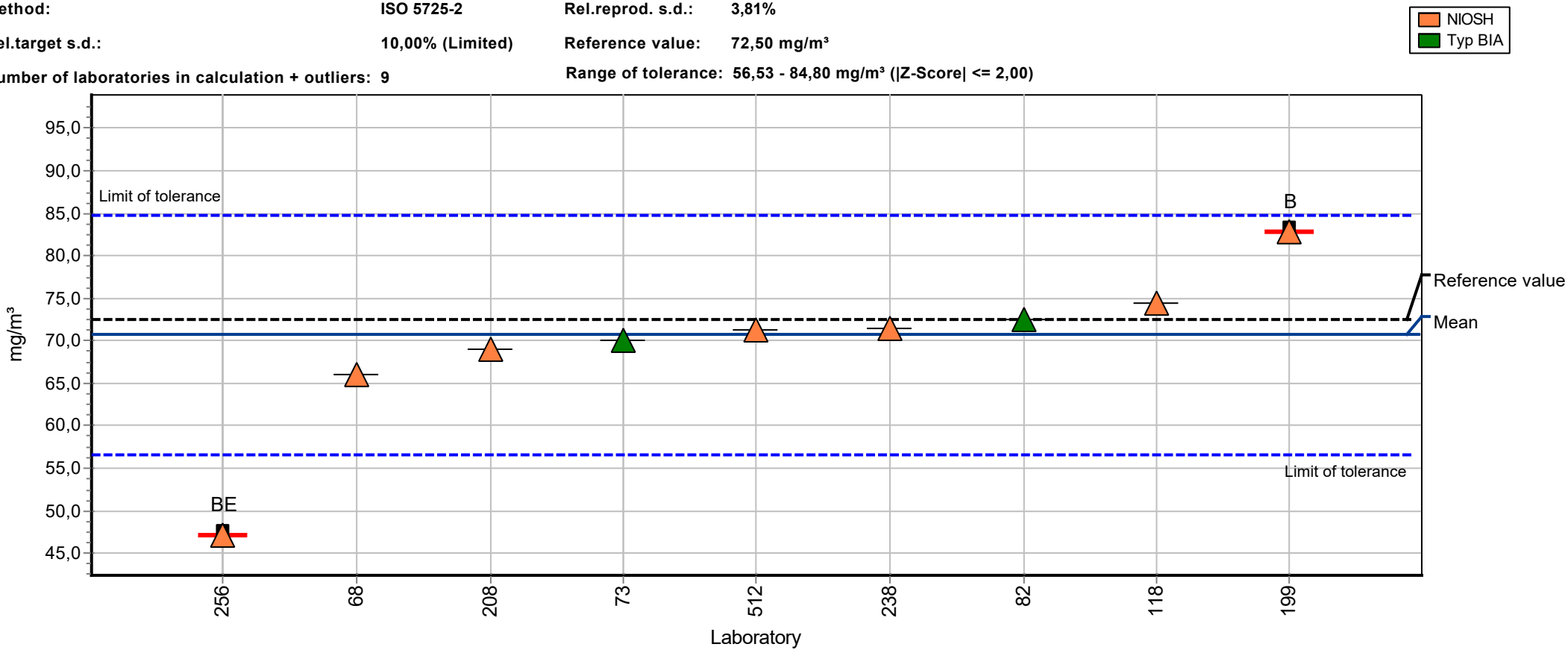
Summary results

Sample:	**1**	**Mean:**	**64,23 mg/m³**
Measurand:	**2-Butanol**	**Reprod. s.d.:**	**9,30 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**14,48%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**74,40 mg/m³**
Number of laboratories in calculation + outliers:	**8**	**Range of tolerance:**	**51,38 - 77,08 mg/m³ (|Z-Score| <= 2,00)**



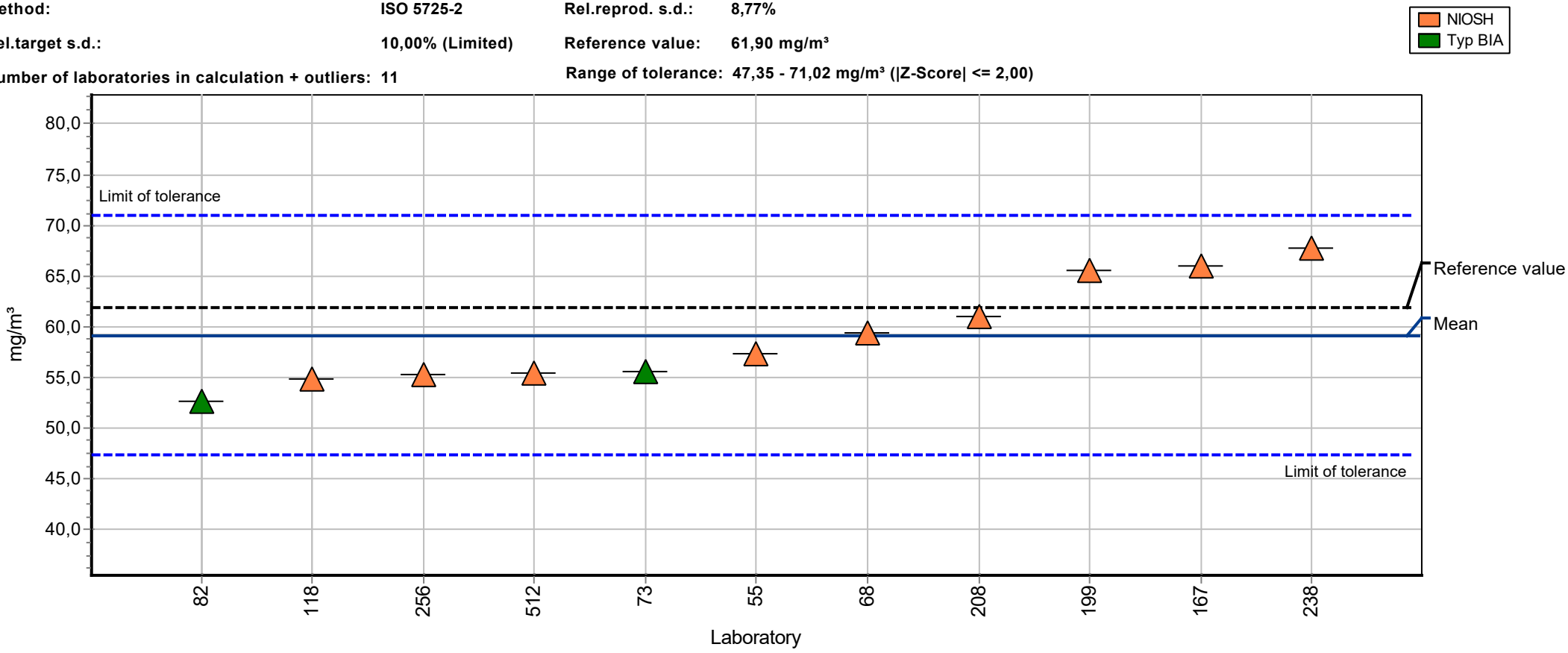
Summary results

Sample:	**1**	**Mean:**	**70,66 mg/m³**
Measurand:	**i-Butanol**	**Reprod. s.d.:**	**2,69 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**3,81%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**72,50 mg/m³**
Number of laboratories in calculation + outliers:	**9**	**Range of tolerance:**	**56,53 - 84,80 mg/m³ (|Z-Score| <= 2,00)**



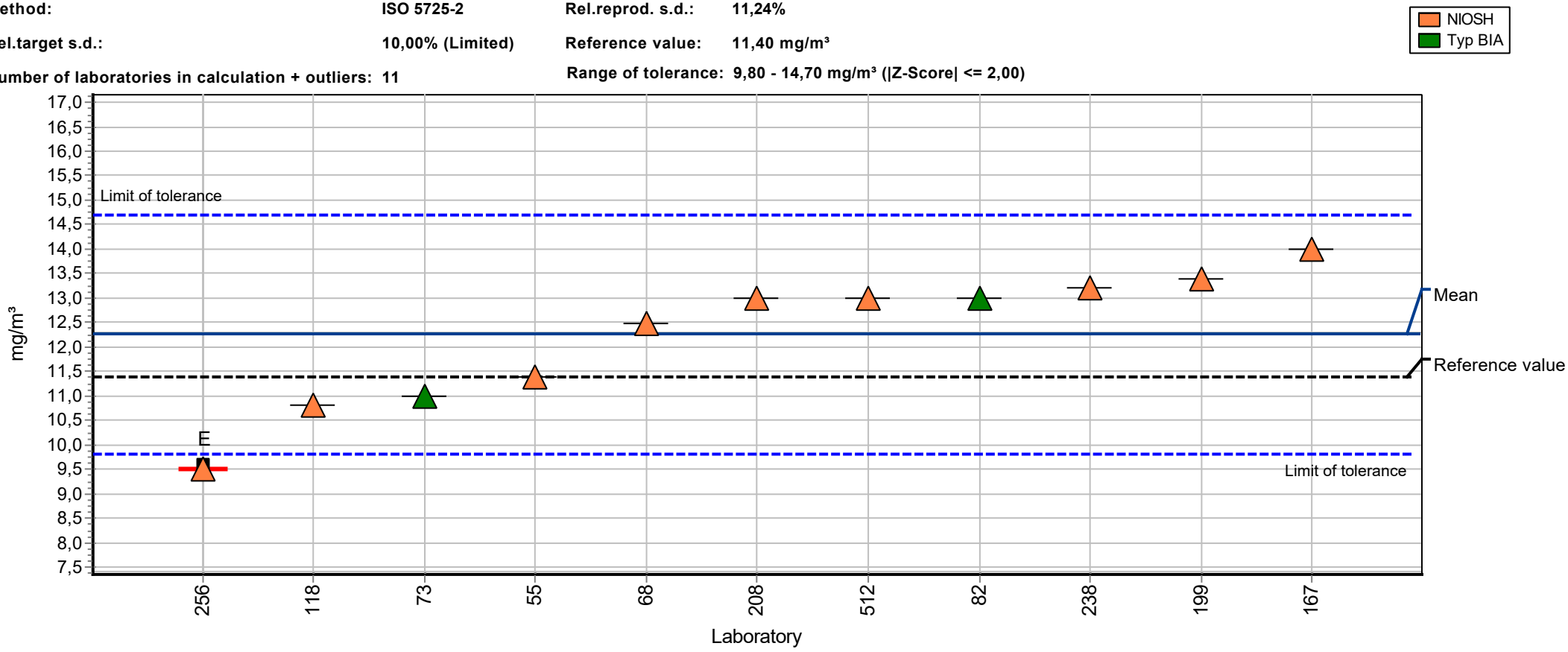
Summary results

Sample:	**2**	**Mean:**	**59,18 mg/m³**
Measurand:	**1,2,4-Trimethylbenzene**	**Reprod. s.d.:**	**5,19 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**8,77%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**61,90 mg/m³**
Number of laboratories in calculation + outliers:	**11**	**Range of tolerance:**	**47,35 - 71,02 mg/m³ (|Z-Score| <= 2,00)**



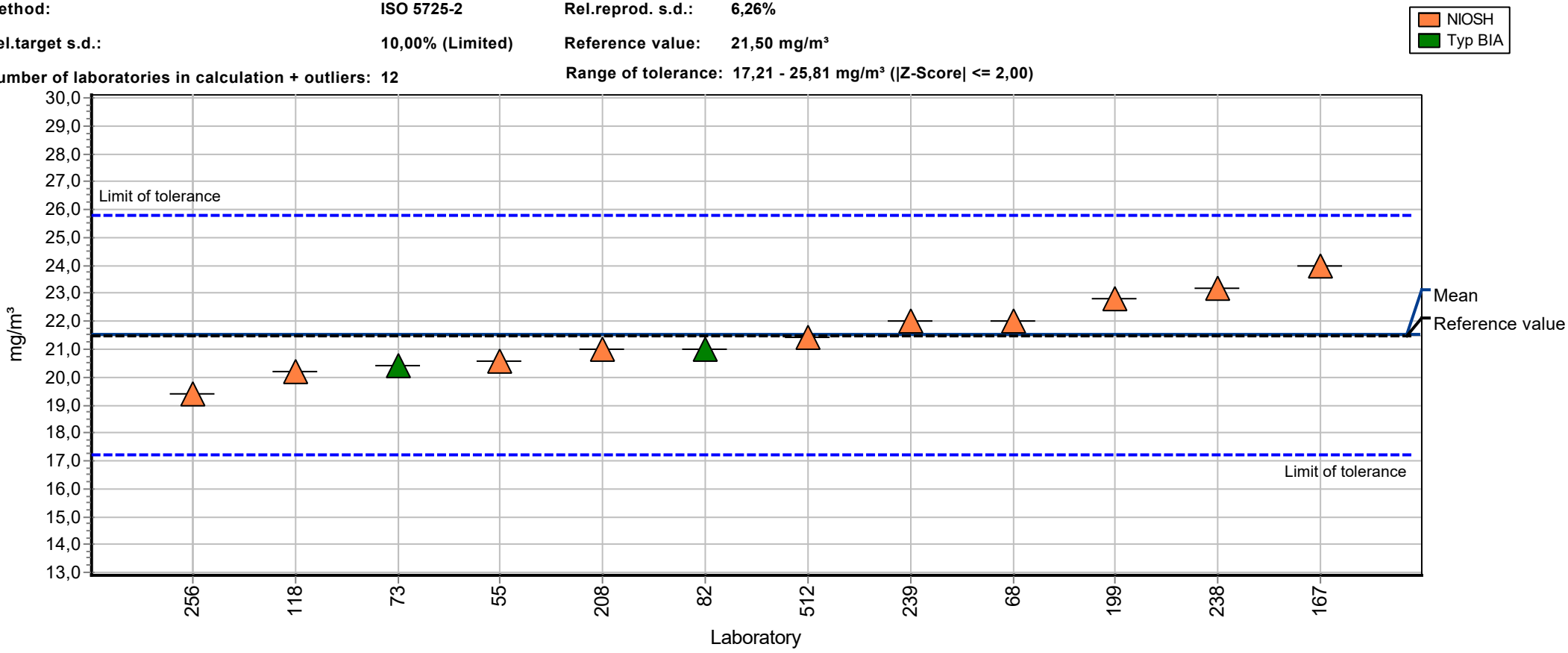
Summary results

Sample:	**2**	**Mean:**	**12,25 mg/m³**
Measurand:	**Cumene**	**Reprod. s.d.:**	**1,38 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**11,24%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**11,40 mg/m³**
Number of laboratories in calculation + outliers:	**11**	**Range of tolerance:**	**9,80 - 14,70 mg/m³ (|Z-Score| <= 2,00)**



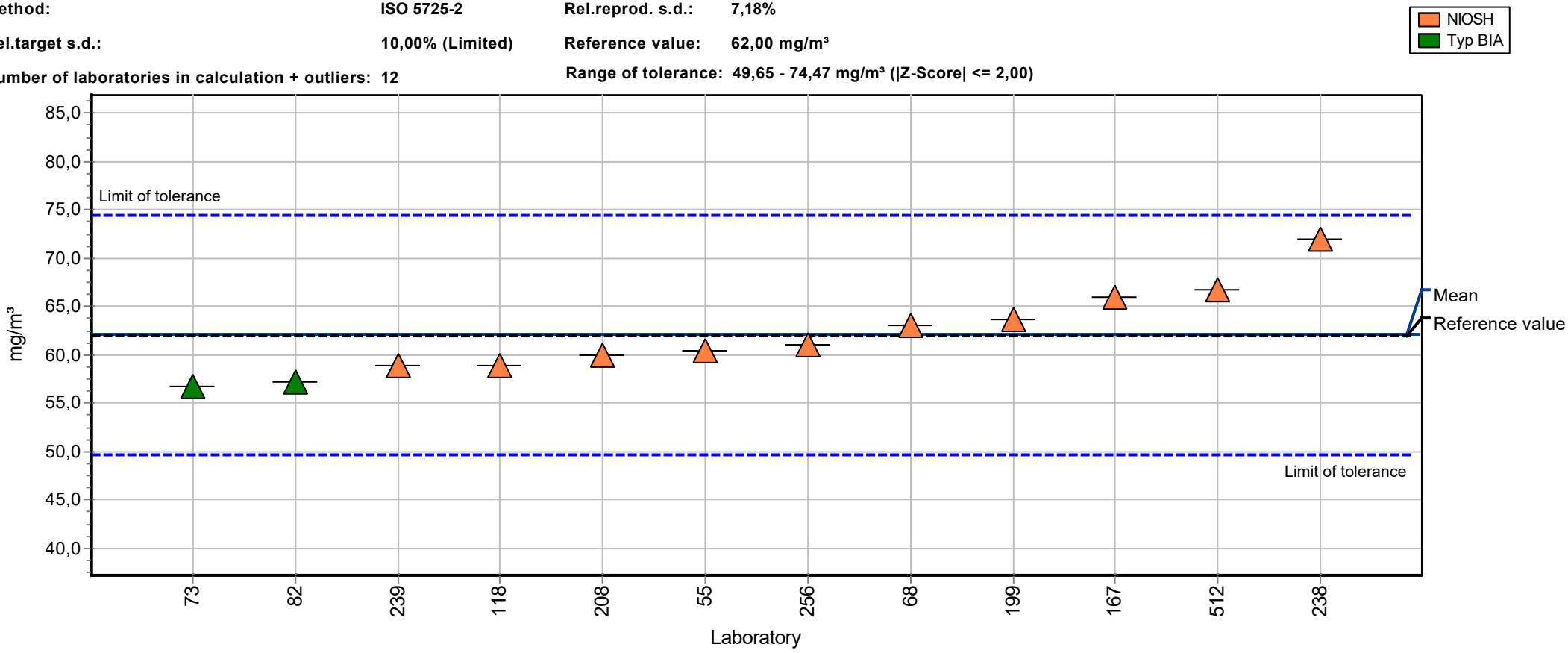
Summary results

Sample:	**2**	**Mean:**	**21,51 mg/m³**
Measurand:	**Ethylbenzene**	**Reprod. s.d.:**	**1,35 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**6,26%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**21,50 mg/m³**
Number of laboratories in calculation + outliers:	**12**	**Range of tolerance:**	**17,21 - 25,81 mg/m³ (|Z-Score| <= 2,00)**



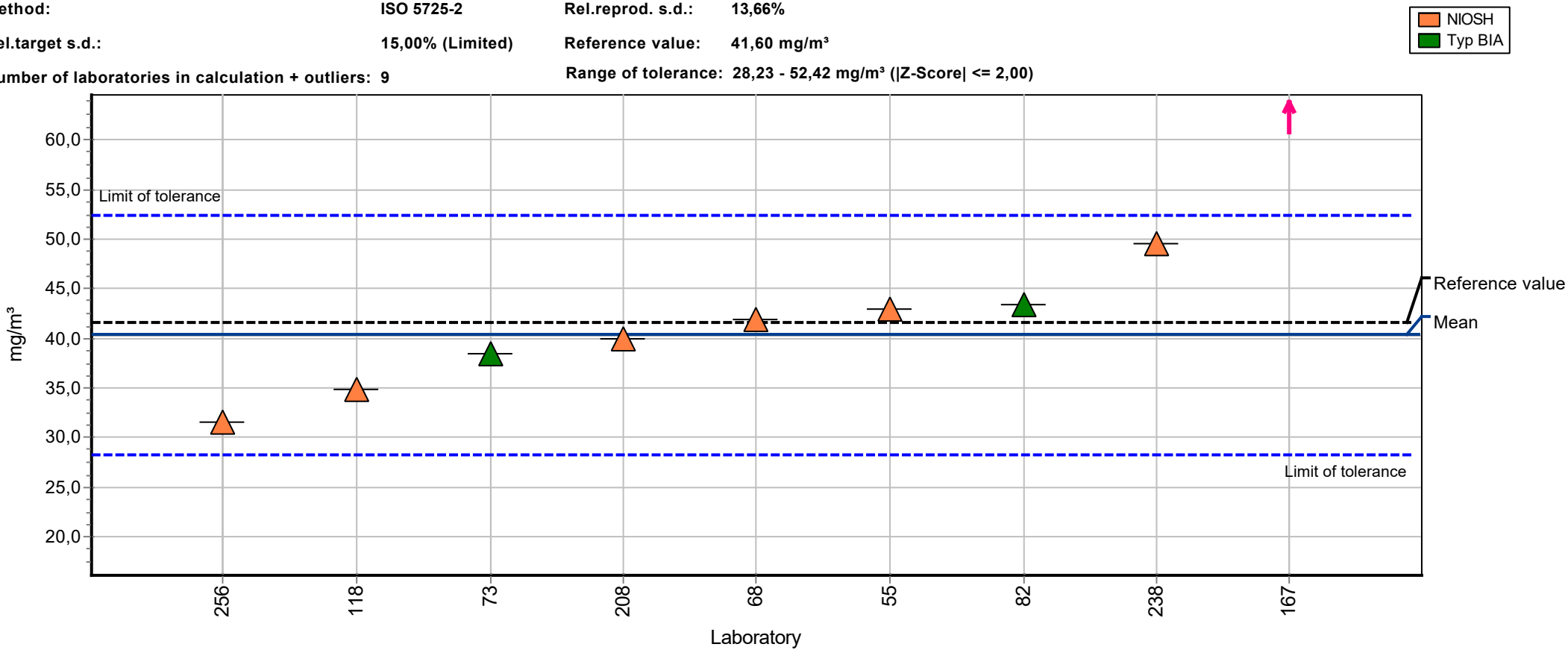
Summary results

Sample:	**2**	**Mean:**	**62,06 mg/m³**
Measurand:	**m-Xylene**	**Reprod. s.d.:**	**4,45 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**7,18%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**62,00 mg/m³**
Number of laboratories in calculation + outliers:	**12**	**Range of tolerance:**	**49,65 - 74,47 mg/m³ (|Z-Score| <= 2,00)**



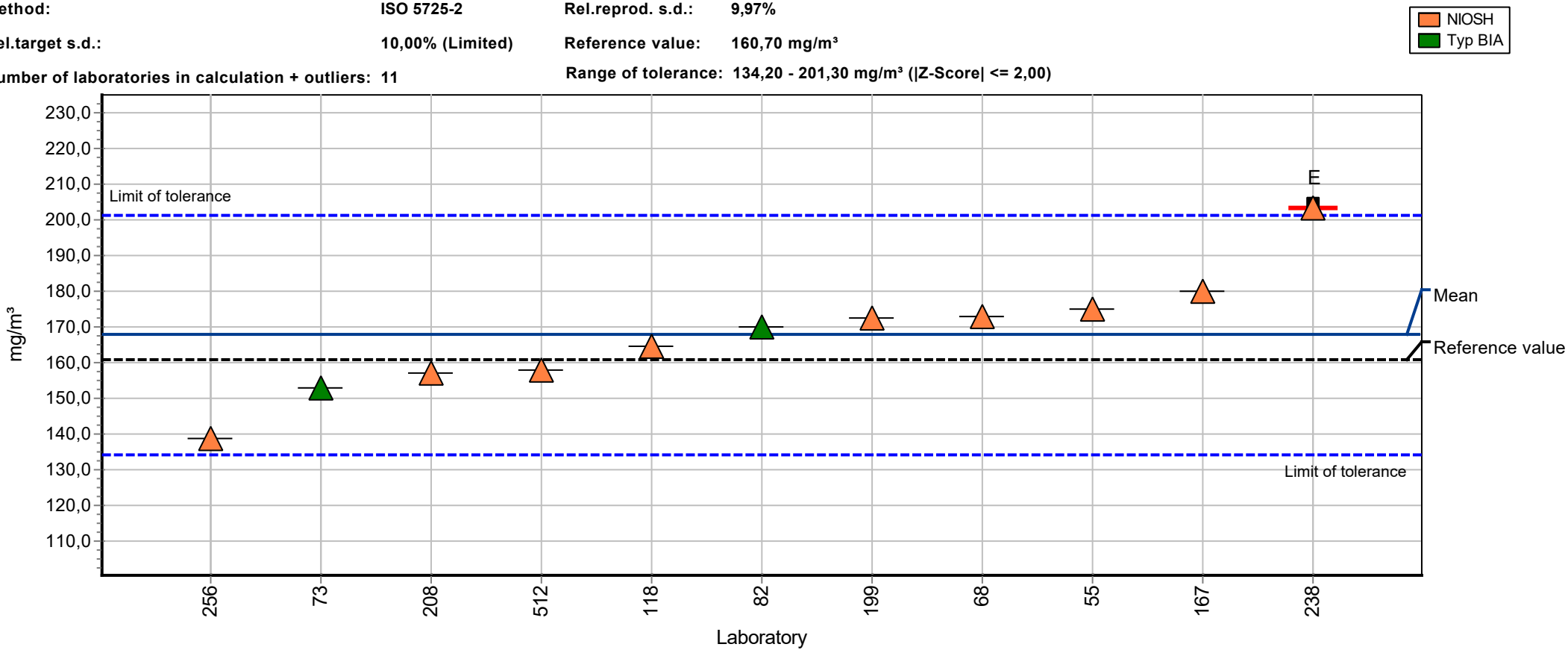
Summary results

Sample:	**2**	**Mean:**	**40,33 mg/m³**
Measurand:	**n-Hexane**	**Reprod. s.d.:**	**5,51 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**13,66%**
Rel.target s.d.:	**15,00% (Limited)**	**Reference value:**	**41,60 mg/m³**
Number of laboratories in calculation + outliers:	**9**	**Range of tolerance:**	**28,23 - 52,42 mg/m³ (|Z-Score| <= 2,00)**



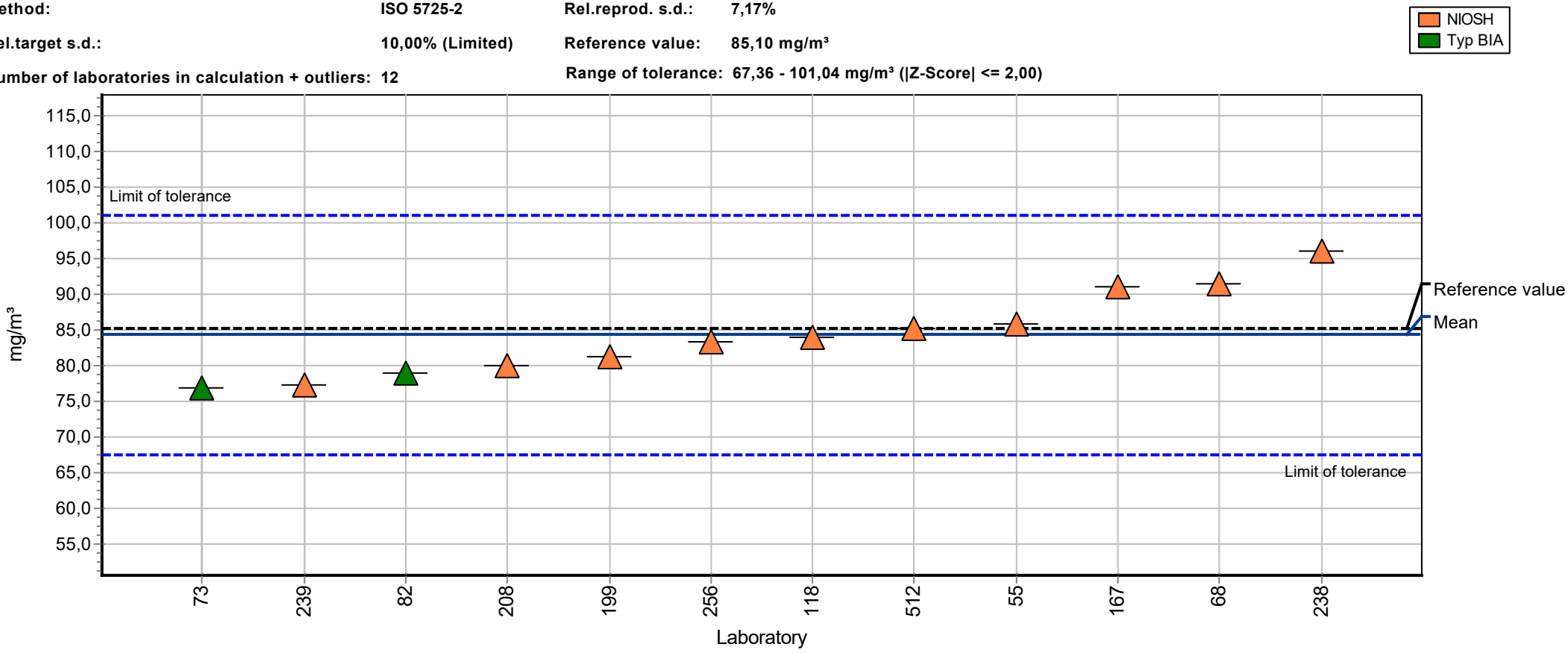
Summary results

Sample:	**2**	**Mean:**	**167,75 mg/m³**
Measurand:	**n-Octane**	**Reprod. s.d.:**	**16,73 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**9,97%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**160,70 mg/m³**
Number of laboratories in calculation + outliers:	**11**	**Range of tolerance:**	**134,20 - 201,30 mg/m³ (|Z-Score| <= 2,00)**



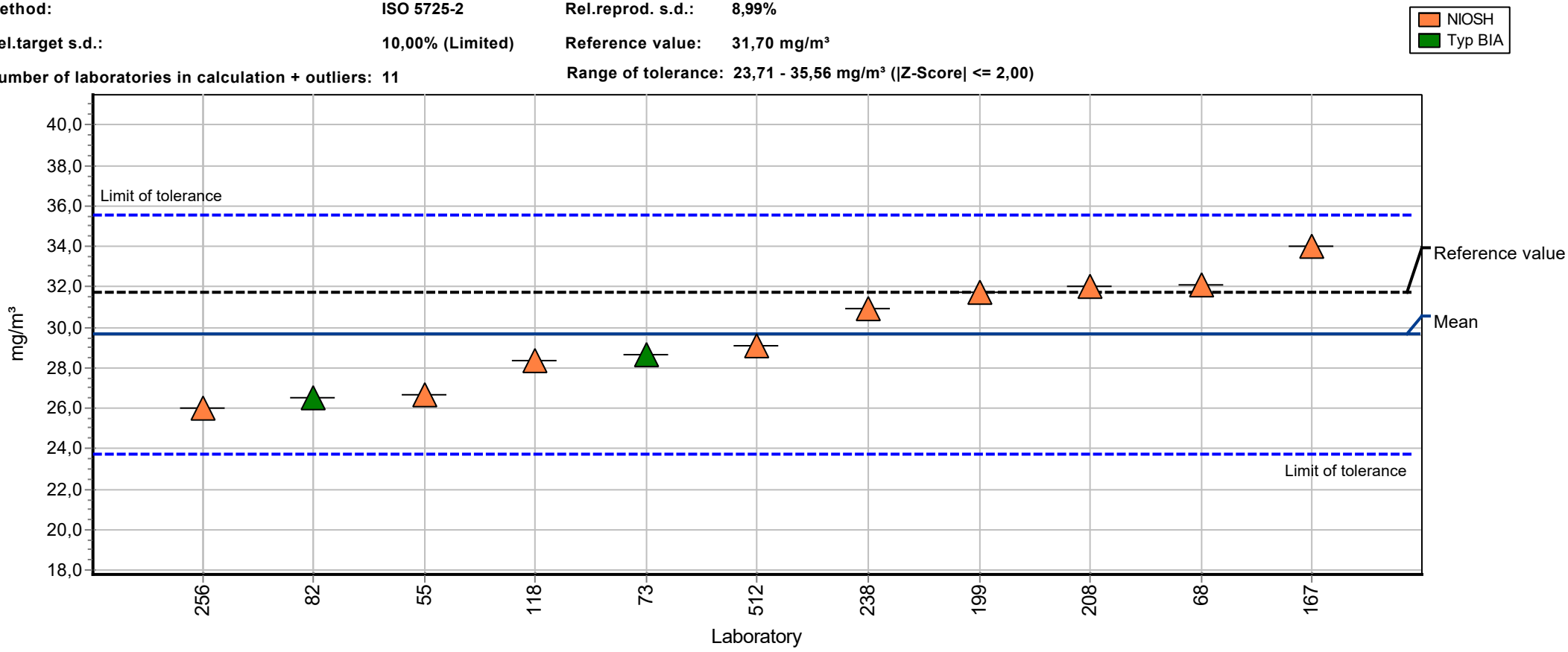
Summary results

Sample:	**2**	**Mean:**	**84,20 mg/m³**
Measurand:	**Toluene**	**Reprod. s.d.:**	**6,03 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**7,17%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**85,10 mg/m³**
Number of laboratories in calculation + outliers:	**12**	**Range of tolerance:**	**67,36 - 101,04 mg/m³ (|Z-Score| <= 2,00)**



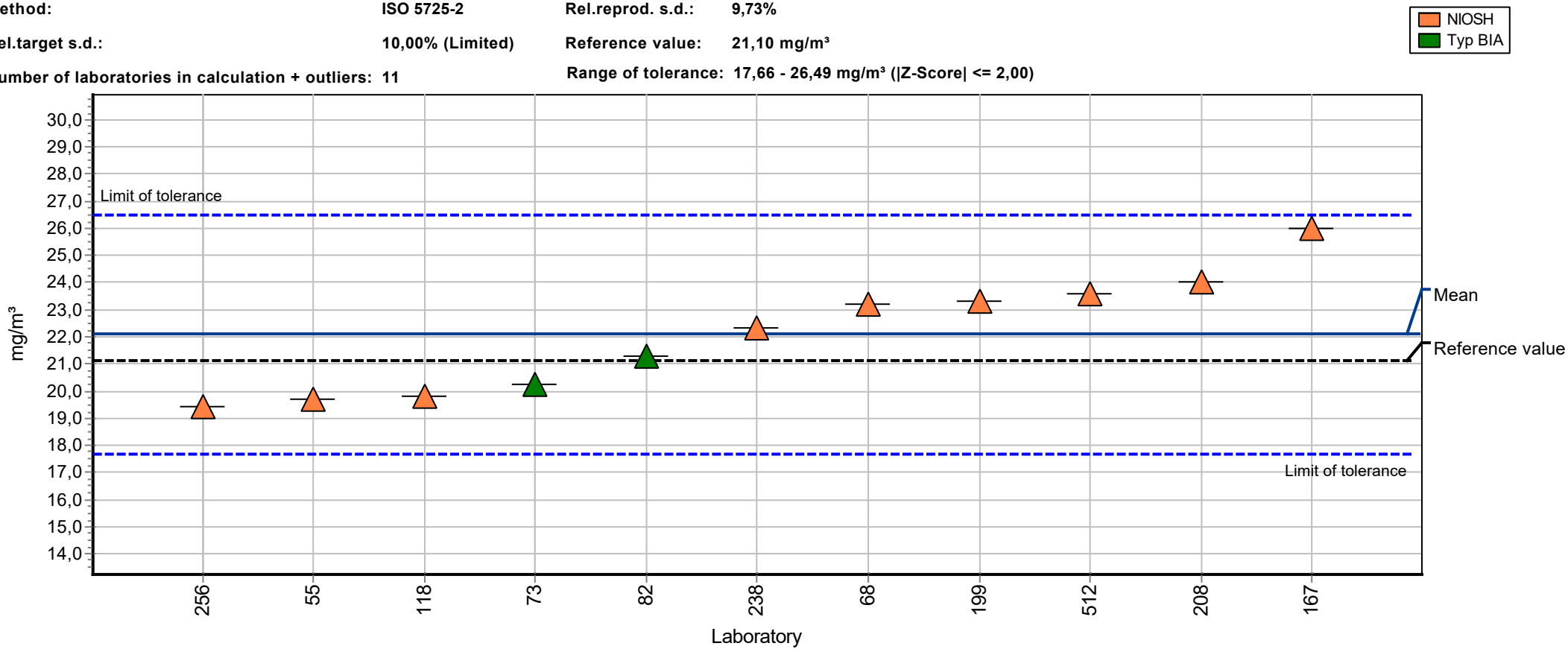
Summary results

Sample:	**3**	**Mean:**	**29,64 mg/m³**
Measurand:	**1,2,4-Trimethylbenzeen**	**Reprod. s.d.:**	**2,66 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**8,99%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**31,70 mg/m³**
Number of laboratories in calculation + outliers:	**11**	**Range of tolerance:**	**23,71 - 35,56 mg/m³ (|Z-Score| <= 2,00)**



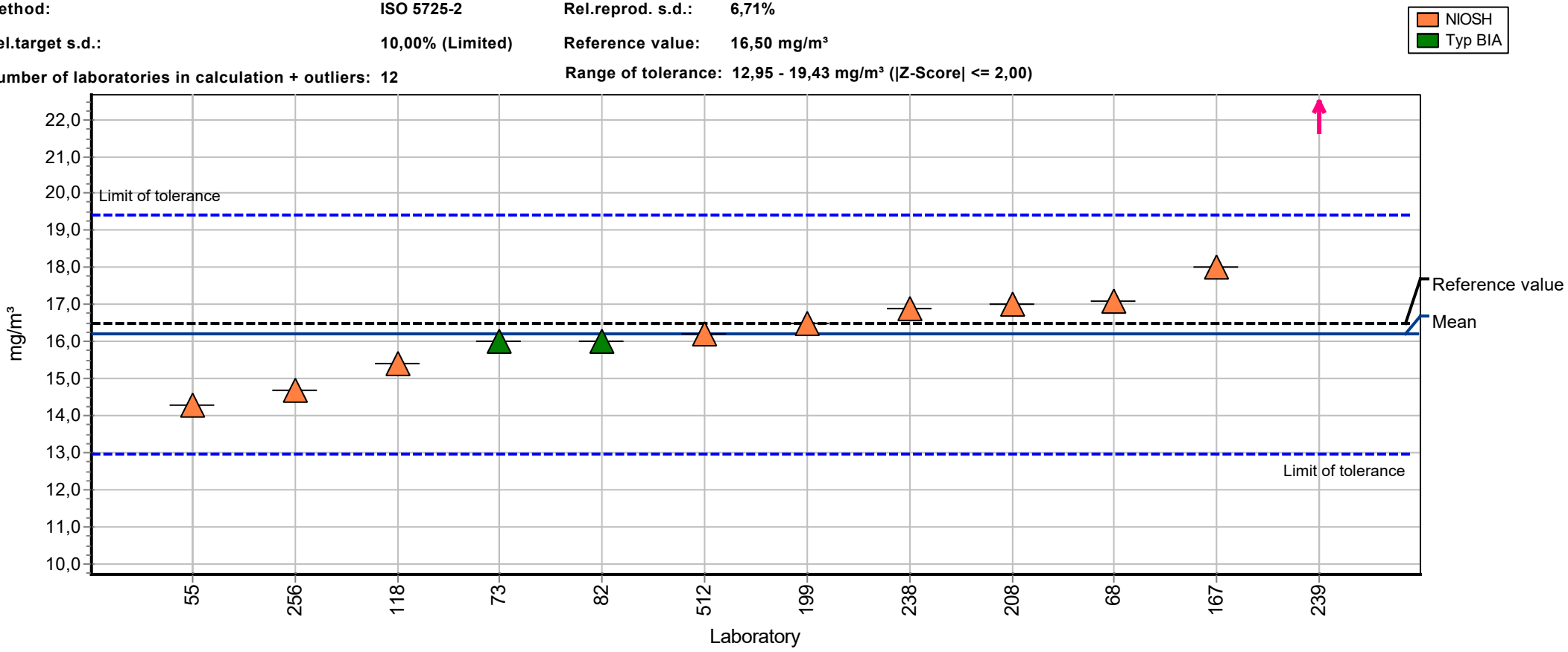
Summary results

Sample:	**3**	**Mean:**	**22,08 mg/m³**
Measurand:	**Cumene**	**Reprod. s.d.:**	**2,15 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**9,73%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**21,10 mg/m³**
Number of laboratories in calculation + outliers:	**11**	**Range of tolerance:**	**17,66 - 26,49 mg/m³ (|Z-Score| <= 2,00)**



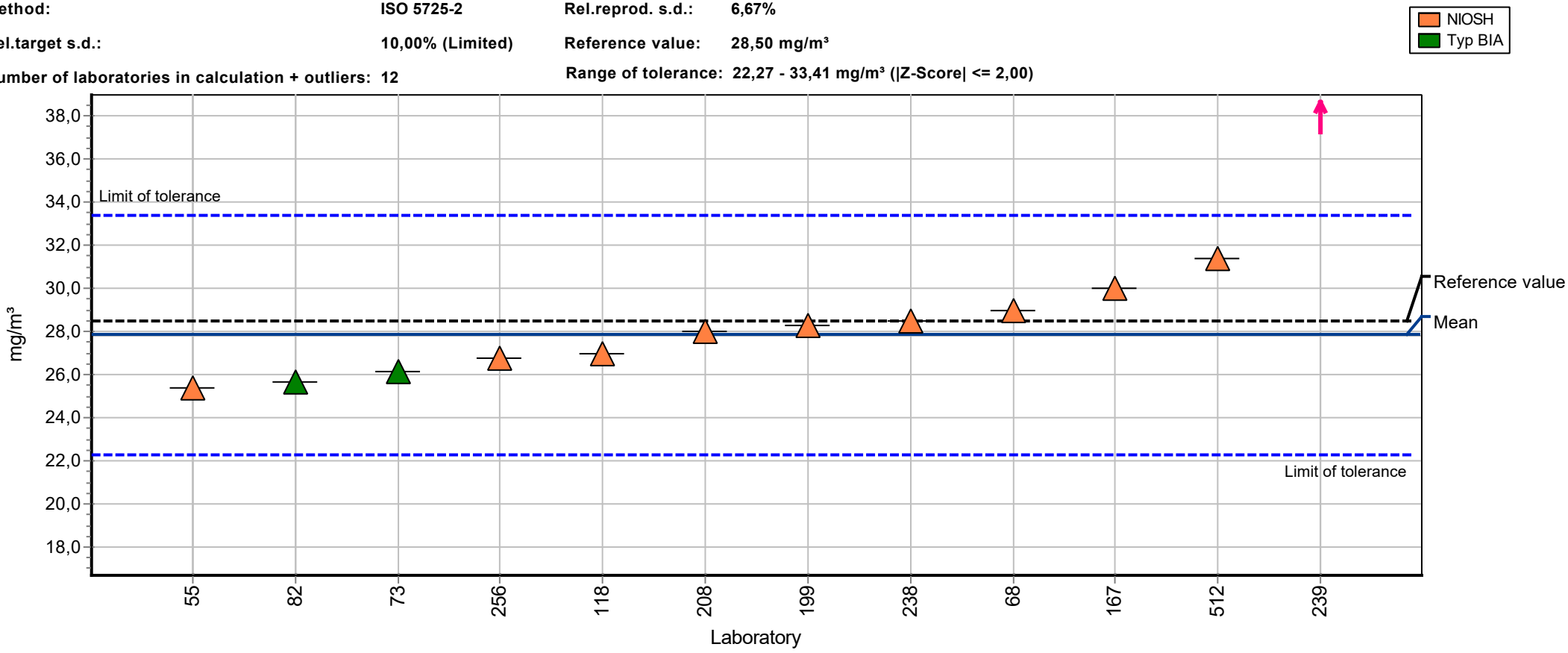
Summary results

Sample:	**3**	**Mean:**	**16,19 mg/m³**
Measurand:	**Ethylbenzene**	**Reprod. s.d.:**	**1,09 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**6,71%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**16,50 mg/m³**
Number of laboratories in calculation + outliers:	**12**	**Range of tolerance:**	**12,95 - 19,43 mg/m³ (|Z-Score| <= 2,00)**



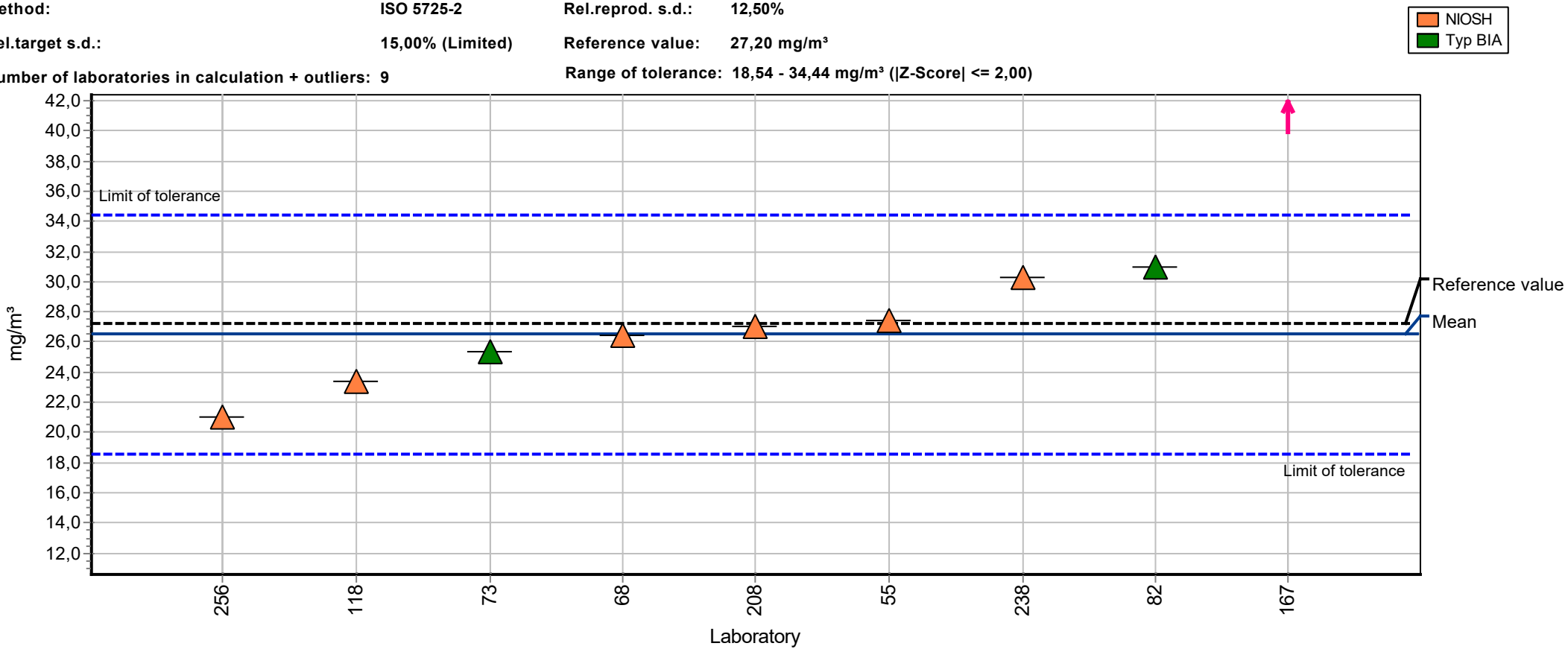
Summary results

Sample:	**3**	**Mean:**	**27,84 mg/m³**
Measurand:	**m-Xylene**	**Reprod. s.d.:**	**1,86 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**6,67%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**28,50 mg/m³**
Number of laboratories in calculation + outliers:	**12**	**Range of tolerance:**	**22,27 - 33,41 mg/m³ (|Z-Score| <= 2,00)**



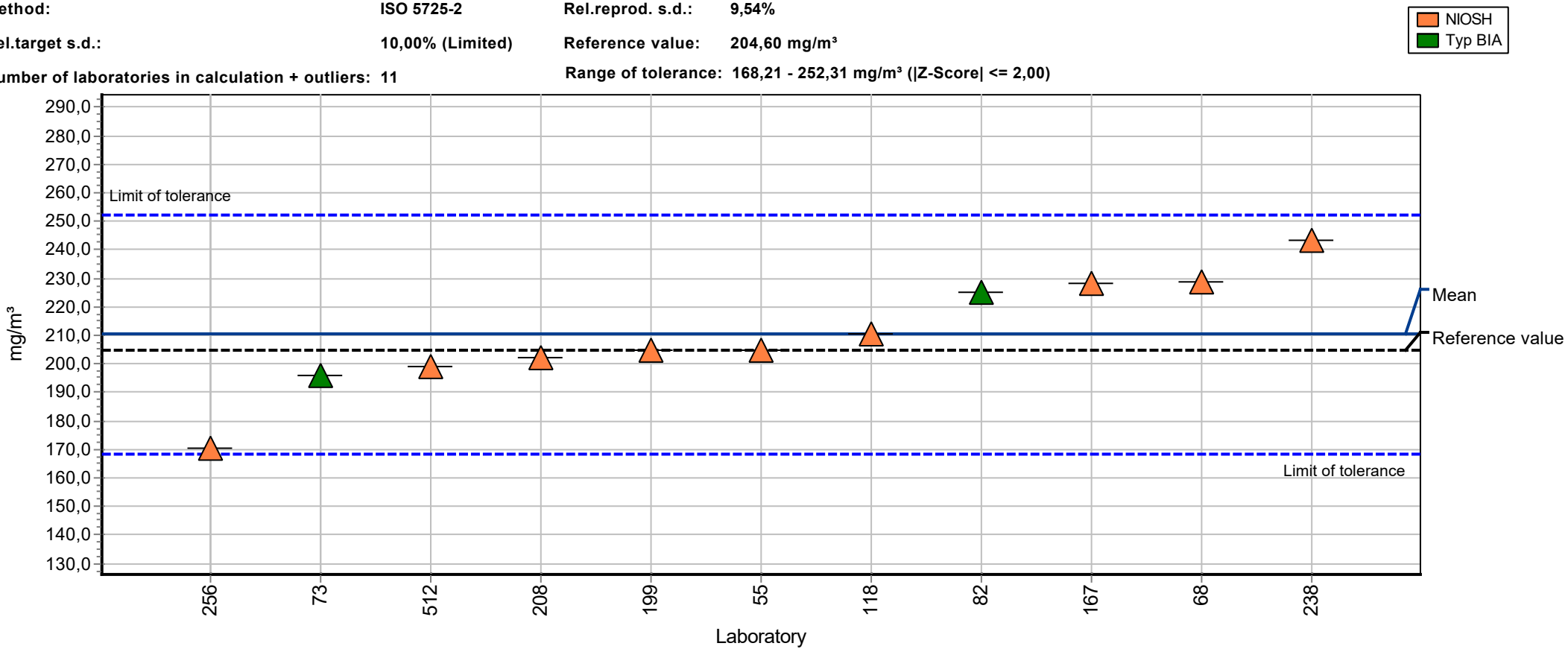
Summary results

Sample:	**3**	**Mean:**	**26,49 mg/m³**
Measurand:	**n-Hexane**	**Reprod. s.d.:**	**3,31 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**12,50%**
Rel.target s.d.:	**15,00% (Limited)**	**Reference value:**	**27,20 mg/m³**
Number of laboratories in calculation + outliers:	**9**	**Range of tolerance:**	**18,54 - 34,44 mg/m³ (|Z-Score| <= 2,00)**



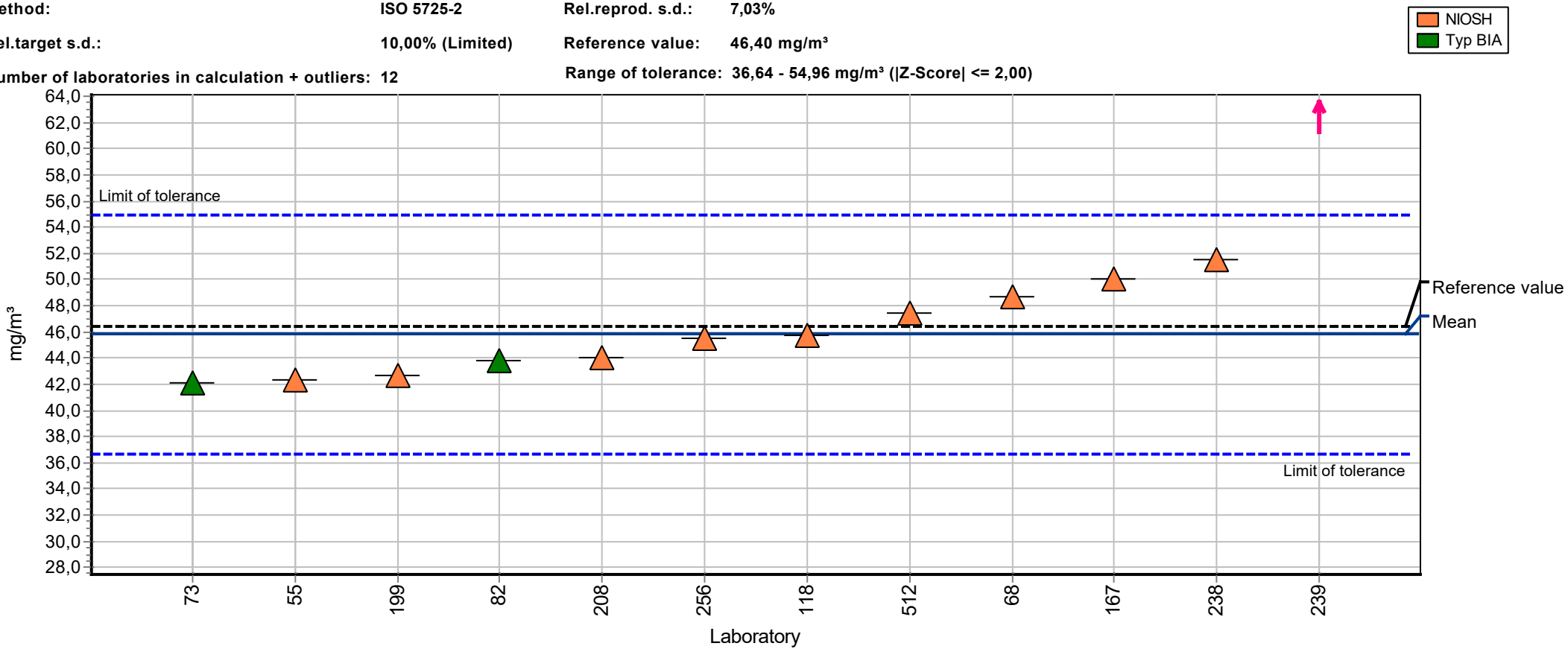
Summary results

Sample:	**3**	**Mean:**	**210,26 mg/m³**
Measurand:	**n-Octane**	**Reprod. s.d.:**	**20,07 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**9,54%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**204,60 mg/m³**
Number of laboratories in calculation + outliers:	**11**	**Range of tolerance:**	**168,21 - 252,31 mg/m³ (|Z-Score| <= 2,00)**



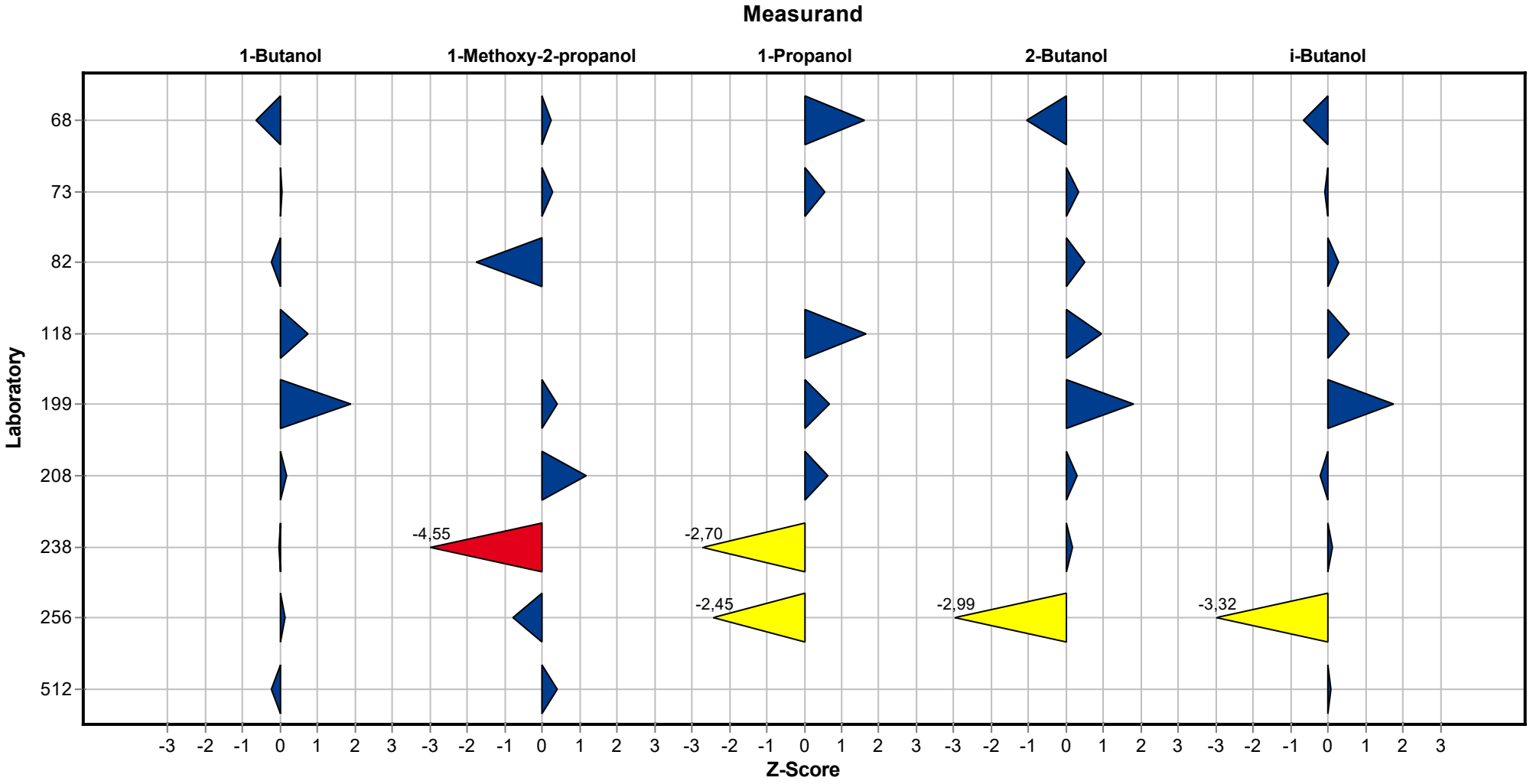
Summary results

Sample:	**3**	**Mean:**	**45,80 mg/m³**
Measurand:	**Toluene**	**Reprod. s.d.:**	**3,22 mg/m³**
Method:	**ISO 5725-2**	**Rel.reprod. s.d.:**	**7,03%**
Rel.target s.d.:	**10,00% (Limited)**	**Reference value:**	**46,40 mg/m³**
Number of laboratories in calculation + outliers:	**12**	**Range of tolerance:**	**36,64 - 54,96 mg/m³ (|Z-Score| <= 2,00)**



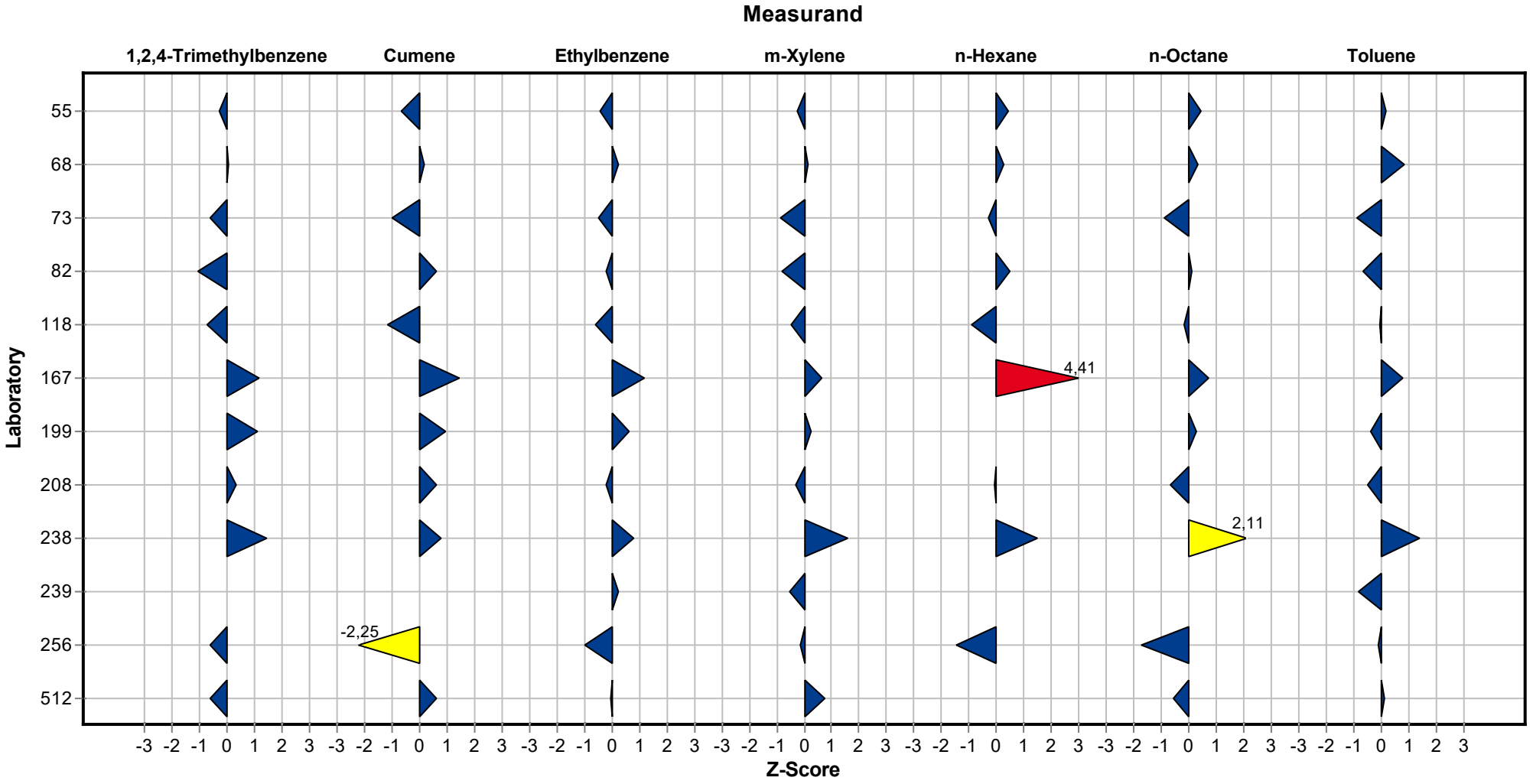
Sample chart of Z-scores

Sample 1



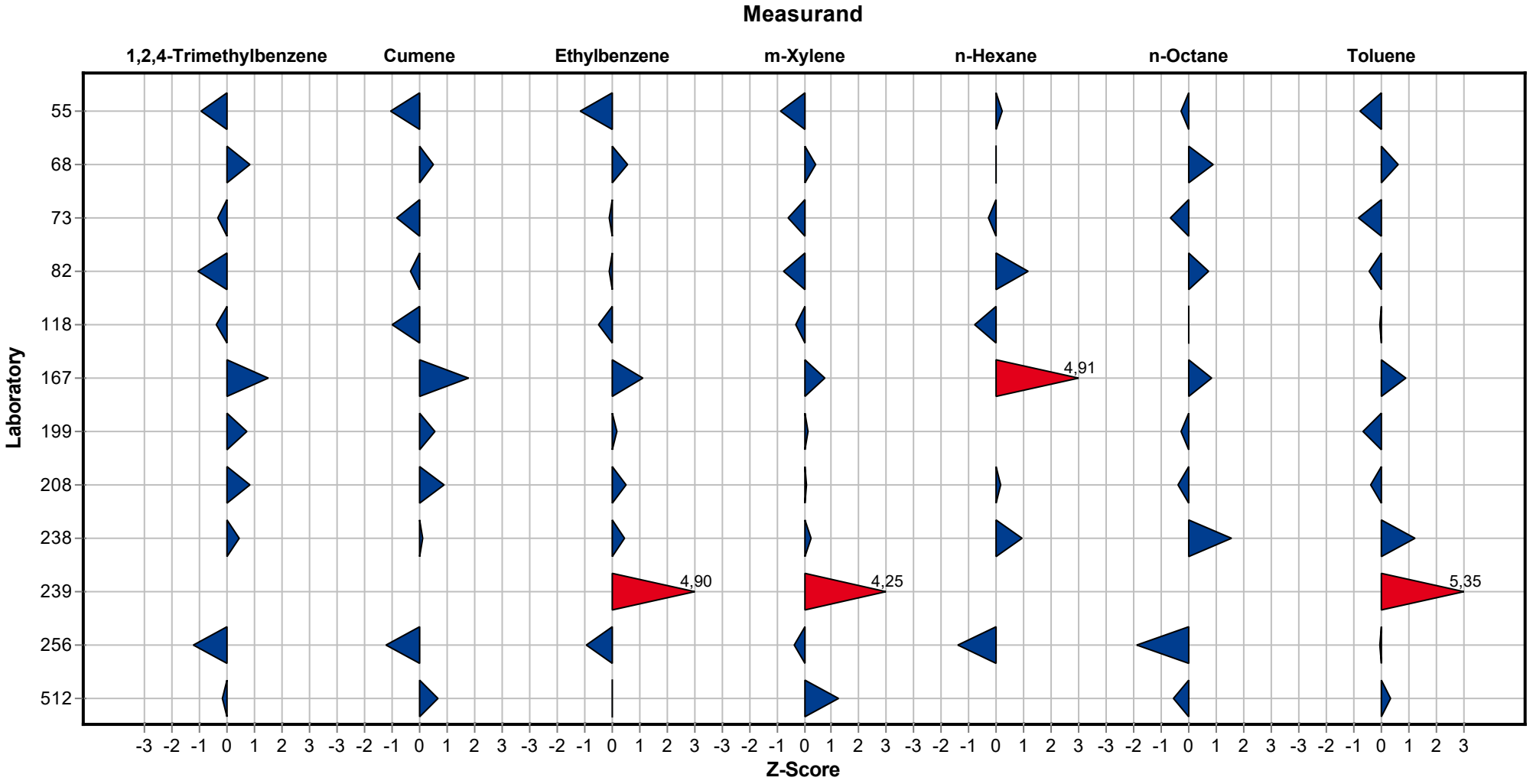
Sample chart of Z-scores

Sample 2



Sample chart of Z-scores

Sample 3

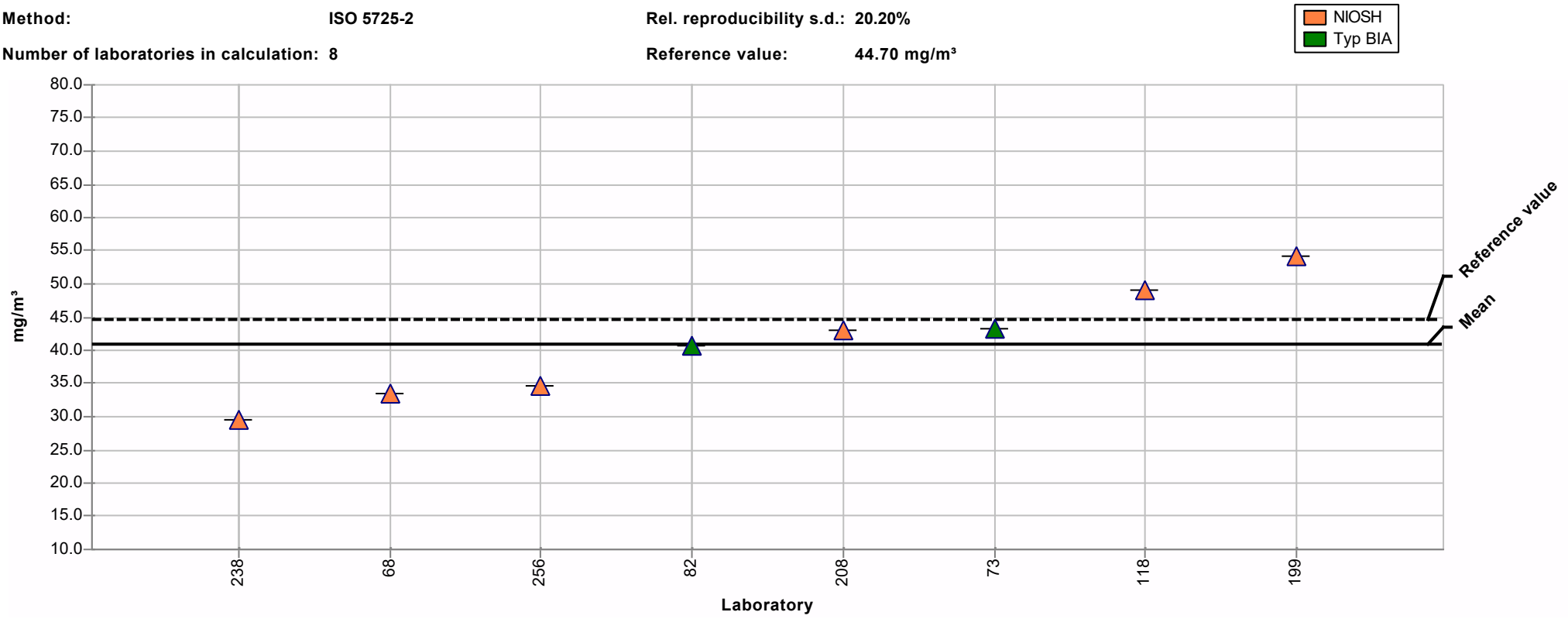


Summary of laboratory test results

Laboratory	Sample 1 2-Propanol	Sample 2 Ethylacetate	Sample 3 Ethylacetate
Unit	mg/m³	mg/m³	mg/m³
68	33.42	68.00	121.08
73	43.37	66.31	119.70
82	40.70	54.80	109.00
118	49.17		
167		102.00	201.00
199	54.20	78.70	131.00
208	43.00	66.00	121.00
238	29.50	60.20	112.70
256	34.70	46.90	84.00
512		77.20	138.00
–	– –	– –	– –
Method	ISO 5725-2	ISO 5725-2	ISO 5725-2
Assessment	unknow n	unknow n	unknow n
No. of laboratories that submitted results	8	8	9
Mean	41.01	68.90	126.39
Reproducibility s.d.	8.28	15.95	31.84
Rel. reproducibility s.d.	20.20 %	23.15 %	25.19 %
Reference value	44.70	65.40	117.80
Target s.d.	4.10	6.89	12.64
Rel. target s.d.	10.00 %	10.00 %	10.00 %

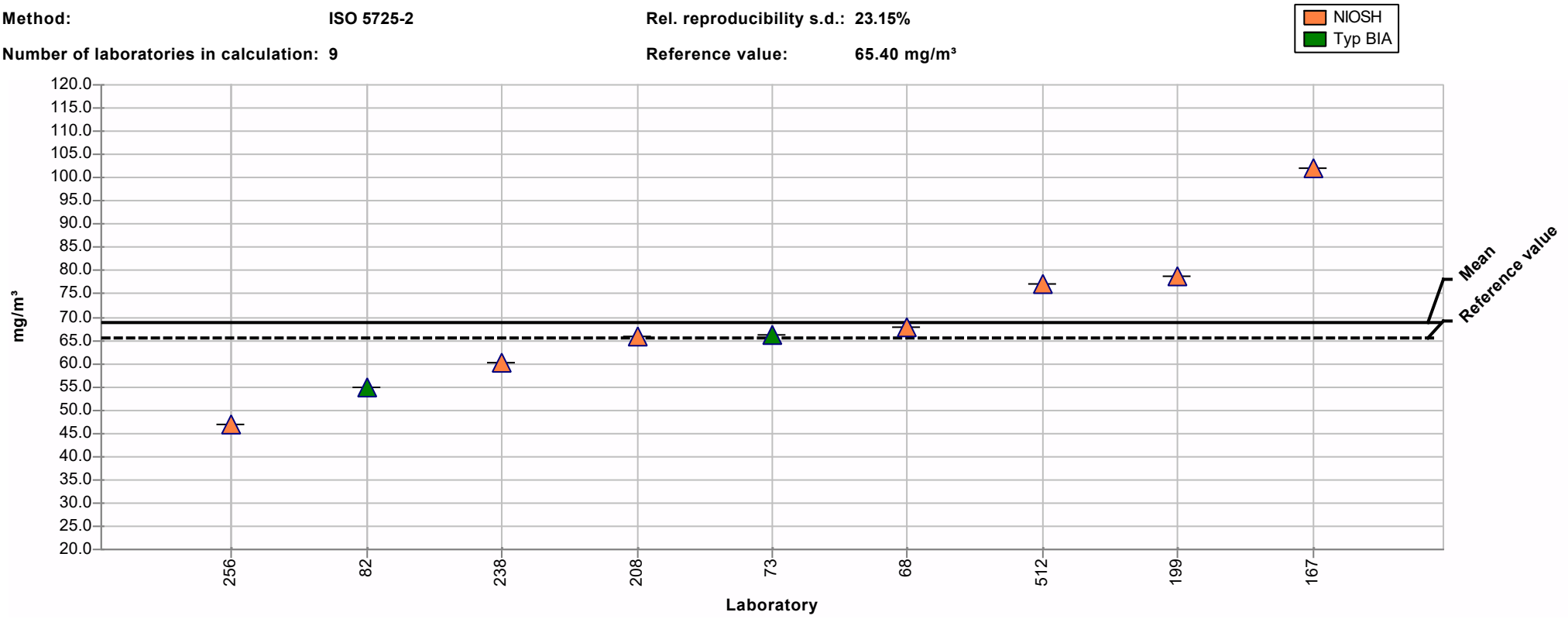
Summary results

Sample:	**1**	**Mean:**	**41.01 mg/m³**
Measurand:	**2-Propanol**	**Reproducibility s.d.:**	**8.28 mg/m³**
Method:	**ISO 5725-2**	**Rel. reproducibility s.d.:**	**20.20%**
Number of laboratories in calculation:	**8**	**Reference value:**	**44.70 mg/m³**



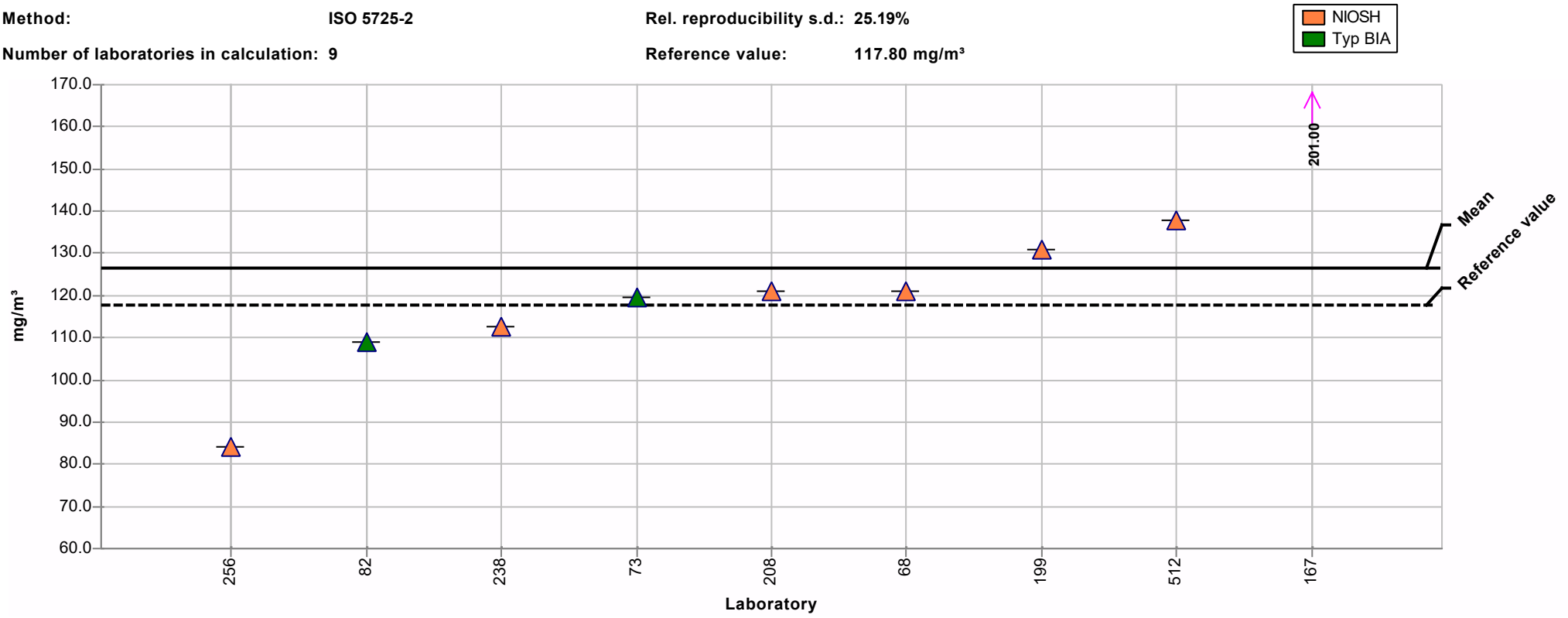
Summary results

Sample:	**2**	**Mean:**	**68.90 mg/m³**
Measurand:	**Ethylacetate**	**Reproducibility s.d.:**	**15.95 mg/m³**
Method:	**ISO 5725-2**	**Rel. reproducibility s.d.:**	**23.15%**
Number of laboratories in calculation:	**9**	**Reference value:**	**65.40 mg/m³**



Summary results

Sample:	**3**	**Mean:**	**126.39 mg/m³**
Measurand:	**Ethylacetate**	**Reproducibility s.d.:**	**31.84 mg/m³**
Method:	**ISO 5725-2**	**Rel. reproducibility s.d.:**	**25.19%**
Number of laboratories in calculation:	**9**	**Reference value:**	**117.80 mg/m³**



Questions and Answers

Participant	Analytical method	Sample carrier
55	intern method	
68	Weder DFG noch IFA-Arbeitsmappe	Dräger Aktivkohle Typ NIOSH (10)
73	Probe 1 IFA-Arbeitsmappe 8414 , , Probe 2 und 3 IFA Arbeitsmappe 7732 / 7733 / 7322	A-Kohle Typ B/G
82	Hauseigene Methode	Typ BIA
118	Inhouse-Methode in Anlehnung an IFA-Arbeitsmappen	NIOSH
167	Internal Method	Activated charcoal tubes NIOSH
199	Hausmethode, angelehnt an VDI 2100 Blatt 2	NIOSH
208	In-house method	Dräger NIOSH
238	NF X 43-267	? not understand
239	GC-MS	Turret automatic liquid sampler
256	VDI 2100 Blatt2	NIOSH (Prod. No. 64 00742) Fa. Dräger Safety
512	LA-GC-012.04a	Aktivkohleröhrchen

Participant	Front- and back section	Desorption solution	Volume of desorption solution
55	yes	CS2	2
68	Ja	CS2	1 ml
73	Ja	Ternäres Gemisch (CH2Cl2 : CS2 : MeOH) = 60 : 35 : 5	ca. 2
82	Ja	CS2	2 mL
118	nein, zusammen	ternäres Gemisch (CH2CL2:CS2:MeOH) = 60:35:5	10mL
167	Yes	CS2	1.5
199	nein	Benzylalkohol	5ml
208	Yes	2% Dimethylformamide in Carbon disulphide	1.5
238	yes	CS2 for sample 2 and 3 and Dichloromethane + CS2 for sample 1	2 mL
239	Y	CS2	0.5
256	nein	Diethylether und CS2	2x 5 ml
512	nein	Dichlormethan	5 mL

Participant	Gas chromatograph (GC)	Carrier gas	Sample injection

Participant	Gas chromatograph (GC)	Carrier gas	Sample injection
55	Agilent	He	split
68	Agilent 8890	Helium	split
73	Agilent 7890B	Wasserstoff	split 1:45
82	Agilent 7890A / 8890	Stickstoff / Wasserstoff	split
118	Agilent 7890A	Stickstoff	on-column
167	Agilent 7890	Helium	Splitless
199	Headspace-GC/MS	Helium	split
208	Agilent 6890	Helium	split
238	Sample 2 and 3 : GC-MS and Sample 1 : GC-FID	Helium	split
239	Agilent 8890	helium	split
256	Agilent Technologies 7890B	Helium	Splitless
512	GC/MS	Helium	splitlos

Participant	Data evaluation
55	internal standard
68	interner Standard
73	Interner Standard n-Heptan ~1mg/ml
82	Quantifizierung über Internen Standard, Identifikation über Retentionszeiten der Bezugssubstanzen
118	interner Standard
167	Internal Standard
199	externe Standards mit Korrektur über internen Standard
208	External standard
238	internal
239	internal standard
256	Interner Standard
512	externer Standard, Korrektur über internen Standard

Participant	Analytical column	Detector	Recovery rate
55	RTX 502.2	MS	yes
68	Vocol von Supelco	FID	Ja
73	DB5-MS , , Länge: 60 m, , ID: 0.25 mm, , Belegung: 1 µm	FID	Nein

Proficiency testing scheme Organic solvents 2023, evaluated measurands

Participant	Analytical column	Detector	Recovery rate
82	HP5 30m 0,32µm X 0,25µm / DB-1 60m 0,32µm X 1,00µm	FID	Nein
118	DB-5 / DB-WAX	FID	
167	Agilent DB-5MS UI, 30m, 0.25mm i.d., 0.25µm film thickness	FID	Yes
199	DB-1701 und DB-5.625	MS	nein
208	HP-5, Innow ax	FID	No
238	DB624	Sample 2 and 3 : GC-MS and Sample 1 : GC-FID	No
239	Restek Rxi- 624sil MS 20m X 0.18 mm x 1. µm	MS	noi
256	RTx-624, 40 m, 0.18 mm ID, 1 ul Film	MSD	ja
512	DB-5.625 und DB-1701	MS	nein

Participant	Date of analysis
55	11/04/2023
68	19./20.04.2023
73	Probe 1 29.03.23, , Probe 2 und 3 30.03.23
82	20.04.2023 / 27.04.2023
118	30.03.2023
167	05-10.May.2023
199	31.03.2023 - 05.04.2023
208	29.3. 2023
238	2023/03/24
239	23/03/23
256	2023-03-24
512	30.03.2023