IFA
Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung

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

## Proficiency testing scheme aldehydes with own sampling

## 16 - 17 October 2018

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

Sample 1

| | Acetaldehyde | Z score | Butyraldehyde | Z score | Formaldehyde | Z score | |
|---|---|---|---|---|---|---|---|
| Unit | mg/m³ | | mg/m³ | | mg/m³ | | |
| 2 | 1,126 | -0,60 | 0,283 | -0,14 | 0,157 | -0,74 | |
| 23 | 1,166 | -0,26 | 0,282 | -0,17 | 0,170 | 0,02 | |
| 33 | 1,297 | 0,83 | 0,273 | -0,49 | 0,184 | 0,87 | |
| 97 | 1,168 | -0,25 | 0,288 | 0,03 | 0,164 | -0,33 | |
| 159 | 1,316 | 0,99 | 0,303 | 0,56 | 0,161 | -0,51 | |
| 171 | 1,020 | -1,48 | 0,256 | -1,08 | 0,155 | -0,86 | |
| 175 | 1,070 | -1,06 | 0,290 | 0,10 | 0,150 | -1,16 | |
| 184 | 1,220 | 0,19 | 0,277 | -0,35 | 0,164 | -0,33 | |
| 230 | 1,240 | 0,36 | 0,324 | 1,29 | 0,180 | 0,61 | |
| 236 | 1,195 | -0,02 | 0,277 | -0,35 | 0,163 | -0,39 | |
| 265 | 1,349 | 1,27 | 0,286 | -0,03 | 0,170 | 0,02 | |
| 285 | 1,230 | 0,27 | 0,330 | 1,50 | 0,190 | 1,20 | |
| 291 | 1,130 | -0,56 | | | 0,210 | 2,38 | E |
| 508 | 1,236 | 0,32 | 0,262 | -0,87 | 0,156 | -0,80 | |
| – | – | – – | – | – – | – | – – | |
| 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 | 14 | | 13 | | 14 | | |
| Mean | 1,197 | | 0,287 | | 0,170 | | |
| Reproducibility s.d. | 0,092 | | 0,021 | | 0,016 | | |
| Rel. reproducibility s.d. | 7,72 % | | 7,46 % | | 9,67 % | | |
| Reference value | 1,139 | | 0,283 | | 0,150 | | |
| Target s.d. | 0,120 | | 0,029 | | 0,017 | | |
| Rel. target s.d. | 10,00 % | | 10,00 % | | 10,00 % | | |
| Low er limit of tolerance | 0,958 | | 0,230 | | 0,136 | | |
| Upper limit of tolerance | 1,437 | | 0,344 | | 0,204 | | |
| No. of laboratories after elimination of outliers type A-D and F (w ithout | 14 | | 13 | | 14 | | |

| | Acetaldehyde | Z score | Butyraldehyde | Z score | Formaldehyde | Z score |
|---|---|---|---|---|---|---|
| laboratories that only gave states but no measured values) | | | | | | |
| | | | | | | |
| 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

Sample 2

| | Acetaldehyde | Z score | Butyraldehyde | Z score | Formaldehyde | Z score |
|---|---|---|---|---|---|---|
| Unit | mg/m³ | | mg/m³ | | mg/m³ | |
| 2 | 0,959 | -0,67 | 1,067 | -0,06 | 0,066 | -0,36 |
| 23 | 0,966 | -0,60 | 1,003 | -0,65 | 0,070 | 0,22 |
| 33 | 1,069 | 0,40 | 0,976 | -0,90 | 0,084 | 2,23 E |
| 97 | 0,989 | -0,37 | 1,107 | 0,32 | 0,065 | -0,51 |
| 159 | 1,107 | 0,77 | 1,122 | 0,46 | 0,068 | -0,07 |
| 171 | 0,755 | -2,65 BE | 0,980 | -0,87 | 0,067 | -0,17 |
| 175 | 0,910 | -1,14 | 1,120 | 0,44 | 0,060 | -1,24 |
| 184 | 1,030 | 0,02 | 1,035 | -0,35 | 0,069 | 0,03 |
| 230 | 1,090 | 0,61 | 1,220 | 1,37 | 0,072 | 0,51 |
| 236 | 1,018 | -0,09 | 1,085 | 0,11 | 0,062 | -0,93 |
| 265 | 1,133 | 1,03 | 1,069 | -0,04 | 0,067 | -0,22 |
| 285 | 1,010 | -0,17 | 1,200 | 1,18 | 0,082 | 1,97 |
| 291 | 1,050 | 0,22 | | | 0,066 | -0,36 |
| 508 | 1,027 | -0,01 | 0,965 | -1,01 | 0,061 | -1,09 |
| – | – | – – | – | – – | – | – – |
| 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 | 14 | | 13 | | 14 | |
| Mean | 1,028 | | 1,073 | | 0,068 | |
| Reproducibility s.d. | 0,063 | | 0,082 | | 0,007 | |
| Rel. reproducibility s.d. | 6,14 % | | 7,60 % | | 10,16 % | |
| Reference value | 0,960 | | 1,095 | | 0,058 | |
| Target s.d. | 0,103 | | 0,107 | | 0,007 | |
| Rel. target s.d. | 10,00 % | | 10,00 % | | 10,00 % | |
| Low er limit of tolerance | 0,822 | | 0,858 | | 0,055 | |
| Upper limit of tolerance | 1,233 | | 1,288 | | 0,082 | |
| Type B outliers | 1 | | | | | |
| No. of laboratories after elimination of | 13 | | 13 | | 14 | |

| | Acetaldehyde | Z score | Butyraldehyde | Z score | Formaldehyde | Z score |
|---|---|---|---|---|---|---|
| outliers type A-D and F (w ithout laboratories that only gave states but no measured values) | | | | | | |
| | | | | | | |
| 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

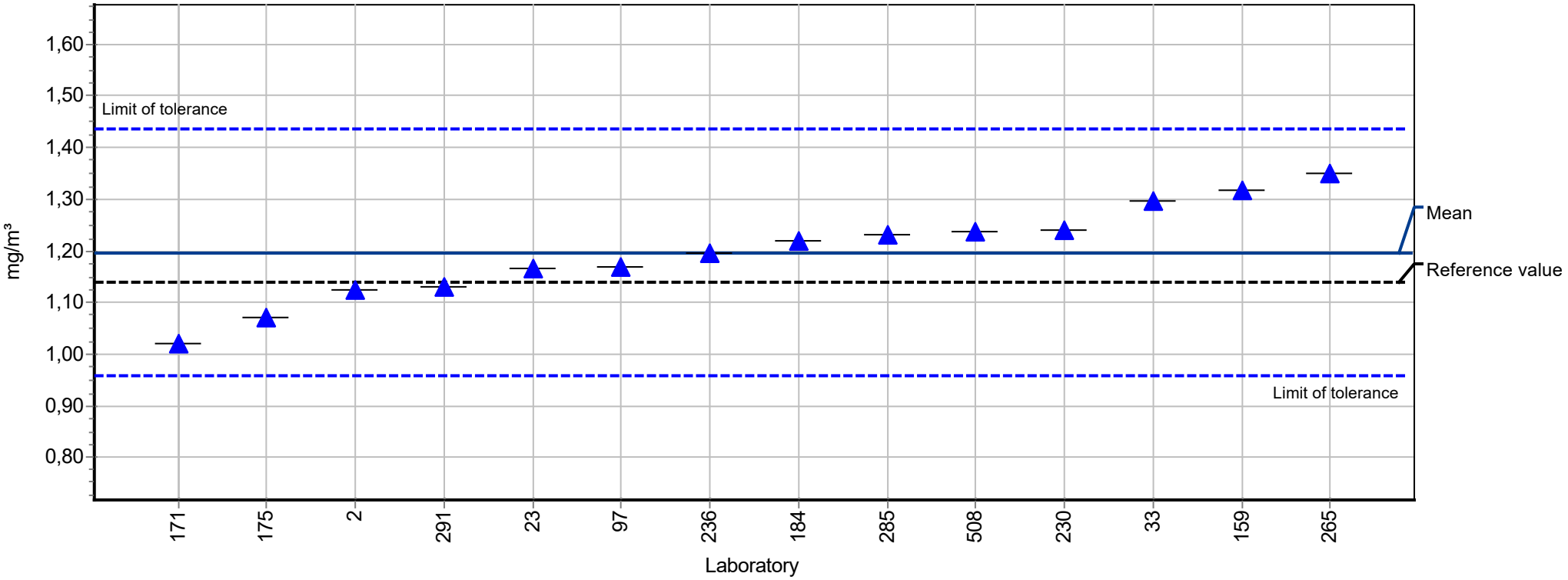
Sample 3

| | Acetaldehyde | Z score | Butyraldehyde | Z score | Formaldehyde | Z score | Propionaldehyde | Z score |
|---|---|---|---|---|---|---|---|---|
| Unit | mg/m³ | | mg/m³ | | mg/m³ | | mg/m³ | |
| 2 | 0,404 | -0,72 | 0,899 | -0,09 | 0,122 | -0,60 | 0,755 | -0,49 |
| 23 | 0,432 | -0,07 | 0,854 | -0,59 | 0,133 | 0,25 | 0,771 | -0,31 |
| 33 | 0,447 | 0,28 | 0,822 | -0,95 | 0,144 | 1,07 | 0,713 | -0,98 |
| 97 | 0,419 | -0,37 | 0,952 | 0,49 | 0,129 | -0,06 | 0,784 | -0,15 |
| 159 | 0,459 | 0,55 | 0,945 | 0,41 | 0,123 | -0,52 | 0,710 | -1,02 |
| 171 | 0,321 | -2,62 BE | 0,864 | -0,48 | 0,130 | 0,02 | 0,675 | -1,42 |
| 175 | 0,390 | -1,04 | 0,960 | 0,58 | 0,120 | -0,75 | 0,740 | -0,67 |
| 184 | 0,425 | -0,23 | 0,868 | -0,44 | 0,129 | -0,06 | 0,764 | -0,39 |
| 230 | 0,460 | 0,57 | 1,040 | 1,46 | 0,135 | 0,40 | 0,900 | 1,20 |
| 236 | 0,432 | -0,07 | 0,838 | -0,77 | 0,127 | -0,21 | 0,935 | 1,61 |
| 265 | 0,486 | 1,17 | 0,913 | 0,06 | 0,133 | 0,25 | 0,904 | 1,25 |
| 285 | 0,440 | 0,11 | 1,020 | 1,24 | 0,146 | 1,25 | 0,900 | 1,20 |
| 291 | 0,425 | -0,23 | | | 0,127 | -0,21 | | |
| 508 | 0,438 | 0,07 | 0,823 | -0,93 | 0,119 | -0,83 | 0,812 | 0,17 |
| – | – | – – | – | – – | – | – – | – | – – |
| 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 | 14 | | 13 | | 14 | | 13 | |
| Mean | 0,435 | | 0,908 | | 0,130 | | 0,797 | |
| Reproducibility s.d. | 0,025 | | 0,072 | | 0,008 | | 0,086 | |
| Rel. reproducibility s.d. | 5,72 % | | 7,93 % | | 6,19 % | | 10,76 % | |
| Reference value | 0,397 | | 0,920 | | 0,114 | | 0,749 | |
| Target s.d. | 0,044 | | 0,091 | | 0,013 | | 0,086 | |
| Rel. target s.d. | 10,00 % | | 10,00 % | | 10,00 % | | 10,76 % | |
| Low er limit of tolerance | 0,348 | | 0,726 | | 0,104 | | 0,626 | |
| Upper limit of tolerance | 0,522 | | 1,089 | | 0,156 | | 0,969 | |
| Type B outliers | 1 | | | | | | | |
| No. of laboratories after elimination of | 13 | | 13 | | 14 | | 13 | |

| | Acetaldehyde | Z score | Butyraldehyde | Z score | Formaldehyde | Z score | Propionaldehyde | Z score |
|---|---|---|---|---|---|---|---|---|
| outliers type A-D and F (w ithout laboratories that only gave states but no measured values) | | | | | | | | |
| | | | | | | | | |
| 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 | | | | | | | | |

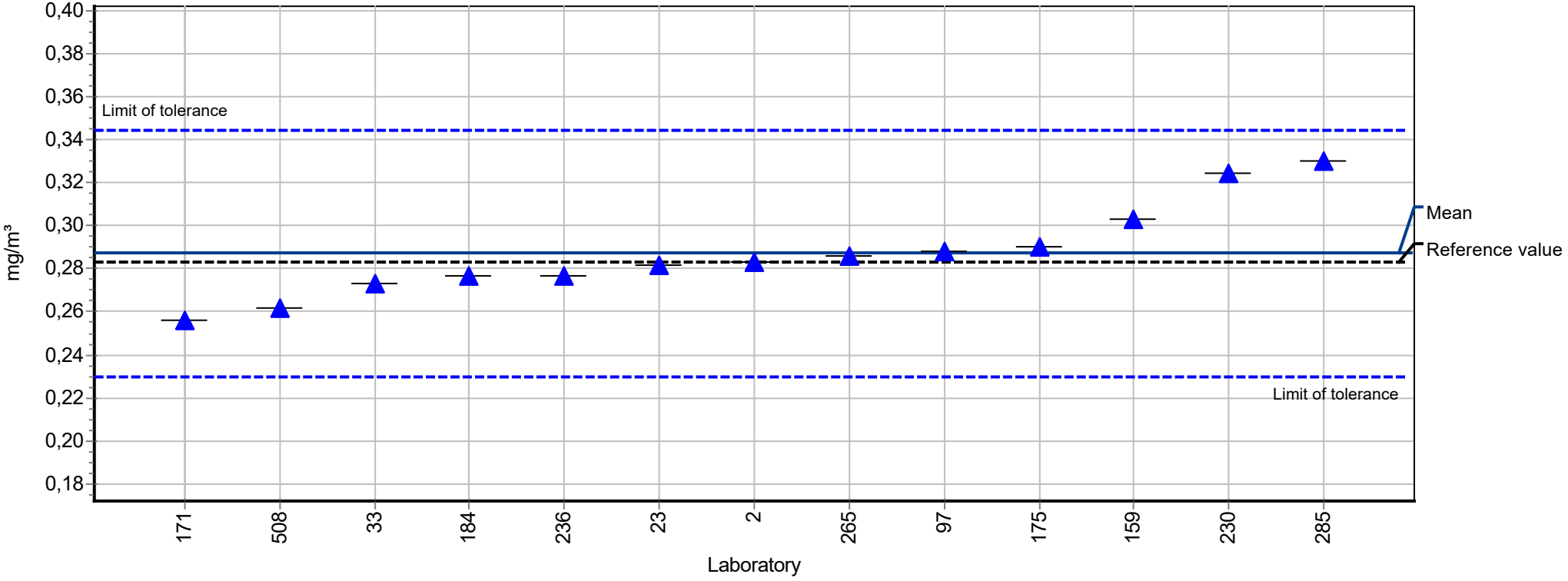
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Acetaldehyde** | **Mean:** | **1,197 mg/m³** |
| **Sample:** | **1** | **Reprod. s.d.:** | **0,092 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **7,72%** |
| **Rel.target s.d.:** | **10,00% (Limited)** | **Reference value:** | **1,139 mg/m³** |
| **No. of laboratories:** | **14** | **Range of tolerance:** | **0,958 - 1,437 mg/m³ (\|Z-Score\| <= 2,00)** |



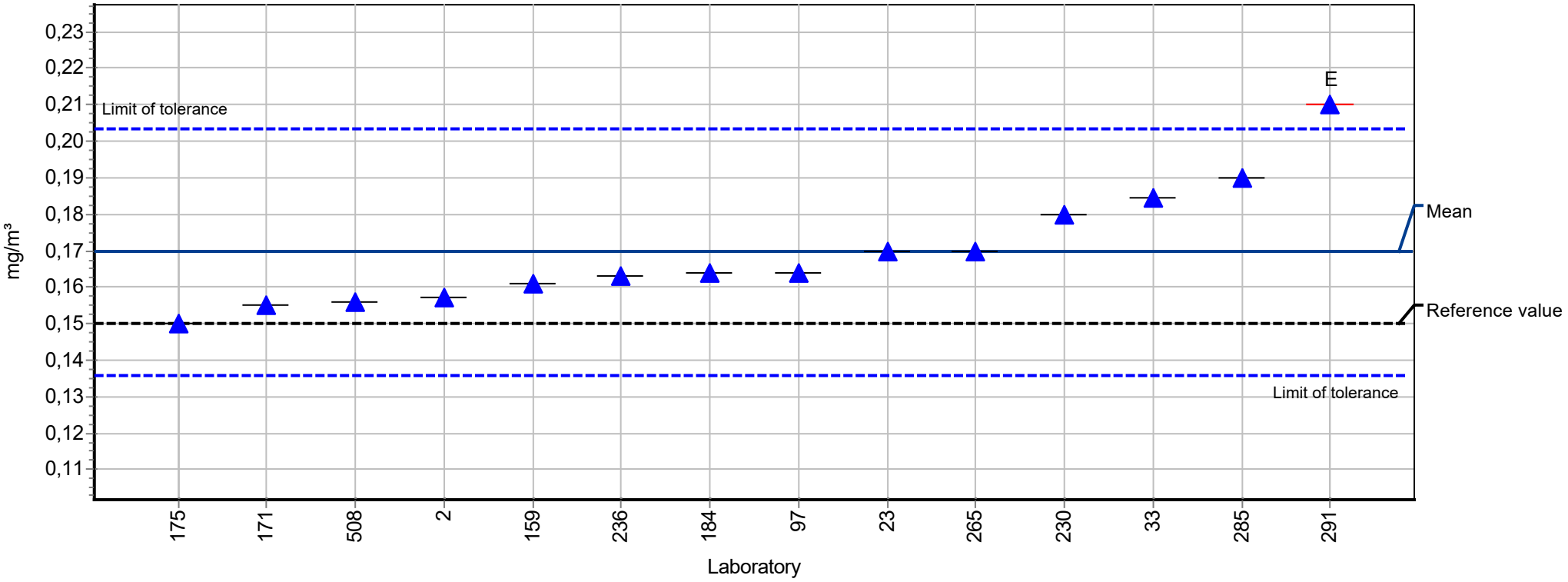
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Butyraldehyde** | **Mean:** | **0,287 mg/m³** |
| **Sample:** | **1** | **Reprod. s.d.:** | **0,021 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **7,46%** |
| **Rel.target s.d.:** | **10,00% (Limited)** | **Reference value:** | **0,283 mg/m³** |
| **No. of laboratories:** | **13** | **Range of tolerance:** | **0,230 - 0,344 mg/m³ (\|Z-Score\| <= 2,00)** |



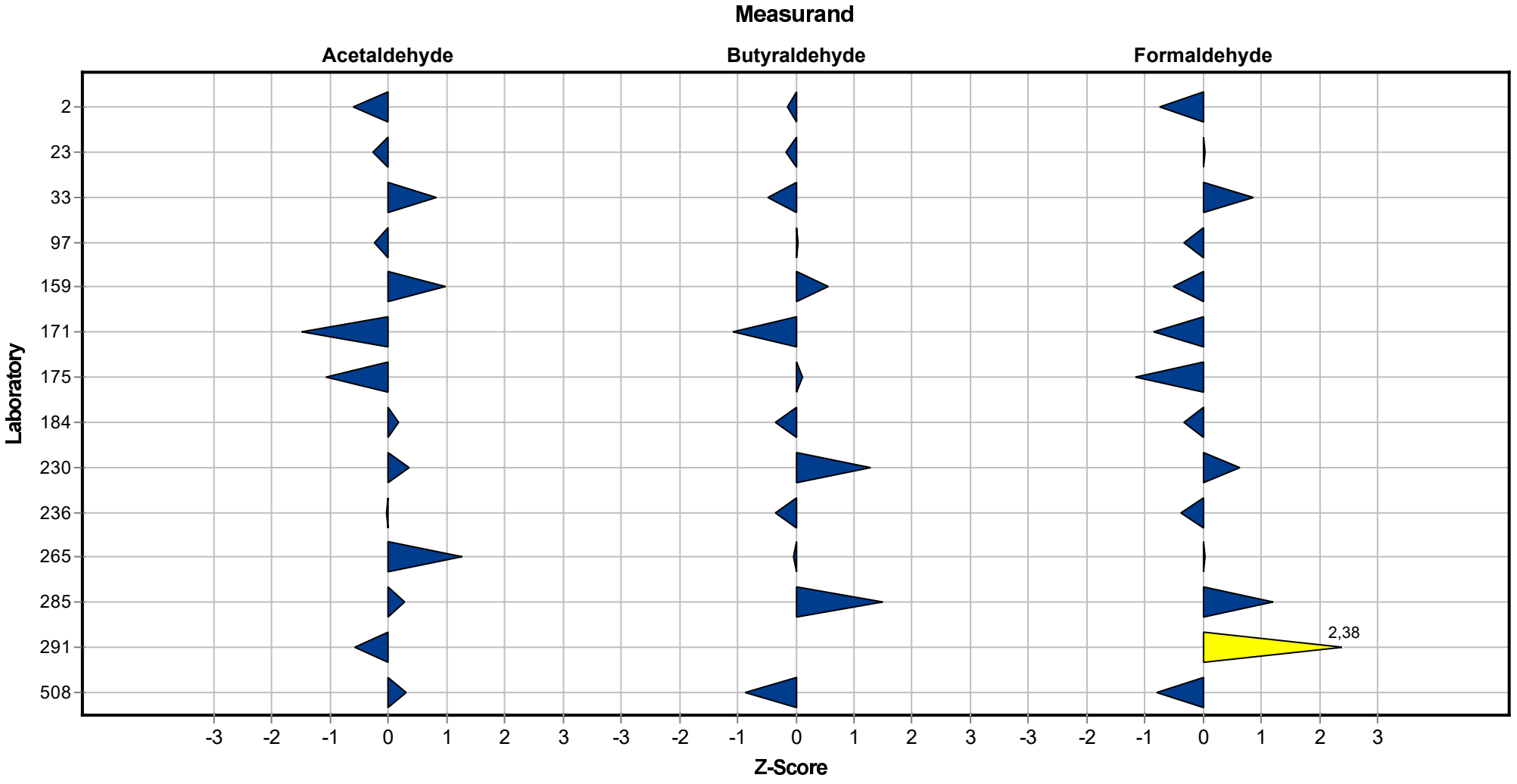
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Formaldehyde** | **Mean:** | **0,170 mg/m³** |
| **Sample:** | **1** | **Reprod. s.d.:** | **0,016 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **9,67%** |
| **Rel.target s.d.:** | **10,00% (Limited)** | **Reference value:** | **0,150 mg/m³** |
| **No. of laboratories:** | **14** | **Range of tolerance:** | **0,136 - 0,204 mg/m³ (\|Z-Score\| <= 2,00)** |



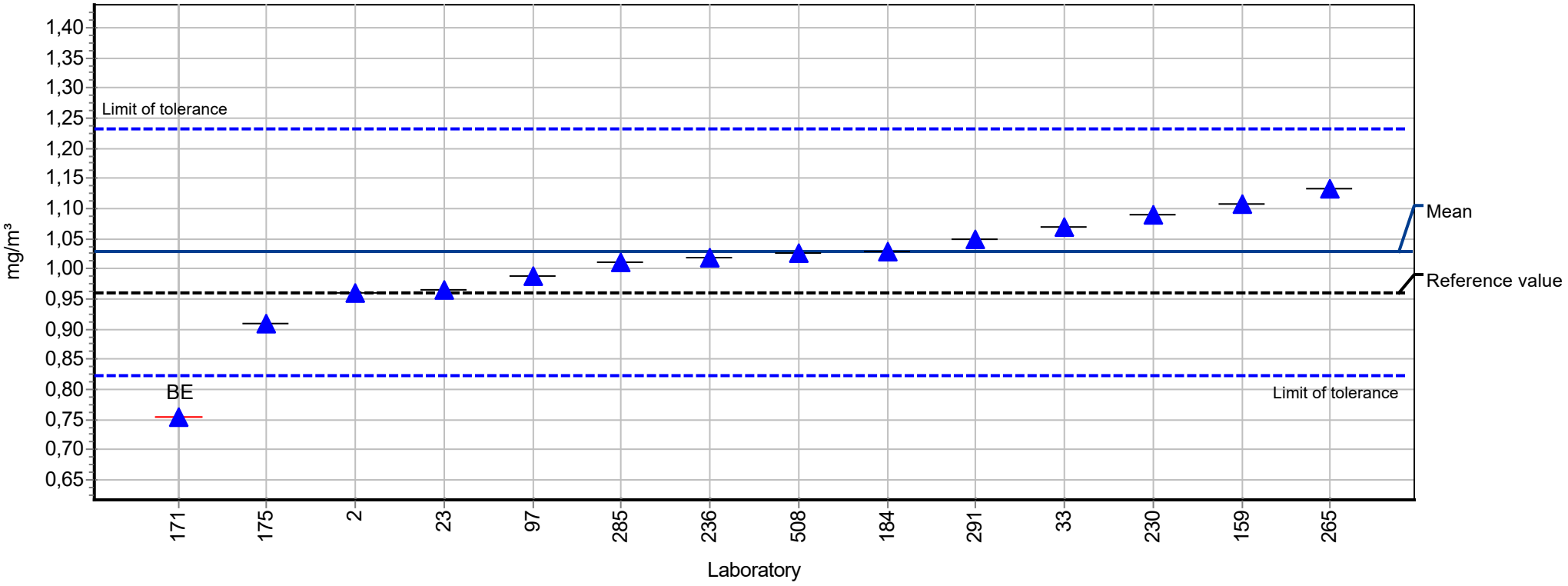
# Sample chart of Z-scores

**Sample 1**



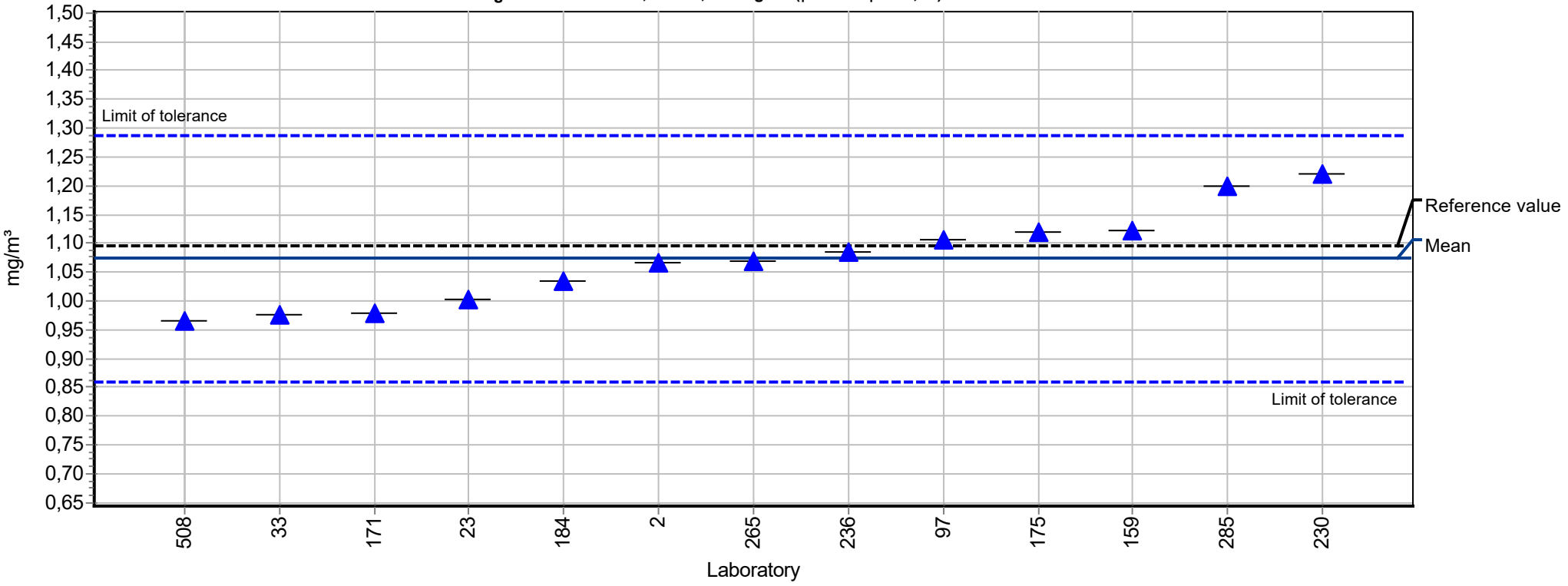
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Acetaldehyde** | **Mean:** | **1,028 mg/m³** |
| **Sample:** | **2** | **Reprod. s.d.:** | **0,063 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **6,14%** |
| **Rel.target s.d.:** | **10,00% (Limited)** | **Reference value:** | **0,960 mg/m³** |
| **No. of laboratories:** | **13** | **Range of tolerance:** | **0,822 - 1,233 mg/m³ (\|Z-Score\| <= 2,00)** |



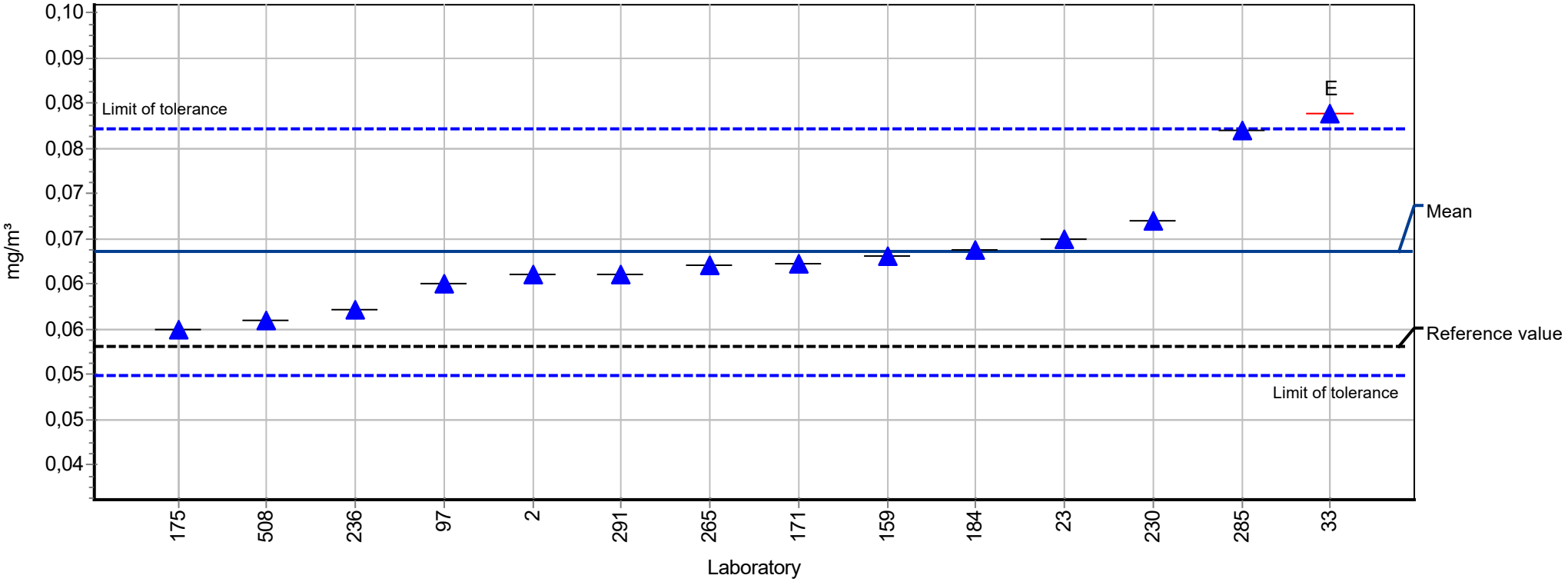
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Butyraldehyde** | **Mean:** | **1,073 mg/m³** |
| **Sample:** | **2** | **Reprod. s.d.:** | **0,082 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **7,60%** |
| **Rel.target s.d.:** | **10,00% (Limited)** | **Reference value:** | **1,095 mg/m³** |
| **No. of laboratories:** | **13** | **Range of tolerance:** | **0,858 - 1,288 mg/m³ (\|Z-Score\| <= 2,00)** |



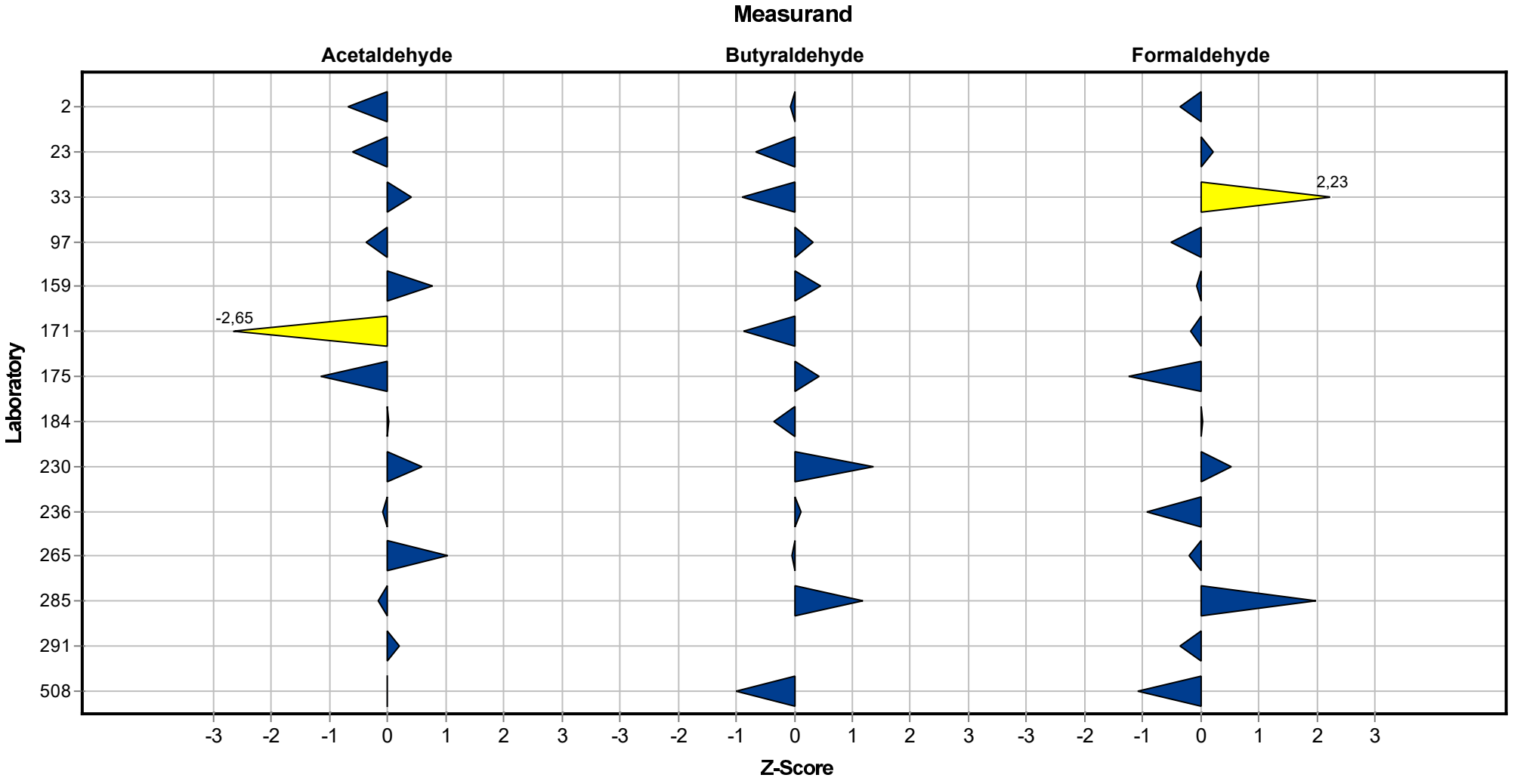
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Formaldehyde** | **Mean:** | **0,068 mg/m³** |
| **Sample:** | **2** | **Reprod. s.d.:** | **0,007 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **10,16%** |
| **Rel.target s.d.:** | **10,00% (Limited)** | **Reference value:** | **0,058 mg/m³** |
| **No. of laboratories:** | **14** | **Range of tolerance:** | **0,055 - 0,082 mg/m³ (\|Z-Score\| <= 2,00)** |



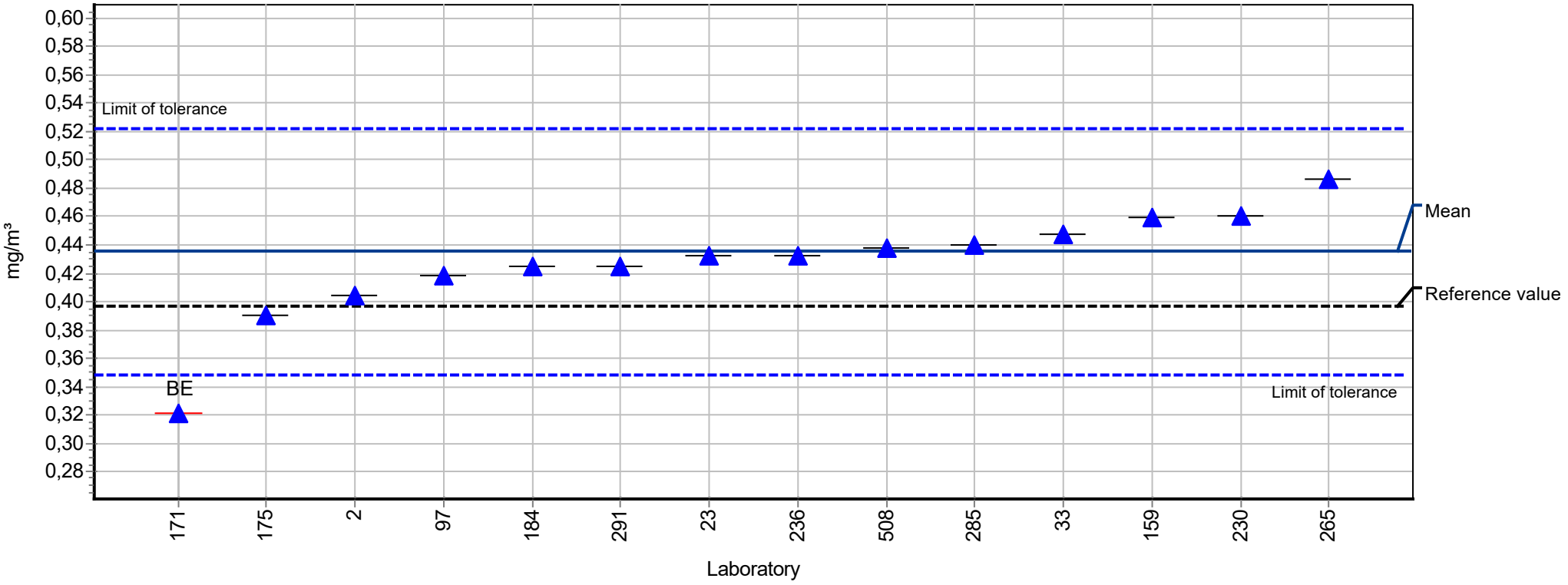
# Sample chart of Z-scores

**Sample 2**



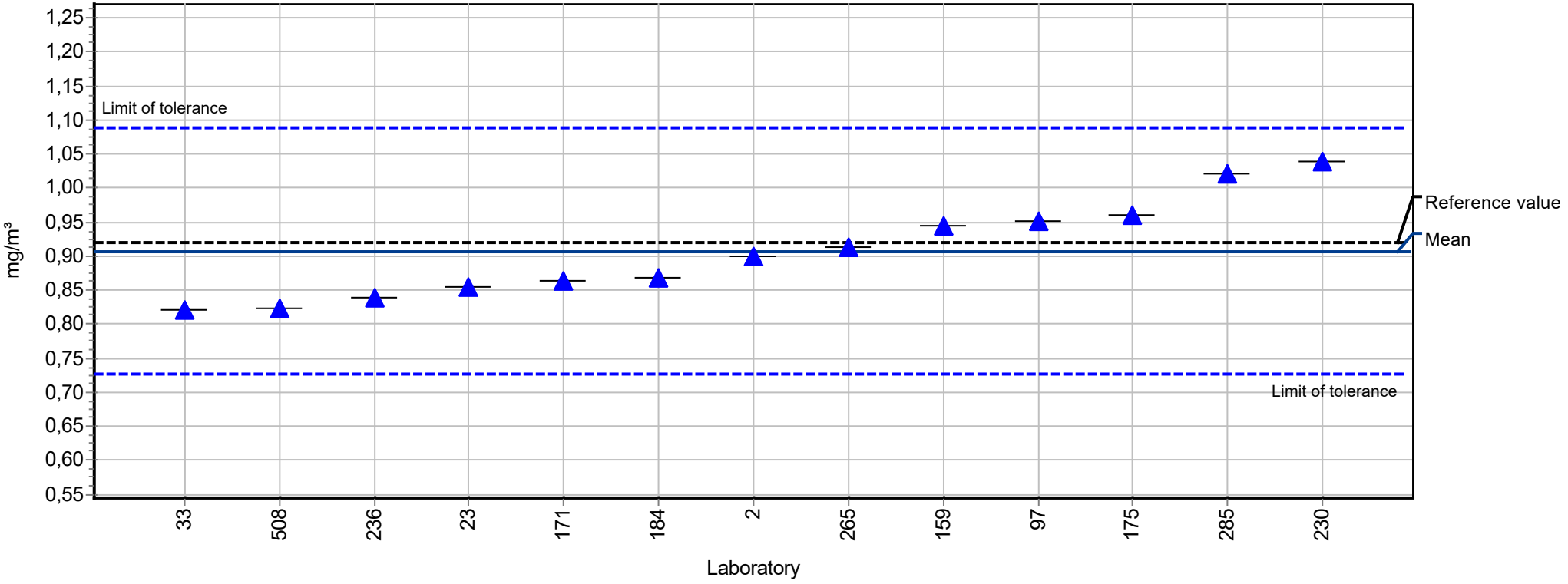
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Acetaldehyde** | **Mean:** | **0,435 mg/m³** |
| **Sample:** | **3** | **Reprod. s.d.:** | **0,025 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **5,72%** |
| **Rel.target s.d.:** | **10,00% (Limited)** | **Reference value:** | **0,397 mg/m³** |
| **No. of laboratories:** | **13** | **Range of tolerance:** | **0,348 - 0,522 mg/m³ (\|Z-Score\| <= 2,00)** |



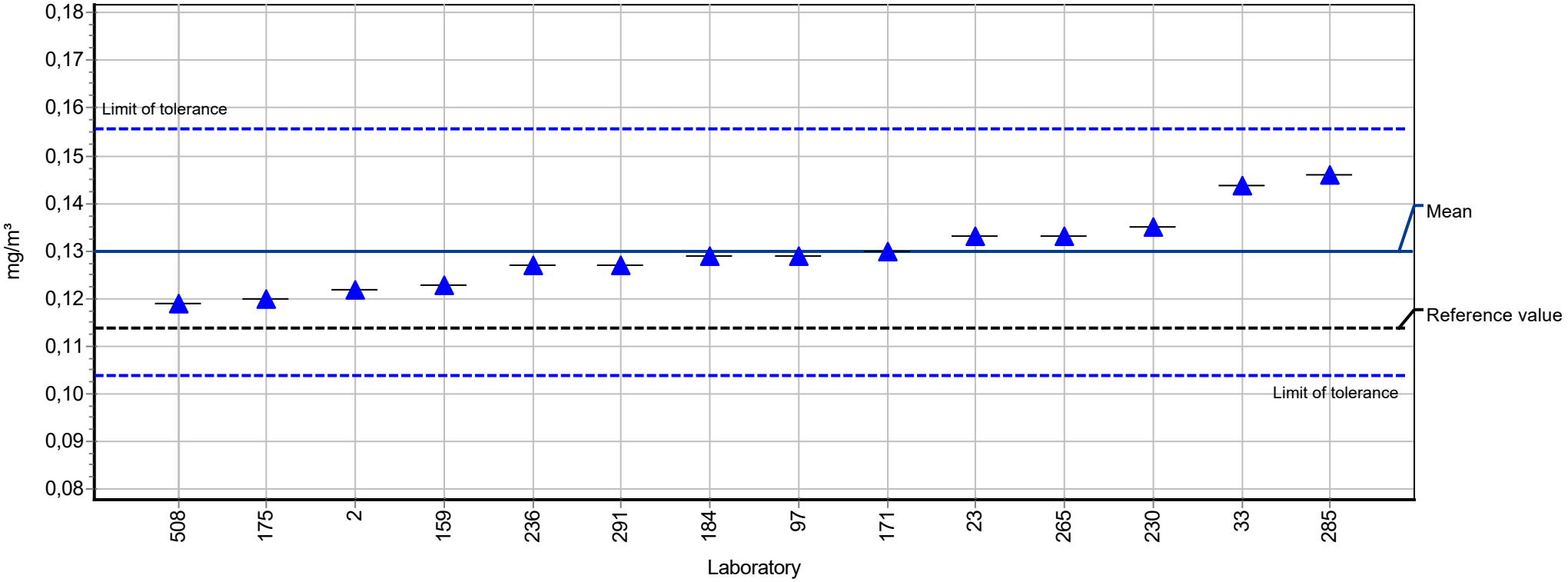
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Butyraldehyde** | **Mean:** | **0,908 mg/m³** |
| **Sample:** | **3** | **Reprod. s.d.:** | **0,072 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **7,93%** |
| **Rel.target s.d.:** | **10,00% (Limited)** | **Reference value:** | **0,920 mg/m³** |
| **No. of laboratories:** | **13** | **Range of tolerance:** | **0,726 - 1,089 mg/m³ (\|Z-Score\| <= 2,00)** |



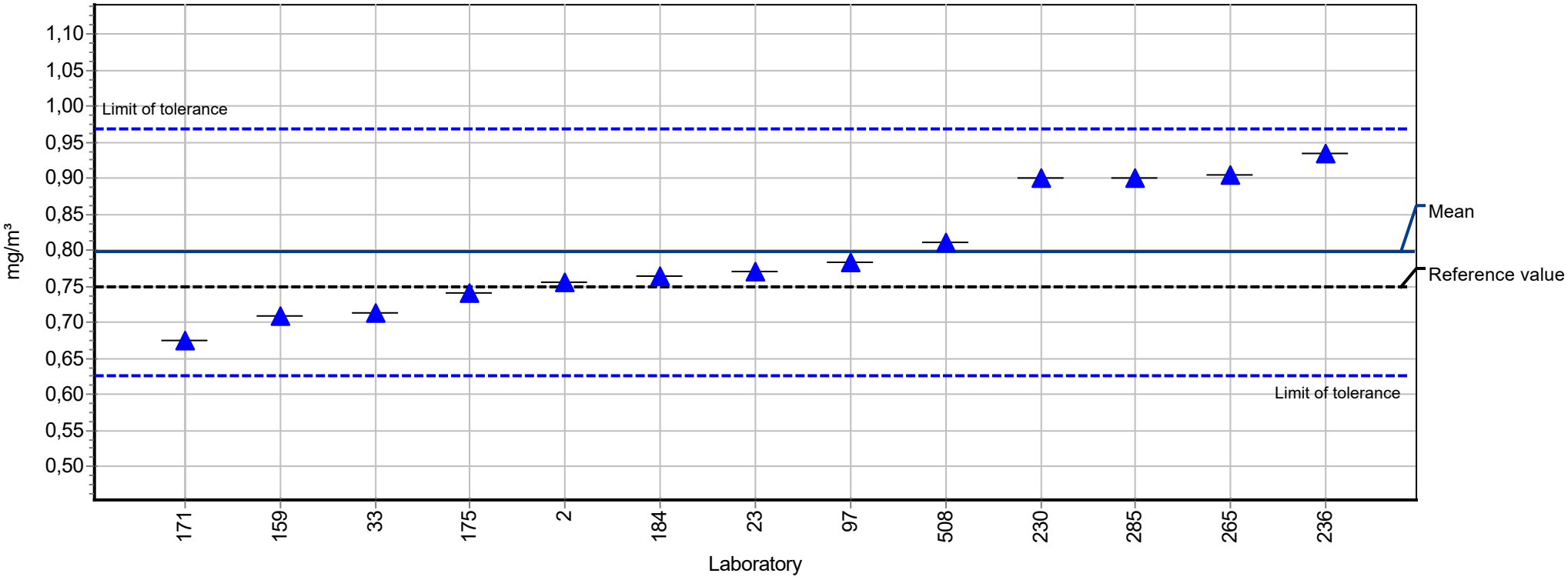
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Formaldehyde** | **Mean:** | **0,130 mg/m³** |
| **Sample:** | **3** | **Reprod. s.d.:** | **0,008 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **6,19%** |
| **Rel.target s.d.:** | **10,00% (Limited)** | **Reference value:** | **0,114 mg/m³** |
| **No. of laboratories:** | **14** | **Range of tolerance:** | **0,104 - 0,156 mg/m³ (\|Z-Score\| <= 2,00)** |



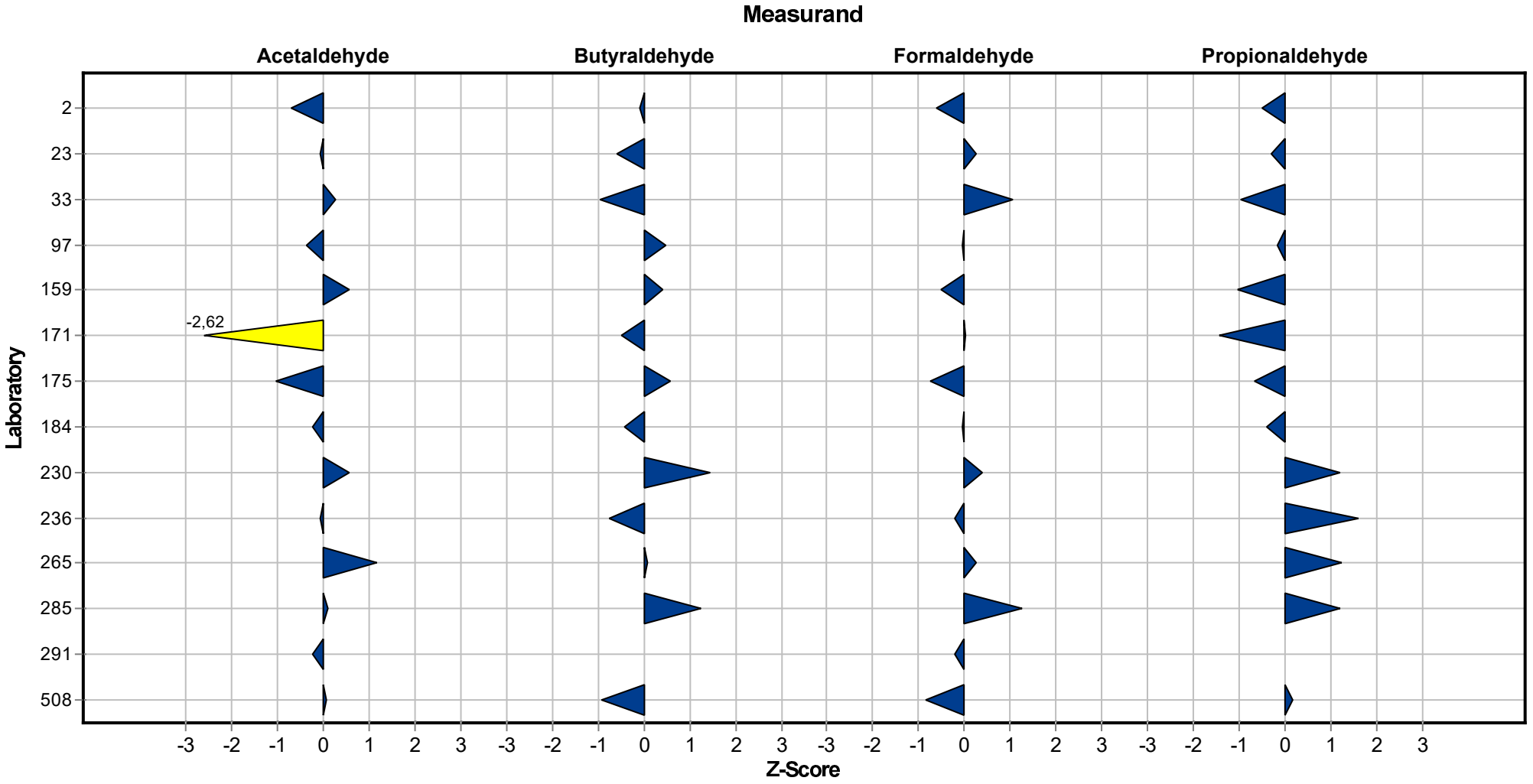
# *Summary results*

| | | | |
|---|---|---|---|
| **Measurand:** | **Propionaldehyde** | **Mean:** | **0,797 mg/m³** |
| **Sample:** | **3** | **Reprod. s.d.:** | **0,086 mg/m³** |
| **Method:** | **ISO 5725-2** | **Rel.reprod. s.d.:** | **10,76%** |
| **Rel.target s.d.:** | **10,76% (Limited)** | **Reference value:** | **0,749 mg/m³** |
| **No. of laboratories:** | **13** | **Range of tolerance:** | **0,626 - 0,969 mg/m³ (\|Z-Score\| <= 2,00)** |



# Sample chart of Z-scores

**Sample 3**



# Questions and Answers

| Participant | Type of sample carrier | Sampling pump | Volume flow |
|---|---|---|---|
| 2 | LpDNPH S10, Fa. Supelco , No. 21014 | Aircheck | 1 L/Min. |
| 23 | DNPH Kartusche von Supelco | BIVOC 2 | 800ml/min |
| 33 | Waters DNPH Silicagel WAT 039550 | SKC Personal Air Sampler 224PCMTX8 | 0,1; 0,15; 0,2 L/min |
| 97 | Supelco S10 DNPH-Kartuschen | BiVOC / SG350ex | 1 l/min / 0,333 l/min |
| 159 | Waters Sep-Pak XPoSure Aldehyd Sampler | SG 2500ex | 1,0 Liter/min |
| 171 | LpDNPH S10x Cartridge; Supelco Analytical | Gilian GilAir Plus | 2 l/min |
| 175 | Water SepPak | GSA 5100, SKC Pocket Pump and SKC Pocket Touch | 100, 200, 400, 1000, 1500 ml/min |
| 184 | Supelco Lp DNPH S10 | Gilan Gilair+; GSA SG 4000 | 0,24 - 0,26 l/min |
| 230 | DNPH, SEP-PAK XPosur, Fa. Waters | Holbach, BIVOC 2 | 1l/min |
| 236 | SKC Röhrchen Nr. 226-119 | Gilian LFS 113 | 100 ml/min |
| 265 | Waters DNPH Kartuschen Shortbody | Desaga GS312 | 1,0 l/min |
| 285 | SKC DNPH coated silica gel | SKC 224-PCXR8 | 0,33 l/min |
| 291 | LP-DNPH-10 Vol. 3ml von Sigma | Honold | 1 l/min |
| 508 | Waters DNPH Kartuschen Shortbody | Desaga GS312 | 1,0 l/min |

| Participant | Volume flow measurement | Sampling time | Analytical method |
|---|---|---|---|
| 2 | Defender 530 | 10 Min. und 20 Min. | IFA-Arbeitsmappe Kennzahl 6045 |
| 23 | BIOS Definer 220 M | 62,5min, 125min | i.A. nach ISO 16000-3 (Aldehyde/Ketone) |
| 33 | Bios Defender 510 | 120 min | IFA 6045 |
| 97 | Defender 510H / Defender 510L | 45 Minuten | HPLC |
| 159 | DryCal | 30 min und 60 min | BGN-Methode 2017-01 2P, HPLC, PN mit DNPH |
| 171 | TSI 4100 | 60 min | ISO 16000-3 |
| 175 | TSI 4100 | 15 min und 2 h | SS-ISO 16000:3 |
| 184 | DryCal DC Lite | 117 - 120 min | IFA 6045 |
| 230 | TSI 4100 | 30 Minuten | DIN EN ISO 16000-3 |
| 236 | Definer 220 Bios DryCal | 2 h | interne SOP 81.40 angelehnt an NIOSH-Methode Nr. 2016 |
| 265 | Gilian Gilibrator | 10-40 min | DIN ISO 16000-3 |
| 285 | DryCal Defender 310 | zw ischen 10 und 60 min mehrere Wiederholungen | DIN ISO 16000-3 (2013-01) |
| 291 | interne Geräteanzeige | 120 min | DIN EN ISO 16000-3:2013-01 |

| Participant | Volume flow measurement | Sampling time | Analytical method |
|---|---|---|---|
| 508 | Gilian Gilibrator | 10-40 min | DIN ISO 16000-3 |

| Participant | Date start sample preparation | Storage time after desorption | Date of analysis |
|---|---|---|---|
| 2 | 22.10.2018 | Ja, für 2 Tage im Kühlschrank bei 4°C. | 24.10.2018 |
| 23 | 29.10.2018 | nein | 29.10.2018 |
| 33 | 18.10.2018 | Im Kühlschrank < 1 Tage | 18.10.2018 |
| 97 | 26.10.2018 | | 26.10. - 27.10.2018 |
| 159 | 19.10.2018 | 6 Tage Raumtemperatur | 25.10.2018 und 14.11.2018 |
| 171 | 22.10.2018 | k.A. | 23.10.2018 |
| 175 | 6. und 7. Nov | 1 Tag | 6. und 7. Nov |
| 184 | 24.10.2018 | Messung erfolgte direkt nach der Desorption | 24.10.2018 |
| 230 | 22.10.2018 | nein | 22.10. 2018 |
| 236 | 18.10.20108 | nein | 18.10.2018 |
| 265 | 18.10.2018 | 1 Tag / -18°C | 18.10.2018 |
| 285 | 19.10.2018 | nein umgehende Analyse | 19.10.2018 |
| 291 | 17.10.2018 | ja, über Nacht, Kühlschrank | 18.10.2018 |
| 508 | 18.10.2018 | 1 Tag/ -18°C | 18.-19.10.2018 |

| Participant | Desorption solution | Volume of desorption solution |
|---|---|---|
| 2 | Acetonitril und 85% Phosphorsäure | 5 mL Acetonitril und 25µL Phosphorsäure |
| 23 | Acetonitril | 5ml |
| 33 | Acetonitril | 6 ml |
| 97 | Acetonitril | |
| 159 | Acetonitril mit DNPH u. H3PO4 (in 200 ml ACN: 250 mg DNPH) | 5 ml |
| 171 | Acetonitril | 1 ml |
| 175 | Acetonitril | 2 ml |
| 184 | Acetonitril | 5 ml |
| 230 | Acetonitril | 10 ml |
| 236 | Acetonitril | 3 ml |
| 265 | Acetonitril | 2 ml |

| Participant | Desorption solution | Volume of desorption solution |
|---|---|---|
| 285 | Acetonitril | 2 ml |
| 291 | Acetonitril | 5 ml |
| 508 | Acetonitril | 2 ml |

| Participant | Chromatography system | Autosampler |
|---|---|---|
| 2 | Agilent 1200 SL | Nein |
| 23 | HPLC/DAD 20A Shimadzu System | nein |
| 33 | BinPump G1312A HP, DAD G1315A HP, ALS G1313A HP | Nein, Raumtemperatur |
| 97 | HPLC-Anlage Shimadzu LC 10 | |
| 159 | Tern. Gradientenpumpe, DAD (HP 1100/1200 Serie Agilent) | nein |
| 171 | Agilent Technologies 1260, DAD Detektor | nicht gekühlt |
| 175 | Vanquish Thermo | Ja 10 |
| 184 | Agilent 1100 Serie | Ungekühlt |
| 230 | Fa. Agilent | nein |
| 236 | Agilent Technologies Infinity 1260 mit DAD Detektor | nein |
| 265 | Shimadzu | ja, 15°C |
| 285 | HPLC Dionex U-3000, Pumpe: LPG-3400 SD, Detektor: DAD-3000; Autosampler: WPS-3000SL | ungekühlt |
| 291 | API 2000 Gerät (LC-MS/MS), MS-Detektor, negativ Modus | ja, 20°C |
| 508 | Shimadzu | ja, 15°C |

| Participant | Analytical column | Flow rate HPLC |
|---|---|---|
| 2 | Ascentis Express RP-Amide | 0,6mL/Min |
| 23 | Synergi 4µmHydro-RP 80A LC Column 250x4,6mm | 1ml/min |
| 33 | Dr. Maisch Reprosil pur 120 C18-AQ 150x4 mm | 1,2 ml/min |
| 159 | ODS Hypersil 250x4.0mm; 5µm von Agilent mit Vorsäule | 0,8 ml/min |
| 171 | Nucleodur C18 (Isis 3um, 250x4mm), Machery&Nagel | 0.5 ml/min |
| 175 | Syncronis C18, 100x2,1 mm 1,7µ | 0,3 ml/min |
| 184 | EC 50/3 NUCLEODUR Sphinx RP, 1,8ìm | 0,9 ml/min |
| 230 | MZ PAH C 18, 5 µm | 0,5ml/min |
| 236 | Pursuit C18 100x2,0 mm 3µm | 0,2 ml/min |

| Participant | Analytical column | Flow rate HPLC |
|---|---|---|
| 265 | Agilent Zorbax RRHD Ecplise PLus C18, 2,1x150mm, 1,8µm | 0,25 ml/min |
| 285 | Restek Allure AK 5µm, 200x4.6mm | 1,5 ml/min |
| 291 | Phenomenex C18 Gemini 150 mm Lange; 3 mm ID; 5 ƒÊm Partikelgrose | 0,4 ml/min |
| 508 | Agilent Zorbax RHHD Eclipse Plus C18, 2,1x150mm, 1,8 µm | 0,25 ml/min |

| Participant | Mobile phase |
|---|---|
| 2 | Wasser/Acetonitril |
| 23 | A: Wasser, B: Acetonitril+5% Wasser |
| 33 | Eluent A: Acetonitril Eluent B: Wasser |
| 159 | Methanol/Wasser/Acetonitril |
| 171 | Acetonitril/Wasser |
| 175 | Acetonitil/Wasser |
| 184 | H2O+10% THF / ACN |
| 230 | dest. Wasser/Acetonitril, Gradientenprogramm |
| 236 | Wasser/Acetonitril 40:60 |
| 265 | Acetonitril/Wasser 55:45 |
| 285 | Acetonitril / Wasser |
| 291 | A: 50 % ACN 50 % Wasser 100 mM Ammoniumacetat 0,04 % Ammoniumhydroxid; B:90 % ACN 10 % Wasser 100 mM Ammoniumacetat 0,04 % Ammoniumhydroxid |
| 508 | Acetonitril / Wasser 55:45 |

| Participant | Recovery rate | Wavelength | Column temperature |
|---|---|---|---|
| 2 | Nein | 360 nm bzw . 370 nm | 30°C |
| 23 | nein | 360nm | 25° C |
| 33 | Nein, da Wiederfindung in Ordnung | 365 nm | Raumtemperatur |
| 159 | ja | 365 nm; 4 nm BW | 27°C |
| 171 | nein | 365.4; Ref 590 | 30°C |
| 175 | Nein | 360 | 10 |
| 184 | nein | 360 nm | 40°C |
| 230 | nein | 362 | 40°C |
| 236 | nein | 360 nm | 33 Grad |

| Participant | Recovery rate | Wavelength | Column temperature |
|---|---|---|---|
| 265 | nein | 356 nm | 45°C |
| 285 | nein | 360 nm | 30°C |
| 291 | nein | s. o. | 30°C Säulenofentemp. |
| 508 | nein | 356 nm | 45 °C |