

Round-robin tests for in-house measuring laboratories

**Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA)
Institute for Occupational Safety and Health of the German Social Accident Insurance**

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Results and Evaluation

Inorganic acids March 2015

Part 1: Volatile acids

Summary of laboratory test results

	Sample 1	Z score	Sample 2	Z score	Sample 3	Z score
Unit	mg/m ³		mg/m ³		mg/m ³	
10	1,350	-0,41	2,270	0,56	3,530	0,34
64	1,520	0,79	2,430	1,31	3,870	1,34
68	< 0,050		< 0,050		0,620	-8,18 BE
78	1,292	-0,83	1,937	-0,99	3,178	-0,69
82	1,447	0,27	2,232	0,39	3,599	0,55
95	1,390	-0,13	1,950	-0,93	3,820	1,19
100	1,456	0,34	2,210	0,28	3,621	0,61
110	1,540	0,93	2,290	0,66	2,570	-2,47 E
114	1,537	0,91	2,213	0,30	3,731	0,93
126	1,240	-1,20	1,810	-1,58	3,020	-1,15
151	1,470	0,44	2,250	0,47	3,430	0,05
163	1,140	-1,91	2,150	0,00	2,800	-1,79
177			1,967	-0,85	3,183	-0,67
178	1,584	1,25	2,410	1,21	10,460	20,65 BE
195	1,090	-2,26 E	1,620	-2,46 E	2,560	-2,50 E
208	1,420	0,08	2,160	0,05	3,500	0,26
224	1,450	0,30	2,230	0,38	3,660	0,73
239	1,525	0,83	2,334	0,86	3,643	0,68
242	1,480	0,51	2,220	0,33	3,560	0,43
248	1,537	0,91	2,255	0,49	4,076	1,94
264	1,300	-0,77	2,000	-0,69	3,200	-0,62
280	1,400	-0,06	2,190	0,19	3,700	0,84
-	-	--	-	--	-	--
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	21		22		22	
Mean	1,408		2,149		3,413	
Reproducibility s.d.	0,136		0,200		0,420	
Rel. reproducibility s.d.	9,67 %		9,31 %		12,31 %	
Reference value	1,470		2,200		3,530	
Target s.d.	0,141		0,215		0,341	
Rel. target s.d.:	10,00 %		10,00 %		10,00 %	
Lower limit of tolerance	1,127		1,719		2,730	
Upper limit of tolerance	1,690		2,579		4,095	
Type B outliers					2	
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	20		21		20	
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 >3,5						

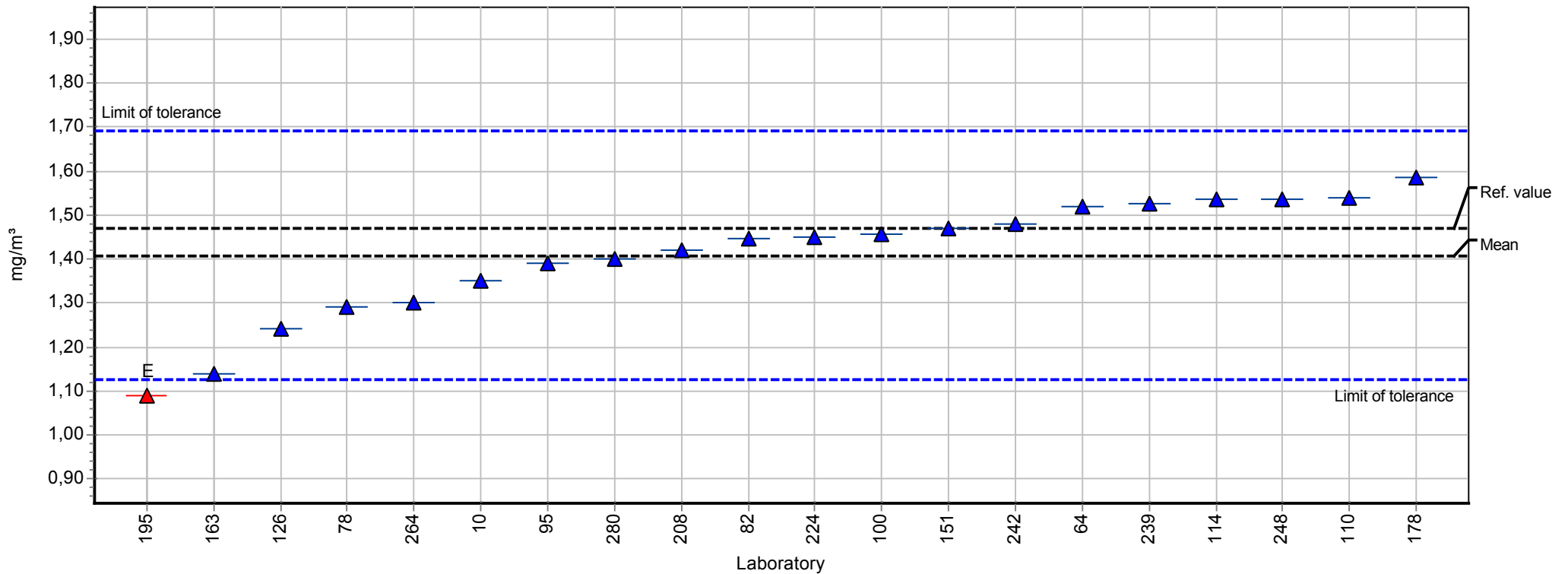
Summary of laboratory test results

Measurand nitric acid

	Sample 1	Z score	Sample 2	Z score	Sample 3	Z score
Unit	mg/m ³		mg/m ³		mg/m ³	
10	1,150	-0,07	1,810	0,53	2,790	1,08
64	1,250	0,79	1,850	0,76	2,700	0,72
68	0,030	-9,74 BE	0,030	-9,83 BE	0,210	-9,17 FE
78	1,004	-1,33	1,568	-0,88	2,301	-0,87
82	1,141	-0,15	1,819	0,58	2,728	0,83
95	1,110	-0,41	1,620	-0,58	2,670	0,60
100	1,223	0,56	1,745	0,15	2,667	0,59
110	1,480	2,78 E	1,760	0,24	1,700	-3,25 E
114	1,078	-0,69	1,709	-0,06	2,728	0,83
151	1,150	-0,07	1,850	0,76	2,600	0,32
163	1,000	-1,36	1,620	-0,58	2,060	-1,82
177			1,618	-0,59	2,522	0,01
178	1,340	1,57	1,930	1,23	4,320	7,15 FE
195	1,380	1,92	2,270	3,20 BE	2,630	0,44
208	1,120	-0,33	1,780	0,35	2,470	-0,19
224	1,800	5,54 BE	2,830	6,46 BE	0,520	-7,94 FE
239	1,010	-1,28	1,572	-0,86	2,413	-0,42
242	1,160	0,02	1,780	0,35	2,690	0,68
248	1,159	0,01	1,765	0,27	2,741	0,88
264	0,990	-1,45	1,400	-1,86	2,100	-1,66
280	1,100	-0,50	1,750	0,18	2,830	1,24
-	-	--	-	--	-	--
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	20		21		21	
Mean	1,158		1,719		2,519	
Reproducibility s.d.	0,135		0,130		0,302	
Rel. reproducibility s.d.	11,69 %		7,55 %		11,99 %	
Reference value	1,250		1,870		2,740	
Target s.d.	0,116		0,172		0,252	
Rel. target s.d.:	10,00 %		10,00 %		10,00 %	
Lower limit of tolerance	0,926		1,375		2,015	
Upper limit of tolerance	1,390		2,063		3,023	
Type B outliers	2		3			
Type F outliers					3	
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	18		18		18	
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 >3,5						

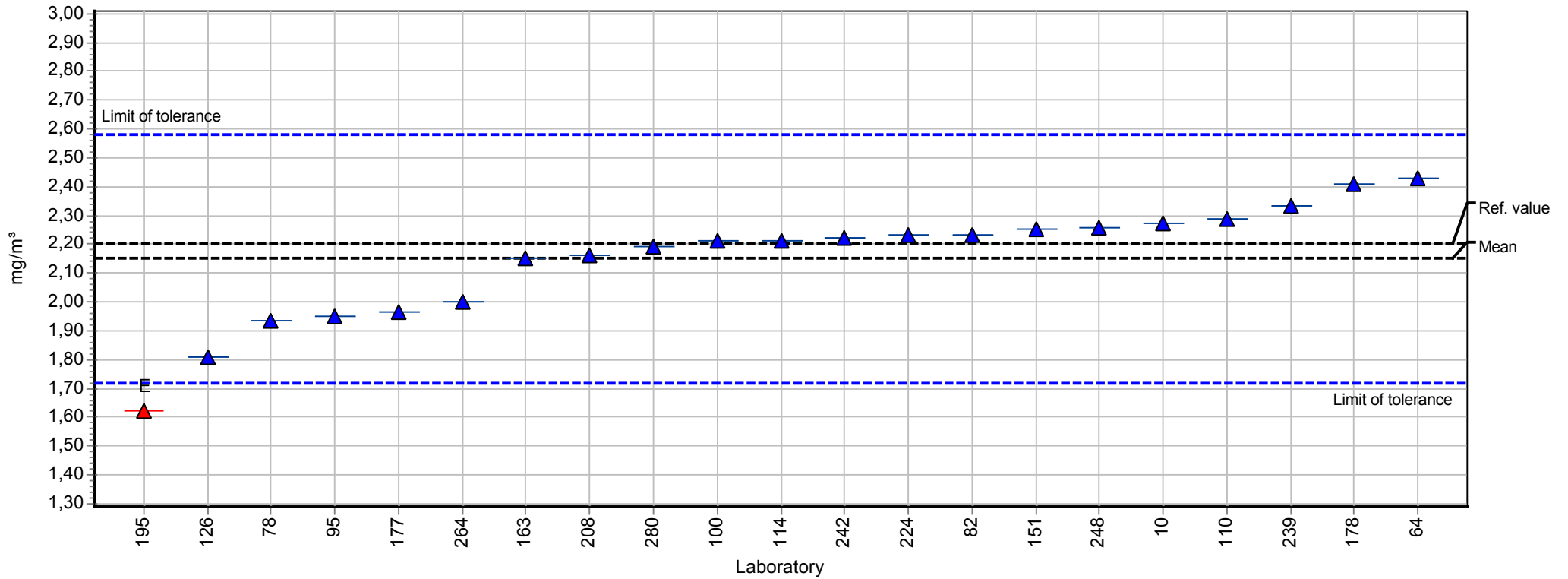
Summary results

Measurand:	hydrochloric acid	Mean:	1,408 mg/m ³
Sample:	1	Reproducibility s.d.:	0,136 mg/m ³
Method:	ISO 5725-2	Relative reproducibility s.d.:	9,67%
No. of laboratories:	20	Reference value:	1,470 mg/m ³
Relative target s.d.:	10,00% (Limited)	Range of tolerance:	1,127 - 1,690 mg/m ³ (Z-Score <= 2,00)



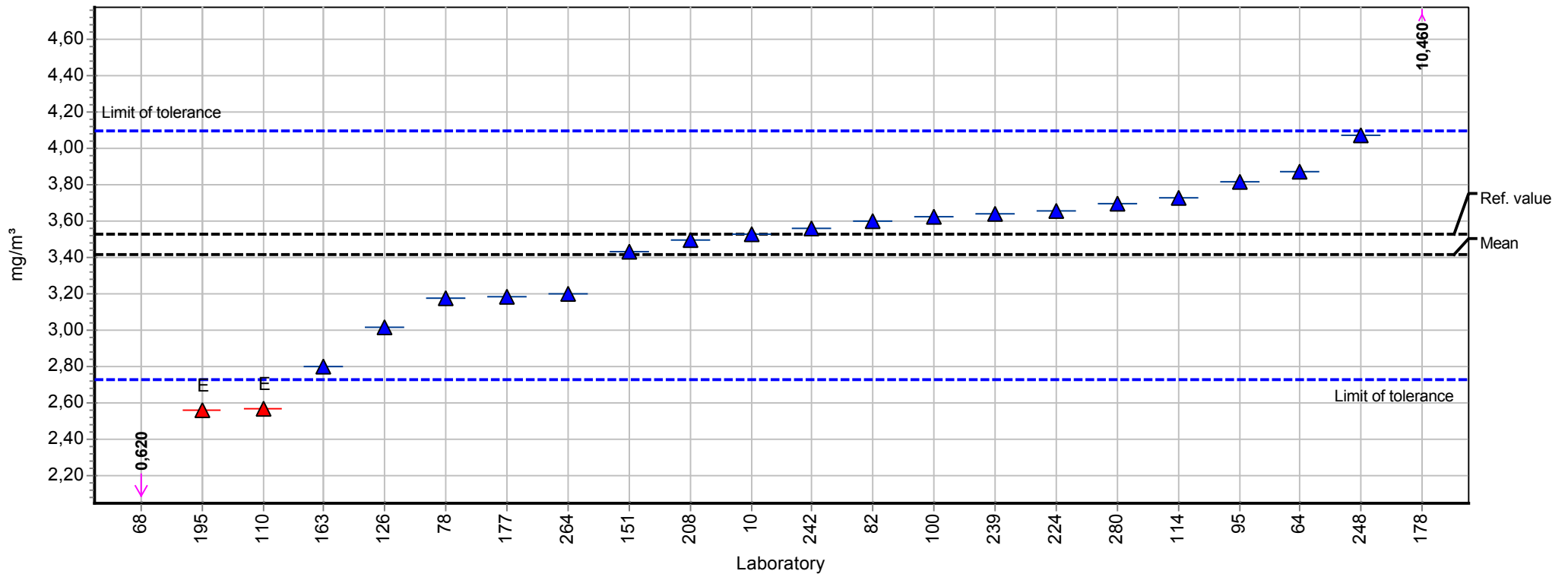
Summary results

Measurand:	hydrochloric acid	Mean:	2,149 mg/m ³
Sample:	2	Reproducibility s.d.:	0,200 mg/m ³
Method:	ISO 5725-2	Relative reproducibility s.d.:	9,31%
No. of laboratories:	21	Reference value:	2,200 mg/m ³
Relative target s.d.:	10,00% (Limited)	Range of tolerance:	1,719 - 2,579 mg/m ³ (Z-Score <= 2,00)



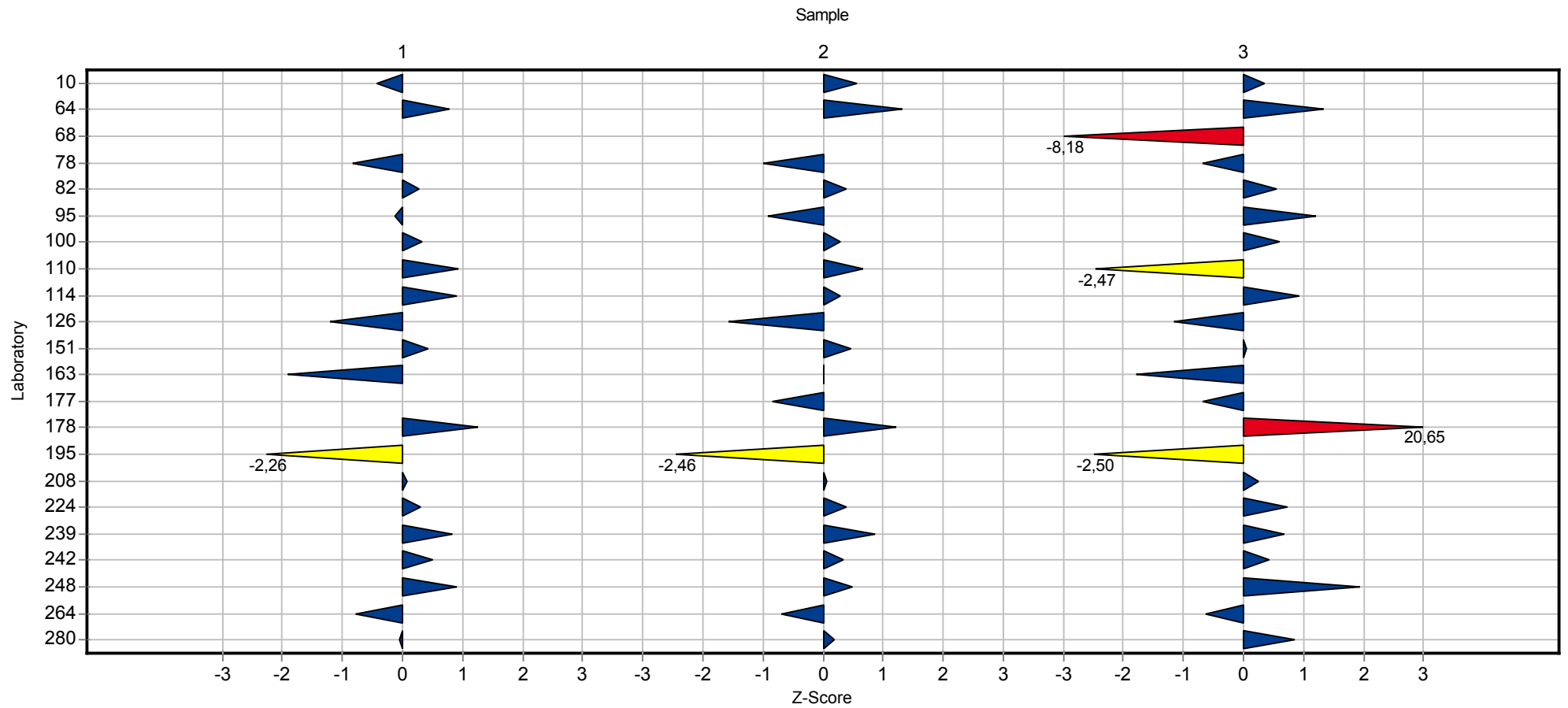
Summary results

Measurand:	hydrochloric acid	Mean:	3,413 mg/m ³
Sample:	3	Reproducibility s.d.:	0,420 mg/m ³
Method:	ISO 5725-2	Relative reproducibility s.d.:	12,31%
No. of laboratories:	20	Reference value:	3,530 mg/m ³
Relative target s.d.:	10,00% (Limited)	Range of tolerance:	2,730 - 4,095 mg/m ³ (Z-Score <= 2,00)



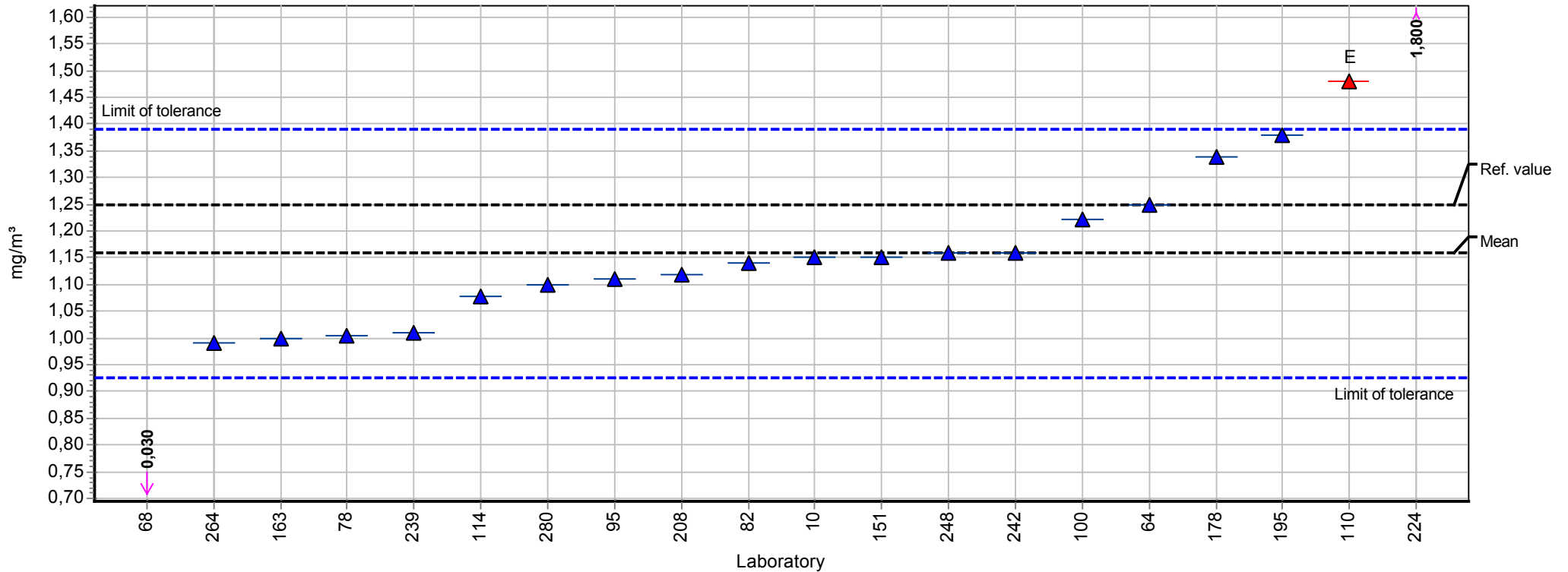
Analyte chart of Z-Scores

Measurand: hydrochloric acid



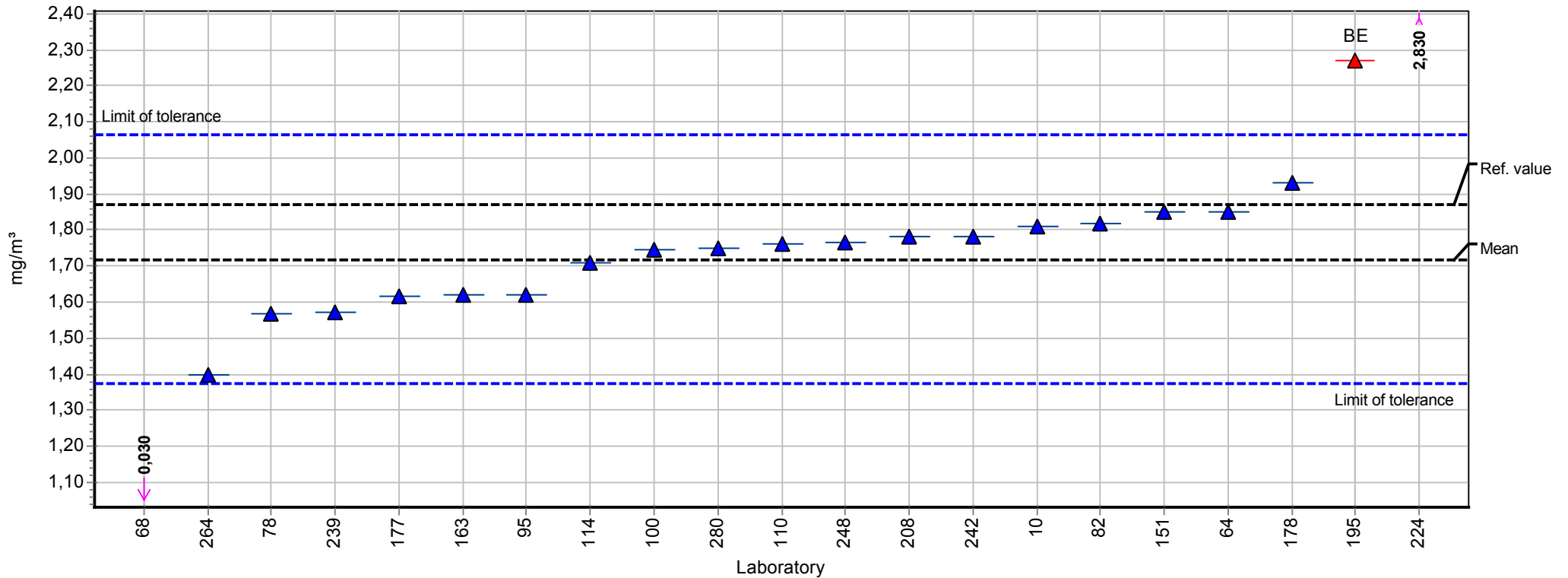
Summary results

Measurand:	nitric acid	Mean:	1,158 mg/m ³
Sample:	1	Reproducibility s.d.:	0,135 mg/m ³
Method:	ISO 5725-2	Relative reproducibility s.d.:	11,69%
No. of laboratories:	18	Reference value:	1,250 mg/m ³
Relative target s.d.:	10,00% (Limited)	Range of tolerance:	0,926 - 1,390 mg/m ³ ($ Z\text{-Score} \leq 2,00$)



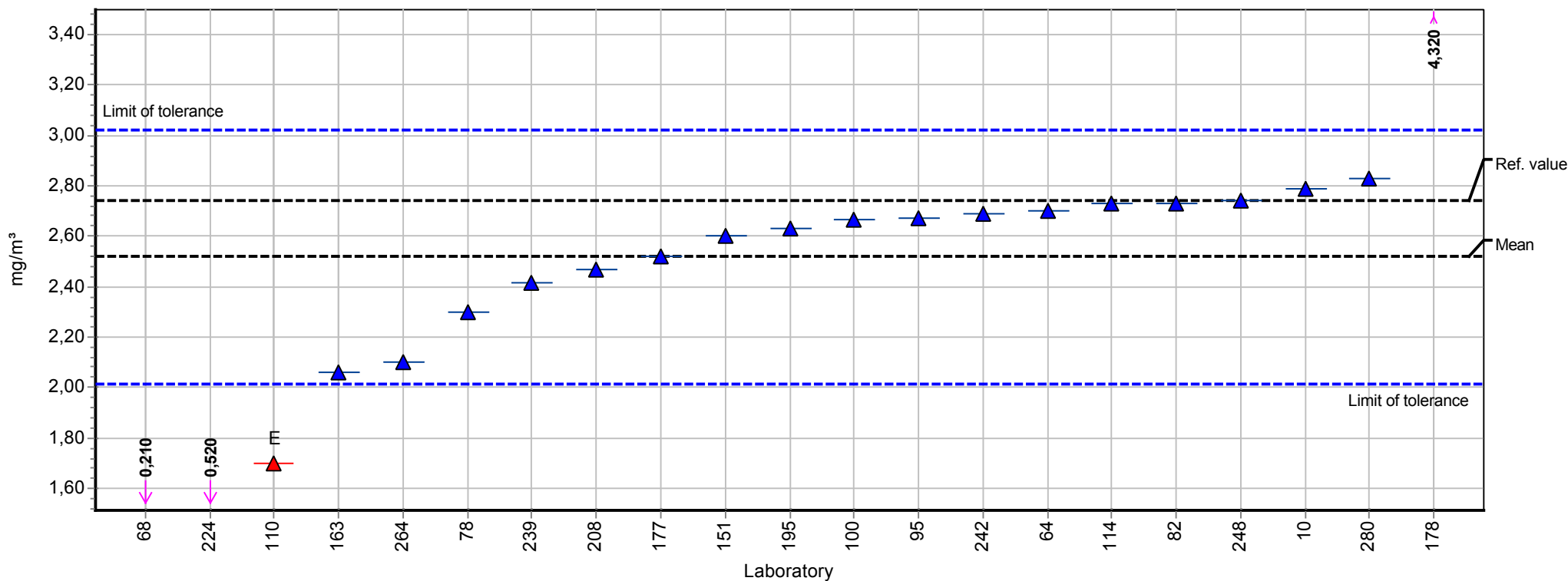
Summary results

Measurand:	nitric acid	Mean:	1,719 mg/m ³
Sample:	2	Reproducibility s.d.:	0,130 mg/m ³
Method:	ISO 5725-2	Relative reproducibility s.d.:	7,55%
No. of laboratories:	18	Reference value:	1,870 mg/m ³
Relative target s.d.:	10,00% (Limited)	Range of tolerance:	1,375 - 2,063 mg/m ³ (Z-Score <= 2,00)



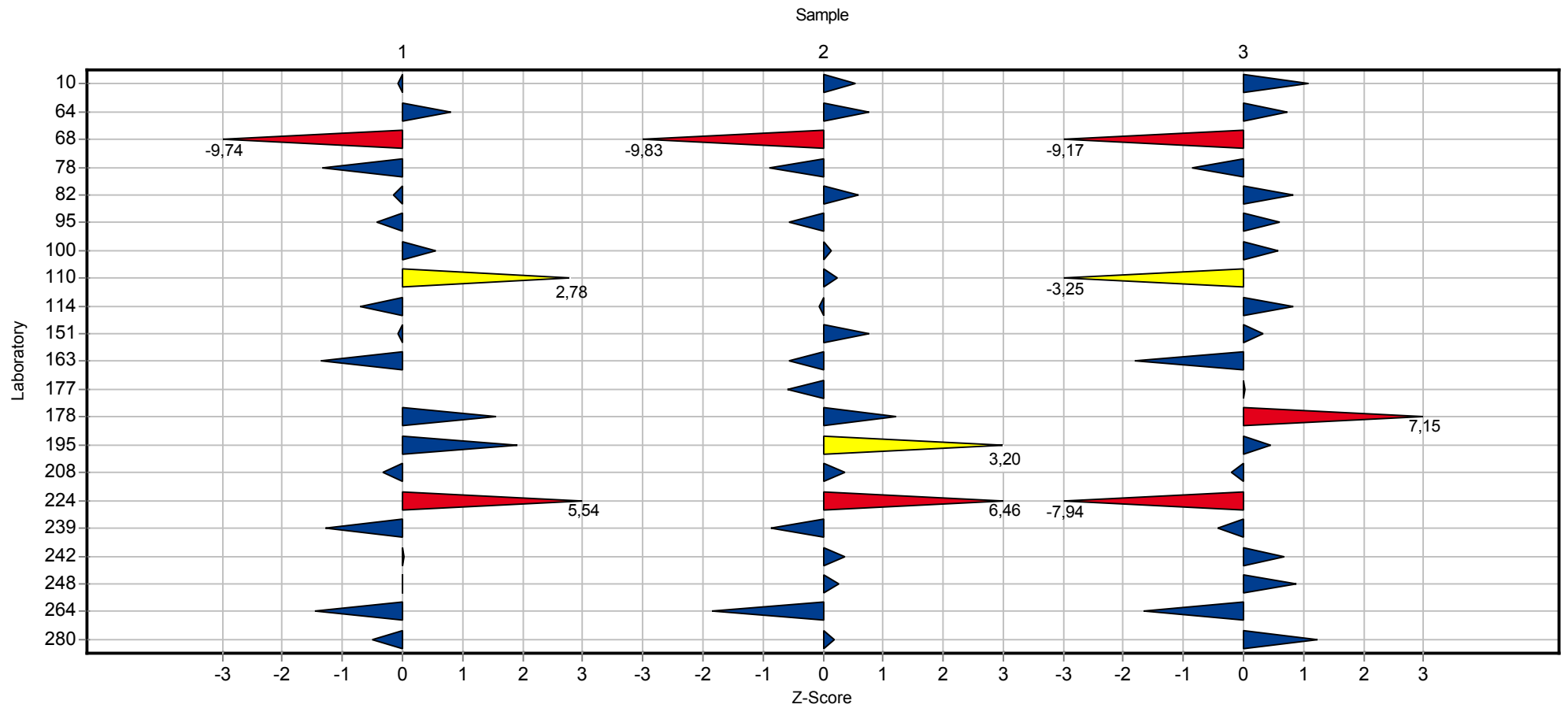
Summary results

Measurand:	nitric acid	Mean:	2,519 mg/m ³
Sample:	3	Reproducibility s.d.:	0,302 mg/m ³
Method:	ISO 5725-2	Relative reproducibility s.d.:	11,99%
No. of laboratories:	18	Reference value:	2,740 mg/m ³
Relative target s.d.:	10,00% (Limited)	Range of tolerance:	2,015 - 3,023 mg/m ³ (Z-Score <= 2,00)



Analyte chart of Z-Scores

Measurand: nitric acid



Questions and Answers

Participant	Analytical method
10	Ionic chromatography
64	BGIA 6172 und BGIA 6173
68	NIOSH
78	IFA 6172, IFA 6173
82	Ionenchromatographie DIN EN ISO 10304-1
95	Ionenchromatographie
100	ISO 21438-1, ISO 21438-2, ISO 21438-3 and MétroPol INRS number 009
110	nach IFA Arbeitsmappe
114	Ionic Chromatography
126	IFA 6172
151	Ion chromatography
163	Ion Chromatography with conductivity detection
177	
195	MTA/MA-019/A90
208	Own method, based on SFS-EN ISO 10304-1, ISO 21438-1/2/3, NIOSH, OSHA and DFG methods
224	IC-CD
239	NF ISO 21438-2
242	IFA Nr. 6172 (HCl, HNO ₃) ; IFA Nr. 6173 (H ₃ PO ₄ , H ₂ SO ₄)
248	DFG Nr. 1
264	Chromatographie ionique
266	IC-UV
280	Chromatography ionic

Participant	Desorption solution
10	Water for H ₂ SO ₄ H ₃ PO ₄ ; Water + Na ₂ CO ₃ for others
64	H ₂ O
68	17 ml 0.1m NaHCO ₃ und 18 ml 0.1 m Na ₂ CO ₃ /1L H ₂ O
78	Reinstwasser
82	3,2 mmol Na ₂ CO ₃ + 1 mmol NaHCO ₃ /L (Eluent)
95	dest. Wasser

Ring test Volatile inorganic

Participant	Desorption solution
100	water
110	8,0 mmol Na ₂ CO ₃ + 1,0 mmol NaHCO ₃
114	Desionized water
126	3,2 mmol/l Na ₂ CO ₃ ; 1,0 mmol/l NaHCO ₃ , 2 % (Vol) Aceton
151	DI water
163	Carbonate/bicarbonate 1.8/1.7 mM
177	KOH 12mmol/l
195	1mM NaHCO ₃ : 3.5 mM Na ₂ CO ₃
208	water for impregnated filters
224	Water
239	water
242	HCL/HNO ₃ : Millipore Wasser; part. Säuren: s. Anschreiben IFA
248	Na ₂ CO ₃ /NaHCO ₃
264	eau
266	NaHCO ₃ 0,3mM
280	ultra-pur water

Participant	Volume of desorption solution
10	20mL
64	10 ml
68	Imprägnierte QFF: 10 ml // Desorbierte QFF: Verdünnung von 2 ml Desorptionslösung/10 ml
78	10 mL
82	25 mL
95	10 bzw . 4ml
100	20 mL
110	50ml
114	20 mL
126	10 ml
151	10 ml
163	10
177	20ml
195	5 mL
208	10 ml for impregnated filters

Ring test Volatile inorganic

Participant	Volume of desorption solution
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224	25 mL
239	15 ml
242	10 mL ; 4 mL
248	4 ml
264	10 mL
266	10mL
280	25mL

Participant	Desorption time
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10	20min - YES
64	30 min
68	Einwirkzeit: 1h, kein Ultraschallbad
78	15 min
82	15 Minuten Ultraschall
95	2h
100	15 min (ultrasonic bath) + 2 h (rest)
110	15min
114	10 min with ultrasonic bath
126	15 Min., US-Bad
151	2 hours
163	30 min in shaker
177	30min
195	1 h orbital shaker
208	45 min ultrasonic bath
224	1h
239	5 mn with ultrasonic bath
242	15 min Ultraschallbad u. 10 min stehen lassen; maximal mögliches Volumen entnommen
248	15 min Ultraschallbad
266	15 minutes
280	30 min

Ring test Volatile inorganic

Participant	Ion Chromatographic System
10	Metrohm 861 - 838 - conductimetry detector
64	DIONEX ICS 1100
68	930 Compact IC Flex von Metrohm
78	Metrohm 761 Compact IC
82	Metrohm 861 Advanced Compact IC ,UV-Detektor Bischoff Lambda 1010 (HNO ₃)
95	Dionex ICS1100
100	Dionex ICS 2100 (HCl/HNO ₃) and Dionex ICS1500 (H ₃ PO ₄ /H ₂ SO ₄)
110	Dionex ICS 900, AS-DV
114	DIONEX ICS2500, detection with conductivity
126	Metrohm, IC-Detector 732, Separ-Center 733, Leitf-Detektor
151	Dionex DX600, GP50 pump, CD20 detector, AS50 autosampler
163	Dionex IC-3000, Manual injection
177	Dionex ICS2000
195	DIONEX ICS-3000
208	Dionex ICS5000, AS-AP, conductivity
224	Dionex ICS 2100
239	ICS5000 autosampler AS-AP
242	Metrohm 850 professional mit AS und LF Detektor
248	ICS 1100
266	DIONEX ICS-2000,. Suppressor : ARSR-300, 4 mm from Dionex
280	Dionex DX 120

Participant	Analytical column
10	Metrosep A Supp 5 de 250 mm
64	AS14A
68	Metrosep C 6 - 250/4.0 von Metrohm
78	A Supp 5 / 250mm
82	Metrosep A-Supp 5-250
95	AS9
100	Thermo Scientific Dionex IonPac AS11-HC (ICS 2100) 4x250 mm and Thermo Scientific Dionex IonPac AS22 (ICS 1500) 4x250 mm
110	AG 14A / AS 14A
114	AS15
126	Metrosep A SUPP 5, 100 mm x 4 mm
151	AS22

Ring test Volatile inorganic

Participant	Analytical column
163	AS11HC
177	AS15
195	IONPACK AS14 250 X 4 mm
208	AS15
224	AS11-HC
239	AS11-HC 2mm
242	ASUPP 5 250 mm x 4 mm
248	AS14A
266	IonPac AS12A
280	AS9-HC

Participant	Mobile phase	Flow rate	Recovery rate
10	3,2 mM de Na ₂ CO ₃ - 1 mM de NaHCO ₃ .	1	No
64	8.0 mM Na ₂ CO ₃ / 1 mM NaHCO ₃	1 ml/min	100 %
68	3.6 mM Na ₂ CO ₃	0.7 ml/min	Nein
78	3,2 mmol/L Na ₂ CO ₃ & 1,0 mmol/L NaHCO ₃	0,7 mL/min	Nein
82	3,2 mmol Na ₂ CO ₃ + 1 mmol NaHCO ₃	0,7 ml / Minute	
95	Natriumcarbonat	1ml/min	
100	gradient (KOH/w ater) ICS 2100 and Na ₂ CO ₃ /NaHCO ₃ (4,5/1,4 mmol/L) ICS 1500	1,5 mL/min (ICS 2100) and 1 mL/min (ICS 1500)	No
110	8,0 mmol Na ₂ CO ₃ + 1,0 mmol NaHCO ₃	1,10ml/min	nein
114	KOH	1.2 mL/min	No
126	3,2 mmol/l Na ₂ CO ₃ ; 1,0 mmol/l NaHCO ₃ , 2 % (Vol) Aceton	0,7 ml/Min.	-
151	1.4 mmol NaHCO ₃ / 4.5 mmol Na ₂ CO ₃	1.2 ml/min	no
163	KOH 21 mM	1 ml/min	No
177	KOH 12-48mmol/l	0,3ml/min	
195	1 mM NaHCO ₃ : 3.5 mM Na ₂ CO ₃	1.2 MI/MIN	90-5%
208	KOH 7-70 mM gradient	0,012	no
224	30 mM NaOH	0.38 mL/min	No
239	w ater/NaOH 30mM	0.3 ml/mn	No
242	4 mM Na ₂ CO ₃	0,7 mL/min	nein
248	Na ₂ CO ₃ /NaHCO ₃	1,2 ml/min	nein
266	Carbonate/Bicarbonate (mM) 2,7/0,3	1,5	n/a
280	Na ₂ CO ₃	1	no

Ring test Volatile inorganic

Participant	Recovery rate HNO3	Date of analysis
10		24/03 and 03/04/2015
64		25.03.2015 und 31.03.2015
68	1.00	1./2.4.2015
78		10.04.15 & 13.04.15
82		30.03. - 08.04.2015
95		30.03. - 01.04.15
100	100,28 %	
110		23.03.15, 22.04.15
114		16/04/15
126	-	08.04.15
151		24/04/2015
163	-	April 20th 2015
177		01.05.15
195	92%	23/04/2015
208	100 %	first set 25.3.2015, second set 2.4.2015
224	No	07/05/2015
239	90-110	15/04/15
242	-	27.04.2015
248	100,6 %	21.04.15
266	n/a	30 apr 2015
280	/	18/03/2015 and 02/04/2015

Round-robin tests for in-house measuring laboratories

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Results and Evaluation

Inorganic acids March 2015

Part 2: Nonvolatile acids

Summary of laboratory test results

Measurand phosphoric acid

	Sample 1	Z score	Sample 2	Z score	Sample 3	Z score
Unit	mg/m ³		mg/m ³		mg/m ³	
10	0,817	-0,87	1,750	-1,02	0,350	-1,11
26	0,867	-0,31	1,900	-0,25	0,390	-0,09
39	0,944	0,55	2,200	1,28	0,412	0,47
40	1,030	1,51	2,340	2,00 E	0,455	1,56
64	0,910	0,17	1,930	-0,10	0,400	0,16
68	0,970	0,84	2,230	1,44	0,400	0,16
78	0,876	-0,21	1,936	-0,07	0,393	-0,01
82	0,831	-0,71	1,909	-0,21	0,398	0,11
95	0,802	-1,04	1,600	-1,79	0,394	0,01
100	0,907	0,13	1,929	-0,11	0,397	0,09
110	0,903	0,09	1,970	0,10	0,440	1,18
111	0,880	-0,17	1,930	-0,10	0,390	-0,09
114	0,924	0,32	2,124	0,89	0,356	-0,95
151	0,937	0,47	2,000	0,26	0,394	0,01
163	0,540	-3,97 BE	1,120	-4,26 BE	0,150	-6,19 BE
177			1,943	-0,03	0,404	0,27
178	0,845	-0,56	2,089	0,71	0,415	0,55
195	1,060	1,84	2,590	3,28 BE	0,430	0,93
208	0,886	-0,10	1,840	-0,56	0,396	0,06
210	0,870	-0,28	1,950	0,00	0,380	-0,34
224	0,871	-0,27	1,915	-0,18	0,384	-0,24
231	0,924	0,32	2,083	0,68	0,415	0,55
234	0,881	-0,16	1,929	-0,11	0,381	-0,32
242	0,883	-0,13	1,874	-0,39	0,427	0,85
248	0,871	-0,27	1,878	-0,37	0,313	-2,06 E
263	0,894	-0,01	1,882	-0,35	0,385	-0,22

	Sample 1	Z score	Sample 2	Z score	Sample 3	Z score
264	0,880	-0,17	1,700	-1,28	0,370	-0,60
266	0,880	-0,17	1,950	0,00	0,380	-0,34
280	0,820	-0,84	1,860	-0,46	0,370	-0,60
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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	28		29		29	
Mean	0,895		1,950		0,394	
Reproducibility s.d.	0,058		0,156		0,028	
Rel. reproducibility s.d.	6,51 %		7,99 %		7,18 %	
Reference value	0,900		1,940		0,390	
Target s.d.	0,089		0,195		0,039	
Rel. target s.d.:	10,00 %		10,00 %		10,00 %	
Lower limit of tolerance	0,716		1,560		0,315	
Upper limit of tolerance	1,074		2,340		0,472	
Type B outliers	1		2		1	
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	27		27		28	
Explanation of outlier types						
A: Single outlier	Grubbs					
B: Differing laboratory mean	Grubbs					
C: Excessive laboratory s.d.	Cochran					
D: Excluded manually						
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F: Z-Score >3,5						

Summary of laboratory test results

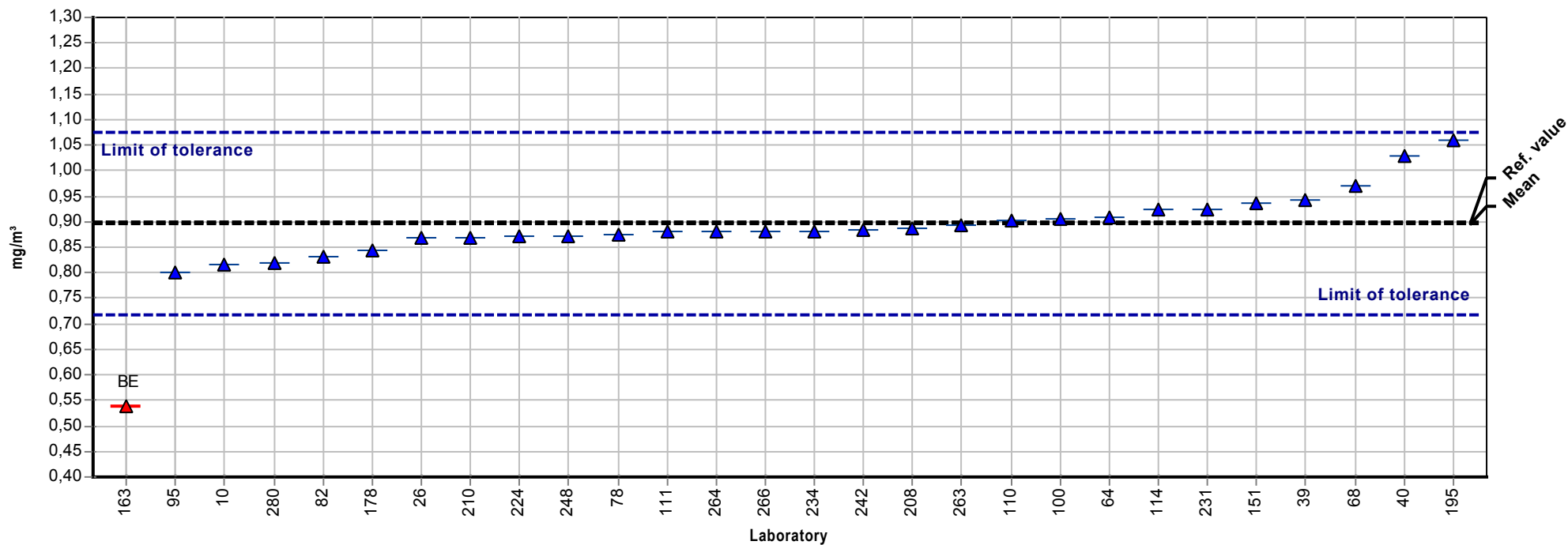
Measurand sulfuric acid

	Sample 1	Z score	Sample 2	Z score	Sample 3	Z score
Unit	mg/m ³		mg/m ³		mg/m ³	
10	0,042	0,29	0,135	-0,06	0,060	-0,43
26	0,042	0,47	0,139	0,23	0,063	0,13
39	0,044	0,86	0,137	0,09	0,064	0,24
40	0,043	0,71	0,156	1,49	0,069	1,08
64	0,042	0,37	0,140	0,31	0,067	0,72
68	0,020	-5,06 BE	0,070	-4,85 BE	0,030	-5,20 BE
78	0,043	0,49	0,142	0,45	0,062	-0,11
82	0,046	1,35	0,136	0,01	0,065	0,40
95	0,049	2,09 E	0,150	1,04	0,077	2,32 E
100	0,032	-2,10 E	0,115	-1,53	0,059	-0,56
110	0,045	1,11	0,142	0,45	0,062	-0,08
111	0,040	-0,13	0,140	0,31	0,060	-0,40
114	0,032	-2,10 E	0,123	-0,94	0,050	-2,00 E
151	0,043	0,61	0,144	0,60	0,067	0,72
163	0,030	-2,60 E	0,130	-0,43	0,020	-6,80 BE
177			0,125	-0,80	0,055	-1,20
178	0,069	7,03 BE	0,155	1,41	0,080	2,80 E
195	0,030	-2,60 E	0,120	-1,16	0,050	-2,00 E
208	0,042	0,27	0,138	0,16	0,062	-0,11
210	0,040	-0,13	0,130	-0,43	0,060	-0,40
224	0,039	-0,37	0,134	-0,13	0,060	-0,40
231	0,047	1,60	0,157	1,56	0,069	1,04
234	0,038	-0,62	0,135	-0,06	0,057	-0,88
239	0,042	0,37	0,144	0,60	0,063	0,08
242	0,049	2,09 E	0,150	1,04	0,062	-0,08
248	0,042	0,44	0,138	0,15	0,064	0,16

	Sample 1	Z score	Sample 2	Z score	Sample 3	Z score
263	0,043	0,61	0,134	-0,13	0,063	0,08
264	0,040	-0,13	0,100	-2,64 E	0,060	-0,40
266	0,039	-0,37	0,140	0,31	0,061	-0,24
280	0,030	-2,60 E	0,110	-1,90	0,060	-0,40
–	–	--	–	--	–	--
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	29		30		30	
Mean	0,041		0,136		0,063	
Reproducibility s.d.	0,005		0,013		0,006	
Rel. reproducibility s.d.	13,48 %		9,74 %		10,25 %	
Reference value	0,042		0,141		0,064	
Target s.d.	0,004		0,014		0,006	
Rel. target s.d.:	10,00 %		10,00 %		10,00 %	
Lower limit of tolerance	0,032		0,109		0,050	
Upper limit of tolerance	0,049		0,163		0,075	
Type B outliers	2		1		2	
No. of laboratories after elimination of outliers type A-D and F (without laboratories that only gave states but no measured values)	27		29		28	
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 >3,5						

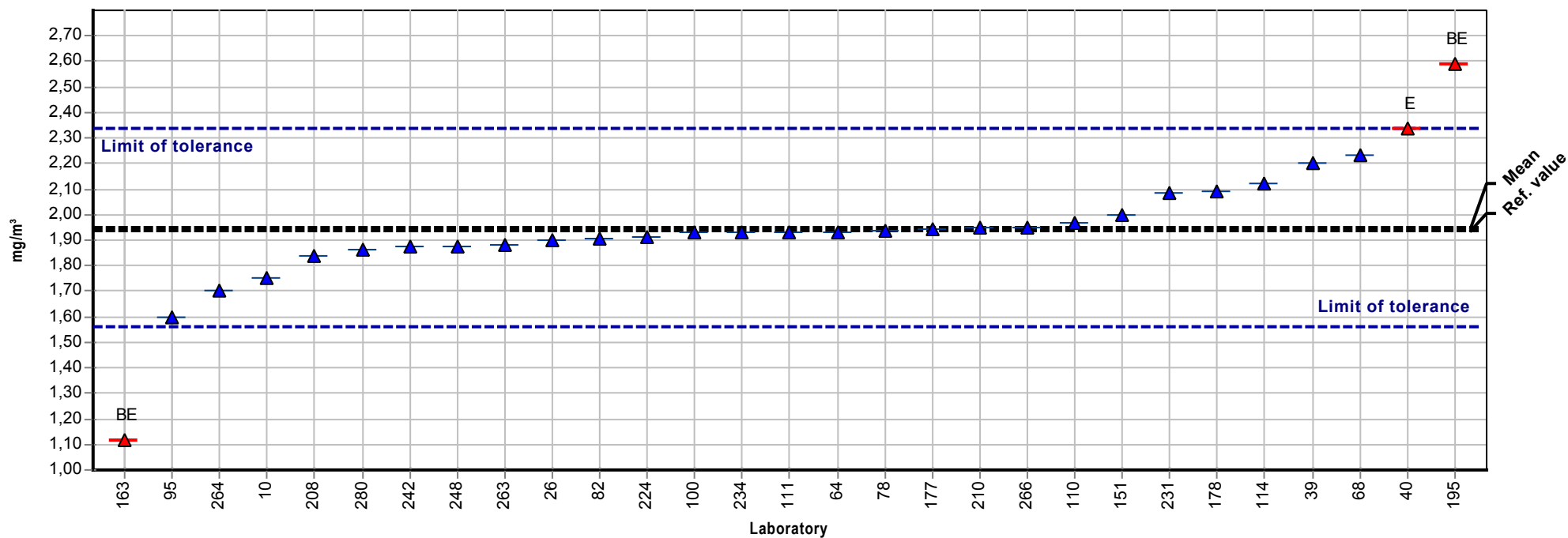
Summary results

Measurand:	phosphoric acid	Mean:	0,895 mg/m ³
Sample:	1	Reprod. s.d.:	0,058 mg/m ³
Method:	ISO 5725-2	Rel. reprod. s.d.:	6,51%
Rel. target s.d.:	10,00% (Limited)	Reference value:	0,900 mg/m ³
No. of laboratories:	27	Range of tolerance:	0,716 - 1,074 mg/m ³ (Z-Score <= 2,00)



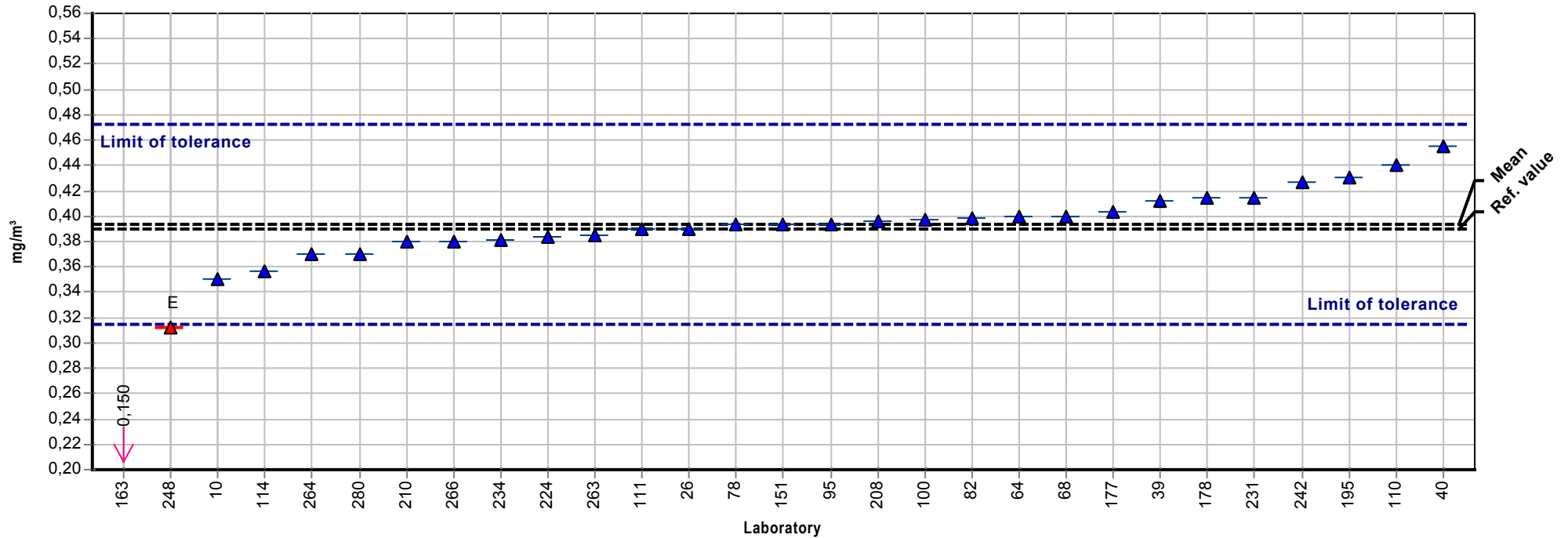
Summary results

Measurand:	phosphoric acid	Mean:	1,950 mg/m ³
Sample:	2	Reprod. s.d.:	0,156 mg/m ³
Method:	ISO 5725-2	Rel. reprod. s.d.:	7,99%
Rel. target s.d.:	10,00% (Limited)	Reference value:	1,940 mg/m ³
No. of laboratories:	27	Range of tolerance:	1,560 - 2,340 mg/m ³ (Z-Score <= 2,00)



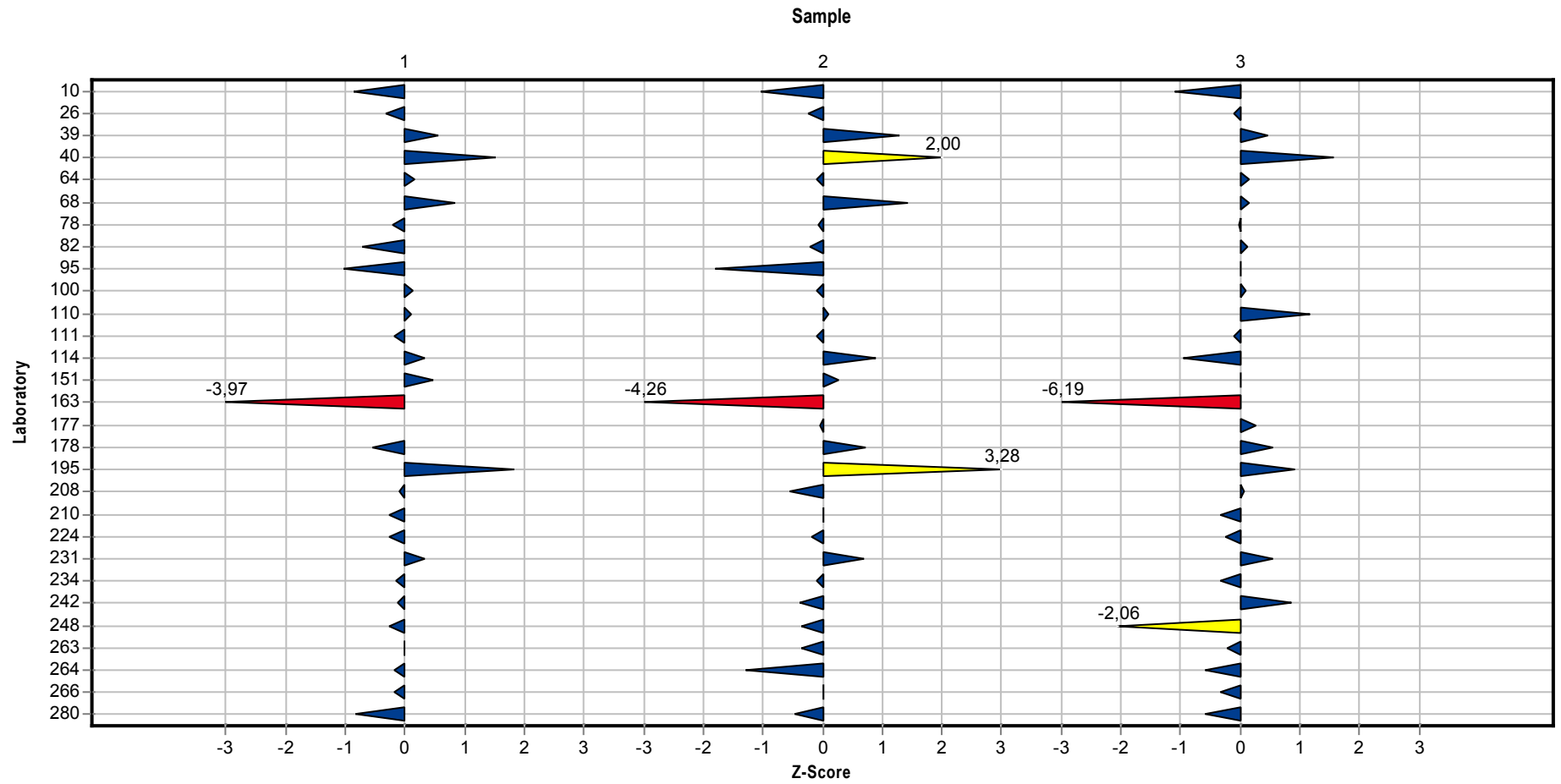
Summary results

Measurand:	phosphoric acid	Mean:	0,394 mg/m ³
Sample:	3	Reprod. s.d.:	0,028 mg/m ³
Method:	ISO 5725-2	Rel. reprod. s.d.:	7,18%
Rel. target s.d.:	10,00% (Limited)	Reference value:	0,390 mg/m ³
No. of laboratories:	28	Range of tolerance:	0,315 - 0,472 mg/m ³ (Z-Score <= 2,00)



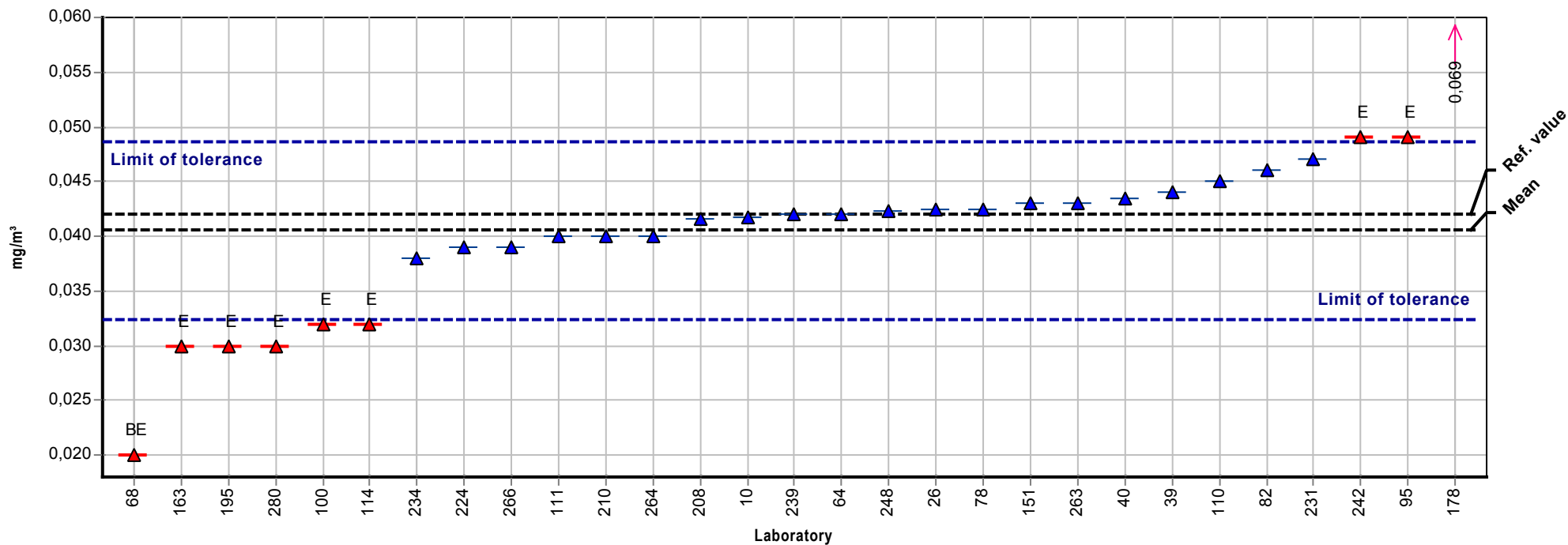
Analyte chart of Z-Scores

Measurand: phosphoric acid



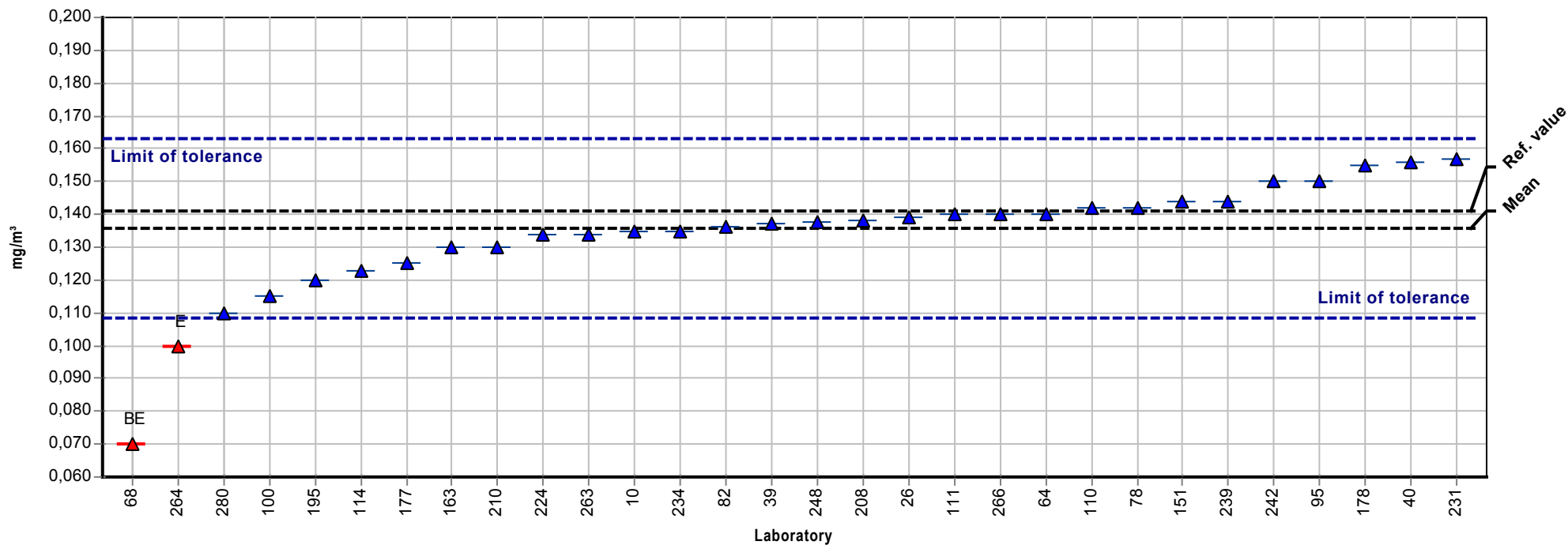
Summary results

Measurand:	sulfuric acid	Mean:	0,041 mg/m ³
Sample:	1	Reprod. s.d.:	0,005 mg/m ³
Method:	ISO 5725-2	Rel. reprod. s.d.:	13,48%
Rel. target s.d.:	10,00% (Limited)	Reference value:	0,042 mg/m ³
No. of laboratories:	27	Range of tolerance:	0,032 - 0,049 mg/m ³ (Z-Score <= 2,00)



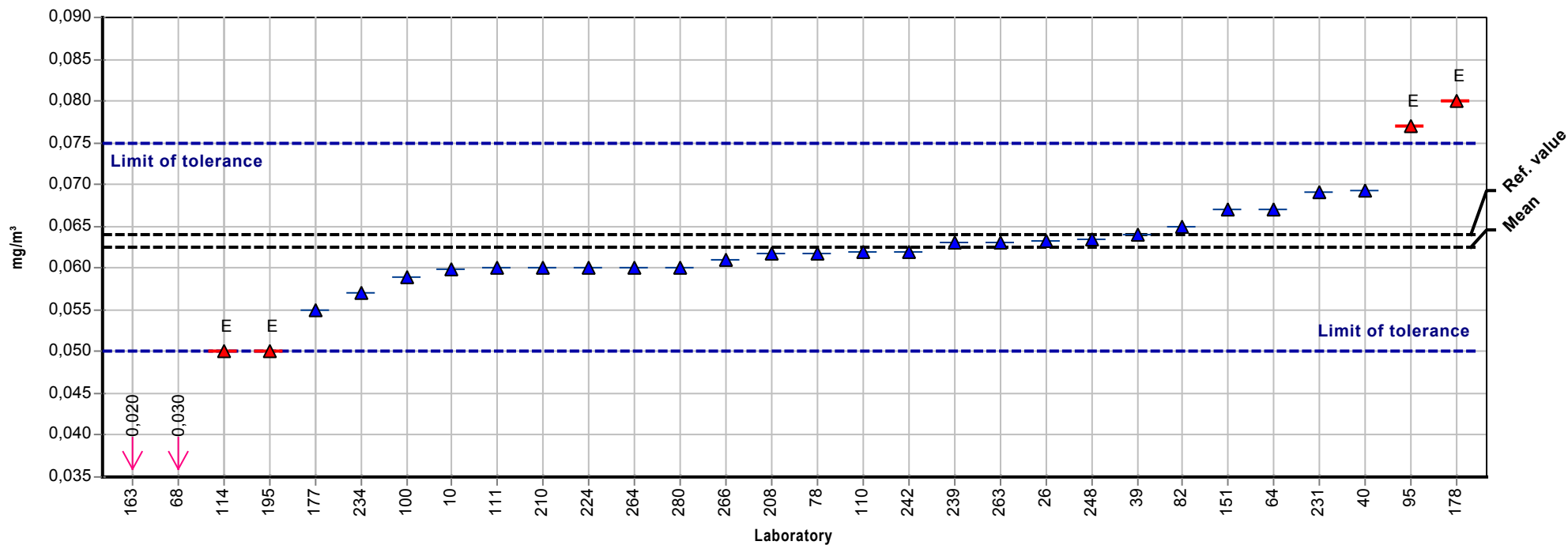
Summary results

Measurand:	sulfuric acid	Mean:	0,136 mg/m ³
Sample:	2	Reprod. s.d.:	0,013 mg/m ³
Method:	ISO 5725-2	Rel. reprod. s.d.:	9,74%
Rel. target s.d.:	10,00% (Limited)	Reference value:	0,141 mg/m ³
No. of laboratories:	29	Range of tolerance:	0,109 - 0,163 mg/m ³ (Z-Score <= 2,00)



Summary results

Measurand:	sulfuric acid	Mean:	0,063 mg/m ³
Sample:	3	Reprod. s.d.:	0,006 mg/m ³
Method:	ISO 5725-2	Rel. reprod. s.d.:	10,25%
Rel. target s.d.:	10,00% (Limited)	Reference value:	0,064 mg/m ³
No. of laboratories:	28	Range of tolerance:	0,050 - 0,075 mg/m ³ (Z-Score <= 2,00)



Analyte chart of Z-Scores

Measurand: sulfuric acid

