Results of Proficiency Test Liquefied Propane October 2014

Organised by: Institute for Interlaboratory Studies Spijkenisse, the Netherlands

Author:dr. R.G. VisserCorrectors:ing. R.J. StarinkReport:iis14S03P

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#### CONTENTS

| 1   | INTRODUCTION                                         | 3  |
|-----|------------------------------------------------------|----|
| 2   | SET UP                                               | 3  |
| 2.1 | QUALITY SYSTEM                                       | 3  |
| 2.2 | PROTOCOL                                             | 3  |
| 2.3 | CONFIDENTIALITY STATEMENT                            | 4  |
| 2.4 | SAMPLES                                              | 4  |
| 2.5 | STABILITY OF THE SAMPLES                             | 4  |
| 2.6 | ANALYSES                                             | 5  |
| 3   | RESULTS                                              | 5  |
| 3.1 | STATISTICS                                           | 5  |
| 3.2 | GRAPHICS                                             | 6  |
| 3.3 | Z-SCORES                                             | 6  |
| 4   | EVALUATION                                           | 8  |
| 4.1 | EVALUATION PER TEST/COMPONENT                        | 8  |
| 4.2 | PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES | 11 |
| 4.3 | DISCUSSION                                           | 11 |

## Appendices:

| 1. | Data and statistical results       | 13 |
|----|------------------------------------|----|
| 2. | Number of participants per country | 27 |
| 3. | Abbreviations and literature       | 28 |

#### 1 INTRODUCTION

Since 2009, the Institute for Interlaboratory Studies organized a proficiency test for the analysis of Liquefied Propane (composition only) every year. It was decided to continue this interlaboratory study during the annual program 2014/2015.

Because iis has limited gas-handling facilities in place to prepare gas samples, a cooperation with EffecTech (Uttoxeter, United Kingdom) was set up. This company is fully equipped and has experience in the preparation of synthetic natural gas samples for PT purposes. EffecTech maintains an ISO17043 accreditation for the preparation of PT samples in homogeneous and stable batches and an ISO17025 accreditation for the calibration and assignment of reference values for these samples.

In the 2014 proficiency test 44 laboratories in 24 different countries have participated. See appendix 2 for the number of participants per country. In this report the results of the 2014 proficiency test on Liquefied Propane are presented and discussed. This report is also electronically available through the iis internet site www.iisnl.com.

### 2 SET UP

The Institute for Interlaboratory Studies (iis) in Spijkenisse, the Netherlands, was the organizer of this proficiency test.

To optimise the costs for the participating laboratories, it was decided to prepare one Liquefied Propane mixture. The mixture was divided over a batch of 48 cylinders. The cylinder size is a cost-effective one-litre cylinder with dip tube device. Each cylinder, filled with approx 200 grams of liquefied propane mixture, was uniquely numbered. The limited cylinder size is chosen to optimise sample stability, cylinder costs, transport and handling costs. The preparation and testing of the sample cylinders was subcontracted. Participants were requested to report rounded and unrounded results. The unrounded results were preferably used for statistical evaluation.

## 2.1 QUALITY SYSTEM

The Institute for Interlaboratory Studies in Spijkenisse, the Netherlands, has implemented a quality system based on ISO/IEC 17043:2010 (R007). This ensures strict adherence to protocols for sample preparation and statistical evaluation and 100% confidentially of participant's data. Also customer's satisfaction is measured on regular basis by the distribution of questionnaires.

EffecTech is an accredited provider of proficiency testing schemes under the requirements of ISO/IEC17043:2010 by UKAS (no. 4719).

## 2.2 PROTOCOL

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3), that can be downloaded from the iis web site http://www.iisnl.com.

#### 2.3 CONFIDENTIALITY STATEMENT

All data presented in this report must be regarded as confidential and for use by the participating companies only. Disclosure of the information in this report is only allowed by means of the entire report. Use of the contents of this report for third parties is only allowed by written permission of the Institute for Interlaboratory Studies. Disclosure of the identity of one or more of the participating companies will be done only after receipt of a written agreement of the companies involved.

### 2.4 SAMPLES

In this proficiency test only one sample was used. One batch of 48 one litre cylinders with artificial Liquefied Propane mixture was prepared and tested for homogeneity by EffecTech (Uttoxeter, United Kingdom) in conformance with ISO Guide 35: 2006 and ISO/IEC17043:2010 (job 14/0842) starting September 1, 2014. Each cylinder was uniquely numbered. Every cylinder in the batch was analysed using 6 replicate measurements. The within bottle and between bottle variations were then assessed in accordance with ISO Guide 35:2006 (Annex A.1). This procedure showed that the between bottle variations were all small compared to the uncertainties on the reference values on each component. Hence, a single reference value could be safely assigned to the entire batch of samples. The repeatability values (r) were calculated per component by multiplication of the respective standard deviation by 2.8. Subsequently, the calculated repeatabilities were compared with 0.3 times the reproducibility of the reference method in agreement with the procedure of ISO 13528, Annex B2 in the next table:

| Parameter    | r(observed)<br>in %mol/mol | 0.3 X R(D2163:96)<br>in %mol/mol | 0.3 X R(D2163:14)<br>in %mol/mol |
|--------------|----------------------------|----------------------------------|----------------------------------|
| Ethane       | 0.013                      | 0.028                            | 0.093                            |
| Propane      | 0.035                      | 0.282                            | 1.259                            |
| Propylene    | 0.006                      | 0.026                            | 0.071                            |
| Iso-Butane   | 0.013                      | 0.058                            | 0.059                            |
| n-Butane     | 0.014                      | 0.057                            | 0.050                            |
| 1-Butene     | 0.001                      | 0.006                            | 0.018                            |
| iso-Butylene | 0.001                      | 0.006                            | 0.018                            |
| n-Pentane    | 0.008                      | 0.023                            | 0.023                            |

Table 1: homogeneity test results of samples #14202

Each calculated repeatability is equal or less than 0.3 times the corresponding reproducibility of the reference method ASTM D2163:96 and also of the latest version D2163:14. Therefore, homogeneity of the subsamples #14202 was assumed.

To each of the participating laboratories one 1L cylinder was sent on October 8, 2014.

#### 2.5 STABILITY OF THE SAMPLES

EffecTech (Uttoxeter, United Kingdom) declares that the prepared gas cylinders have a shelf life of at least 6 months. This is sufficient for the proficiency testing purposes.

#### 2.6 ANALYSES

The participants were asked to determine the composition: Ethane, Propane, Propylene, n-Butane, iso-Butane, n-Pentane, 1-Butene, iso-Butene and some physical parameters calculated from the composition: Molar Mass, Relative Density @60F, Absolute and Relative Vapour pressure @100F and Absolute and Relative Vapour pressure @40°C. To get comparable results a detailed report form, on which the units were prescribed as well as the required standards and a letter of instructions were prepared and made available on the data entry portal www.kpmd.co.uk/sgs-iis/. The detailed report form and the letter of instructions were also made available for download on the iis website www.iisnl.com. A SDS and a form to confirm receipt of the sample was added to the sample package.

#### 3 RESULTS

During four weeks after sample despatch, the results of the individual laboratories were gathered. The original results are tabulated per determination in the appendix 1 of this report. The laboratories are presented by their code numbers.

Directly after the deadline the available results were screened for suspect data. A result was called suspect in case the Huber Elimination Rule (a robust outlier test) found it to be an outlier. The laboratories that produced these suspect data were asked to check the results. Additional or corrected data are put under 'Remarks' in the result tables in appendix 1. Results that came in after deadline were not taken into account in the screening for suspect data and thus these participants were not requested for checks.

#### 3.1 STATISTICS

The protocol followed in the organisation of this proficiency test was the one as described for proficiency testing in the report 'iis Interlaboratory Studies: Protocol for the Organisation, Statistics and Evaluation' of April 2014 (iis-protocol, version 3.3).

For the statistical evaluation the *unrounded* (when available) figures were used instead of the rounded results. Results reported as '...' or '>...' were not used in the statistical evaluation.

First, the normality of the distribution of the various data sets per determination was checked by means of the Lilliefors-test a variant of the Kolmogorov-Smirnov test and by the calculation of skewness and kurtosis. Evaluation of the three normality indicators in combination with the visual evaluation of the graphic Kernel density plot, lead to judgement of the normality being either 'unknown', 'OK', 'suspect' or 'not OK'. After removal of outliers, this check was repeated. Not all data sets proved to have a normal distribution, in which cases the statistical evaluation of the results should be used with due care.

In accordance with ISO 5725 (1986 and 1994) the original results per determination were submitted subsequently to Dixon and Grubbs outlier tests. Outliers are marked by D(0.01) for the Dixon test and by G(0.01) or DG(0.01) for the Grubbs test. Stragglers are marked by

D(0.05) for the Dixon test, by G(0.05) or DG(0.05) for the Grubbs test and by R(0.05) for the Rosner General ESD test (ref. 21). Both outliers and stragglers were not included in the calculations of the averages and the standard deviations.

For each assigned value, the uncertainty was determined in accordance with ISO13528. Subsequently the calculated uncertainty was evaluated against the respective requirement based on the target reproducibility in accordance with ISO13528. When the uncertainty passed the evaluation, no remarks are made in the report. However, when the uncertainty failed the evaluation it is mentioned in the report and it will have consequences for the evaluation of the test results.

Finally the reproducibilities were calculated from the standard deviations by multiplying these with a factor of 2.8.

### 3.2 GRAPHICS

In order to visualise the data against the reproducibilities from literature, Gauss plots were made, using the sorted data for one determination (see appendix 1). On the Y-axis the reported analysis results are plotted. The corresponding laboratory numbers are under the X-axis. The straight horizontal line presents the consensus value (a trimmed mean). The four striped lines, parallel to the consensus value line, are the +3s, +2s, -2s and -3s target reproducibility limits of the selected standard. Outliers and other data, which were excluded from the calculations, are represented as a cross. Accepted data are represented as a triangle. Furthermore, Kernel Density Graphs were made. This method is producing a smooth density approximation to a set of data that avoids some problems associated with histograms (see appendix 3; nos.14 and 15). Also a normal Gauss curve was projected over the Kernel Density Graph for reference.

## 3.3 Z-SCORES

To evaluate the performance of the participating laboratories the z-scores were calculated. As it was decided to evaluate the performance of the participants in this proficiency test (PT) against the literature requirements, e.g. ASTM, EN-, ISO-, IP reproducibilities, the z-scores were calculated using a target standard deviation. This target standard deviation was calculated from the literature reproducibility by division with 2.8. The z-scores were calculated according to:

z(target) = (result - average of PT) / target standard deviation

The z(target) scores are listed in the result tables in appendix 1.

When a laboratory did use a test method with a reproducibility that is significantly different from the reproducibility of the reference test method used in this report, it is strongly advised to recalculate the z-score, while using the reproducibility of the actual test method used, this in order to evaluate whether the reported test result is fit-for-use.

Absolute values for z<2 are very common and absolute values for z>3 are very rare. Therefore the usual interpretation of z-scores is as follows:

|z| < 1 good 1 < |z| < 2 satisfactory 2 < |z| < 3 questionable 3 < |z| unsatisfactory

#### 4 EVALUATION

In this proficiency test several problems were encountered with sample transport. Due to these problems five cylinders did reach the laboratory near or after the final reporting date and were unable to test the cylinder and to report results before the deadline of reporting. In total seven laboratories reported the test results after the final reporting date and another seven laboratories did not report any test results due to several circumstances. Not all laboratories did report all test results requested.

In total 44 participating laboratories reported 395 numerical test results. Observed were 27 outlying test results, which is 6.8% of all numerical results. In proficiency studies outlier percentages of 3% - 7.5% are quite normal.

#### 4.1 EVALUATION PER TEST/COMPONENT

In this section the results are discussed per component. The methods, which were used by the various laboratories, are taken into account for explaining the observed differences when possible and applicable. These methods are also in the tables together with the original data. The abbreviations, used in these tables, are listed in appendix 3.

Not all original data sets proved to have a normal Gaussian distribution. These are referred to as "not OK" or "suspect". The statistical evaluation of these data sets should be used with due care.

Because the majority of the participating laboratories used ASTM D2163 as test method, it was decided to use the reproducibilities of this test method as target reproducibilities, and to mention the reproducibilities of EN27941 (identical to IP405 and ISO7941) for reference only. Regretfully in the last version ASTM D2163:07 only repeatabilities, but no reproducibilities are mentioned. Therefore the precision data from the previous version ASTM D2163:96 (estimated from figure 3) were used.

All test results reported by laboratories 92, 1491 and 1776 were deviating and many of the eight test results appeared to be statistical outliers. As the eight test results are not independent, it was decided to reject all of the test results of this laboratory for the statistical evaluation.

Also the test results of laboratory 1026 were not used in the calculations because this laboratory did report only 5 of the 8 components present and therefore proper normalisation of the test results was not possible.

Ethane: The determination of this component may be problematic, depending on the test method used by the laboratory. Four statistical outliers were observed. The calculated reproducibility, after exclusion of the suspect data, is not at all in agreement with the requirements of ASTM D2163:96. However, the calculated reproducibility is in good agreement with the less strict reproducibility requirements of EN27941 (identical to IP405 and ISO7941).

| The determination of this component was problematic for a number of       |
|---------------------------------------------------------------------------|
| laboratories. Two statistical outliers were observed. However, the        |
| calculated reproducibility after exclusion of the suspect data is in good |
| agreement with the requirements of ASTM D2163:96 and also with the        |
| reproducibility requirements of EN27941 (identical to IP405 and           |
| ISO7941).                                                                 |
|                                                                           |

- <u>Propylene:</u> The determination of this component may be problematic, depending on the test method used by the laboratory. Four statistical outliers were observed. The calculated reproducibility after exclusion of the suspect data is not in agreement with the requirements of ASTM D2163:96. However, the calculated reproducibility is in good agreement with the less strict reproducibility requirements of EN27941 (identical to IP405 and ISO7941).
- iso-Butane: The determination of this component was problematic for a number of laboratories. Five (!) statistical outliers were observed. The calculated reproducibility after exclusion of the suspect data is in good agreement with the requirements of ASTM D2163:96 and also with the reproducibility requirements of EN27941 (identical to IP405 and ISO7941).
- <u>n-Butane:</u> The determination of this component was problematic. Four statistical outliers were observed. The calculated reproducibility after exclusion of the suspect data is not in agreement with the requirements of ASTM D2163:96, nor with the less strict reproducibility requirements of EN27941 (identical to IP405 and ISO7941).
- <u>1-Butene:</u> The determination of this component may be problematic, depending on the test method used by the laboratory. Two statistical outliers were observed. The calculated reproducibility after exclusion of the suspect data is not in agreement with the requirements of ASTM D2163:96. However, the calculated reproducibility is in good agreement with the less strict reproducibility requirements of EN27941 (identical to IP405 and ISO7941).
- <u>Iso-Butene:</u> The determination of this component may be problematic, depending on the test method used by the laboratory. Two statistical outliers were observed. The calculated reproducibility after exclusion of the suspect data is not in agreement with the requirements of ASTM D2163:96. However, the calculated reproducibility is in good agreement with the less strict reproducibility requirements of EN27941 (identical to IP405 and ISO7941).

- <u>n-Pentane:</u> The determination of this component may be problematic, depending on the test method used by the laboratory. Two statistical outliers were observed. The calculated reproducibility after exclusion of the suspect data is not in agreement with the requirements of ASTM D2163:96. However, the calculated reproducibility is in good agreement with the less strict reproducibility requirements of EN27941 (identical to IP405 and ISO7941).
- <u>Molar Mass:</u> This calculated parameter may not be problematic. The results vary over a range from 44.58 – 44.7346. No statistical outliers were present. The calculated reproducibility is small in comparison with the calculated reproducibility of iis13S03P (0.12 vs. 0.27). See also the discussion in 4.3.
- <u>Rel. Density @60F:</u> This calculated parameter may be problematic. The results vary over a range from 0.5095 0.511. No statistical outliers were present. Possibly seven laboratories reported the relative density @15°C, as IP432 or ISO8973 were used, both methods use 15°C instead of 60F. However, the difference in relative density between 15°C and 60F is less than 0.0001 and therefore this cannot fully explain for the observed spread.
- Abs. VP @100F: As the reported results calculated via ASTM D2598 and ISO8973 are not identical, it was decided to calculate the absolute vapour pressure for each laboratory according to both test methods by using the reported contents of the components. When the result of the calculation method of ASTM D2598 is comparison with the result of the calculation method of ISO8973, it is noticed that the difference in the means is significant, while the difference in the spreads is not significant. See also the discussion in 4.3. The quality of the test results has improved significantly since the previous PT as the dispersion of the results decreased (1.534 vs 2.698 for ISO8973 and 1.575 vs 2.485 for D2598).
- Rel. VP @100F: As the reported results calculated via ASTM D2598 and ISO8973 are not identical, it was decided to calculate the absolute vapour pressure for each laboratory according to both test methods by using the reported contents of the components. When the result of the calculation method of ASTM D2598 is comparison with the result of the calculation method of ISO8973, it is noticed that the difference in the means is significant, while the difference in the spreads is not significant. See also the discussion in 4.3. The quality of the test results has improved significantly since the previous PT as the dispersion of the results decreased (1.534 vs 2.698 for ISO8973 and 1.575 vs 2.485 for D2598).
- <u>Abs. VP @40°C:</u> This determination may be problematic. The range of the reported test results is large: from 1236 1386 kPa. One calculation error was observed and possibly two Relative VPs results were reported under

Absolute VP. After exclusion of the suspect data one more statistical outlier was observed.

<u>Rel. VP @40°C:</u> This determination may be problematic. The range of the reported test results is large: from 1138.7 – 1285 kPa. After exclusion of the suspect data one more statistical outlier was observed.

#### 4.2 **PERFORMANCE EVALUATION FOR THE GROUP OF LABORATORIES**

A comparison has been made between the reproducibility as declared by the relevant standard and the reproducibility as found for the group of participating laboratories. The average results per sample, calculated reproducibilities and reproducibilities, derived from literature standards (in casu ASTM D2163:96 and EN27941/ISO7941/IP405) are compared in the next table.

| Parameter         | unit     | n  | cons. value | 2.8 * sd | R(D2163:96)<br>in <b>%mol</b> | R(EN27941)<br>liqinj.<br>in <b>%mol</b> |
|-------------------|----------|----|-------------|----------|-------------------------------|-----------------------------------------|
| Ethane            | %mol/mol | 31 | 0.807       | 0.167    | 0.093                         | 0.297                                   |
| Propane           | %mol/mol | 32 | 94.103      | 0.778    | 0.941                         | 1.013                                   |
| Propylene         | %mol/mol | 31 | 0.743       | 0.096    | 0.086                         | 0.212                                   |
| iso-Butane        | %mol/mol | 31 | 1.670       | 0.187    | 0.192                         | 0.384                                   |
| n-Butane          | %mol/mol | 32 | 1.658       | 0.237    | 0.191                         | 0.212                                   |
| 1-Butene          | %mol/mol | 32 | 0.168       | 0.041    | 0.019                         | 0.159                                   |
| Iso-Butene        | %mol/mol | 32 | 0.168       | 0.041    | 0.019                         | 0.159                                   |
| n-Pentane         | %mol/mol | 30 | 0.669       | 0.139    | 0.077                         | 0.310                                   |
| Molar Mass        | g/mol    | 18 | 44.662      | 0.122    | n.a.                          | n.a.                                    |
| Rel. Density @60F |          | 20 | 0.5102      | 0.0013   | n.a.                          | n.a.                                    |
| Abs. VP @100F     | psi      |    | see         | §4.3     | n.a.                          | n.a.                                    |
| Rel. VP @100F     | psi      |    | see         | §4.3     | n.a.                          | n.a.                                    |
| Abs. VP @40°C     | kPa      | 13 | 1350        | 32       | n.a.                          | n.a.                                    |
| Rel. VP @40°C     | kPa      | 13 | 1246        | 12       | n.a.                          | n.a.                                    |

Table 2: Performance of the group in comparison with the target reproducibilities

Without further statistical calculations it can be concluded that for some components/tests there is a good compliance of the group of participating laboratories with the relevant standard. The problematic components/tests have been discussed in paragraph 4.1.

## 4.3 DISCUSSION

Because several of the reproducibility requirements of ASTM D2163 differ significantly from the reproducibility requirements of EN27941 (for liquid injection), the outcome of the evaluation will be strongly dependent on the target test method selected for the evaluation.

The consensus values as determined in this PT are compared with the average values from the homogeneity testing by EffecTech, United Kingdom in the following table.

| Parameter  | Average values by<br>EffecTech<br>in %mol/mol | Consensus values from<br>participants results<br>in %mol/mol | Absolute<br>differences<br>in %mol/mol | z-score |
|------------|-----------------------------------------------|--------------------------------------------------------------|----------------------------------------|---------|
| Ethane     | 0.950                                         | 0.807                                                        | +0.143                                 | +4.31   |
| Propane    | 94.231                                        | 94.103                                                       | +0.128                                 | +0.38   |
| Propylene  | 0.757                                         | 0.743                                                        | +0.014                                 | +0.46   |
| iso-Butane | 1.578                                         | 1.670                                                        | -0.092                                 | -1.34   |
| n-Butane   | 1.551                                         | 1.658                                                        | -0.107                                 | -1.57   |
| 1-Butene   | 0.159                                         | 0.168                                                        | -0.009                                 | -1.31   |
| Iso-Butene | 0.156                                         | 0.169                                                        | -0.013                                 | -1.88   |
| n-Pentane  | 0.618                                         | 0.669                                                        | +0.051                                 | +1.85   |

Table 3: comparison of consensus values with values determined by EffecTech

From this comparison it is clear that <u>all</u> consensus values as determined in this PT are in line with the values as determined by EffecTech during the preparation of the cylinders, except for Ethane. Ethane, being the most volatile component, ethane will occupy the headspace in the sample to a greater extent. With each handling (injection, rinsing), the amount of liquid will decrease and the amount of vapour will increase and consequently the ethane concentration in the liquid will decrease. The higher the initial ethane concentration, the more visible the decrease will be.

For the calculation of the Vapour Pressure (VP) @100F, ten participants used ISO8973/IP432/EN589 and seven participants used ASTM D2598. In ISO 8973 (identical to IP432) the <u>Absolute</u> VP is calculated from the <u>mole fraction</u> per component and a VP factor of that component (given for all components). From the Absolute VP, the Relative VP is calculated. The participants that reported a test result for Vapour Pressure @40° all used ISO8973 or IP 432, except one laboratory.

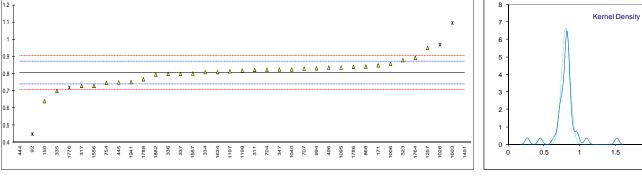
In ASTM D2598 the Gage pressure (identical to the <u>Relative</u> VP) is calculated from the <u>liquid</u> <u>volume percentage</u> per component and a VP factor of that component. Regretfully in the 2002 (2007) version of D2598 no factors are given for n-butene, 1-butene and n-pentane. However, in the draft 2012 version, factors are mentioned for these and other components. As one would expect to find identical values from both calculation methods, it is remarkable to see that the results from the ASTM D2598 calculation are significantly lower than the results from the ISO8973/IP432 calculation. The observed difference is caused by a difference in the VP factor of Ethane. ASTM (Subcommittee D02.H) commented (see also Appendix 3, literature: 20):

"The vapor pressure of ethane in D2598 was revised a few times prior to 2002. The current value, 611 psi, has remained the same for the last ten years. The revision of ethane was done because components in LPG blends do not necessarily behave as ideal gases. In particular, properties of ethane and ethylene appear to differ from ideality. Factors for these two components have been modified from 'ideal gas' values to make the calculated vapor pressure results more closely approximate actual measured vapor pressures of LPG blends. (i.e. D1267). Chapter 2 of Fuels and Lubricants Handbook (George Totten, © 2003), states that calculated vapor pressure were found to be biased high relative to experimental vapor pressure measured by D1267 for high ethane samples in earlier versions of D2598".

#### **APPENDIX 1**

Determination of Ethane on sample #14202; results in %mol/mol

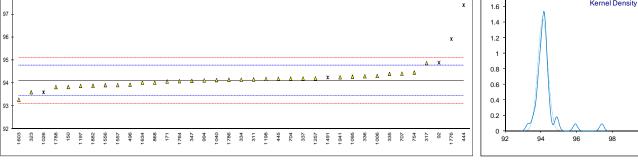
| 92       D2163       0.45       R(0.01)       -10.76         150       D2163       0.641       5.01         150       D2163       0.641       5.01         151       D2163       0.8496       1.28         151       D2163       0.8227       -2.32         153       D2163       0.73       -2.32         153       D2163       0.73       -2.32         153       D2163       0.73       -2.32         153       D2163       0.73       -2.32         154       D2163       0.76       -0.22         157       D2163       0.826       0.57         151                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | lab  | method                 | value   | mark      | z(targ) | suits in %moi/moi                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------|---------|-----------|---------|----------------------------------------------------------|
| 160       D2163       0.641       -5.01         311       D2163       0.84966       1.28         311       D2163       0.8227       0.47         323       D2163       0.8227       0.47         324       EN27941       0.81       0.09         335       D2163       0.7       -3.23         336       EN27941       0.8       C       -0.22         337       D2163       0.75       -7.23         336       EN27941       0.8       C       -0.22         347       D2163       0.826       0.57         7444       IP405       0.27       C.R(0.01)       -16.19       first reported .21         4445       D2163       0.824       0.51       -1.72         754       D2163       0.824       1.05       -1.72         754       D2163       0.842       1.05       -1.72         94       D2163       0.842       1.05       -24         912                                                                                                                                                                                                                                              |      |                        |         |           |         |                                                          |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                        |         |           |         |                                                          |
| 317       D2163       0.8227       0.47         317       D2163       0.73       -2.32         323       D2163       0.88       2.19         334       ENZ7941       0.81       0.09         335       ENZ7941       0.8       C       -0.22         337       ENZ7941       0.8       C       -0.22         337       ENZ7941       0.8       C       -0.22         336       ENZ7941       0.8       C       -0.22         337       D2163       0.75       -1.72       first reported 0.44         444       P405       0.27       C.R(0.01)       -16.19       first reported .21         445       D2163       0.747       -1.72       -0.51       -0.51         707       D2163       0.825       0.76       -0.51         707       D2163       0.825       0.76       -0.57         708       D2163       0.826       1.53       -0.24         1006       D2163       0.836       1.53       -0.24         1189       D2163       0.81       0.24       -0.57         1189       D2163       0.81       0.24       -0.57 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> |      |                        |         |           |         |                                                          |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                        |         |           |         |                                                          |
| 223       D2163       0.88       2.19         334       EN27941       0.81       0.09         335       D2163       0.7       -3.23         336       EN27941       0.8       C       -0.22         337       D2163       0.826       0.57         444       IP405       0.27       C.R(0.01)       -16.19         445       D2163       0.75       -1.72         446       D2163       0.75       -1.72         470       D2163       0.826       0.57         707       D2163       0.821       0.72         707       D2163       0.825       0.76         812       0.642       1.05         912       0.612163       0.8325       0.76         1086       D2163       0.8325       0.76         1080       D2163       0.8325       0.76         1080       D2163       0.81       0.24         1199       D2163       0.81       0.24         1198       D2163       0.81       0.24         1198       D2163       0.81       0.24         1199       D2163       0.820       0.39                                                                                                         |      |                        |         |           |         |                                                          |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                        |         |           |         |                                                          |
| 335     D2163     0.7     -3.23       336     EN27941     0.8     C     -0.22       337     D2163     0.826     0.57       444     IP405     0.27     C,R(0.01)     -16.19       445     D2163     0.826     0.67       511         704     D2163     0.824     0.61       707     D2163     0.824     0.61       704     D2163     0.825     0.76       912         994     D2163     0.825     0.76       912         994     D2163     0.825     0.76       1006     D2163     0.826     0.57       10109         1020         1137     D2163     0.826     0.39       1138     D2163     0.820     0.39       1139     D2163     0.821        1200         1217     D2163     0.851        1218     D2163     0.893     2.60       1764     D2163     0.893     2.60       1776     EN27941     0.72 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td></td<>                                                                                                                                                                                                                  |      |                        |         |           |         |                                                          |
| 337       EN27941       0.8       -0.22         347       D2163       0.826       0.57         444       IP405       0.27       C,R(0.01)       -16.19         445       D2163       0.75       -1.72         446       D2163       0.836       0.87         704       D2163       0.824       0.51         707       D2163       0.825       0.76         912                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                        |         |           |         |                                                          |
| 347     D2163     0.826     0.57       444     IP405     0.27     C,R(0.01)     -16.19       445     D2163     0.836     0.87       470     D2163     0.824     0.51       707     D2163     0.824     0.51       707     D2163     0.842     1.05       912         924     D2163     0.825     0.76       1006     D2163     0.888     1.53       912         914     D2163     0.8325     0.76       1026     ISO7941     0.97     exult excluded, laboratory did report only 5 components       1040     DIN51619     0.826     0.57       1055     EN27941     0.837     0.90       1199         1199     D2163     0.815     0.24       1199     D2163     0.811     4.34       1257     D2163     0.9511     4.34       1257     D2163     0.961     R(0.01)     8.71       1631     inhouse     1.0961     R(0.01)     8.71       1632     inhouse     1.0961     R(0.01)     8.71       1633     inhouse     1.0961     Conte                                                                                                                                                            | 336  | EN27941                | 0.8     | С         | -0.22   | first reported 0.44                                      |
| 444       IP405       0.27       C,R(0.01)       -16.19       first reported .21         445       D2163       0.75       -1.72       first reported .21         704       D2163       0.836       0.67         704       D2163       0.831       0.72         754       D2163       0.824       0.51         774       D2163       0.824       1.05         912                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 337  | EN27941                | 0.8     |           | -0.22   |                                                          |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 347  | D2163                  | 0.826   |           | 0.57    |                                                          |
| 496         EN27941         0.836         0.87           511              704         D2163         0.824         0.51           707         D2163         0.831         0.72           784         D2163         0.842         1.05           994         D2163         0.858         1.53           1006         D2163         0.826         0.57           1040         D1K51619         0.826         0.57           1035         EN27941         0.837         0.90           11197         D2163         0.820         0.39           1197         D2163         0.820         0.39           1200             1259             1267         D2163         0.8511         4.34           1259             1267         D2163         0.89511         4.34           1259             1267         D2163         0.8933         2.60           1634         ISO7941         0.502         C           1634         ISO7941 <t< td=""><td>444</td><td>IP405</td><td>0.27</td><td>C,R(0.01)</td><td>-16.19</td><td>first reported .21</td></t<>                                                | 444  | IP405                  | 0.27    | C,R(0.01) | -16.19  | first reported .21                                       |
| 511           704       D2163       0.824       0.51         707       D2163       0.831       0.72         754       D2163       0.842       1.05         912           994       D2163       0.858       1.05         912           914       D2163       0.858       1.53         1026       ISO7941       0.97       ex       4.91         1040       D1N51619       0.826       0.57         1040       D1N51619       0.826       0.57         1040       D1N51619       0.826       0.57         1040       D1N51619       0.820       0.90              1197       D2163       0.815       0.24         1198       D2163       0.820       C       -0.16         1180       D2163       0.893       2.60                                                                                                                                                                                                       | 445  | D2163                  | 0.75    |           | -1.72   |                                                          |
| 704       D2163       0.824       0.51         707       D2163       0.831       0.72         784       D2163       0.842       1.05         994       D2163       0.8325       0.76         906       D2163       0.8325       0.76         1006       D2163       0.888       1.53         1026       ISO7941       0.97       ex       4.91         result excluded, laboratory did report only 5 components       1.05       1.05         1040       DINS1619       0.826       0.57         1095       ENZ7941       0.837       0.90         1109           1197       D2163       0.820       0.39         1200           1257       D2163       0.9511       4.34         1259           1491       ISO7941       0.73       2.32         1557       ENZ7941       0.72       ex       2.63         1633       in house       1.0961       R(0.01)       8.71         1634       ISO7941       0.72       ex       2.63         1766       D2163       0.841 <td>496</td> <td>EN27941</td> <td>0.836</td> <td></td> <td>0.87</td> <td></td>                                               | 496  | EN27941                | 0.836   |           | 0.87    |                                                          |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         |           |         |                                                          |
| 754       D2163       0.7475       -1.80         868       D2163       0.842       1.05         994       D2163       0.8325       0.76         1006       D2163       0.858       1.53         1026       ISO7941       0.97       ex       4.91         1040       DIN51619       0.826       0.57         1095       EN27941       0.837       0.90         1109           1200           1217       D2163       0.820       0.39         1200           1257       D2163       0.9511       4.34         1259           1257       D2163       0.952       C         1318       ISO7941       0.73       -2.32         1557       EN27941       0.73       -2.32         1557       EN27941       0.72       ex       -2.63         1766       D2163       0.841       1.02         1776       EN27941       0.7682       -1.17         1882       EN27941       0.7682       -1.17         1860       2.163                                                                                                                                                                                  |      |                        |         |           |         |                                                          |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         |           |         |                                                          |
| 912           994       D2163       0.8325       0.76         1006       D2163       0.858       1.53         1026       ISO7941       0.97       ex       4.91         1040       DNS1619       0.826       0.57         1095       EN27941       0.837       0.90         1109           1197       D2163       0.820       0.39         1200           1257       D2163       0.9511       4.34         1259           1257       D2163       0.9511       4.34         1259           1257       D2163       0.9511       4.34         1259            1491       ISO7941       0.73       -2.32         1557       EN27941       0.73       -2.32         1764       D2163       0.8933       2.60         1776       EN27941       0.7682       -1.17         1882       EN27941       0.7682       -1.17         1862       EN27941       0.7682       -0.33     <                                                                                                                                                                                                                         |      |                        |         |           |         |                                                          |
| 994         D2163         0.8325         0.76           1006         D2163         0.858         1.53           1026         ISO7941         0.97         ex         4.91           1040         DIN51619         0.826         0.57           1095         EN27941         0.837         0.90           1109             1197         D2163         0.815         0.24           1198         D2163         0.820         0.39           1200             1257         D2163         0.9511         4.34           1259             1257         D2163         0.9511         4.34           1259             1341         ISO7941         0.802         C         -0.16           1557         EN27941         0.802         C         -0.16         first reported .5372           1603         in house         1.0961         R(0.01)         8.71         1.02           1776         EN27941         0.762         -1.17         1.67           1822         EN27941         0.7663         -0.03 <td></td> <td>D2163</td> <td></td> <td></td> <td></td> <td></td>                         |      | D2163                  |         |           |         |                                                          |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      | <b>Ba</b> / <b>a</b> a |         |           |         |                                                          |
| 1026       ISO7941       0.97       ex       4.91       result excluded, laboratory did report only 5 components         1040       DIN51619       0.826       0.57         1095       EN27941       0.837       0.90         1109           1197       D2163       0.815       0.24         1198       D2163       0.815       0.24         1257       D2163       0.9511       4.34         1259           1491       ISO7941       1.520       R(0.01)       21.48         1566       EN27941       0.802       C       -0.16         1633       in house       1.0961       R(0.01)       8.71         1634       ISO7941       0.81       0.09         1766       D2163       0.8933       2.60         1776       EN27941       0.72       ex       -2.63         1786       D2163       0.841       1.02         1786       D27941       0.7517       -1.67         1822       EN27941       0.7517       -1.67         1960           1960                                                                                                                                                |      |                        |         |           |         |                                                          |
| 1040       DIN51619       0.826       0.57         1095       EN27941       0.837       0.90         1109           1197       D2163       0.815       0.24         1198       D2163       0.820       0.39         1200           1257       D2163       0.9511       4.34         1259           1491       ISO7941       1.520       R(0.01)       21.48         1556       EN27941       0.802       C       -0.16         1603       in house       1.0961       R(0.01)       8.71         1634       ISO7941       0.802       C       -0.16         1766       D2163       0.8933       2.60         1776       EN27941       0.72       ex       -2.63         1786       EN27941       0.7682       -1.17         1882       EN27941       0.7682       -1.17         1882       EN27941       0.7517       -1.67         1960            2124           normality       suspect      <                                                                                                                                                                                                 |      |                        |         |           | 1.53    |                                                          |
| 1095       EN27941 $0.837$ $0.90$ 1109           1197       D2163 $0.815$ $0.24$ 1198       D2163 $0.820$ $0.39$ 1200           1257       D2163 $0.9511$ $4.34$ 1259           1401       ISO7941 $0.73$ $-2.32$ 1557       EN27941 $0.802$ C $-0.16$ 1634       ISO7941 $0.802$ C $-0.16$ 1764       D2163 $0.8933$ 2.60         1776       EN27941 $0.72$ ex $-2.63$ 1776       EN27941 $0.72$ ex $-2.63$ 1776       EN27941 $0.7682$ $-1.17$ 188       EN27941 $0.7682$ $-1.17$ 182       EN27941 $0.7517$ $-1.67$ 1960           2124           normality       suspect       suspect         n       31       outliers       4                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                        |         | ex        |         | result excluded, laboratory did report only 5 components |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                        |         |           |         |                                                          |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      | EIN27941               |         |           |         |                                                          |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      | D2163                  |         |           |         |                                                          |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         |           |         |                                                          |
| 1257       D2163       0.9511       4.34         1259                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         |           |         |                                                          |
| 1259           1491       ISO7941       1.520       R(0.01)       21.48         1556       EN27941       0.73       -2.32         1603       in house       1.0961       R(0.01)       8.71         1603       in house       1.0961       R(0.01)       8.71         1603       in house       1.0961       R(0.01)       8.71         1603       is Norse       1.0961       R(0.01)       8.71         1634       ISO7941       0.81       0.09         1776       EN27941       0.72       ex       -2.63       see §4.1         1786       D2163       0.841       1.02          1788       EN27941       0.7682       -1.17          1822       EN27941       0.7963       -0.33          1960             2124            normality       suspect           near (n)       0.05980       R(calc.)       0.1674       Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                      |      | D2163                  | 0.9511  |           | 4.34    |                                                          |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         |           |         |                                                          |
| 1557       EN27941 $0.802$ C       -0.16       first reported .5372         1603       in house $1.0961$ R(0.01) $8.71$ 1634       ISO7941 $0.81$ $0.09$ 1764       D2163 $0.8933$ 2.60         1776       EN27941 $0.72$ ex       -2.63         1786       D2163 $0.841$ $1.02$ 1788       EN27941 $0.7682$ -1.17         1882       EN27941 $0.7963$ -0.33         1941       EN27941 $0.7517$ -1.67         1960           normality       suspect          n       31          outliers       4       + 2 excl.         mean (n)       0.8072          st.dev. (n)       0.05980       R(calc.)       0.1674         R(D2163:96)       0.0929       Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                          | 1491 | ISO7941                | 1.520   | R(0.01)   | 21.48   |                                                          |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1556 | EN27941                | 0.73    |           | -2.32   |                                                          |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1557 | EN27941                | 0.802   | С         | -0.16   | first reported .5372                                     |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         | R(0.01)   |         |                                                          |
| 1776       EN27941 $0.72$ ex       -2.63       see §4.1         1786       D2163 $0.841$ $1.02$ 1788       EN27941 $0.7682$ -1.17         1882       EN27941 $0.7963$ -0.33         1941       EN27941 $0.7517$ -1.67         1960           2124           normality       suspect          n       31          outliers       4       + 2 excl.         mean (n)       0.8072          st.dev. (n)       0.05980         R(calc.)       0.1674         R(D2163:96)       0.0929    Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         |           |         |                                                          |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         |           |         |                                                          |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         | ex        |         | see §4.1                                                 |
| 1882       EN27941       0.7963       -0.33         1941       EN27941       0.7517       -1.67         1960           2124           normality       suspect          n       31          outliers       4       + 2 excl.         mean (n)       0.8072       st.dev. (n)         st.dev. (n)       0.05980         R(calc.)       0.1674         R(D2163:96)       0.0929         Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                        |         |           |         |                                                          |
| 1941       EN27941 $0.7517$ $-1.67$ 1960           2124           normality       suspect          n       31          outliers       4       + 2 excl.         mean (n)       0.8072          st.dev. (n)       0.05980         R(calc.)       0.1674         R(D2163:96)       0.0929         Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                        |         |           |         |                                                          |
| 1960           2124           normality       suspect          n       31          outliers       4       + 2 excl.         mean (n)       0.8072         st.dev. (n)       0.05980         R(calc.)       0.1674         R(D2163:96)       0.0929         Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                        |         |           |         |                                                          |
| 2124<br>normality suspect<br>n 31<br>outliers 4 + 2 excl.<br>mean (n) 0.8072<br>st.dev. (n) 0.05980<br>R(calc.) 0.1674<br>R(D2163:96) 0.0929 Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      | EN2/941                |         |           |         |                                                          |
| normality         suspect           n         31           outliers         4         + 2 excl.           mean (n)         0.8072           st.dev. (n)         0.05980           R(calc.)         0.1674           R(D2163:96)         0.0929   Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                        |         |           |         |                                                          |
| n 31<br>outliers 4 + 2 excl.<br>mean (n) 0.8072<br>st.dev. (n) 0.05980<br>R(calc.) 0.1674<br>R(D2163:96) 0.0929 Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2124 |                        |         |           |         |                                                          |
| n 31<br>outliers 4 + 2 excl.<br>mean (n) 0.8072<br>st.dev. (n) 0.05980<br>R(calc.) 0.1674<br>R(D2163:96) 0.0929 Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      | normality              | suspect |           |         |                                                          |
| mean (n)         0.8072           st.dev. (n)         0.05980           R(calc.)         0.1674           R(D2163:96)         0.0929   Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                        |         |           |         |                                                          |
| st.dev. (n) 0.05980<br>R(calc.) 0.1674<br>R(D2163:96) 0.0929 Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      | outliers               | 4       | + 2 excl. |         |                                                          |
| st.dev. (n) 0.05980<br>R(calc.) 0.1674<br>R(D2163:96) 0.0929 Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      | mean (n)               | 0.8072  |           |         |                                                          |
| R(D2163:96) 0.0929 Compare R(EN27941(liq)) = 0.2970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      | st.dev. (n)            |         |           |         |                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                        |         |           |         |                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      | R(D2163:96)            | 0.0929  |           |         | Compare R(EN27941(liq)) = 0.2970                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                        |         |           |         |                                                          |



2

# Determination of Propane on sample #14202; results in %mol/mol

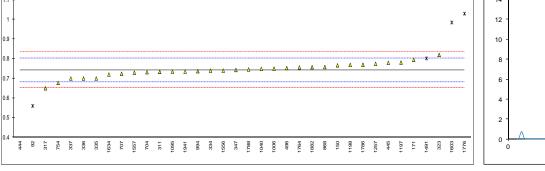
| lab  | method        | value   | mark      | z(targ) | remarks                                                  |
|------|---------------|---------|-----------|---------|----------------------------------------------------------|
| 92   | D2163         | 94.89   | ex        | 2.34    | see §4.1                                                 |
| 150  | D2163         | 93.827  | 0.        | -0.82   |                                                          |
| 171  | D2163         | 94.0695 |           | -0.10   |                                                          |
| 311  | D2163         | 94.1617 |           | 0.17    |                                                          |
| 317  | D2163         | 94.87   |           | 2.28    |                                                          |
| 323  | D2163         | 93.60   |           | -1.50   |                                                          |
| 334  | EN27941       | 94.15   |           | 0.14    |                                                          |
| 335  | D2163         | 94.4    |           | 0.88    |                                                          |
| 336  | EN27941       | 94.3    | С         | 0.59    | first reported 93.91                                     |
| 337  | EN27941       | 94.2    | -         | 0.29    |                                                          |
| 347  | D2163         | 94.094  |           | -0.03   |                                                          |
| 444  | IP405         | 97.40   | C,R(0.01) | 9.81    | first reported 99.03                                     |
| 445  | D2163         | 94.19   | , , ,     | 0.26    |                                                          |
| 496  | EN27941       | 93.934  |           | -0.50   |                                                          |
| 511  |               |         |           |         |                                                          |
| 704  | D2163         | 94.194  |           | 0.27    |                                                          |
| 707  | D2163         | 94.412  |           | 0.92    |                                                          |
| 754  | D2163         | 94.4625 |           | 1.07    |                                                          |
| 868  | D2163         | 94.023  |           | -0.24   |                                                          |
| 912  |               |         |           |         |                                                          |
| 994  | D2163         | 94.1181 |           | 0.04    |                                                          |
| 1006 | D2163         | 94.313  |           | 0.62    |                                                          |
| 1026 | ISO7941       | 93.6    | ex        | -1.50   | result excluded, laboratory did report only 5 components |
| 1040 | DIN51619      | 94.130  |           | 0.08    |                                                          |
| 1095 | EN27941       | 94.281  |           | 0.53    |                                                          |
| 1109 |               |         |           |         |                                                          |
| 1197 | D2163         | 93.875  |           | -0.68   |                                                          |
| 1198 | D2163         | 94.184  |           | 0.24    |                                                          |
| 1200 |               |         |           |         |                                                          |
| 1257 | D2163         | 94.2040 |           | 0.30    |                                                          |
| 1259 |               |         |           |         |                                                          |
| 1491 | ISO7941       | 94.246  | ex        | 0.42    | see §4.1                                                 |
| 1556 | EN27941       | 93.91   |           | -0.58   |                                                          |
| 1557 | EN27941       | 93.911  | С         | -0.57   | first reported 92.5901                                   |
| 1603 | in house      | 93.2776 |           | -2.46   |                                                          |
| 1634 | ISO7941       | 94.02   |           | -0.25   |                                                          |
| 1764 | D2163         | 94.083  |           | -0.06   |                                                          |
| 1776 | EN27941       | 95.92   | R(0.01)   | 5.41    |                                                          |
| 1786 | D2163         | 94.147  |           | 0.13    |                                                          |
| 1788 | EN27941       | 93.8268 |           | -0.82   |                                                          |
| 1882 | EN27941       | 93.8833 |           | -0.65   |                                                          |
| 1941 | EN27941       | 94.2532 |           | 0.45    |                                                          |
| 1960 |               |         |           |         |                                                          |
| 2124 |               |         |           |         |                                                          |
|      |               |         |           |         |                                                          |
|      | normality     | not OK  |           |         |                                                          |
|      | n<br>autliana | 32      | .0        |         |                                                          |
|      | outliers      | 2       | +3 excl.  |         |                                                          |
|      | mean (n)      | 94.103  |           |         |                                                          |
|      | st.dev. (n)   | 0.2779  |           |         |                                                          |
|      | R(calc.)      | 0.778   |           |         | Compare B(EN07044/lig)) 4 042                            |
|      | R(D2163:96)   | 0.941   |           |         | Compare R(EN27941(liq)) = 1.013                          |
|      |               |         |           |         |                                                          |
| 98   |               |         |           |         | 1.8 Kernel Density                                       |
| 97 - |               |         |           |         | x 1.6 - Kernel Density                                   |
|      |               |         |           |         | 1.4 -                                                    |

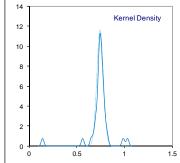


100

# Determination of Propylene on sample #14202; results in %mol/mol

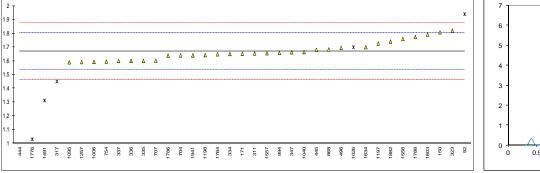
| lab          | method                 | value   | mark       | z(targ) | remarks                          |
|--------------|------------------------|---------|------------|---------|----------------------------------|
| 92           | D2163                  | 0.56    | R(0.01)    | -5.98   |                                  |
| 150          | D2163                  | 0.767   |            | 0.80    |                                  |
| 171          | D2163                  | 0.7952  |            | 1.72    |                                  |
| 311          | D2163                  | 0.7337  |            | -0.30   |                                  |
| 317          | D2163                  | 0.65    |            | -3.04   |                                  |
| 323          | D2163                  | 0.82    |            | 2.53    |                                  |
| 334          | EN27941                | 0.74    |            | -0.09   |                                  |
| 335          | D2163                  | 0.7     |            | -1.40   |                                  |
| 336          | EN27941                | 0.7     | С          | -1.40   | first reported 0.65              |
| 337          | EN27941                | 0.7     |            | -1.40   |                                  |
| 347          | D2163                  | 0.743   |            | 0.01    |                                  |
| 444          | IP405                  | 0.14    | C,R(0.01)  | -19.74  | first reported 0.17              |
| 445          | D2163                  | 0.78    |            | 1.22    |                                  |
| 496          | EN27941                | 0.753   |            | 0.34    |                                  |
| 511          |                        |         |            |         |                                  |
| 704          | D2163                  | 0.732   |            | -0.35   |                                  |
| 707          | D2163                  | 0.724   |            | -0.61   |                                  |
| 754          | D2163                  | 0.6775  |            | -2.14   |                                  |
| 868          | D2163                  | 0.758   |            | 0.50    |                                  |
| 912          | <b>Ba</b> / <b>a</b> a |         |            |         |                                  |
| 994          | D2163                  | 0.7369  |            | -0.19   |                                  |
| 1006         | D2163                  | 0.750   |            | 0.24    |                                  |
| 1026         | DINEAGA                |         |            |         |                                  |
| 1040         | DIN51619               | 0.749   |            | 0.21    |                                  |
| 1095         | EN27941                | 0.735   |            | -0.25   |                                  |
| 1109         | D0160                  |         |            | 1.05    |                                  |
| 1197         | D2163                  | 0.781   |            | 1.25    |                                  |
| 1198<br>1200 | D2163                  | 0.769   |            | 0.86    |                                  |
| 1200         | D2163                  | 0.7750  |            | 1.06    |                                  |
| 1259         | D2103                  |         |            |         |                                  |
| 1491         | ISO7941                | 0.802   | ex         | 1.94    | see §4.1                         |
| 1556         | EN27941                | 0.74    | UX         | -0.09   | 300 34.1                         |
| 1557         | EN27941                | 0.730   | С          | -0.42   | first reported 0.6908            |
| 1603         | in house               | 0.9850  | C,R(0.01)  | 7.93    | first reported 0.9970            |
| 1634         | ISO7941                | 0.72    | 0,11(0.01) | -0.74   |                                  |
| 1764         | D2163                  | 0.7564  |            | 0.45    |                                  |
| 1776         | EN27941                | 1.03    | R(0.01)    | 9.41    |                                  |
| 1786         | D2163                  | 0.770   |            | 0.89    |                                  |
| 1788         | EN27941                | 0.7460  |            | 0.11    |                                  |
| 1882         | EN27941                | 0.7573  |            | 0.48    |                                  |
| 1941         | EN27941                | 0.7351  |            | -0.25   |                                  |
| 1960         |                        |         |            |         |                                  |
| 2124         |                        |         |            |         |                                  |
|              |                        |         |            |         |                                  |
|              | normality              | suspect |            |         |                                  |
|              | n                      | 31 ່    |            |         |                                  |
|              | outliers               | 4       | +1 excl.   |         |                                  |
|              | mean (n)               | 0.7427  |            |         |                                  |
|              | st.dev. (n)            | 0.03426 |            |         |                                  |
|              | R(calc.)               | 0.0959  |            |         |                                  |
|              | R(D2163:96)            | 0.0855  |            |         | Compare R(EN27941(liq)) = 0.2122 |
|              |                        |         |            |         |                                  |
| 1.1 т        |                        |         |            |         | 14                               |
|              |                        |         |            |         | 14 Kernel Density                |

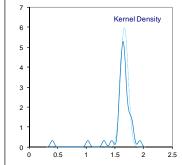




# Determination of iso-Butane on sample #14202; results in %mol/mol

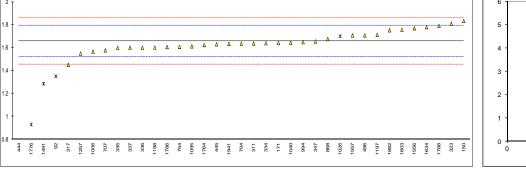
| 92       D2163       1.94       R(0.01)       3.94         160       D2163       1.6625       -0.26         171       D2163       1.6545       -0.22         371       D2163       1.6545       -0.29         373       EN27941       1.6       -1.01         374       EN27941       1.6       -1.01         375       EN27941       1.6       -1.01         376       EN27941       1.66       -0.02         377       EN27941       1.66       -0.01         444       IP406       0.41       C.R(0.01)       -1.85         571       D2163       1.640       -0.43         680       D2163       1.640       -0.43         707       D2163       1.6581       -0.07         941       D2163       1.6581       -0.17         1006       D2163       1.6581       -0.17         1006       D2163       1.6581       -0.42         119       D2163       1.642       -0.08         1096            1198       D2163       1.727       0.84         1198       D2163       1                                                                                       | lab  | method      | value  | mark      | z(targ) | remarks                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|--------|-----------|---------|---------------------------------------------------------|
| 171       D2163       1.6525       -0.25         371       D2163       1.6545       -0.22         373       D2163       1.45       D(0.05)       -3.20         374       EN27941       1.65       -0.29         375       D2163       1.6       -101         376       EN27941       1.6       -101         377       D2163       1.663       -0.10         444       IP405       0.41       C,R(0.01)       -18.35         704       D2163       1.660       0.15         445       D2163       1.640       -0.43         707       D2163       1.622       -0.99         754       D2163       1.623       -0.17         706       D2163       1.6581       -0.17         706       D2163       1.6581       -0.17         706       D2163       1.5910       -1.16         707       D2163       1.5910       -1.16         704       D2163       1.5910       -1.16         705       D2163       1.5910       -1.15         707       D2163       1.5910       -1.15         718       D27941       1.                                                         |      |             |        | R(0.01)   |         |                                                         |
| 311     D2163     1.645     -0.22       323     D2163     1.45     D(0.05)     3.20       324     EN27941     1.65     -0.29       335     D2163     1.6     -1.01       336     EN27941     1.6     -1.01       337     D2163     1.663     -0.10       337     D2163     1.683     -0.10       347     D2163     1.683     -0.10       347     D2163     1.68     0.15       511         704     D2163     1.640     -0.43       707     D2163     1.640     -0.43       707     D2163     1.659        912         9212         932         934     D2163     1.6591     -0.17       935     EN27941     1.7     exult excluded, laboratory did report only 5 components       1040     D105         1137     D2163     1.5930     -1.12       1138     D2163     1.642     -0.40       1139     D2163     1.5910     -1.15       1138     D2163     1.5910     -1.15 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td></t<>                                                                                                                      |      |             |        |           |         |                                                         |
| 317     D2163     1.45     D(0.05)     -3.20       323     D2163     1.82     2.19       334     EN27941     1.65     -0.29       337     EN27941     1.6     -0.10       437     D2163     1.663     -0.10       444     IP405     0.41     C,R(0.01)     -18.35       445     D2163     1.683     -0.10       444     IP405     0.41     C,R(0.01)     -18.35       450     EN27941     1.666     0.38       511         707     D2163     1.663     -0.19       777     D2163     1.6581     -0.17       708     D2163     1.6581     -0.17       7106     D2163     1.6581     -0.17       7106     D2163     1.593     -1.12       711     006     D2163     1.593     -1.12       711     1006     D2163     1.593     -1.12       711     1006     D2163     1.591     -0.44       7109     D2163     1.542     -0.40       7119     D2163     1.642     -0.40       7120     D2163     1.642     -0.40       7137     D2163     1.642 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td></t<>                                                 |      |             |        |           |         |                                                         |
| 323     D2163     1.82     2.19       334     ENZ7941     1.65     -0.29       335     D2163     1.6     -1.01       336     ENZ7941     1.8     -1.01       337     ENZ7941     1.8     -1.01       337     ENZ7941     1.63     -0.10       337     ENZ7941     1.66     -0.10       344     IP405     0.41     C.R(0.01)     -1.35       345     D2163     1.640     -0.43       704     D2163     1.640     -0.43       707     D2163     1.650     -1.09       868     D2163     1.5950     -1.12       704     D2163     1.5950     -1.12       705     D2163     1.593     -1.12       706     D2163     1.593     -1.12       707     D2163     1.593     -1.12       708     D2163     1.593     -1.12       709     D2163     1.593     -1.12       719     D2163     1.591     -1.16       719     D2163     1.642     -0.04       719     D2163     1.591     -1.16       719     D2163     1.642     -0.41       719     D2163     1.642                                                                                                               |      |             |        |           |         |                                                         |
| 334         EN27941         1.65         -0.29           335         D2163         1.6         -1.01           336         EN27941         1.6         -1.01           337         EN27941         1.6         -1.01           444         IP405         0.41         C,R(0.01)         18.35           444         IP405         0.41         C,R(0.01)         18.35           444         IP405         0.41         C,R(0.01)         18.35           445         D2163         1.660         0.38           511             707         D2163         1.602         -0.99           754         D2163         1.6581         -0.17           706         D2163         1.6581         -0.17           7106         D2163         1.5830         -1.12           704         D2163         1.5681         -0.08           705         D2163         1.580         -1.16           7106         D2163         1.542         -0.40           7199         D2163         1.642         -0.40           7199         D2163         1.5910         -1.15           7 |      |             |        | D(0.05)   |         |                                                         |
| 335       D2163       1.6       -1.01         336       ENZ7941       1.6       -1.01         337       ENZ7941       1.6       -1.01         347       D2163       1.63       -0.10         347       D2163       1.68       -0.10         444       IP405       0.41       C.R(0.01)       -18.35         first reported 0.34       1.680       0.15         704       D2163       1.640       -0.43         707       D2163       1.692       -0.99         784       D2163       1.683       0.19         912                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |             |        |           |         |                                                         |
| 336       EN27941       1.6       C       -1.01       first reported 1.85         347       D2163       1.663       -0.10       -0.10         444       IP405       0.41       C.R(0.01)       -18.35       first reported 0.34         445       D2163       1.680       0.38       -         704       D2163       1.640       -0.43         707       D2163       1.620       -0.99         764       D2163       1.6581       -0.17         707       D2163       1.6581       -0.17         708       D2163       1.6581       -0.17         709       D2163       1.6581       -0.17         7010       D2163       1.5930       -1.12         702       D2163       1.5910       -1.16         719       D2163       1.5910       -1.16         719       D2163       1.5910       -1.16         719       D2163       1.5910       -1.16         719       D2163       1.5910       -1.16         7199       D2163       1.5910       -1.16         7199       D2163       1.5910       -1.16         7180       D.256                                      |      |             |        |           |         |                                                         |
| 337       EN27941       1.6       -1.01         444       IP405       0.610       -0.10         444       IP405       0.411       C,R(0.01)       -18.35       first reported 0.34         445       D2163       1.680       0.15       irst reported 0.34         446       EN27941       1.696       0.38         511           704       D2163       1.602       -0.99         784       D2163       1.683       0.19         912           934       D2163       1.6581       -0.17         1006       D2163       1.593       -1.12         1026       ISO7941       1.7       ex       0.44         1040       D1N51619       1.664       -0.08         1197       D2163       1.727       0.84         1198       D2163       1.622       -0.40         1199       D2163       1.624       -0.40         1191       D2163       1.624       -0.40         1191       D2163       1.624       -0.40         1192            1193       R0                                                                                                                     |      |             |        | C         |         | first reported 1.95                                     |
| 347     D2163     1.663     -0.10       444     I4905     0.41     C,R(0.01)     -18.35       445     D2163     1.68     0.33       511         707     D2163     1.640     -0.43       707     D2163     1.683     0.19       986     D2163     1.6581     -0.19       994     D2163     1.6581     -0.17       1006     D2163     1.593     -1.12       1006     D2163     1.593     -1.12       1006     D2163     1.593     -1.12       1006     D2163     1.593     -1.12       1006     D2163     1.593     -1.16       1119     D2163     1.727     0.84       1090         1197     D2163     1.727     0.84       1198     D2163     1.727     0.84       1199         1257     D2163     1.727     0.84       1198     D2163     1.727     0.84       1198     D2163     1.656     C     -0.20       1556     EN27941     1.76     1.32       1637     Inbuse     1.793     0.45                                                                                                                                                                          |      |             |        | 0         |         |                                                         |
| 444       IP405       0.41       C,R(0.01)       -18.35       first reported 0.34         445       D2163       1.68       0.15         511           704       D2163       1.640       -0.43         707       D2163       1.602       -0.99         764       D2163       1.652          988       D2163       1.653       -1.09         988       D2163       1.6581       -0.17         1006       D2163       1.593       -1.12         1026       ISC7941       1.7       exult excluded, laboratory did report only 5 components         1040       DINS1619       1.664       -0.08         1055       EN27941       1.590       -1.16         1109           1197       D2163       1.510       -1.15         1257       D2163       1.642       -0.40         1200           1257       D2163       1.642       -0.41         1265       EN27941       1.76       1.32         1557       EN27941       1.666       C       -0.23         1764       D2163 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>                                    |      |             |        |           |         |                                                         |
| 445       D2183       1.68       0.15         496       EN27941       1.696       0.38         511           707       D2163       1.640       -0.43         707       D2163       1.640       -0.43         707       D2163       1.6950       -1.09         868       D2163       1.683       0.19         912           994       D2163       1.583       -1.12         1006       D2163       1.583       -1.12         1006       D2163       1.642       -0.04         1197       D2163       1.727       0.84         1199       D2163       1.642       -0.40         1200           1259           1267       D2163       1.510       -1.15         1259            1257       D2163       1.510       -1.15         157       EN27941       1.312       R(0.01)       -5.21         1567       EN27941       1.76       1.32         157       D2163       1.642                                                                                                                                                                                          |      |             |        | C,R(0.01) |         | first reported 0.34                                     |
| 496         EN27941         1.696         0.38           511             704         D2163         1.602         -0.99           754         D2163         1.5950         -1.09           888         D2163         1.683         0.19           912             924         D2163         1.593         -1.12           1026         ISO7941         1.7         ex         0.44           1040         DIN51619         1.664         -0.08           1035         EN27941         1.590         -1.16           1040         DIN51619         1.664         -0.08           1039              1199              1257         D2163         1.5910         -1.15           1259              1257         D2163         1.542         -0.40           1200              1257         D2163         1.642         -0.20         first reported 2.1558           1603         in house         1.7923                                                                                                                                                               |      |             |        | -, ()     |         |                                                         |
| 704       D2163       1.640       -0.43         707       D2163       1.602       -0.99         868       D2163       1.683       0.19         912                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |             |        |           |         |                                                         |
| 707       D2163       1.602       -0.99         754       D2163       1.5950       -1.09         986       D2163       1.683       0.19         912                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |             |        |           |         |                                                         |
| 754       D2163       1.5950       -1.09         868       D2163       1.683       0.19         912           994       D2163       1.6581       -0.17         1006       D2163       1.593       -1.12         1026       ISO7941       1.7       ex       0.44         1040       DIN51619       1.664       -0.08         1095       ENZ7941       1.590       -1.16         1109           1197       D2163       1.727       0.84         1198       D2163       1.642       -0.40         1200           1257       D2163       1.5910       -1.15         1259           1491       ISO7941       1.312       R(0.01)       -5.21         1566       EN27941       1.666       C       -0.20         1575       EN27941       1.662       -0.31         1603       1.642       -0.31         1766       D2163       1.642       -0.31         1776       EN27941       1.03       R(0.01)       9.32                                                                                                                                                         |      |             |        |           |         |                                                         |
| 888         D2163         1.683         0.19           912             1006         D2163         1.593         -1.12           1026         ISO7941         1.7         ex         0.44           1026         ISO7941         1.7         ex         0.44           1026         ISO7941         1.593         -1.12           1026         ISO7941         1.590         -1.16           1095         ENZ7941         1.590         -1.16           1109              1200             1201         1.642         -0.40           1200             1257         D2163         1.5910         -1.15           1259              1421         ISO7941         1.76         1.32           1557         EN27941         1.656         C         -0.20           1557         EN27941         1.6482         -0.31           1776         EN27941         1.03         R(0.01)         -9.32           1786         EN27941         1.7402 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>                                                          |      |             |        |           |         |                                                         |
| 912           994       D2163       1.6581       -0.17         1006       D2163       1.593       -1.12         1026       ISO7941       1.7       ex       0.44       result excluded, laboratory did report only 5 components         1040       DIN51619       1.664       -0.08         1095       EN27941       1.590       -1.16         1109           1197       D2163       1.727       0.84         1200           1257       D2163       1.5910       -1.15         1259            1491       ISO7941       1.312       R(0.01)       -5.21         1557       EN27941       1.656       C       -0.20         1534       ISO7941       1.70       0.44         1764       D2163       1.6482       -0.31         1776       EN27941       1.03       R(0.01)       -9.32         1786       EN27941       1.738       1.52         1882       EN27941       1.7402       1.03         1960           1776                                                                                                                                              |      |             |        |           |         |                                                         |
| 994         D2163         1.6581         -0.17           1006         D2163         1.593         -1.12           1026         ISO7941         1.7         ex         0.44           1040         DIN51619         1.664         -0.08           1095         EN27941         1.590         -1.16           1109             1197         D2163         1.727         0.84           1188         D2163         1.642         -0.40           1250             1491         ISO7941         1.312         R(0.01)         -5.21           1556         EN27941         1.76         1.32           1557         EN27941         1.76         1.32           1557         EN27941         1.76         1.32           1557         EN27941         1.70         0.44           1764         D2163         1.6482         -0.31           1776         EN27941         1.70         0.44           1776         EN27941         1.7738         1.52           1882         EN27941         1.738         1.52           1882         EN27941                          |      | D2163       |        |           |         |                                                         |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      | D0160       |        |           |         |                                                         |
| 1026       ISO7941       1.7       ex       0.44       result excluded, laboratory did report only 5 components         1040       DIN51619       1.664       -0.08         1095       EN27941       1.590       -1.16         1109           1197       D2163       1.727       0.84         1198       D2163       1.642       -0.40         1200           1257       D2163       1.5910       -1.15         1259           1491       ISO7941       1.312       R(0.01)       -5.21         1557       EN27941       1.656       C       -0.20         1603       in house       1.7923       1.79         1634       ISO7941       1.70       0.44         1766       D2163       1.6482       -0.31         1776       EN27941       1.03       R(0.01)       -9.32         1786       D2163       1.639       -0.45         1788       EN27941       1.7402       1.03         1941       EN27941       1.6403       -0.43         1960                                                                                                                      |      |             |        |           |         |                                                         |
| 1040       DIN51619       1.664       -0.08         1095       EN27941       1.590       -1.16         1109           1197       D2163       1.727       0.84         1198       D2163       1.642       -0.40         1200           1257       D2163       1.5910       -1.15         1259           1491       ISO7941       1.312       R(0.01)       -5.21         1566       EN27941       1.656       C       -0.20         first reported 2.1558       in house       1.7923       1.79         1634       ISO7941       1.70       0.44         1766       EN27941       1.03       R(0.01)       -9.32         1776       EN27941       1.03       R(0.01)       -9.32         1786       D2163       1.639       -0.45         1786       EN27941       1.773       1.52         1882       EN27941       1.7402       1.03         1960           1960           1960        <                                                                                                                                                                          |      |             |        | AY        |         | result excluded laboratory did report only 5 components |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |             |        | 67        |         |                                                         |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |             |        |           |         |                                                         |
| 1197       D2163       1.727       0.84         1198       D2163       1.642       -0.40         1200           1257       D2163       1.5910       -1.15         1259           1491       ISO7941       1.312       R(0.01)       -5.21         1556       EN27941       1.76       1.32         1557       EN27941       1.656       C       -0.20         1634       ISO7941       1.70       0.44         1764       D2163       1.6482       -0.31         1776       EN27941       1.03       R(0.01)       -9.32         1786       D2163       1.639       -0.45         1788       EN27941       1.7738       1.52         1882       EN27941       1.7402       1.03         1941       EN27941       1.6403       -0.43         1960           2124           normality       OK          nottlers       5       +1 excl.         mean (n)       1.6696          st.dev. (n)       0.06690 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>                                                                                                  |      |             |        |           |         |                                                         |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      | D2163       | 1.727  |           | 0.84    |                                                         |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1198 | D2163       | 1.642  |           | -0.40   |                                                         |
| 1259           1491       ISO7941       1.312       R(0.01)       -5.21         1556       EN27941       1.656       C       -0.20         1631       in house       1.7923       1.79         1634       ISO7941       1.70       0.44         1764       D2163       1.6482       -0.31         1776       EN27941       1.03       R(0.01)       -9.32         1786       D2163       1.639       -0.45         1788       EN27941       1.7402       1.03         1941       EN27941       1.7402       1.03         1941       EN27941       1.6403       -0.43         1960           2124           normality       OK          n       31          2124           normality       OK          nean (n)       1.6696       -+1 excl.         mean (n)       1.6696          st.dev. (n)       0.066890          R(calc.)       0.1873                                                                                                                                                                                                                        |      |             |        |           |         |                                                         |
| 1491ISO79411.312 $R(0.01)$ -5.211556EN279411.761.321557EN279411.656C-0.201603in house1.79231.791634ISO79411.700.441764D21631.6482-0.311776EN279411.03R(0.01)-9.321786D21631.639-0.451788EN279411.77381.521882EN279411.74021.031941EN279411.6403-0.4319602124normality<br>mean (n)0K<br>1.6696<br>st.dev. (n)0.06690<br>0.06690<br>R(calc.)+1 excl.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      | D2163       |        |           |         |                                                         |
| 1556       EN27941       1.76       1.32         1557       EN27941       1.656       C       -0.20       first reported 2.1558         1603       in house       1.7923       1.79         1634       ISO7941       1.70       0.44         1764       D2163       1.6482       -0.31         1776       EN27941       1.03       R(0.01)       -9.32         1786       D2163       1.639       -0.45         1788       EN27941       1.7738       1.52         1882       EN27941       1.7402       1.03         1941       EN27941       1.6403       -0.43         1960           2124           normality       OK          nean (n)       1.6696       +1 excl.         mean (n)       1.6696       st.dev. (n)       0.06690         R(calc.)       0.1873                                                                                                                                                                                                                                                                                                |      | 1007044     |        |           |         |                                                         |
| 1557EN279411.656C-0.20first reported 2.15581603in house1.79231.791634ISO79411.700.441764D21631.6482-0.311776EN279411.03R(0.01)-9.321786D21631.639-0.451788EN279411.77381.521882EN279411.74021.031941EN279411.6403-0.4319602124normality<br>mean (n)OK<br>1.6696<br>st.dev. (n)+1 excl.mean (n)<br>R(calc.)0.1873+1 excl.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |             |        | R(0.01)   |         |                                                         |
| 1603       in house       1.7923       1.79         1634       ISO7941       1.70       0.44         1764       D2163       1.6482       -0.31         1776       EN27941       1.03       R(0.01)       -9.32         1786       D2163       1.639       -0.45         1788       EN27941       1.7738       1.52         1882       EN27941       1.7402       1.03         1941       EN27941       1.6403       -0.43         1960           2124           normality       OK          nean (n)       1.6696       +1 excl.         mean (n)       1.6696       st.dev. (n)       0.06690         R(calc.)       0.1873                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |             |        | C         |         | first reported 2 1559                                   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |             |        | C         |         | liist reputteu 2.1000                                   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |             |        |           |         |                                                         |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |             |        |           |         |                                                         |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |             |        | R(0.01)   |         |                                                         |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |             |        | ()        |         |                                                         |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1788 | EN27941     | 1.7738 |           | 1.52    |                                                         |
| 1960           2124           normality       OK          n       31          outliers       5       +1 excl.         mean (n)       1.6696         st.dev. (n)       0.06690         R(calc.)       0.1873                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |             |        |           |         |                                                         |
| 2124         normality     OK        n     31        outliers     5     +1 excl.       mean (n)     1.6696       st.dev. (n)     0.06690       R(calc.)     0.1873                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      | EN27941     |        |           |         |                                                         |
| normality         OK           n         31           outliers         5         +1 excl.           mean (n)         1.6696           st.dev. (n)         0.06690           R(calc.)         0.1873                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |             |        |           |         |                                                         |
| n 31<br>outliers 5 +1 excl.<br>mean (n) 1.6696<br>st.dev. (n) 0.06690<br>R(calc.) 0.1873                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2124 |             |        |           |         |                                                         |
| n 31<br>outliers 5 +1 excl.<br>mean (n) 1.6696<br>st.dev. (n) 0.06690<br>R(calc.) 0.1873                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      | normality   | ОК     |           |         |                                                         |
| outliers         5         +1 excl.           mean (n)         1.6696           st.dev. (n)         0.06690           R(calc.)         0.1873                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      | •           |        |           |         |                                                         |
| mean (n)         1.6696           st.dev. (n)         0.06690           R(calc.)         0.1873                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |             |        | +1 excl.  |         |                                                         |
| st.dev. (n) 0.06690<br>R(calc.) 0.1873                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |             |        |           |         |                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      | ( )         |        |           |         |                                                         |
| R(D2163:96) 0.1922 Compare R(EN27941(liq)) = 0.3842                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      | ```         |        |           |         |                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      | R(D2163:96) | 0.1922 |           |         | Compare R(EN27941(liq)) = 0.3842                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |             |        |           |         |                                                         |

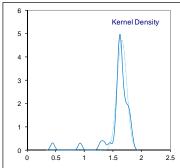




# Determination of n-Butane on sample #14202; results in %mol/mol

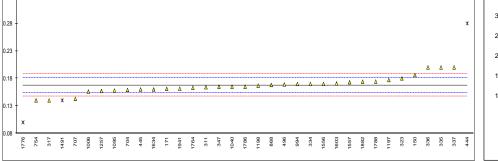
| lab          | method             | value            | mark       | z(targ)        | remarks                                                  |
|--------------|--------------------|------------------|------------|----------------|----------------------------------------------------------|
| 92           | D2163              | 1.35             | R(0.05)    | -4.52          |                                                          |
| 150          | D2163              | 1.835            |            | 2.59           |                                                          |
| 171          | D2163              | 1.6428           |            | -0.23          |                                                          |
| 311          | D2163              | 1.6370           |            | -0.31          |                                                          |
| 317          | D2163              | 1.45             |            | -3.05          |                                                          |
| 323          | D2163              | 1.81             |            | 2.23           |                                                          |
| 334          | EN27941            | 1.64             |            | -0.27          |                                                          |
| 335          | D2163              | 1.6              | 0          | -0.85          | first reported 4.00                                      |
| 336<br>337   | EN27941<br>EN27941 | 1.6<br>1.6       | С          | -0.85<br>-0.85 | first reported 1.93                                      |
| 347          | D2163              | 1.655            |            | -0.85          |                                                          |
| 444          | IP405              | 0.45             | C,R(0.01)  | -17.72         | first reported 0.20                                      |
| 445          | D2163              | 1.63             | 0,1((0.01) | -0.41          |                                                          |
| 496          | EN27941            | 1.708            |            | 0.73           |                                                          |
| 511          |                    |                  |            |                |                                                          |
| 704          | D2163              | 1.636            |            | -0.33          |                                                          |
| 707          | D2163              | 1.577            |            | -1.19          |                                                          |
| 754          | D2163              | 1.6075           |            | -0.74          |                                                          |
| 868          | D2163              | 1.676            |            | 0.26           |                                                          |
| 912          |                    |                  |            |                |                                                          |
| 994          | D2163              | 1.6489           |            | -0.14          |                                                          |
| 1006         | D2163              | 1.566            |            | -1.35          |                                                          |
| 1026         | ISO7941            | 1.7              | ex         | 0.61           | result excluded, laboratory did report only 5 components |
| 1040         | DIN51619           | 1.645            |            | -0.19          |                                                          |
| 1095<br>1109 | EN27941            | 1.612            |            | -0.68          |                                                          |
| 1197         | D2163              | 1.713            |            | 0.80           |                                                          |
| 1198         | D2163              | 1.602            |            | -0.82          |                                                          |
| 1200         | B2100              |                  |            |                |                                                          |
| 1257         | D2163              | 1.5490           |            | -1.60          |                                                          |
| 1259         |                    |                  |            |                |                                                          |
| 1491         | ISO7941            | 1.286            | R(0.05)    | -5.46          |                                                          |
| 1556         | EN27941            | 1.77             |            | 1.64           |                                                          |
| 1557         | EN27941            | 1.707            | С          | 0.72           | first reported 2.2217                                    |
| 1603         | in house           | 1.7582           |            | 1.47           |                                                          |
| 1634         | ISO7941            | 1.78             |            | 1.79           |                                                          |
| 1764         | D2163              | 1.6235           |            | -0.51          |                                                          |
| 1776         | EN27941            | 0.93             | R(0.01)    | -10.68         |                                                          |
| 1786         | D2163              | 1.606            |            | -0.77<br>1.94  |                                                          |
| 1788<br>1882 | EN27941<br>EN27941 | 1.7907<br>1.7524 |            | 1.94           |                                                          |
| 1941         | EN27941            | 1.6340           |            | -0.35          |                                                          |
| 1960         | LIN2/ 341          |                  |            | -0.55          |                                                          |
| 2124         |                    |                  |            |                |                                                          |
|              |                    |                  |            |                |                                                          |
|              | normality          | OK               |            |                |                                                          |
|              | n                  | 32               |            |                |                                                          |
|              | outliers           | 4                | +1 excl.   |                |                                                          |
|              | mean (n)           | 1.6582           |            |                |                                                          |
|              | st.dev. (n)        | 0.08457          |            |                |                                                          |
|              | R(calc.)           | 0.2368           |            |                |                                                          |
|              | R(D2163:96)        | 0.1909           |            |                | Compare R(EN27941(liq)) = 0.2122                         |
|              |                    |                  |            |                |                                                          |
| 2 T          |                    |                  |            |                | 6                                                        |

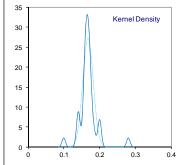




# Determination of 1-Butene on sample #14202; results in %mol/mol

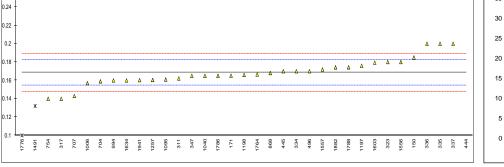
| 92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | lab    | method      | value  | mark      | z(targ) | remarks                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|--------|-----------|---------|----------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |             |        |           |         |                                  |
| 171     D2163     0.1610     -0.97       311     D2163     0.1613     -0.97       317     D2163     0.14     -4.02       323     D2163     0.14     -4.02       334     EN27941     0.2     4.68       336     D2163     0.165     -0.39       337     EN27941     0.2     4.68       337     EN27941     0.2     4.68       344     IP405     0.28     C.R(0.01)     first reported 0.19       511      -0.39     first reported 0.01       445     D2163     0.169     -1.12       456     EN27941     0.169     0.12       511         704     D2163     0.169     -1.26       707     D2163     0.169     0.32       1006     D2163     0.167     -0.10       1020         1199     D2163     0.167     -0.10       1090          1198     D2163     0.167     -0.10       1199     D2163     0.167     -0.10       1198     D2163     0.167     -0.10       1198     D2163     0.167     -0.10                                                                                                             |        | D2163       | 0.186  |           |         |                                  |
| 311       D2163       0.1639       → 0.55         323       D2163       0.14       → 0.02         324       ENZ7941       0.17       0.33         335       D2163       0.12       4.68         337       D2163       0.16       -0.39         344       ENZ7941       0.2       C       4.68         337       D2163       0.16       -0.39         444       IP405       0.28       C,R(0.01)       15.29         first reported 0.01       4.64       -0.01       -0.01         445       D2163       0.16       -0.39         704       D2163       0.150       -1.26         707       D2163       0.143       -3.58         754       D2163       0.168       -0.04         912       D2163       0.156       -1.70         1026       D185       -1.70       -1.61         1197       D2163       0.167       -0.10         1267       D2163       0.167       -0.10         1270       D2163       0.1570       -1.55         1285       PN27941       0.17       0.33         1257       D2163       < |        |             |        |           |         |                                  |
| 317     D2163     0.14     -4.02       323     D2163     0.18     1.78       334     EN27941     0.2     4.68       335     D2163     0.165     -0.39       344     IP405     0.28     C.R(0.01)     15.29       345     D2163     0.166     -1.12       446     EN27941     0.169     0.19       511         704     D2163     0.143     -3.58       754     D2163     0.166     -0.2       924     0.165     -1.70       1026         934     D2163     0.167     -0.10       1030         1197     D2163     0.167     -0.10       1030                                                                                                                                                                                                                                                                                                       |        |             |        |           |         |                                  |
| 333 D2163 0.18 1.78  335 D2163 0.2 4.68  first reported 0.19  436 PNZP41 0.2 C 4.68  first reported 0.19  437 D2163 0.165 -0.39  439 PNZP41 0.165 -0.39  444 P405 0.28 C.R(0.01) 16.29 first reported 0.01  445 D2163 0.16 -1.12  456 D2163 0.16 -1.12  707 D2163 0.143 -3.58  754 D2163 0.168 0.04  912                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |        |           |         |                                  |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |        |           |         |                                  |
| 336     D2163     0.2     4.68       337     ENZ7941     0.2     C     4.68       337     D2163     0.165     -0.39       444     IP405     0.28     C.R(0.01)     16.29       445     D2163     0.16     -1.12       446     D2163     0.169     -1.26       707     D2163     0.143     -3.58       707     D2163     0.169     -1.26       707     D2163     0.169     -0.19       718     D2163     0.169     -0.26       707     D2163     0.169     0.32       706     D2163     0.166     -1.70       1026         707     D2163     0.167       708     D2163     0.167       709     D2163     0.167       7199     D2163     0.177       1199         7199     D2163     0.177       1198     D2163     0.177       1198     D2163     0.177       1199         1267     D2163     0.167       1198     D2163     0.167       118     D2163     0.167       118     D                                                                                                                                 |        |             |        |           |         |                                  |
| 336     ENZ7941     0.2     C     4.68       347     ENZ7941     0.2     4.68       347     D2163     0.185     -0.39       444     IP405     0.28     C.R(0.01)     16.29       445     D2163     0.169     -1.12       446     ENZ7941     0.169     -1.26       707     D2163     0.159     -1.26       707     D2163     0.143     -3.58       764     D2163     0.168     0.04       912         92163     0.156     -1.70       1026     0.156     -1.70       1026     0.158     -1.41       1197     D2163     0.167     -0.39       1095     ENZ7941     0.158     -1.41       1197     D2163     0.1570     -1.55       1257     D2163     0.1570     -1.55       1256     ENZ7941     0.177     1.35       1197     D2163     0.177     1.35       1556     ENZ7941     0.170     0.34       1556     ENZ7941     0.170     0.34       1561     ENZ7941     0.170     0.34       1575     ENZ7941     0.170     0.34       15                                                                        |        |             |        |           |         |                                  |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |        |           |         |                                  |
| 347     D2163     0.165     -0.39       444     IP405     0.28     C.R(0.01)     16.29       445     D2163     0.169     0.19       511         704     D2163     0.143     -3.58       754     D2163     0.1668     0.04       912         944     D2163     0.1669     0.32       1006     D2163     0.1669     0.32       1006     D2163     0.167        1040     DIN51619     0.165     -0.39       1055     EN27941     0.158     -1.41       1197     D2163     0.1677     -1.35       1257     D2163     0.1677     -0.10       1263     0.1677     -0.10       1270     D2163     0.1677     -0.10       1280          1290          1270     D2163     0.1677     -0.10       1280     D.1777     0.33     first reported 0.2179       1603     in house     0.1707     0.44       1575     ENZ7941     0.174     0.33       1766     D2163     0.166     -1.12 <t< td=""><td>336</td><td>EN27941</td><td>0.2</td><td>С</td><td>4.68</td><td>first reported 0.19</td></t<>                            | 336    | EN27941     | 0.2    | С         | 4.68    | first reported 0.19              |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 337    | EN27941     | 0.2    |           | 4.68    |                                  |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 347    | D2163       |        |           |         |                                  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 444    | IP405       |        | C.R(0.01) |         | first reported 0.01              |
| 496 EN27941 0.169 0.19<br>501                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |             |        | - / ( /   |         |                                  |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        |             |        |           |         |                                  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |        |           |         |                                  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        | D2163       |        |           |         |                                  |
| 754     D2163     0.1400     -4.02       868     D2163     0.168     0.04       912         994     D2163     0.156     -1.70       1006     D2163     0.156     -1.70       1026         1040     D1N51619     0.158     -1.41       1199         1197     D2163     0.1570     -1.55       1250         1267     D2163     0.1570     -1.55       1259         1257     D2163     0.1570     -1.55       1259         1265     D.177     0.33       157     EN27941     0.17     0.33       157     EN27941     0.177     0.33       157     EN27941     0.170     0.44       1634     ISO7941     0.16     -1.12       1764     D2163     0.1651     -0.39       1786     D2163     0.1651     -0.39       1786     D2163     0.1641     -0.91       1960          1224         mean (n)     0.1677                                                                                                                                                                                                          |        |             |        |           |         |                                  |
| 868       D2163       0.188       0.04         912           994       D2163       0.1699       0.32         1006       D2163       0.156       -1.70         1026           1040       DIN51619       0.165       -0.39         1095       EN27941       0.158       -1.41         1109           1197       D2163       0.177       1.35         1198       D2163       0.1570       -1.55         1250       D2163       0.1570       -1.55         1290           1491       ISO7941       0.140       ex       -4.02         1556       EN27941       0.173       C       0.77         1633       in house       0.1707       0.44         1634       ISO7941       0.165       -0.39         1786       D2163       0.165       -0.39         1786       D2163       0.165       -0.39         1786       D2163       0.165       -0.39         1786       D2163       0.1641       -0.91         1940                                                                                                    |        |             |        |           |         |                                  |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |        |           |         |                                  |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        | D2163       |        |           |         |                                  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |        |           |         |                                  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |             |        |           |         |                                  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1006   | D2163       | 0.156  |           | -1.70   |                                  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1026   |             |        |           |         |                                  |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        | DIN51619    | 0.165  |           | -0.39   |                                  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        | EN27941     |        |           |         |                                  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |             |        |           |         |                                  |
| 1198       D2163       0.167       -0.10         1200           1257       D2163       0.1570       -1.55         1259           1491       ISO7941       0.140       ex       -4.02       see §4.1         1556       EN27941       0.17       0.33       1557       EN27941       0.170         1603       in house       0.1707       0.44           1634       ISO7941       0.16       -1.12           1764       D2163       0.1631       -0.67           1776       EN27941       0.1743       0.96           1786       EN27941       0.1743       0.96           1882       EN27941       0.1614       -0.91            1960              2124                                                                                                                                                                                                                                                                                                                                                         |        | D2163       |        |           |         |                                  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |             |        |           |         |                                  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        | D2105       |        |           |         |                                  |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        | D0460       |        |           |         |                                  |
| 1491       ISO7941       0.140       ex       -4.02       see §4.1         1556       EN27941       0.173       C       0.77       first reported 0.2179         1603       in house       0.1707       0.44         1634       ISO7941       0.16       -1.12         1764       D2163       0.1631       -0.67         1776       EN27941       0.10       R(0.01)       -9.82         1786       D2163       0.165       -0.39         1788       EN27941       0.1614       -0.90         1882       EN27941       0.1614       -0.91         1960           1960           1960           1960           1960           1960           1960           1960           197       st.dev. (n)       0.01467         R(calc.)       0.0411       Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                              |        | D2103       |        |           |         |                                  |
| 1556       EN27941       0.17       0.33         1557       EN27941       0.173       C       0.77         1603       in house       0.1707       0.44         1634       ISO7941       0.16       -1.12         1764       D2163       0.1631       -0.67         1776       EN27941       0.10       R(0.01)       -9.82         1786       D2163       0.165       -0.39         17786       D2163       0.1665       -0.39         1788       EN27941       0.1741       0.93         1941       EN27941       0.1614       -0.91         1960           2124           normality       OK          nean (n)       0.1677       st.dev. (n)       0.014677         st.dev. (n)       0.014677       R(calc.)       0.0411         R(D2163:96)       0.0193       Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                           |        | 1007044     |        |           |         |                                  |
| 1557       EN27941       0.173       C       0.77       first reported 0.2179         1603       in house       0.1707       0.44         1634       ISO7941       0.16       -1.12         1764       D2163       0.1631       -0.67         1776       EN27941       0.10       R(0.01)       -9.82         1786       D2163       0.165       -0.39         1788       EN27941       0.1741       0.93         1882       EN27941       0.1614       -0.91         1960           1960           2124           normality<br>mean (n)       OK<br>n<br>R(calc.)       0.01467<br>                                                                                                                                                                                                                                                                                                                                                                                                                            |        |             |        | ex        |         | see §4.1                         |
| 1603       in house $0.1707$ $0.44$ 1634       ISO7941 $0.16$ $-1.12$ 1764       D2163 $0.1631$ $-0.67$ 1776       EN27941 $0.10$ $R(0.01)$ $-9.82$ 1786       D2163 $0.165$ $-0.39$ 1788       EN27941 $0.1743$ $0.96$ 1882       EN27941 $0.1741$ $0.93$ 1941       EN27941 $0.1614$ $-0.91$ 1960           2124           normality       OK $n$ $32$ outliers       2       +1 excl.          mean (n) $0.1677$ st.dev. (n) $0.01467$ R(D2163:96) $0.0193$ Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |             |        | _         |         |                                  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |             |        | С         |         | first reported 0.2179            |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |             |        |           |         |                                  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1634   | ISO7941     | 0.16   |           | -1.12   |                                  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1764   | D2163       | 0.1631 |           | -0.67   |                                  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1776   | EN27941     | 0.10   | R(0.01)   | -9.82   |                                  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        | D2163       |        | · · · ·   | -0.39   |                                  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1788   | EN27941     | 0.1743 |           | 0.96    |                                  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |             |        |           |         |                                  |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |             |        |           |         |                                  |
| 2124<br>normality OK<br>n 32<br>outliers 2 +1 excl.<br>mean (n) 0.1677<br>st.dev. (n) 0.01467<br>R(calc.) 0.0411<br>R(D2163:96) 0.0193 Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1960   | LINEFOIL    |        |           |         |                                  |
| normality OK<br>n 32<br>outliers 2 +1 excl.<br>mean (n) 0.1677<br>st.dev. (n) 0.01467<br>R(calc.) 0.0411<br>R(D2163:96) 0.0193 Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |             |        |           |         |                                  |
| n 32<br>outliers 2 +1 excl.<br>mean (n) 0.1677<br>st.dev. (n) 0.01467<br>R(calc.) 0.0411<br>R(D2163:96) 0.0193 Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2124   |             |        |           |         |                                  |
| n 32<br>outliers 2 +1 excl.<br>mean (n) 0.1677<br>st.dev. (n) 0.01467<br>R(calc.) 0.0411<br>R(D2163:96) 0.0193 Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        | normality   | OK     |           |         |                                  |
| outliers       2       +1 excl.         mean (n)       0.1677         st.dev. (n)       0.01467         R(calc.)       0.0411         R(D2163:96)       0.0193         Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |        | •           |        |           |         |                                  |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |             |        |           |         |                                  |
| st.dev. (n) 0.01467<br>R(calc.) 0.0411<br>R(D2163:96) 0.0193 Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |             |        | +1 excl.  |         |                                  |
| $\begin{array}{c} R(calc.) & 0.0411 \\ R(D2163:96) & 0.0193 \end{array} \\ \hline \\ \hline \\ \\ \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |             |        |           |         |                                  |
| R(D2163:96) 0.0193 Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |        |           |         |                                  |
| R(D2163:96) 0.0193 Compare R(EN27941(liq)) = 0.1592                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             | 0.0411 |           |         |                                  |
| 30 - Kernel Density                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        | R(D2163:96) | 0.0193 |           |         | Compare R(EN27941(liq)) = 0.1592 |
| 30 - Kernel Density                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |        |           |         |                                  |
| 30 - Kernel Density                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.33 т |             |        |           |         | 35                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |             |        |           |         |                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.28   |             |        |           |         |                                  |

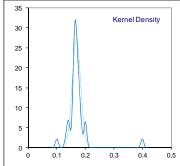




# Determination of iso-Butene on sample #14202; results in %mol/mol

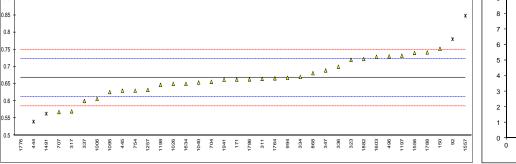
|              |                    | _             |            |               |                                  |    |   |   |                |
|--------------|--------------------|---------------|------------|---------------|----------------------------------|----|---|---|----------------|
| lab          | method             | value         | mark       | z(targ)       | remarks                          |    |   |   |                |
| 92           | D0400              |               |            |               |                                  |    |   |   |                |
| 150          | D2163              | 0.185         |            | 2.37          |                                  |    |   |   |                |
| 171          | D2163              | 0.1651        |            | -0.50         |                                  |    |   |   |                |
| 311          | D2163              | 0.1621        |            | -0.93         |                                  |    |   |   |                |
| 317          | D2163              | 0.14          |            | -4.12         |                                  |    |   |   |                |
| 323          | D2163              | 0.18          |            | 1.65          |                                  |    |   |   |                |
| 334<br>335   | EN27941<br>D2163   | 0.17<br>0.2   |            | 0.21<br>4.53  |                                  |    |   |   |                |
| 336          | EN27941            | 0.2           | С          | 4.53          | first reported 0.19              |    |   |   |                |
| 337          | EN27941            | 0.2           | C          | 4.53          | list reported 0.19               |    |   |   |                |
| 347          | D2163              | 0.165         |            | -0.52         |                                  |    |   |   |                |
| 444          | IP405              | 0.40          | C,R(0.01)  | 33.39         | first reported 0.02              |    |   |   |                |
| 445          | D2163              | 0.17          | 0,1((0.01) | 0.21          |                                  |    |   |   |                |
| 496          | EN27941            | 0.170         |            | 0.21          |                                  |    |   |   |                |
| 511          | 2.12.011           |               |            |               |                                  |    |   |   |                |
| 704          | D2163              | 0.159         |            | -1.38         |                                  |    |   |   |                |
| 707          | D2163              | 0.143         |            | -3.69         |                                  |    |   |   |                |
| 754          | D2163              | 0.1400        |            | -4.12         |                                  |    |   |   |                |
| 868          | D2163              | 0.168         |            | -0.08         |                                  |    |   |   |                |
| 912          |                    |               |            |               |                                  |    |   |   |                |
| 994          | D2163              | 0.1600        |            | -1.24         |                                  |    |   |   |                |
| 1006         | D2163              | 0.157         |            | -1.67         |                                  |    |   |   |                |
| 1026         |                    |               |            |               |                                  |    |   |   |                |
| 1040         | DIN51619           | 0.165         |            | -0.52         |                                  |    |   |   |                |
| 1095         | EN27941            | 0.161         |            | -1.09         |                                  |    |   |   |                |
| 1109         |                    |               |            |               |                                  |    |   |   |                |
| 1197         | D2163              | 0.176         |            | 1.07          |                                  |    |   |   |                |
| 1198         | D2163              | 0.166         |            | -0.37         |                                  |    |   |   |                |
| 1200         |                    |               |            |               |                                  |    |   |   |                |
| 1257         | D2163              | 0.1605        |            | -1.17         |                                  |    |   |   |                |
| 1259         | 1007014            |               |            |               |                                  |    |   |   |                |
| 1491         | ISO7941            | 0.132         | ex         | -5.28         | see §4.1                         |    |   |   |                |
| 1556         | EN27941            | 0.18          | 0          | 1.65          | first and sets d.0.400           |    |   |   |                |
| 1557         | EN27941            | 0.172         | С          | 0.49          | first reported 2.166             |    |   |   |                |
| 1603         | in house           | 0.1794        |            | 1.56          |                                  |    |   |   |                |
| 1634         | ISO7941            | 0.16          |            | -1.24         |                                  |    |   |   |                |
| 1764         | D2163              | 0.1665        | D(0.01)    | -0.30         |                                  |    |   |   |                |
| 1776<br>1786 | EN27941<br>D2163   | 0.10<br>0.165 | R(0.01)    | -9.89         |                                  |    |   |   |                |
| 1788         | EN27941            | 0.1743        |            | -0.52<br>0.83 |                                  |    |   |   |                |
| 1882         | EN27941<br>EN27941 | 0.1743        |            | 0.83          |                                  |    |   |   |                |
| 1941         | EN27941            | 0.1603        |            | -1.19         |                                  |    |   |   |                |
| 1941         | LIN2/ 941          | 0.1003        |            | -1.19         |                                  |    |   |   |                |
| 2124         |                    |               |            |               |                                  |    |   |   |                |
| 2124         |                    |               |            |               |                                  |    |   |   |                |
|              | normality          | ОК            |            |               |                                  |    |   |   |                |
|              | n                  | 32            |            |               |                                  |    |   |   |                |
|              | outliers           | 2             | +1 excl.   |               |                                  |    |   |   |                |
|              | mean (n)           | 0.1686        |            |               |                                  |    |   |   |                |
|              | st.dev. (n)        | 0.01470       |            |               |                                  |    |   |   |                |
|              | R(calc.)           | 0.0412        |            |               |                                  |    |   |   |                |
|              | R(D2163:96)        | 0.0194        |            |               | Compare R(EN27941(liq)) = 0.1592 |    |   |   |                |
|              | ```'               |               |            |               |                                  |    |   |   |                |
|              |                    |               |            |               |                                  |    |   |   |                |
| 0.24         |                    |               |            |               |                                  | 35 | ] |   | Kernel Density |
|              |                    |               |            |               |                                  |    | 1 | ٨ | Remei Density  |

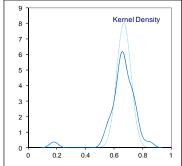




# Determination of n-Pentane on sample #14202; results in %mol/mol

| lab          | method                  | value            | mark      | z(targ)        | remarks                                                  |
|--------------|-------------------------|------------------|-----------|----------------|----------------------------------------------------------|
| 92           | D2163                   | 0.78             | ex        | 4.05           | see §4.1                                                 |
| 150          | D2163                   | 0.752            | <u>.</u>  | 3.03           | 0                                                        |
| 171          | D2163                   | 0.6627           |           | -0.22          |                                                          |
| 311          | D2163                   | 0.6644           |           | -0.16          |                                                          |
| 317          | D2163                   | 0.57             |           | -3.59          |                                                          |
| 323          | D2163                   | 0.72             |           | 1.87           |                                                          |
| 334          | EN27941                 | 0.67             |           | 0.05           |                                                          |
| 335          |                         |                  |           |                |                                                          |
| 336          | EN27941                 | 0.7              | С         | 1.14           | first reported 0.85                                      |
| 337          | EN27941                 | 0.6              |           | -2.50          |                                                          |
| 347          | D2163                   | 0.689            | Cov       | 0.74           | and \$4.1 first reported 0.02                            |
| 444<br>445   | IP405<br>D2163          | 0.54<br>0.63     | C,ex      | -4.68<br>-1.41 | see §4.1, first reported 0.02                            |
| 445<br>496   | EN27941                 | 0.03             |           | 2.23           |                                                          |
| 430<br>511   | LIN2/ 341               |                  |           |                |                                                          |
| 704          | D2163                   | 0.656            |           | -0.46          |                                                          |
| 707          | D2163                   | 0.568            |           | -3.66          |                                                          |
| 754          | D2163                   | 0.6300           |           | -1.41          |                                                          |
| 868          | D2163                   | 0.681            |           | 0.45           |                                                          |
| 912          |                         |                  |           |                |                                                          |
| 994          | D2163                   | 0.6675           |           | -0.04          |                                                          |
| 1006         | D2163                   | 0.606            |           | -2.28          |                                                          |
| 1026         | ISO7941                 | 0.65             | ex        | -0.68          | result excluded, laboratory did report only 5 components |
| 1040         | DIN51619                | 0.654            |           | -0.54          |                                                          |
| 1095         | EN27941                 | 0.626            |           | -1.55          |                                                          |
| 1109<br>1197 | D2163                   | <br>0.732        |           | 2.30           |                                                          |
| 1197         | D2163                   | 0.647            |           | -0.79          |                                                          |
| 1200         | D2103                   | 0.047            |           | -0.73          |                                                          |
| 1257         | D2163                   | 0.6324           |           | -1.32          |                                                          |
| 1259         |                         |                  |           |                |                                                          |
| 1491         | ISO7941                 | 0.563            | ex        | -3.84          | see §4.1                                                 |
| 1556         | EN27941                 | 0.74             |           | 2.59           |                                                          |
| 1557         | EN27941                 | 0.848            | C,G(0.05) | 6.52           | first reported 1.3664                                    |
| 1603         | in house                | 0.7287           |           | 2.18           |                                                          |
| 1634         | ISO7941                 | 0.65             |           | -0.68          |                                                          |
| 1764         | D2163                   | 0.6660           | D(0.04)   | -0.10          |                                                          |
| 1776         | EN27941                 | 0.18             | R(0.01)   | -17.77         |                                                          |
| 1786<br>1788 | D2163<br>EN27941        | 0.663<br>0.7415  |           | -0.21<br>2.65  |                                                          |
| 1882         | EN27941                 | 0.7222           |           | 1.95           |                                                          |
| 1941         | EN27941                 | 0.6622           |           | -0.24          |                                                          |
| 1960         |                         |                  |           |                |                                                          |
| 2124         |                         |                  |           |                |                                                          |
|              |                         |                  |           |                |                                                          |
|              | normality               | OK               |           |                |                                                          |
|              | n                       | 30               |           |                |                                                          |
|              | outliers                | 2                | +4 excl.  |                |                                                          |
|              | mean (n)                | 0.6687           |           |                |                                                          |
|              | st.dev. (n)             | 0.04973          |           |                |                                                          |
|              | R(calc.)<br>R(D2163:96) | 0.1393<br>0.0770 |           |                | Compare R(EN27941(liq)) = 0.3095                         |
|              | 11(02103.30)            | 0.0770           |           |                | Compare ((LINZ) = 0.5035)                                |
| 0.9 T        |                         |                  |           |                |                                                          |
|              |                         |                  |           |                | 9 Kernel Density                                         |
| 0.85 -       |                         |                  |           |                | * 8                                                      |
| 0.8          |                         |                  |           |                | 7 -                                                      |





# Determination of Molar Mass on sample #14202; results in g/mol

| lab          | method             | value              | mark | z(targ) | remarks                                     |
|--------------|--------------------|--------------------|------|---------|---------------------------------------------|
| 92           | D2163              | 44.7               | ex   |         | see §4.1                                    |
| 150          |                    |                    |      |         |                                             |
| 171          | D2421              | 44.64814322        |      |         |                                             |
| 311          | in house           | 44.66              |      |         |                                             |
| 317          | INH-001            | 44.58              |      |         |                                             |
| 323          |                    |                    |      |         |                                             |
| 334          |                    |                    |      |         |                                             |
| 335          |                    |                    |      |         |                                             |
| 336          |                    |                    |      |         |                                             |
| 337<br>347   | D2421              | 44.667             |      |         |                                             |
| 444          | D2421              | 44.007             |      |         |                                             |
| 445          | IP432              | 44.657             |      |         |                                             |
| 496          | D2421              | 44.691             |      |         |                                             |
| 511          | DZAZI              |                    |      |         |                                             |
| 704          | D2163/D2421        | 44.6464            |      |         |                                             |
| 707          | D2163/D2421        | 44.6028            |      |         |                                             |
| 754          | D2421              | 44.63798           |      |         |                                             |
| 868          | D2598              | 44.67              |      |         |                                             |
| 912          |                    |                    |      |         |                                             |
| 994          | calc               | 44.6565            |      |         |                                             |
| 1006         |                    |                    |      |         |                                             |
| 1026         |                    |                    |      |         |                                             |
| 1040         |                    |                    |      |         |                                             |
| 1095         | D2421              | 44.6               |      |         |                                             |
| 1109         |                    |                    |      |         |                                             |
| 1197         |                    |                    |      |         |                                             |
| 1198         |                    |                    |      |         |                                             |
| 1200         |                    |                    |      |         |                                             |
| 1257         |                    |                    |      |         |                                             |
| 1259         |                    |                    |      |         |                                             |
| 1491         |                    |                    |      |         |                                             |
| 1556         | 10111 4 0 0 0      | 44.73              |      |         |                                             |
| 1557         | INH-1200           | 44.7346            |      |         |                                             |
| 1603         |                    |                    |      |         |                                             |
| 1634         | D2509              | <br>44.642         |      |         |                                             |
| 1764         | D2598              | 44.042             |      |         |                                             |
| 1776<br>1786 |                    |                    |      |         |                                             |
| 1788         | ISO8973            | 44.73              |      |         |                                             |
| 1882         | 1500375            |                    |      |         |                                             |
| 1941         | in house           | 44.65954           |      |         |                                             |
| 1960         | III IIOUSC         |                    |      |         |                                             |
| 2124         |                    |                    |      |         |                                             |
|              |                    |                    |      |         | Calculated by iis from all reported results |
|              | normality          | OK                 |      |         | OK                                          |
|              | n                  | 17                 |      |         | 30                                          |
|              | outliers           | 0 + 1 excl.        |      |         | 1 + 3 excl.                                 |
|              | mean (n)           | 44.662             |      |         | 44.663                                      |
|              | st.dev. (n)        | 0.0437             |      |         | 0.0423                                      |
|              | R(calc.)           | 0.122              |      |         | 0.119                                       |
|              | R(iis13S03P)       | 0.272              |      |         | 0.224                                       |
|              |                    |                    |      |         |                                             |
| 44.8 T       |                    |                    |      |         | 12                                          |
|              |                    |                    |      |         | A A A Kernel Density                        |
| 44.7 -       |                    |                    |      |         |                                             |
| 44.6 -       | Δ Δ                |                    |      |         |                                             |
| 44.5 -       |                    |                    |      |         | 8 -                                         |
| 44.5         |                    |                    |      |         |                                             |
| 44.4 -       |                    |                    |      |         | 6                                           |
| 44.3 -       |                    |                    |      |         |                                             |
| 44.2         |                    |                    |      |         | 4                                           |
| 44.2 -       |                    |                    |      |         |                                             |
| 44.1 -       |                    |                    |      |         | 2                                           |
| 44           | 10                 |                    |      |         |                                             |
| 317          | 1095<br>707<br>754 | 1764<br>704<br>171 | 994  | 311     |                                             |
|              |                    |                    |      |         |                                             |
|              |                    |                    |      |         |                                             |

# Determination of Relative Density @60F on sample #14202; unitless results

| lab meth<br>92 D259                                                | od                 | value    | mark     | z(targ)            | remarks                                                                                                         |
|--------------------------------------------------------------------|--------------------|----------|----------|--------------------|-----------------------------------------------------------------------------------------------------------------|
| 02 D200                                                            |                    | 0.511    | ex       |                    | see §4.1                                                                                                        |
| 150 D259                                                           |                    | 0.5104   | CX       |                    | 300 37.1                                                                                                        |
| 171 D242                                                           |                    | 0.510006 |          |                    |                                                                                                                 |
| 311 in ho                                                          |                    | 0.5098   |          |                    |                                                                                                                 |
| 317 INH-0                                                          |                    | 0.5095   |          |                    |                                                                                                                 |
| 323 D259                                                           |                    | 0.5103   |          |                    |                                                                                                                 |
| 334                                                                |                    |          |          |                    |                                                                                                                 |
| 335                                                                |                    |          |          |                    |                                                                                                                 |
| 336                                                                |                    |          |          |                    |                                                                                                                 |
| 337                                                                |                    |          |          |                    |                                                                                                                 |
| 347 D259                                                           | 8                  | 0.5099   |          |                    |                                                                                                                 |
| 444                                                                | -                  |          |          |                    |                                                                                                                 |
| 445 IP432                                                          | 2                  | 0.5104   |          |                    |                                                                                                                 |
| 496 D259                                                           | 8                  | 0.5102   |          |                    |                                                                                                                 |
| 511                                                                |                    |          |          |                    |                                                                                                                 |
| 704 D259                                                           | 8                  | 0.5100   |          |                    |                                                                                                                 |
| 707 D259                                                           | 8                  | 0.5097   |          |                    |                                                                                                                 |
| 754 ISO8                                                           | 973                | 0.51018  |          |                    |                                                                                                                 |
| 868 D259                                                           | 8                  | 0.5101   |          |                    |                                                                                                                 |
| 912                                                                |                    |          |          |                    |                                                                                                                 |
| 994 D259                                                           |                    | 0.5095   | E        |                    | Result calculated by iis 0.5102                                                                                 |
| 1006 D259                                                          |                    | 0.5099   | •        |                    |                                                                                                                 |
| 1026 ISO8                                                          | 973                | 0.5098   | C, ex    |                    | reported 509.8 probably in a different unit                                                                     |
| 1040                                                               |                    |          |          |                    | result excluded, laboratory did report only 5 components                                                        |
| 1095                                                               |                    |          |          |                    |                                                                                                                 |
| 1109<br>1197                                                       |                    |          |          |                    |                                                                                                                 |
| 1198                                                               |                    |          |          |                    |                                                                                                                 |
| 1200                                                               |                    |          |          |                    |                                                                                                                 |
| 1257                                                               |                    |          |          |                    |                                                                                                                 |
| 1259                                                               |                    |          |          |                    |                                                                                                                 |
| 1491                                                               |                    |          |          |                    |                                                                                                                 |
| 1556 ISO8                                                          | 973                | 0.5108   | С        |                    | reported 510.8 probably in a different unit                                                                     |
| 1557 ISO8                                                          |                    | 0.5108   |          |                    |                                                                                                                 |
| 1603                                                               |                    |          |          |                    |                                                                                                                 |
| 1634 ISO8                                                          | 973                | 0.511    |          |                    |                                                                                                                 |
| 1764 D259                                                          | 8                  | 0.5099   |          |                    |                                                                                                                 |
| 1776                                                               |                    |          |          |                    |                                                                                                                 |
| 1786                                                               |                    |          |          |                    |                                                                                                                 |
| 1788 ISO8                                                          | 973                | 0.511    |          |                    |                                                                                                                 |
| 1882                                                               |                    |          |          |                    |                                                                                                                 |
| 1941 D259                                                          | 18                 | 0.51012  |          |                    |                                                                                                                 |
| 1960<br>2124                                                       |                    |          |          |                    |                                                                                                                 |
| 2124                                                               |                    |          |          |                    | Calculated by iis from all reported results                                                                     |
| norm                                                               | ality              | ОК       |          |                    | suspect                                                                                                         |
| n                                                                  | any                | 20       |          |                    | 31                                                                                                              |
| outlie                                                             | ers                | 0        | +2 excl. |                    | 2 + 4 excl.                                                                                                     |
| mear                                                               |                    | 0.51018  |          |                    | 0.51024                                                                                                         |
| st.de                                                              |                    | 0.000449 |          |                    | 0.0002496                                                                                                       |
| R(cal                                                              |                    | 0.00126  |          |                    | 0.00069                                                                                                         |
| D.("                                                               | 13S03P)            | 0.00156  |          |                    | 0.00134                                                                                                         |
| R(IIS)                                                             |                    |          |          |                    |                                                                                                                 |
| R(IIS                                                              |                    |          |          |                    | 1000                                                                                                            |
|                                                                    |                    |          |          |                    | 900 - Kernel Density                                                                                            |
| 0.5115                                                             |                    |          |          |                    |                                                                                                                 |
| 0.5115                                                             |                    |          |          |                    |                                                                                                                 |
|                                                                    |                    |          |          |                    | х д д 800 -                                                                                                     |
| 0.5115 T<br>0.511 -                                                |                    |          |          |                    | Δ Δ Δ 800 -<br>700 -                                                                                            |
| 0.5115                                                             |                    |          |          |                    |                                                                                                                 |
| 0.5115 -<br>0.511 -<br>0.5105 -                                    |                    |          | A        | <u> </u>           | × Δ Δ 800 -<br>Δ Δ 700 -<br>600 -<br>500 -                                                                      |
| 0.5115 T<br>0.511 -<br>0.5105 -<br>0.51 -                          | . <b>Δ</b> X       | ۵ ۵ ۵    | Δ Δ      | <u> </u>           | x         Δ         800 -           Δ         700 -           600 -         500 -           400 -         400 - |
| 0.5115 - 0.511 - 0.5105 - 0.51 -                                   | ▲ _ X              | ۵ ۵ ۵    | ۵ ۵      | <u> </u>           | x         Δ         800 -           Δ         700 -         600 -           500 -         400 -         300 -   |
| 0.5115 T<br>0.511 -<br>0.5105 -<br>0.51 -                          | ▲ ▲ ×              | ۵ ۵ ۵    | Δ        | <u> </u>           | X A A 800 -<br>A A 700 -<br>600 -<br>500 -<br>400 -<br>300 -<br>200 -                                           |
| 0.5115 T<br>0.511 -<br>0.5105 -<br>0.51 -<br>0.5095 - Δ Δ          | <u>۸</u> ۸ ۸       | ۵ ۵ ۵    | Δ Δ      | <u> </u>           | X A A<br>A A<br>A A<br>A A<br>A A<br>A A<br>A A<br>A A                                                          |
| 0.5115 T<br>0.511 -<br>0.5105 -<br>0.51 -<br>0.5095 - Δ Δ<br>0.509 | 707<br>311<br>1028 |          | 171      | 1941<br>754<br>488 | X A A 800 -<br>A A 700 -<br>600 -<br>500 -<br>400 -<br>300 -<br>200 -                                           |

# Determination of Absolute Vapour Pressure @100F on sample #14202; results in psi

| lab              | method                   | value            | mark | z(targ)     | remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------|--------------------------|------------------|------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 92<br>150        | D2598                    | <br>186.51       | Е    |             | iis calculated 184.34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 171<br>311       | ISO8973                  |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 317              | ISO8973                  | 190<br>190       |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 323<br>334       |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 335              |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 336<br>337       |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 347              | D2598                    | 185.6            | С    |             | first reported 172.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 444<br>445       |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 496              | D2598                    | 185.4            |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 511<br>704       | ISO8973                  | <br>190.24       |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 704              | ISO8973                  | 190.24           |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 754<br>868       | ISO8973<br>D2598         | 189.975<br>185.6 |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 912              | D2398                    |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 994<br>1006      | IP432<br>D2598           | 190.194          |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1006<br>1026     | ISO8973                  | 186.1<br>169.98  | ex   |             | result excluded, laboratory did report only 5 components                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1040             | 1800072                  |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1095<br>1109     | ISO8973                  | 188.69<br>       |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1197             |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1198<br>1200     |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1257             |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1259<br>1491     |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1556             |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1557<br>1603     |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1634             | ISO8973                  | 195              | C, E |             | first reported 181; iis calculated 189.88                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1764<br>1776     | D2598                    | 186.000<br>      |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1786             | 1000070                  |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1788<br>1882     | ISO8973                  | 189.27<br>       |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1941             |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1960<br>2124     |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                  |                          |                  |      |             | Calculated by iis from all reported results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                  | normality                |                  |      |             | ISO8973/IP432 ASTM D2598<br>not OK suspect                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                  | n                        |                  |      |             | 32 33<br>0 + 2 aval                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                  | outliers<br>mean (n)     |                  |      |             | 0 + 2 excl. 0 + 4 excl.<br>190.081 185.813                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                  | st.dev. (n)              |                  |      |             | 0.5477 0.5172                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                  | R(calc.)<br>R(iis13S03P) |                  |      |             | 1.534     1.448       2.698     2.485                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                  | . ,                      |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <sup>200</sup> T |                          |                  |      |             | 0.16 Kernel Density                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 195 -            |                          |                  |      |             | ▲ 0.14 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 190 -            |                          |                  | Δ    | Δ Δ         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 185 -            | Δ Δ Δ                    | Δ Δ              | ۵    |             | 0.1 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 180 -            |                          |                  |      |             | 0.08 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 175 -            |                          |                  |      |             | 0.06 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 170 - ×          |                          |                  |      |             | 0.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 165              | m                        | 4 10             |      | m →         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1026             | 496<br>347<br>868        | 1764             | 150  | 1788<br>754 | E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E         E <the< th=""> <the< th=""> <the< th=""> <the< th=""></the<></the<></the<></the<> |
|                  |                          |                  |      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

# Determination of Relative Vapour Pressure @100F on sample #14202; results in psi

| la             | b   | meth             | od            |     |     | lue           |      | marl | k -  | z(targ |     | remar           | ks     |         |        |         |         |                                         |
|----------------|-----|------------------|---------------|-----|-----|---------------|------|------|------|--------|-----|-----------------|--------|---------|--------|---------|---------|-----------------------------------------|
| 92<br>150      |     | D259             | 8             |     | 17  | <br>0.802     |      | Е    |      |        |     | iis calo        | culate | d 169   | .64    |         |         |                                         |
| 171<br>311     |     | ISO89            | 273           |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 317            |     | ISO89            |               |     | 17  |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 323            |     | D259             | 8             |     |     | 0.7           |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 334<br>335     |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 336            |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 337<br>347     |     | D259             | 8             |     | 17  | <br>0.9       |      | С    |      |        |     | first re        | norter | 1158    | 0      |         |         |                                         |
| 444            |     |                  |               |     |     |               |      | U    |      |        |     | motro           | ponot  | . 100.  |        |         |         |                                         |
| 445            |     | IP432            |               |     | 17  | 5<br>0.7      |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 496<br>511     |     | D259             | 0             |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 704            |     | ISO89            |               |     |     | 5.55          |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 707<br>754     |     | ISO89            |               |     |     | 5.90<br>5.275 |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 868            |     | D259             |               |     |     | 0.9           |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 912<br>994     |     | IP432            | ,             |     |     | <br>5.236     |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 100            |     | D259             |               |     |     | 5.230<br>1.4  |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 102            | 6   |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 104<br>109     |     | ISO89            | 973           |     | 17  | <br>4.05      |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 110            | 9   |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 119<br>119     |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 120            |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 125            |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 125<br>149     |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 155            | 6   |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 155<br>160     |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 163            | 4   | ISO89            |               |     | 18  | 1             |      | C,E  |      |        |     | first re        | ported | 166;    | iis ca | alcula  | ted 175 | 5.19                                    |
| 176            |     | D259             | 8             |     | 17  | 1.304         |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 177<br>178     |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 178            | 8   | ISO89            | 973           |     |     | 2.53          |      | Е    |      |        |     | iis calo        | culate | d 174   | .65    |         |         |                                         |
| 188<br>194     |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 196            | 0   |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 212            | 4   |                  |               |     |     |               |      |      |      |        |     | Calcul          | atod h | w iie f | rom    | all ron | orted r | eculte                                  |
|                |     |                  |               |     |     |               |      |      |      |        |     | ISO89           | 73/IP4 |         |        |         | oncur   | <u>ASTM D2598</u>                       |
|                |     | norma            | ality         |     |     |               |      |      |      |        |     | not Oł<br>32    | <      |         |        |         |         | suspect<br>33                           |
|                |     | n<br>outlie      | rs            |     |     |               |      |      |      |        |     | 3∠<br>0+2€      | excl.  |         |        |         |         | 55<br>0 + 4 excl.                       |
|                |     | mean             | (n)           |     |     |               |      |      |      |        |     | 175.38          | 32     |         |        |         |         | 171.117                                 |
|                |     | st.dev<br>R(cale | /. (n)<br>c.) |     |     |               |      |      |      |        |     | 0.5477<br>1.534 | ,<br>, |         |        |         |         | 0.5172<br>1.448                         |
|                |     | R(iis1           |               | BP) |     |               |      |      |      |        |     | 2.698           |        |         |        |         |         | 2.485                                   |
|                |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |
| 183 -          |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         | 0.16 Kernel Density                     |
| 181 -<br>179 - |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         | ۵       |                                         |
| 177 -          |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         | 0.12 -                                  |
| 175 -          |     |                  |               |     |     |               |      |      |      | ۵      | ۵   | ۵               | ۵      | ۵       | ۵      | ۵       |         | 0.1 -                                   |
| 173 -          |     |                  |               |     |     |               |      | ۵    | Δ    |        |     |                 |        |         |        |         |         | 0.08 -                                  |
| 171 -          | Δ   | ۵                | ۵             | ۵   | ۵   | ۵             | ۵    |      |      |        |     |                 |        |         |        |         |         | 0.06 -                                  |
| 169 -          |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         | 0.04 -                                  |
| 167 -          |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         | 0.02 -                                  |
| 100            | 496 | 323              | 150           | 347 | 868 | 1764          | 1006 | 1788 | 1095 | 311    | 445 | 994             | 754    | 704     | 707    | 317     | 1634    | 0 , , , , , , , , , , , , , , , , , , , |
|                |     |                  |               |     |     |               |      |      |      |        |     |                 |        |         |        |         |         |                                         |

# Determination of Absolute Vapour Pressure @40°C on sample #14202; results in kPa

| la h                | moth o d                | value               | marl        | -(10    | remerika                                                                  |
|---------------------|-------------------------|---------------------|-------------|---------|---------------------------------------------------------------------------|
| lab<br>92           | method                  | value               | mark        | z(targ) | remarks                                                                   |
| 150                 |                         |                     |             |         |                                                                           |
| 171                 | 1000070                 |                     | -           |         | "                                                                         |
| 311<br>317          | ISO8973<br>ISO8973      | 1351.4<br>1350      | E<br>C      |         | iis calculated 1348.6<br>first reported 196, probably in a different unit |
| 323                 | 1300973                 |                     | C           |         | instreported 190, probably in a different drift                           |
| 334                 |                         |                     |             |         |                                                                           |
| 335                 | ISO8973                 | 1345                |             |         |                                                                           |
| 336<br>337          |                         |                     |             |         |                                                                           |
| 347                 |                         |                     |             |         |                                                                           |
| 444                 |                         |                     |             |         |                                                                           |
| 445<br>496          | ISO8973                 | <br>1348.2          |             |         |                                                                           |
| 511                 |                         |                     |             |         |                                                                           |
| 704                 | ISO8973                 | 1349.05             |             |         |                                                                           |
| 707<br>754          | ISO8973<br>ISO8973      | 1351.60<br>1347.0   |             |         |                                                                           |
| 868                 | 1000373                 |                     |             |         |                                                                           |
| 912                 |                         |                     |             |         |                                                                           |
| 994<br>1006         | IP432                   | 1348.75<br>         |             |         |                                                                           |
| 1006                | ISO8973                 | 1236                | ex          |         | result excluded, laboratory did report only 5 components                  |
| 1040                |                         |                     |             |         |                                                                           |
| 1095                | ISO8973                 | 1338                |             |         |                                                                           |
| 1109<br>1197        |                         |                     |             |         |                                                                           |
| 1198                |                         |                     |             |         |                                                                           |
| 1200                |                         |                     |             |         |                                                                           |
| 1257<br>1259        |                         |                     |             |         |                                                                           |
| 1491                | ISO8973                 | 1386                | ex          |         | see §4.1                                                                  |
| 1556                | ISO8973                 | 1240.0              | G(0.01)     |         |                                                                           |
| 1557<br>1603        | ISO8973                 | 1242                | ex          |         | result excluded, probably reported Relative Vapour Pressure instead       |
| 1634                | ISO8973                 | 1346                | С           |         | first reported 1245                                                       |
| 1764                | ISO8973                 | 1351.849            |             |         |                                                                           |
| 1776<br>1786        | ISO8973                 | 1263.03             | ex          |         | see §4.1                                                                  |
| 1788                | ISO8973                 | 1343                |             |         |                                                                           |
| 1882                |                         |                     |             |         |                                                                           |
| 1941                |                         |                     |             |         |                                                                           |
| 1960<br>2124        |                         |                     |             |         |                                                                           |
|                     |                         |                     |             |         | Calculated by iis from all reported results                               |
|                     |                         |                     |             |         | <u>ISO8973/IP432</u>                                                      |
|                     | normality<br>n          | not OK<br>13        |             |         | suspect<br>32                                                             |
|                     | outliers                | 1 + 4 excl.         |             |         | 0 + 2 excl.                                                               |
|                     | mean (n)                | 1350.45             |             |         | 1347.87                                                                   |
|                     | st.dev. (n)<br>R(calc.) | 11.365<br>31.823    |             |         | 4.062<br>11.374                                                           |
|                     | R(iis13S03P)            | n.a.                |             |         | n.a.                                                                      |
|                     |                         |                     |             |         |                                                                           |
| <sup>1400</sup> T   |                         |                     |             |         | 0.07                                                                      |
| 1380 -              |                         |                     |             |         | ▲ Kernel Density                                                          |
| 1360                |                         | Δ                   | Δ Δ         | Δ 4     |                                                                           |
| 1340 -<br>1320 -    |                         | <u>م</u>            |             |         |                                                                           |
| 1300 -              |                         |                     |             |         | 0.04 -                                                                    |
| 1280 -              |                         |                     |             |         | 0.03 -                                                                    |
| 1260 -              | ×                       |                     |             |         | 0.02 -                                                                    |
| <sup>1240</sup> - * | ж ж                     |                     |             |         | 0.01                                                                      |
| 1220 -              |                         |                     |             |         |                                                                           |
| 1200 - <u>§</u>     | 1556<br>1557<br>1776    | 1095<br>1788<br>335 | 1634<br>754 | 496     |                                                                           |
|                     |                         |                     |             |         |                                                                           |

# Determination of Relative Vapour Pressure @40°C on sample #14202; results in kPa

| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | lab           | method         | value                           | mark     | z(targ) | remarks                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|---------------------------------|----------|---------|-------------------------------------------------------------------------------------------------------------|
| 171       ISO8973       1248 0       C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                |                                 |          |         |                                                                                                             |
| 317       ISOB973       1248       C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                |                                 |          |         |                                                                                                             |
| 223       D2598       1238          334       isO6973       1244          337           338           337           337           338           337           337                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                |                                 |          |         |                                                                                                             |
| 334     ISO8973     1244       335     ISO8973     1244       336     ISO8973     1244       444     IFSO8973     124.8       444     ISO8973     124.7.3       511     ISO8973     124.7.3       577     ISO8973     124.7.3       578     ISO8973     124.7.7       912                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |                |                                 | С        |         | first reported 181, probably in a different unit                                                            |
| 336     ISO8973     1244       337         337         347         444     IP432     1244.8       445     IP432     1246.9       1500873     1226.73        704     ISO8973     1226.77       715     ISO8973     1226.77       716     ISO8973     1226.77       717     ISO8973     1226.77       718     IP432     1247.45       7199         71006         71190         7121188         7121180         7121191         7121192         7121193         7121193         7121193         7121193         7121193         7121193         7126     ISO8973     1245     C       7176     ISO8973     1245     C       7176     ISO8973     1245                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | D2390          |                                 |          |         |                                                                                                             |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               | ISO8973        | 1244                            |          |         |                                                                                                             |
| 347           444       IP432       1244.8         446       ISO8973       1247.73         704       ISO8973       1247.73         707       ISO8973       1247.75         994       IP432       1247.45         9912           992       1247.45          993       IP432       1247.45         1006           1026           1026           1026          1027                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                |                                 |          |         |                                                                                                             |
| 444       P432       1244.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               |                |                                 |          |         |                                                                                                             |
| 445       IP432       1244.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |                |                                 |          |         |                                                                                                             |
| 511                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 445           |                |                                 |          |         |                                                                                                             |
| 704       ISOB973       1247.73                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               | ISO8973        |                                 |          |         |                                                                                                             |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               | 1508973        |                                 |          |         |                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                |                                 |          |         |                                                                                                             |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 754           |                |                                 |          |         |                                                                                                             |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                |                                 |          |         |                                                                                                             |
| $1006 \qquad \qquad \\ 1040 \qquad \qquad \\ 1040 \qquad \qquad \\ 1055 ISO8973 \qquad 1237 \qquad \\ 1197 \qquad \qquad \\ 1198 \qquad \qquad \\ 1257 \qquad \qquad \\ 1257 \qquad \qquad \\ 1258 \qquad \qquad \\ 1557 \qquad \qquad \\ 1557 \qquad \qquad \\ 1563 ISO8973 \qquad 1285 \qquad ex \qquad \\ 1567 \qquad \qquad \\ 1563 ISO8973 \qquad 1285 \qquad C \qquad \\ 1564 ISO8973 \qquad 1225.244 \qquad \\ 1786 \qquad \qquad \\ 1786 \qquad \qquad \\ 1882 \qquad \qquad \\ 1882 \qquad \qquad \\ 1860 \qquad \qquad \\ 1861 \qquad \qquad \\ 1860 \qquad \qquad \\ 1214 \qquad \qquad \\ 1860 \qquad \qquad \\ 1960 \qquad \\ 100 \qquad$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               | IP432          |                                 |          |         |                                                                                                             |
| 1026                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               | 11 432         |                                 |          |         |                                                                                                             |
| 1096       ISO8973       1237          1197           1198           1259           1257           1568       ISO8973       1285       ex          1557                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1026          |                |                                 |          |         |                                                                                                             |
| $1109 \qquad \qquad \\ 1197 \qquad \qquad \\ 1198 \qquad \qquad \\ 1257 \qquad \qquad \\ 1259 \qquad \qquad \\ 1259 \qquad \qquad \\ 1560 \qquad \qquad \\ 1557 \qquad \qquad \\ 1557 \qquad \qquad \\ 1563 \qquad \qquad \\ 1564 \qquad ISO8973 \qquad 1245 \qquad C \qquad \\ 1786 \qquad \qquad \\ 1788 \qquad \qquad \\ 1788 \qquad \qquad \\ 1788 \qquad \qquad \\ 1882 \qquad \qquad \\ 1882 \qquad \qquad \\ 1882 \qquad \qquad \\ 1882 \qquad \qquad \\ 1941 \qquad \qquad \\ 1941 \qquad \qquad \\ 2124 \qquad \qquad \\ 2124 \qquad \qquad \\ 2124 \qquad \qquad \\ 1941 \qquad \qquad \\ 2124 \qquad \qquad \\ 2124 \qquad \qquad \\ 2124 \qquad \qquad \\ 1941 \qquad \qquad \\ 2124 \qquad \qquad$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               | 1000070        |                                 |          |         |                                                                                                             |
| $1197 \qquad \dots \qquad \dots \qquad \dots \\ 1198 \qquad \dots \qquad \dots \qquad \dots \\ 1259 \qquad \dots \qquad \dots \qquad \dots \\ 1257 \qquad \dots \qquad \dots \\ 1259 \qquad \dots \qquad \dots \\ 1556 \qquad ISO8973 \qquad 1225 \qquad ex \qquad \dots \\ 1356 \qquad ISO8973 \qquad 1225 \qquad ex \qquad \dots \\ 1357 \qquad \dots \qquad \dots \\ 1557 \qquad \dots \qquad \dots \\ 1603 \qquad \dots \qquad \dots \\ 1784 \qquad ISO8973 \qquad 1245 \qquad C \qquad \dots \\ 1786 \qquad \dots \qquad \dots \\ 1786 \qquad \dots \qquad \dots \\ 1788 \qquad \dots \qquad \dots \\ 1882 \qquad \dots \qquad \dots \\ 1882 \qquad \dots \qquad \dots \\ 1882 \qquad \dots \qquad \dots \\ 1960 \qquad \dots \\ 1960 \qquad \dots \\ 1970 \qquad \dots \\ 1960 \qquad \dots \\ 1960 \qquad \dots \\ 1970 \qquad \dots \\ 1970$ |               | 1508973        |                                 |          |         |                                                                                                             |
| $1198 \qquad \qquad \\ 1200 \qquad \qquad \\ 1257 \qquad \qquad \\ 1259 \qquad \qquad \\ 1491  ISO8973 \qquad 11285 \qquad ex \qquad \\ 1567 \qquad \qquad \\ 1563 \qquad \qquad \\ 1578 \qquad \qquad \\ 1776 \qquad \qquad \\ 1776 \qquad \qquad \\ 1788 \qquad \qquad \\ 1882 \qquad \qquad \\ 1882 \qquad \qquad \\ 1941 \qquad \qquad \\ 1941 \qquad \qquad \\ 1942 \qquad \qquad \\ 1941 \qquad \qquad \\ 1941 \qquad \qquad \\ 1942 \qquad \qquad \\ 1944 \qquad \qquad \\ 1944 \qquad \qquad \\ 1944 \qquad \qquad \\ 1944 \qquad \qquad \\ 1946 \qquad \\ 1946 \qquad$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                |                                 |          |         |                                                                                                             |
| 1257                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1198          |                |                                 |          |         |                                                                                                             |
| 1259                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                |                                 |          |         |                                                                                                             |
| $1491 \  SO8973 \ 1285 \ ex \ \ see §4.1$ $1556 \  SO8973 \ 1138.7 \ G(0.01) \ \ first reported 1144$ $1564 \  SO8973 \ 1225.524 \ \ first reported 1144$ $1764 \  SO8973 \ 1225.524 \ \ Interported 1144$ $1766 \ \ \ Interported 1144$ $1766 \ \ Interported 1144 \ \ Interported 1144$ $1766 \ \ Interported 1144 \ \ Interported 1144$ $1766 \ \ Interported 1144 \ \ Interporte$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                |                                 |          |         |                                                                                                             |
| 1556 ISO8973 1138.7 G(0.01) 1557 1603 1764 ISO8973 1245 C first reported 1144 1776 1786 1786 1788 1980 1941 2124 2124 normality OK suspect normality OK suspect normality 13 32 outliers 1+1 excl. 0+2 excl. 1508973/IP432 suspect 11.50 11.37 R(iis13S03P) n.a. n.a. n.a.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               | ISO8973        |                                 | ex       |         | see §4.1                                                                                                    |
| 1633                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1556          | ISO8973        | 1138.7                          | G(0.01)  |         | -                                                                                                           |
| 1634       ISO8973       1245       C        first reported 1144         1764       ISO8973       1250.524           1776            1786           1882           1941           1960           2124           normality<br>outliers       0K       suspect<br>suspect         near (n)       1245.65       1246.55         st.dev. (n)       4.109       4.652         R(calc.)<br>mean (n)       11.50       11.37         R(iis13S03P)       n.a.       n.a.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                |                                 |          |         |                                                                                                             |
| 1764 ISO8973 1250.524                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               | ISO8973        |                                 | С        |         | first reported 1144                                                                                         |
| 1786                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                |                                 | U        |         |                                                                                                             |
| $1788 \qquad \qquad \\ 1982 \qquad \qquad \\ 1941 \qquad \qquad \\ 2124 \qquad \qquad \\ 2124 \qquad \qquad \\ \frac{Calculated by iis from all reported results}{ISO8973/IP432} \\ \frac{ISO8973/IP432}{suspect} \\ suspect \\ st.dev. (n) \qquad 4.109 \qquad 4.062 \\ R(calc.) \qquad 11.50 \qquad 11.37 \\ R(iis13S03P) \qquad n.a. \qquad n.a. \qquad n.a. \\ \hline 0.12 \qquad \\ 100 \qquad$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1776          |                |                                 |          |         |                                                                                                             |
| $1882 \qquad \cdots \qquad \cdots \qquad \cdots \\1941 \qquad \cdots \qquad \cdots \qquad \cdots \\2124 \qquad \cdots \qquad \cdots \qquad \cdots \\2124 \qquad \cdots \qquad \cdots \qquad \cdots \\ \hline Calculated by iis from all reported results}{ISO8973/IP432} \\ normality OK \qquad suspect \\ n \qquad 13 \qquad 32 \\ outliers \qquad 1 + 1 excl. \qquad 0 + 2 excl. \\ mean (n) \qquad 1245.65 \qquad 1246.55 \\ st.dev. (n) \qquad 4.109 \qquad 4.062 \\ R(calc.) \qquad 11.50 \qquad 11.37 \\ R(iis13S03P) \qquad n.a. \qquad n.a. \qquad \cdots \\ \hline \begin{array}{c} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                |                                 |          |         |                                                                                                             |
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| 2124<br>normality OK<br>n 13 32<br>outliers 1+1 excl. 0+2 excl.<br>mean (n) 1245.65 1246.55<br>st.dev. (n) 4.109 4.062<br>R(calc.) 11.50 11.37<br>R(iis13S03P) n.a. n.a. $x^{(iis13S03P)}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                |                                 |          |         |                                                                                                             |
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| normality OK suspect<br>n 13 32<br>outliers 1+1 excl. 0+2 excl.<br>mean (n) 1245.65 1246.55<br>st.dev. (n) 4.109 4.062<br>R(calc.) 11.50 11.37<br>R(iis13S03P) n.a. n.a.<br>x $x$ $x$ $x$ $x$ $x$ $x$ $x$ $x$ $x$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2124          |                |                                 |          |         | Coloulated by instrom all reported regults                                                                  |
| normality OK suspect<br>n 13 32<br>outliers 1+1 excl. 0+2 excl.<br>mean (n) 1245.65 1246.55<br>st.dev. (n) 4.109 4.062<br>R(calc.) 11.50 11.37<br>R(iis13S03P) n.a. n.a.<br>$1300 - \frac{x}{4} + \frac{x}{4} +$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |                |                                 |          |         |                                                                                                             |
| outliers $1 + 1 \text{ excl.}$ $0 + 2 \text{ excl.}$<br>mean (n) $1245.65$ $1246.55$<br>st.dev. (n) $4.109$ $4.062$<br>R(calc.) $11.50$ $11.37$<br>R(iis13S03P) n.a. n.a.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               | normality      | OK                              |          |         |                                                                                                             |
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| $\begin{array}{c} R(calc.) & 11.50 & 11.37 \\ R(iis13S03P) & n.a. & n.a. \end{array}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                |                                 |          |         |                                                                                                             |
| 1300 -       x         1280 -       x         1290 -       x         1100 -       x         1100 -       x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               | R(calc.)       |                                 |          |         | 11.37                                                                                                       |
| 1220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               | R(iis13S03P)   | n.a.                            |          |         | n.a.                                                                                                        |
| 1220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                |                                 |          |         |                                                                                                             |
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| 1240     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A     A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |                |                                 |          |         |                                                                                                             |
| 1220 -     0.08 -       1200 -     0.06 -       1180 -     0.04 -       1140 - x     0.02 -       1120 -     0.02 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |                |                                 | <u>\</u> | Δ       |                                                                                                             |
| 120 -<br>1180 -<br>1160 -<br>1140 - <b>x</b><br>1120 -<br>1100 -<br>110                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               | Δ Δ            | -                               |          |         | 0.08 -                                                                                                      |
| 1180 -<br>1160 -<br>1140 - x<br>1120 -<br>1100 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                |                                 |          |         | 0.06 -                                                                                                      |
| 1140 + x<br>1120 +<br>1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                |                                 |          |         |                                                                                                             |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1140 <b>x</b> |                |                                 |          |         |                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                |                                 |          |         |                                                                                                             |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 31            |                | ······ •                        | 4        |         |                                                                                                             |

### **APPENDIX 2**

## Number of participants per country

| 3 labs in | AUSTRALIA                |
|-----------|--------------------------|
| 1 lab in  | AZERBAIJAN               |
| 1 lab in  | BELGIUM                  |
| 1 lab in  | CANADA                   |
| 1 lab in  | CHINA, People's Republic |
| 1 lab in  | CROATIA                  |
| 4 labs in | FRANCE                   |
| 3 labs in | GERMANY                  |
| 1 lab in  | INDIA                    |
| 1 lab in  | ITALY                    |
| 3 labs in | MALAYSIA                 |
| 3 labs in | NETHERLANDS              |
| 1 lab in  | PERU                     |
| 4 labs in | PORTUGAL                 |
| 1 lab in  | RUSSIAN FEDERATION       |
| 1 lab in  | SAUDI ARABIA             |
| 3 labs in | SERBIA                   |
| 1 lab in  | SPAIN                    |
| 2 labs in | SWEDEN                   |
| 1 lab in  | TAIWAN                   |
| 2 labs in | UKRAINE                  |
| 1 lab in  | UNITED ARAB EMIRATES     |
| 2 labs in | UNITED KINGDOM           |
| 2 labs in | UNITED STATES OF AMERICA |
|           |                          |

### **APPENDIX 3**

#### Abbreviations:

| С        | = final result after checking of first reported suspect result |
|----------|----------------------------------------------------------------|
| D(0.01)  | = outlier in Dixon's outlier test                              |
| D(0.05)  | = straggler in Dixon's outlier test                            |
| G(0.01)  | = outlier in Grubbs' outlier test                              |
| G(0.05)  | = straggler in Grubbs' outlier test                            |
| DG(0.01) | = outlier in Double Grubbs' outlier test                       |
| DG(0.05) | = straggler in Double Grubbs' outlier test                     |
| R(0.01)  | = outlier in Rosner outlier test                               |
| R(0.05)  | = straggler in Rosner outlier test                             |
| ex       | = excluded from calculations                                   |
| n/a      | = not applicable                                               |
| W        | = withdrawn on request participant                             |
| U        | = reported in wrong unit                                       |
| E        | = error in calculations                                        |
| SDS      | = Safety Data Sheet                                            |

### Literature:

| 1  | iis Interlaboratory Studies, Protocol for the Organisation, Statistics and Evaluation, April 2014 |
|----|---------------------------------------------------------------------------------------------------|
| 2  | ASTM D2163-96                                                                                     |
| 3  | ASTM D2163-07                                                                                     |
| 4  | ASTM D2421-07                                                                                     |
| 5  | ISO 5725-86                                                                                       |
| 6  | ISO 5725, parts 1-6, 1994                                                                         |
| 7  | M. Thompson and R. Wood, J. AOAC Int, <u>76</u> , 926, (1993)                                     |
| 8  | W.J. Youden and E.H. Steiner, Statistical Manual of the AOAC, (1975)                              |
| 9  | IP 367/84                                                                                         |
| 10 | DIN 38402 T41/42                                                                                  |
| 11 | P.L. Davies, First reported Z. Anal. Chem, <u>331</u> , 513, (1988)                               |
| 12 | J.N. Miller, Analyst, <u>118</u> , 455, (1993)                                                    |
| 13 | Analytical Methods Committee Technical Brief, No4 January 2001                                    |
| 14 | The Royal Society of Chemistry 2002, Analyst 2002, 127 page1359-1364, P.J. Lowthian and M.        |
|    | Thompson. (see http://www.rsc.org/suppdata/an/b2/b205600n/)                                       |
| 15 | ISO 17043:2010                                                                                    |
| 16 | EN 27941:1993                                                                                     |
| 17 | ASTM D2598-02 (reapproved 2007)                                                                   |
| 18 | IP 432-2000 = ISO8973-1997                                                                        |
| 19 | Work Item WK36318, proposal to revise ASTM D2598-02 (07)                                          |
| 20 | Private communication ASTM Subcommittee D02.H                                                     |
| 21 | Bernard Rosner, Percentage Points for a Generalized ESD Many-Outlier Procedure, Technometrics,    |
|    | 25(2), pp. 165-172, (1983)                                                                        |
|    |                                                                                                   |