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## A) Summary statistics for a sample : SO3 - content

| | | X1, X2, ... X(p-1), Xp | X2, X3, ... X(p-1), Xp | X3, X4... X(p-1), Xp | X1, X2, ... X(p-2), X(p-1) | X1, X2, ... X(p-3), X(p-2) | Sample without outliers |
|---|---|---|---|---|---|---|---|
| Count (Sample size) | n | 15 | 14 | 13 | 14 | 13 | 14 |
| Minimum value | $x_{min} = x_1$ | 2,985 | 3,17 | 3,18 | 2,99 | 2,99 | 3,17 |
| Maximum value | $x_{max} = x_p$ | 3,45 | 3,45 | 3,45 | 3,44 | 3,36 | 3,45 |
| Range of sample R = | $x_{max} - x_{min}$ | 0,465 | 0,28 | 0,27 | 0,46 | 0,38 | 0,28 |
| difference $L_{m95\%} - L_{M95\%}$ ..... | $\Delta L_{95\%}$ | 0,5034 | | | | | 0,3868 |
| Lower confidence limitsafterelimination of outliers (for P=98%) | $L_{m98\%}$ | 2,9647 | | | | | 3,056 |
| Lower confidence limitsafterelimination of outliers (for P=95%) | $L_{m95\%}$ | 3,0210 | | | | | 3,0998 |
| Lower Irwin confidence limit (for P=95%) | xminIw1-5% | 3,0159 | | | | | |
| Lower Grubbs confidence limit (for P=99%) | xminG1-1% | 2,9434 | 3,0466 | | | | |
| Lower Grubbs confidence limit (for P=95%) | xminG1-5% | 3,0088 | 3,0688 | | | | |
| Average (arithmetic mean) $\overline{x}$ = | $1/p\sum(x_i)$ = | 3,2727 | 3,2932 | 3,3027 | 3,2600 | 3,2462 | 3,2932 |
| Precision of a measure of the mean (for P=95%) | ± ε | 0,0673 | 0,0703 | 0,0738 | 0,0703 | 0,0738 | 0,0536 |
| Upper Grubbs confidence limit (for P=99%) | xmaxGp-5% | 3,5366 | | | 3,5373 | | |
| Upper Grubbs confidence limit (for P=95%) | xmaxGp-1% | 3,602 | | | 3,5648 | | |
| Upper Irwin confidence limit (for P=99%) | xmaxIw1-5% | 3,5941 | | | | | |
| Upper confidence limitsafterelimination of outliers (for P=95%) | $L_{M95\%}$ | 3,5244 | | | | | 3,4866 |
| Upper confidence limitsafterelimination of outliers (for P=98%) | $L_{M98\%}$ | 3,5807 | | | | | 3,5304 |
| Standard deviation of a sample | $s_{x,n-1}$ | 0,11735 | 0,0895 | 0,08553 | 0,11063 | 0,10174 | 0,0895 |
| Standard deviation | $s_{x,0}$ | 0,11337 | 0,08624 | 0,08217 | 0,1066 | 0,09775 | 0,08624 |
| Coefficient of variation | v | 3,6% | 2,7% | 2,6% | 3,4% | 3,1% | 2,7% |
| Standard skewness | $Sk_{est}$ | -0,700 | 0,443 | 0,456 | -0,877 | -1,297 | 0,443 |
| Standard kurtosis (exces) | $\gamma_2$ | 1,433 | -0,840 | -0,872 | 2,014 | 2,770 | -0,840 |
| t-value of the Student's distribution for P=95% | $t_{(n-1),\alpha=2,5\%}$ | 2,145 | 2,160 | 2,179 | 2,160 | 2,179 | 2,160 |
| t-value of the Student's distribution for P=98% | $t_{(n-1),\alpha=1,0\%}$ | 2,625 | 2,650 | 2,681 | 2,650 | 2,681 | 2,650 |

## B1) Tests by Irwin for an afterelimination of outliers

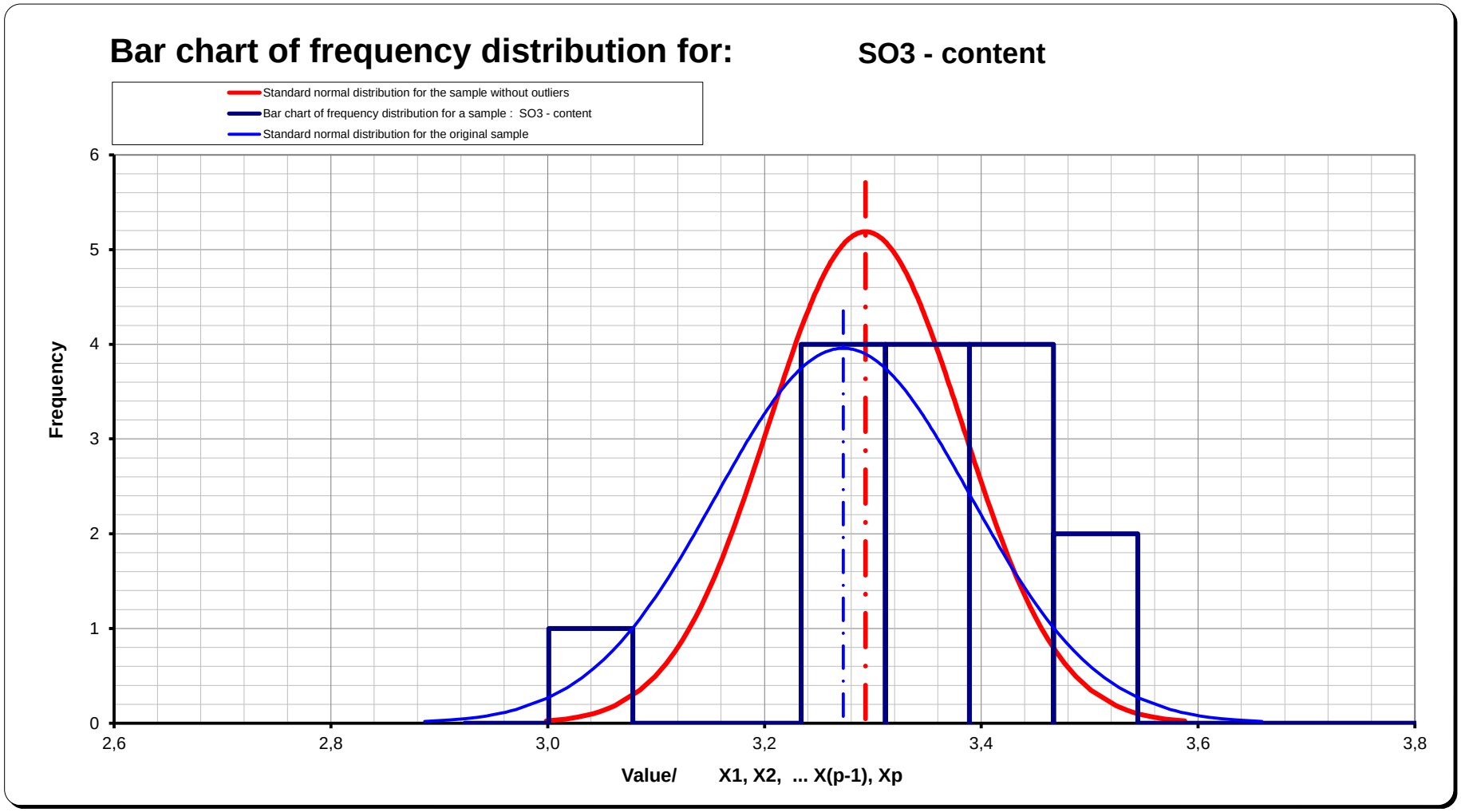
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Tests by Irwin for an afterelimination of outliers based on a level of significance of 5%** | | | |
| Irwin critical value (for P=95%) | $\lambda_{\alpha(n)}$ | 1,359 | | 1,383 | 1,411 | 1,383 | 1,411 |
| | $\lambda_{calc,1,2}$ | 1,632 | | 0,116 | 0,487 | 1,735 | 1,893 |
| | $\lambda_{calc,n,n-1}$ | 0,088 | | 0,116 | 0,122 | 0,750 | 0,051 |
| | *x1 ** * | **0** | ... | **1** | **1** | **0** | **0** |
| | *Value xp is not outlier* | **1** | ... | **1** | **1** | **1** | **1** |

## B2) Tests by Grubb for an afterelimination of outliers or biased values

| | | | | | |
|---|---|---|---|---|---|
| Grubb_i=1 | $G_1$ | 2,452 | | 3,444 | |
| Grubb_i=p | $G_p$ | 1,511 | | 1,717 | |
| Upper critical values | $G_{h,1\%}$ | 2,806 | | 2,755 | **Test for an afterelimination of one outlier based on a level of significance of 1%** |
| for the Grubb-test | | **1** | ... | **0** | ..... x1 ** is the outlier |
| according to ISO 5725-2, | | **1** | ... | **1** | ..... Value xp is not outlier |
| clause 7.3.4.1 | $G_{h,5\%}$ | 2,249 | | 2,507 | **Test for an afterelimination of one biased value based on a level of significance of 5%** |
| | | **0** | ... | **0** | ..... x1 * is the biased value |
| | | **1** | ... | **1** | ..... Value xp is not biased |
| Grubb_i=1,2 | $G_{1,2}$ | 0,525 | | 0,525 | |
| Grubb_i=p,p-1 | $G_{p,p-1}$ | 0,743 | | 0,743 | |
| Lower critical values | $G_{d,1\%}$ | 0,253 | | 0,228 | **Test for an afterelimination of two outliers based on a level of significance of 5%** |
| for the Grubb-test | | **1** | ... | **1** | ..... Values x1, x2 are not outliers |
| according to ISO 5725-2, | | **1** | ... | **1** | ..... Values xp, xp-1 are not biased values |
| clause 7.3.4.2 | $G_{d,5\%}$ | 0,337 | | 0,311 | **Test for an afterelimination of two biased values based on a level of significance of 5%** |
| | | **1** | ... | **1** | ..... Values x1, x2 are not outliers |
| | | **1** | ... | **1** | ..... Values xp, xp-1 are not biased values |

## B3) Tests by Dixon for an afterelimination of outliers or biased values

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Test for an afterelimination of one biased value based on a level of significance of 5%** | | | | |
| Dixon_i=1, ... $(x_2-x_1)$ | $Q_1$ | 0,398 | | 0,036 | 0,148 | 0,407 | 0,493 | |
| Dixon_i=p, ...$(x_p-x_{(p-1)})$ | $Q_p$ | 0,022 | | 0,036 | 0,037 | 0,176 | 0,013 | |
| Upper critical values | $Q_{v,\alpha,5\%}$ | **0,338** | | **0,349** | **0,361** | **0,349** | **0,361** | |
| *x1 * is the biased value* | | **0** | ... | **1** | **1** | **0** | **0** | |
| *Value xp is not biased* | | **1** | ... | **1** | **1** | **1** | **1** | |


Bar chart of frequency distribution for: SO3 - content
Standard normal distribution for the sample without outliers
Bar chart of frequency distribution for a sample : SO3 - content
Standard normal distribution for the original sample
Frequency
0
1
2
3
4
5
6
2,6
2,8
3,0
3,2
3,4
3,6
3,8
Value/ X1, X2, ... X(p-1), Xp

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## A) Summary statistics for a sample :

**Cl - content**

| | | X1, X2, ... X(p-1), Xp | X2, X3, ... X(p-1), Xp | X3, X4... X(p-1), Xp | X1, X2, ... X(p-2), X(p-1) | X1, X2, ... X(p-3), X(p-2) | Sample without outliers |
|---|---|---|---|---|---|---|---|
| Count (Sample size) | n | 15 | 14 | 12 | 14 | 13 | 14 |
| Minimum value | $x_{min} = x_1$ | 0,067 | 0,08 | 0,08 | 0,07 | 0,07 | 0,08 |
| Maximum value | $x_{max} = x_p$ | 0,094 | 0,09 | 0,09 | 0,09 | 0,09 | 0,09 |
| Range of sample R = | $x_{max} - x_{min}$ | 0,027 | 0,02 | 0,02 | 0,03 | 0,02 | 0,02 |
| difference $L_{m95\%} - L_{M95\%}$ ..... | $\Delta L_{95\%}$ | 0,028 | | | | | 0,0224 |
| Lower confidence limitsafterelimination of outliers (for P=98%) | $L_{m98\%}$ | 0,0650 | | | | | 0,0694 |
| Lower confidence limitsafterelimination of outliers (for P=95%) | $L_{m95\%}$ | 0,0681 | | | | | 0,0720 |
| Lower Irwin confidence limit (for P=95%) | $x_{minIw1-5\%}$ | 0,0684 | | | | | |
| Lower Grubbs confidence limit (for P=99%) | $x_{minG1-1\%}$ | 0,0638 | 0,0689 | | | | |
| Lower Grubbs confidence limit (for P=95%) | $x_{minG1-5\%}$ | 0,0674 | 0,0702 | | | | |
| Average (arithmetic mean) $\bar{x}$ = | $1/p\sum(x_i)$ = | 0,0821 | 0,0832 | 0,0843 | 0,0813 | 0,0805 | 0,0832 |
| Precision of a measure of the mean (for P=95%) | ± ε | 0,0037 | 0,0039 | 0,0043 | 0,0039 | 0,0041 | 0,0031 |
| Upper Grubbs confidence limit (for P=99%) | $x_{maxGp-5\%}$ | 0,0968 | | | 0,096 | | |
| Upper Grubbs confidence limit (for P=95%) | $x_{maxGp-1\%}$ | 0,1004 | | | 0,0974 | | |
| Upper Irwin confidence limit (for P=99%) | $x_{maxIw1-5\%}$ | 0,1006 | | | | | |
| Upper confidence limitsafterelimination of outliers (for P=95%) | $L_{M95\%}$ | 0,0961 | | | | | 0,0944 |
| Upper confidence limitsafterelimination of outliers (for P=98%) | $L_{M98\%}$ | 0,0992 | | | | | 0,097 |
| Standard deviation of a sample | $s_{x,n-1}$ | 0,00652 | 0,00519 | 0,00486 | 0,00585 | 0,00517 | 0,00519 |
| Standard deviation | $s_{x,0}$ | 0,0063 | 0,005 | 0,00466 | 0,00564 | 0,00497 | 0,005 |
| Coefficient of variation | v | 7,9% | 6,2% | 5,8% | 7,2% | 6,4% | 6,2% |
| Standard skewness | $Sk_{est}$ | -0,257 | 0,927 | 1,046 | -0,627 | -1,298 | 0,927 |
| Standard kurtosis (exces) | $\gamma_2$ | 1,374 | 0,130 | -0,001 | 2,247 | 3,333 | 0,130 |
| t-value of the Student's distribution for P=95% | $t_{(n-1),\alpha=2,5\%}$ | 2,145 | 2,160 | 2,201 | 2,160 | 2,179 | 2,160 |
| t-value of the Student's distribution for P=98% | $t_{(n-1),\alpha=1,0\%}$ | 2,625 | 2,650 | 2,718 | 2,650 | 2,681 | 2,650 |

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## B1) Tests by Irwin for an afterelimination of outliers

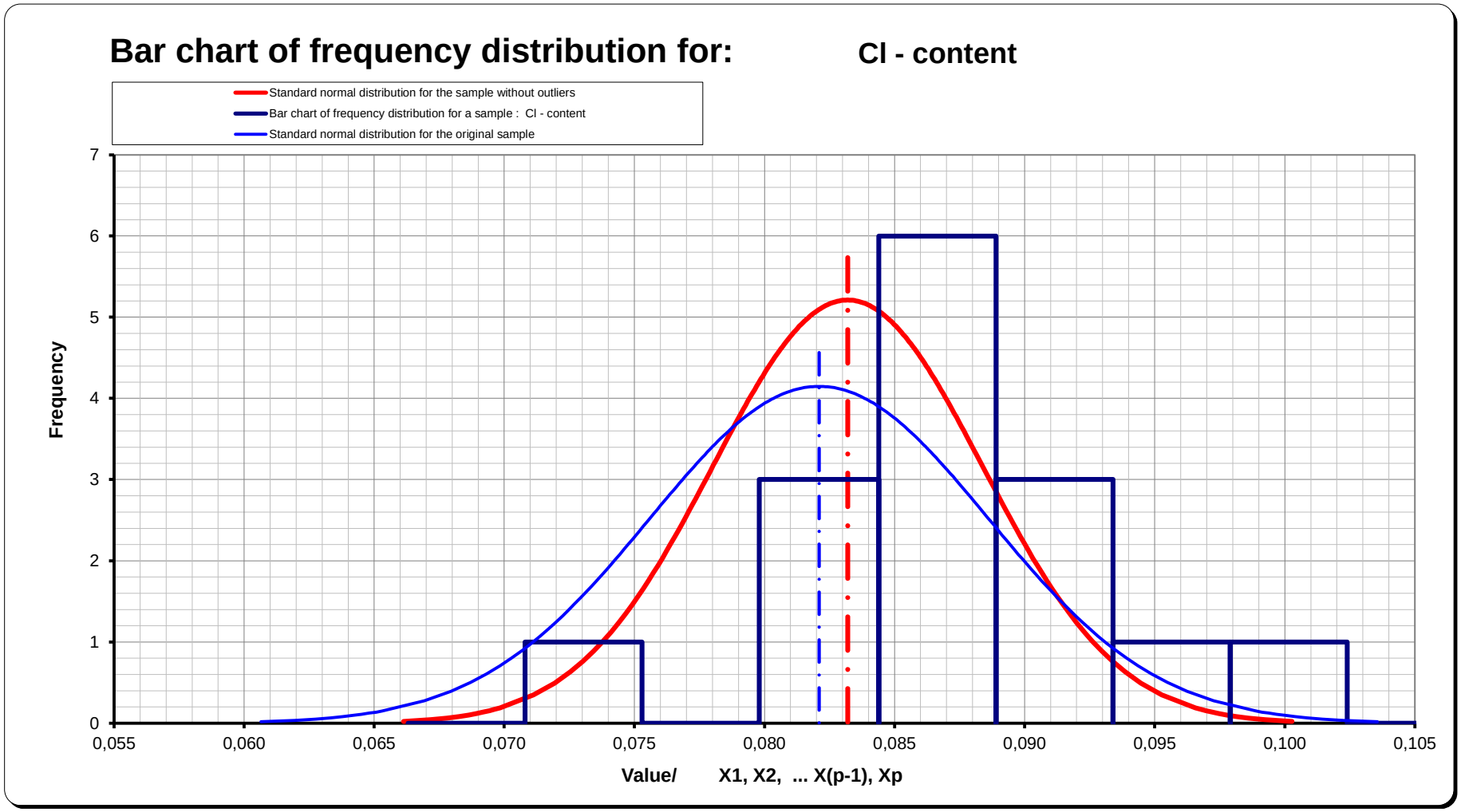
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Tests by Irwin for an afterelimination of outliers based on a level of significance of 5%** | | | |
| Irwin critical value (for P=95%) | $\lambda_{\alpha(n)}$ | 1,359 | | 1,383 | 1,441 | 1,383 | 1,411 |
| | $\lambda_{calc,1,2}$ | 1,587 | | 0,000 | 0,215 | 1,773 | 2,012 |
| | $\lambda_{calc,n,n-1}$ | 0,317 | | 0,400 | 0,429 | 0,709 | 0,402 |
| | *x1 ** * | **0** | ... | **1** | **1** | **0** | **0** |
| | *Value xp is not outlier* | **1** | ... | **1** | **1** | **1** | **1** |

## B2) Tests by Grubb for an afterelimination of outliers or biased values

| | | | | | |
|---|---|---|---|---|---|
| Grubb_i=1 | $G_1$ | 2,316 | | 3,121 | |
| Grubb_i=p | $G_p$ | 1,825 | | 2,171 | |
| Upper critical values | $G_{h,1\%}$ | 2,806 | | 2,755 | **Test for an afterelimination of one outlier based on a level of significance of 1%** |
| for the Grubb-test | | **1** | ... | **0** | ..... x1 ** is the outlier |
| according to ISO 5725-2, | | **1** | ... | **1** | ..... Value xp is not outlier |
| clause 7.3.4.1 | $G_{h,5\%}$ | 2,249 | | 2,507 | **Test for an afterelimination of one biased value based on a level of significance of 5%** |
| | | **0** | ... | **0** | ..... x1 * is the biased value |
| | | **1** | ... | **1** | ..... Value xp is not biased |
| Grubb_i=1,2 | $G_{1,2}$ | 0,547 | | 0,547 | |
| Grubb_i=p,p-1 | $G_{p,p-1}$ | 0,622 | | 0,622 | |
| Lower critical values | $G_{d,1\%}$ | 0,253 | | 0,228 | **Test for an afterelimination of two outliers based on a level of significance of 5%** |
| for the Grubb-test | | **1** | ... | **1** | ..... Values x1, x2 are not outliers |
| according to ISO 5725-2, | | **1** | ... | **1** | ..... Values xp, xp-1 are not biased values |
| clause 7.3.4.2 | $G_{d,5\%}$ | 0,337 | | 0,311 | **Test for an afterelimination of two biased values based on a level of significance of 5%** |
| | | **1** | ... | **1** | ..... Values x1, x2 are not outliers |
| | | **1** | ... | **1** | ..... Values xp, xp-1 are not biased values |

## B3) Tests by Dixon for an afterelimination of outliers or biased values

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | **Test for an afterelimination of one biased value based on a level of significance of 5%** | | | | |
| Dixon_i=1, ... $(x_2-x_1)$ | $Q_1$ | 0,370 | | 0,000 | 0,067 | 0,400 | 0,476 |
| Dixon_i=p, ...$(x_p-x_{(p-1)})$ | $Q_p$ | 0,074 | | 0,118 | 0,133 | 0,160 | 0,095 |
| Upper critical values | $Q_{v,\alpha,5\%}$ | **0,338** | | **0,349** | 0,376 | **0,349** | **0,361** |
| *x1 * is the biased value* | | **0** | ... | **1** | **1** | **0** | **0** |
| *Value xp is not biased* | | **1** | ... | **1** | **1** | **1** | **1** |


Bar chart of frequency distribution for: Cl - content
Standard normal distribution for the sample without outliers
Bar chart of frequency distribution for a sample : Cl - content
Standard normal distribution for the original sample
Frequency
0
1
2
3
4
5
6
7
0,055
0,060
0,065
0,070
0,075
0,080
0,085
0,090
0,095
0,100
0,105
Value/ X1, X2, ... X(p-1), Xp

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## A) Summary statistics for a sample :

**Loss on Ignition**

| | | X1, X2, ... X(p-1), Xp | X2, X3, ... X(p-1), Xp | X3, X4... X(p-1), Xp | X1, X2, ... X(p-2), X(p-1) | X1, X2, ... X(p-3), X(p-2) | Sample without outliers |
|---|---|---|---|---|---|---|---|
| Count (Sample size) | n | 15 | 13 | 12 | 14 | 13 | 14 |
| Minimum value | $x_{min} = x_1$ | 7,615 | 7,63 | 7,65 | 7,62 | 7,62 | 7,62 |
| Maximum value | $x_{max} = x_p$ | 8,52 | 8,52 | 8,52 | 7,97 | 7,89 | 7,97 |
| Range of sample R = | $x_{max} - x_{min}$ | 0,905 | 0,90 | 0,87 | 0,36 | 0,27 | 0,36 |
| difference $L_{m95\%} - L_{M95\%}$ ..... | $\Delta L_{95\%}$ | 0,982 | | | | | 0,466 |
| Lower confidence limitsafterelimination of outliers (for P=98%) | $L_{m98\%}$ | 7,1819 | | | | | 7,4442 |
| Lower confidence limitsafterelimination of outliers (for P=95%) | $L_{m95\%}$ | 7,2917 | | | | | 7,497 |
| Lower Irwin confidence limit (for P=95%) | $x_{minIw1-5\%}$ | 7,3244 | | | | | |
| Lower Grubbs confidence limit (for P=99%) | $x_{minG1-1\%}$ | 7,1403 | 7,1713 | | | | |
| Lower Grubbs confidence limit (for P=95%) | $x_{minG1-5\%}$ | 7,2678 | 7,2273 | | | | |
| Average (arithmetic mean) $\bar{x}$ = | $1/p\sum(x_i)$ = | 7,7827 | 7,8085 | 7,8238 | 7,7300 | 7,7115 | 7,7300 |
| Precision of a measure of the mean (for P=95%) | ± ε | 0,1312 | 0,1440 | 0,1519 | 0,1372 | 0,1440 | 0,0646 |
| Upper Grubbs confidence limit (for P=99%) | $x_{maxGp-5\%}$ | 8,2976 | | | 7,9955 | | |
| Upper Grubbs confidence limit (for P=95%) | $x_{maxGp-1\%}$ | 8,4251 | | | 8,0211 | | |
| Upper Irwin confidence limit (for P=99%) | $x_{maxIw1-5\%}$ | 8,2706 | | | | | |
| Upper confidence limitsafterelimination of outliers (for P=95%) | $L_{M95\%}$ | 8,2737 | | | | | 7,963 |
| Upper confidence limitsafterelimination of outliers (for P=98%) | $L_{M98\%}$ | 8,3835 | | | | | 8,0158 |
| Standard deviation of a sample | $s_{x,n-1}$ | 0,22893 | 0,23608 | 0,23976 | 0,10785 | 0,0862 | 0,10785 |
| Standard deviation | $s_{x,0}$ | 0,22116 | 0,22682 | 0,22956 | 0,10392 | 0,08282 | 0,10392 |
| Coefficient of variation | v | 2,9% | 3,0% | 3,1% | 1,4% | 1,1% | 1,4% |
| Standard skewness | $Sk_{est}$ | 2,668 | 2,588 | 2,556 | 0,959 | 0,707 | 0,959 |
| Standard kurtosis (exces) | $\gamma_2$ | 8,232 | 7,613 | 7,326 | 0,290 | -0,422 | 0,290 |
| t-value of the Student's distribution for P=95% | $t_{(n-1),\alpha=2,5\%}$ | 2,145 | 2,179 | 2,201 | 2,160 | 2,179 | 2,160 |
| t-value of the Student's distribution for P=98% | $t_{(n-1),\alpha=1,0\%}$ | 2,625 | 2,681 | 2,718 | 2,650 | 2,681 | 2,650 |

## B1) Tests by Irwin for an afterelimination of outliers

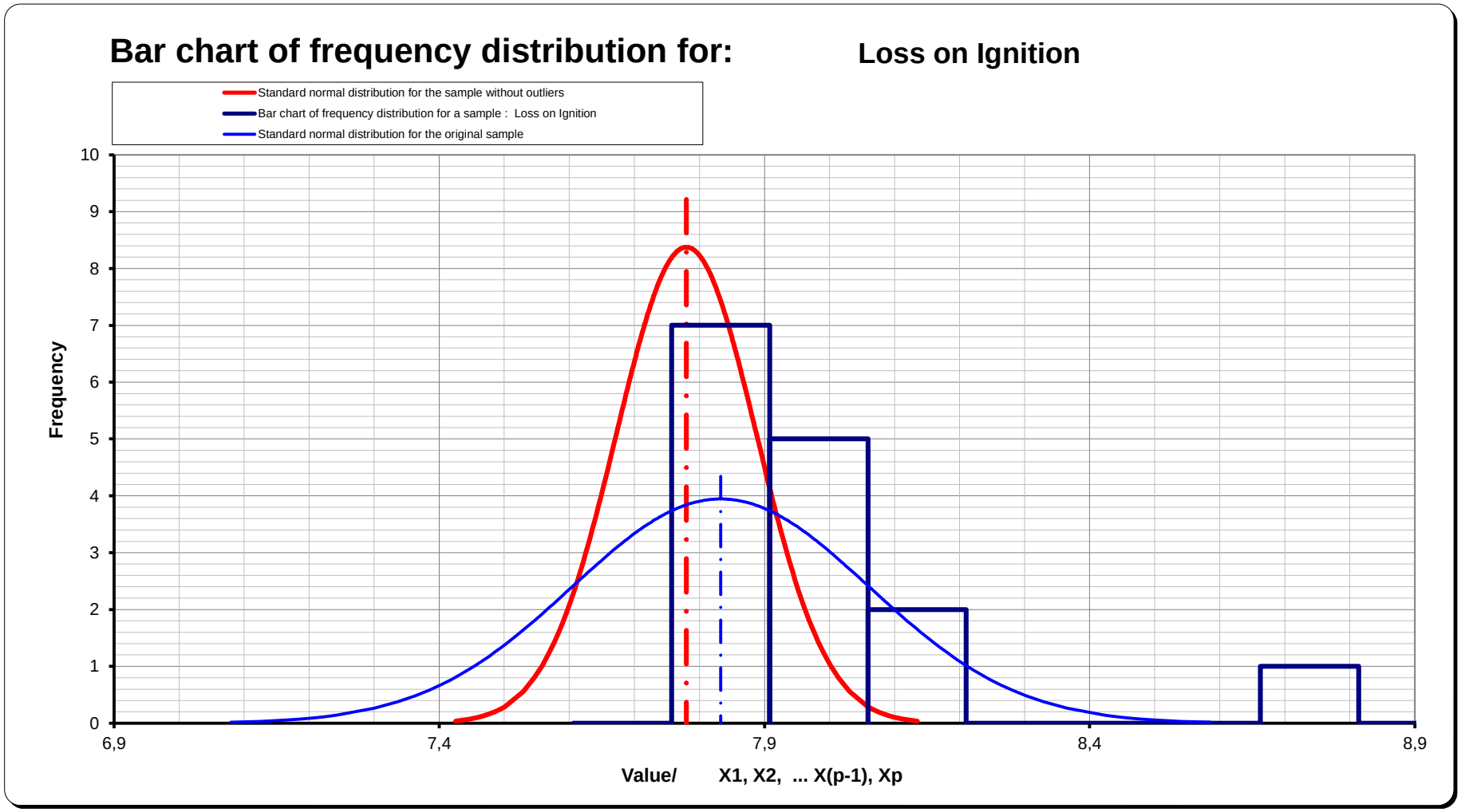
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Tests by Irwin for an afterelimination of outliers based on a level of signifiance of 5%** | | | |
| Irwin critical value (for P=95%) | $\lambda_{\alpha(n)}$ | 1,359 | | 1,411 | 1,441 | 1,383 | 1,411 |
| | $\lambda_{calc,1,2}$ | 0,000 | | 0,110 | 0,022 | 0,000 | 0,000 |
| | $\lambda_{calc,n,n-1}$ | 2,487 | | 2,425 | 2,396 | 0,818 | 0,664 |
| *Value x1 is not outlier* | | **1** | ... | **1** | **1** | **1** | **1** |
| *xp ** is an outlier* | | **0** | ... | **0** | **0** | **1** | **1** |

## B2) Tests by Grubb for an afterelimination of outliers or biased values

| | | | | | |
|---|---|---|---|---|---|
| Grubb_i=1 | $G_1$ | 0,733 | 0,820 | | |
| Grubb_i=p | $G_p$ | 3,221 | 7,325 | | |
| Upper critical values | $G_{h,1\%}$ | **2,806** | **2,699** | **Test for an afterelimination of one outlier based on a level of signifiance of 1%** | |
| for the Grubb-test | | **1** ... | **1** ..... | Value x1 is not outlier | |
| according to ISO 5725-2, | | **0** ... | **0** ..... | xp ** is the outlier | |
| clause 7.3.4.1 | $G_{h,5\%}$ | 2,249 | 2,462 | **Test for an afterelimination of one biased value based on a level of signifiance of 5%** | |
| | | **1** ... | **1** ..... | Value x1 is not biased | |
| | | **0** ... | **0** ..... | xp * is the biased value | |
| Grubb_i=1,2 | $G_{1,2}$ | 1,077 | 1,077 | | |
| Grubb_i=p,p-1 | $G_{p,p-1}$ | 0,140 | 0,140 | | |
| Lower critical values | $G_{d,1\%}$ | 0,253 | 0,202 | **Test for an afterelimination of two outliers based on a level of signifiance of 5%** | |
| for the Grubb-test | | **1** ... | **1** ..... | Values x1, x2 are not outliers | |
| according to ISO 5725-2, | | **0** ... | **0** ..... | xp *, xp-1 * are biased values | |
| clause 7.3.4.2 | $G_{d,5\%}$ | 0,337 | 0,284 | **Test for an afterelimination of two biased values based on a level of signifiance of 5%** | |
| | | **1** ... | **1** ..... | Values x1, x2 are not outliers | |
| | | **0** ... | **0** ..... | xp *, xp-1 * are biased values | |

## B3) Tests by Dixon for an afterelimination of outliers or biased values

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Test for an afterelimination of one biased value based on a level of signifiance of 5%** | | | |
| Dixon_i=1, ... $(x_2-x_1)$ | $Q_1$ | 0,000 | 0,028 | 0,006 | 0,000 | 0,000 |
| Dixon_i=p, ...$(x_p-x_{(p-1)})$ | $Q_p$ | 0,608 | 0,615 | 0,632 | 0,239 | 0,204 |
| Upper critical values | $Q_{v,\alpha,5\%}$ | **0,338** | **0,361** | **0,376** | **0,349** | **0,361** |
| *Value x1 is not biased* | | **1** ... | **1** | **1** | **1** | **1** |
| *xp * is the biased value* | | **0** ... | **0** | **0** | **1** | **1** |


Bar chart of frequency distribution for: Loss on Ignition
Standard normal distribution for the sample without outliers
Bar chart of frequency distribution for a sample : Loss on Ignition
Standard normal distribution for the original sample
Frequency
10
9
8
7
6
5
4
3
2
1
0
6,9
7,4
7,9
8,4
8,9
Value/ X1, X2, ... X(p-1), Xp

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## A) Summary statistics for a sample : Insoluble residue

| | | X1, X2, ... X(p-1), Xp | X2, X3, ... X(p-1), Xp | X3, X4... X(p-1), Xp | X1, X2, ... X(p-2), X(p-1) | X1, X2, ... X(p-3), X(p-2) | Sample without outliers |
|---|---|---|---|---|---|---|---|
| Count (Sample size) | n | 14 | 13 | 12 | 13 | 12 | 14 |
| Minimum value | $x_{min} = x_1$ | 1,47 | 1,50 | 1,52 | 1,47 | 1,47 | 1,47 |
| Maximum value | $x_{max} = x_p$ | 1,785 | 1,79 | 1,79 | 1,78 | 1,76 | 1,79 |
| Range of sample R = | $x_{max} - x_{min}$ | 0,315 | 0,29 | 0,27 | 0,31 | 0,29 | 0,32 |
| difference $L_{m95\%} - L_{M95\%}$ ..... | $\Delta L_{95\%}$ | 0,4522 | | | | | 0,4522 |
| Lower confidence limitsafterelimination of outliers (for P=98%) | $L_{m98\%}$ | 1,3672 | | | | | 1,3672 |
| Lower confidence limitsafterelimination of outliers (for P=95%) | $L_{m95\%}$ | 1,4185 | | | | | 1,4185 |
| Lower Irwin confidence limit (for P=95%) | $x_{minIw1-5\%}$ | 1,3555 | | | | | |
| Lower Grubbs confidence limit (for P=99%) | $x_{minG1-1\%}$ | 1,3563 | 1,4002 | | | | |
| Lower Grubbs confidence limit (for P=95%) | $x_{minG1-5\%}$ | 1,3822 | 1,4229 | | | | |
| Average (arithmetic mean) $\bar{x}$ = | $1/p\sum(x_i)$ = | 1,6446 | 1,6581 | 1,6717 | 1,6338 | 1,6217 | 1,6446 |
| Precision of a measure of the mean (for P=95%) | ± ε | 0,0627 | 0,0658 | 0,0694 | 0,0658 | 0,0694 | 0,0627 |
| Upper Grubbs confidence limit (for P=99%) | $x_{maxGp-5\%}$ | 1,907 | | | 1,8812 | | |
| Upper Grubbs confidence limit (for P=95%) | $x_{maxGp-1\%}$ | 1,9329 | | | 1,905 | | |
| Upper Irwin confidence limit (for P=99%) | $x_{maxIw1-5\%}$ | 1,9195 | | | | | |
| Upper confidence limitsafterelimination of outliers (for P=95%) | $L_{M95\%}$ | 1,8707 | | | | | 1,8707 |
| Upper confidence limitsafterelimination of outliers (for P=98%) | $L_{M98\%}$ | 1,9220 | | | | | 1,922 |
| Standard deviation of a sample | $s_{x,n-1}$ | 0,10465 | 0,09554 | 0,08566 | 0,10048 | 0,0944 | 0,10465 |
| Standard deviation | $s_{x,0}$ | 0,10084 | 0,09179 | 0,08201 | 0,09654 | 0,09038 | 0,10084 |
| Coefficient of variation | v | 6,4% | 5,8% | 5,1% | 6,2% | 5,8% | 6,4% |
| Standard skewness | $Sk_{est}$ | -0,323 | -0,366 | -0,386 | -0,286 | -0,320 | -0,323 |
| Standard kurtosis (exces) | $\gamma_2$ | -1,067 | -0,875 | -0,616 | -1,061 | -1,146 | -1,067 |
| t-value of the Student's distribution for P=95% | $t_{(n-1),\alpha=2,5\%}$ | 2,160 | 2,179 | 2,201 | 2,179 | 2,201 | 2,160 |
| t-value of the Student's distribution for P=98% | $t_{(n-1),\alpha=1,0\%}$ | 2,650 | 2,681 | 2,718 | 2,681 | 2,718 | 2,650 |

## B1) Tests by Irwin for an afterelimination of outliers

**Tests by Irwin for an afterelimination of outliers based on a level of signifiance of 5%**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Irwin critical value (for P=95%) | $\lambda_{\alpha(n)}$ | 1,383 | 1,411 | 1,441 | 1,411 | 1,441 |
| | $\lambda_{calc,1,2}$ | 0,248 | 0,272 | 0,305 | 0,259 | 0,277 |
| | $\lambda_{calc,n,n-1}$ | 0,050 | 0,054 | 0,061 | 0,207 | 0,498 |
| *Value x1 is not outlier* | | **1** ... | **1** | **1** | **1** | **1** |
| *Value xp is not outlier* | | **1** ... | **1** | **1** | **1** | **1** |

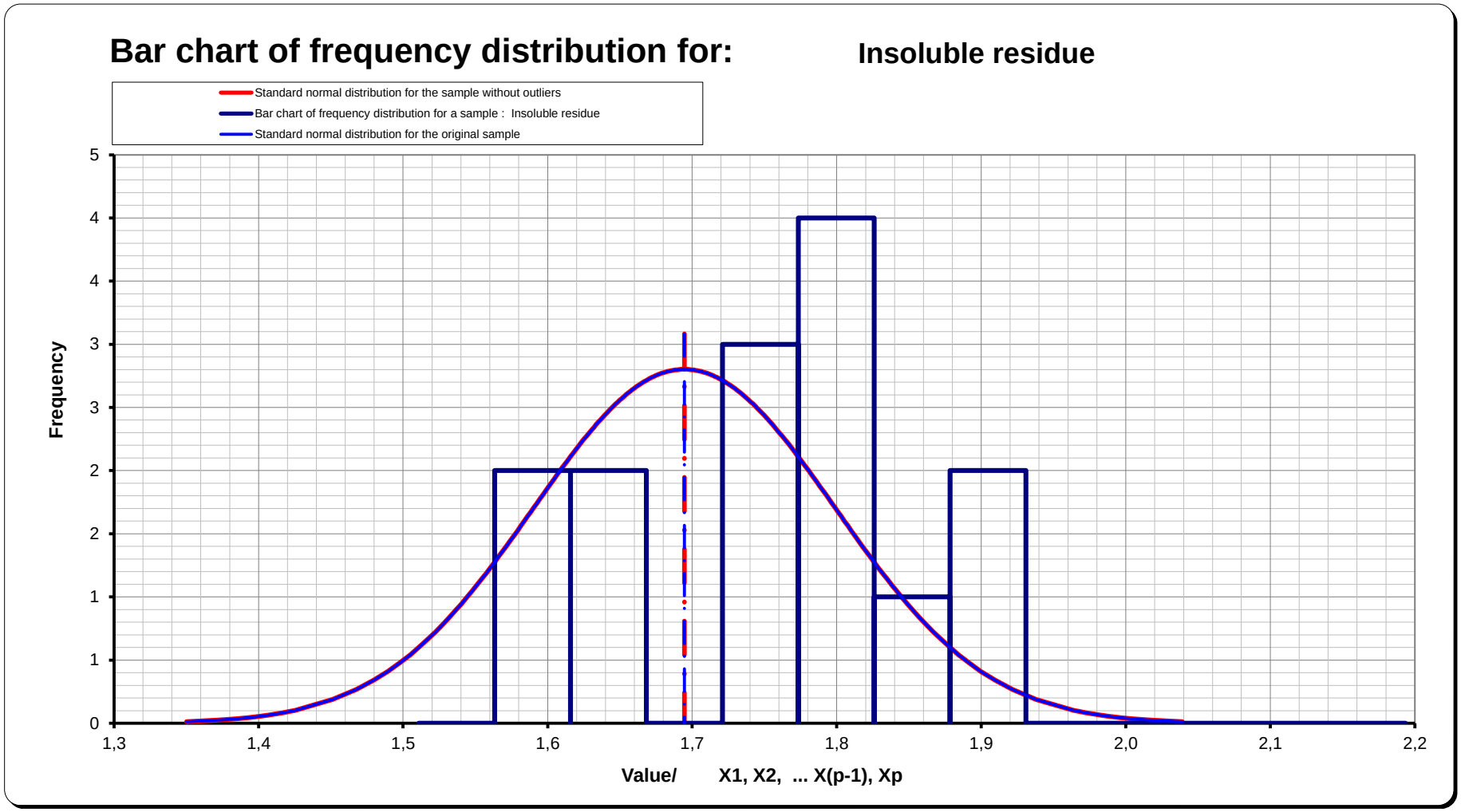
## B2) Tests by Grubb for an afterelimination of outliers or biased values

| | | | | |
|---|---|---|---|---|
| Grubb_i=1 | $G_1$ | 1,668 | 1,969 | |
| Grubb_i=p | $G_p$ | 1,342 | 1,505 | |
| Upper critical values | $G_{h,1\%}$ | 2,755 | 2,699 | **Test for an afterelimination of one outlier based on a level of signifiance of 1%** |
| for the Grubb-test | | **1** ... | **1** ..... | Value x1 is not outlier |
| according to ISO 5725-2, | | **1** ... | **1** ..... | Value xp is not outlier |
| clause 7.3.4.1 | $G_{h,5\%}$ | 2,507 | 2,462 | **Test for an afterelimination of one biased value based on a level of signifiance of 5%** |
| | | **1** ... | **1** ..... | Value x1 is not biased |
| | | **1** ... | **1** ..... | Value xp is not biased |
| Grubb_i=1,2 | $G_{1,2}$ | 0,661 | 0,661 | |
| Grubb_i=p,p-1 | $G_{p,p-1}$ | 0,803 | 0,803 | |
| Lower critical values | $G_{d,1\%}$ | 0,228 | 0,202 | **Test for an afterelimination of two outliers based on a level of signifiance of 5%** |
| for the Grubb-test | | **1** ... | **1** ..... | Values x1, x2 are not outliers |
| according to ISO 5725-2, | | **1** ... | **1** ..... | Values xp, xp-1 are not biased values |
| clause 7.3.4.2 | $G_{d,5\%}$ | 0,311 | 0,284 | **Test for an afterelimination of two biased values based on a level of signifiance of 5%** |
| | | **1** ... | **1** ..... | Values x1, x2 are not outliers |
| | | **1** ... | **1** ..... | Values xp, xp-1 are not biased values |

## B3) Tests by Dixon for an afterelimination of outliers or biased values

**Test for an afterelimination of one biased value based on a level of signifiance of 5%**

| | | | | | | |
|---|---|---|---|---|---|---|
| Dixon_i=1, ... $(x_2-x_1)$ | $Q_1$ | 0,079 | 0,086 | 0,094 | 0,081 | 0,086 |
| Dixon_i=p, ...$(x_p-x_{(p-1)})$ | $Q_p$ | 0,016 | 0,017 | 0,019 | 0,065 | 0,155 |
| Upper critical values | $Q_{v,\alpha,5\%}$ | 0,349 | 0,361 | 0,376 | 0,361 | 0,376 |
| *Value x1 is not biased* | | **1** ... | **1** | **1** | **1** | **1** |
| *Value xp is not biased* | | **1** ... | **1** | **1** | **1** | **1** |


Bar chart of frequency distribution for: Insoluble residue
Standard normal distribution for the sample without outliers
Bar chart of frequency distribution for a sample : Insoluble residue
Standard normal distribution for the original sample
Frequency
0
1
1
2
2
3
3
4
4
5
1,3
1,4
1,5
1,6
1,7
1,8
1,9
2,0
2,1
2,2
Value/ X1, X2, ... X(p-1), Xp

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## A) Summary statistics for a sample : Natriumoxid-content

| | | X1, X2, ... X(p-1), Xp | X2, X3, ... X(p-1), Xp | X3, X4... X(p-1), Xp | X1, X2, ... X(p-2), X(p-1) | X1, X2, ... X(p-3), X(p-2) | Sample without outliers |
|---|---|---|---|---|---|---|---|
| Count (Sample size) | n | 13 | 12 | 11 | 12 | 11 | 11 |
| Minimum value | $x_{min} = x_1$ | 0,21 | 0,22 | 0,23 | 0,21 | 0,21 | 0,21 |
| Maximum value | $x_{max} = x_p$ | 0,72 | 0,72 | 0,72 | 0,46 | 0,32 | 0,32 |
| Range of sample R = | $x_{max} - x_{min}$ | 0,51 | 0,51 | 0,49 | 0,25 | 0,11 | 0,11 |
| difference $L_{m95\%} - L_{M95\%}$ ..... | $\Delta L_{95\%}$ | 0,5996 | | | | | 0,1608 |
| Lower confidence limitsafterelimination of outliers (for P=98%) | $L_{m98\%}$ | -0,0566 | | | | | 0,1625 |
| Lower confidence limitsafterelimination of outliers (for P=95%) | $L_{m95\%}$ | 0,0125 | | | | | 0,1819 |
| Lower Irwin confidence limit (for P=95%) | $x_{minIw1-5\%}$ | 0,0285 | | | | | |
| Lower Grubbs confidence limit (for P=99%) | $x_{minG1-1\%}$ | -0,059 | -0,0484 | | | | |
| Lower Grubbs confidence limit (for P=95%) | $x_{minG1-5\%}$ | -0,0264 | -0,017 | | | | |
| Average (arithmetic mean) $\bar{x}$ = | $1/p\sum(x_i)$ = | 0,3123 | 0,3208 | 0,3305 | 0,2783 | 0,2623 | 0,2623 |
| Precision of a measure of the mean (for P=95%) | ± ε | 0,0865 | 0,0913 | 0,0969 | 0,0913 | 0,0969 | 0,0254 |
| Upper Grubbs confidence limit (for P=99%) | $x_{maxGp-5\%}$ | 0,651 | | | 0,4361 | | |
| Upper Grubbs confidence limit (for P=95%) | $x_{maxGp-1\%}$ | 0,6836 | | | 0,4507 | | |
| Upper Irwin confidence limit (for P=99%) | $x_{maxIw1-5\%}$ | 0,6415 | | | | | |
| Upper confidence limitsafterelimination of outliers (for P=95%) | $L_{M95\%}$ | 0,6121 | | | | | 0,3427 |
| Upper confidence limitsafterelimination of outliers (for P=98%) | $L_{M98\%}$ | 0,6812 | | | | | 0,3621 |
| Standard deviation of a sample | $s_{x,n-1}$ | 0,13758 | 0,14007 | 0,14268 | 0,06542 | 0,0361 | 0,0361 |
| Standard deviation | $s_{x,0}$ | 0,13218 | 0,1341 | 0,13604 | 0,06264 | 0,03442 | 0,03442 |
| Coefficient of variation | v | 44,1% | 43,7% | 43,2% | 23,5% | 13,8% | 13,8% |
| Standard skewness | $Sk_{est}$ | 2,546 | 2,495 | 2,447 | 1,877 | -0,058 | -0,058 |
| Standard kurtosis (exces) | $\gamma_2$ | 6,978 | 6,608 | 6,235 | 4,783 | -1,106 | -1,106 |
| t-value of the Student's distribution for P=95% | $t_{(n-1),\alpha=2,5\%}$ | 2,179 | 2,201 | 2,228 | 2,201 | 2,228 | 2,228 |
| t-value of the Student's distribution for P=98% | $t_{(n-1),\alpha=1,0\%}$ | 2,681 | 2,718 | 2,764 | 2,718 | 2,764 | 2,764 |

## B1) Tests by Irwin for an afterelimination of outliers

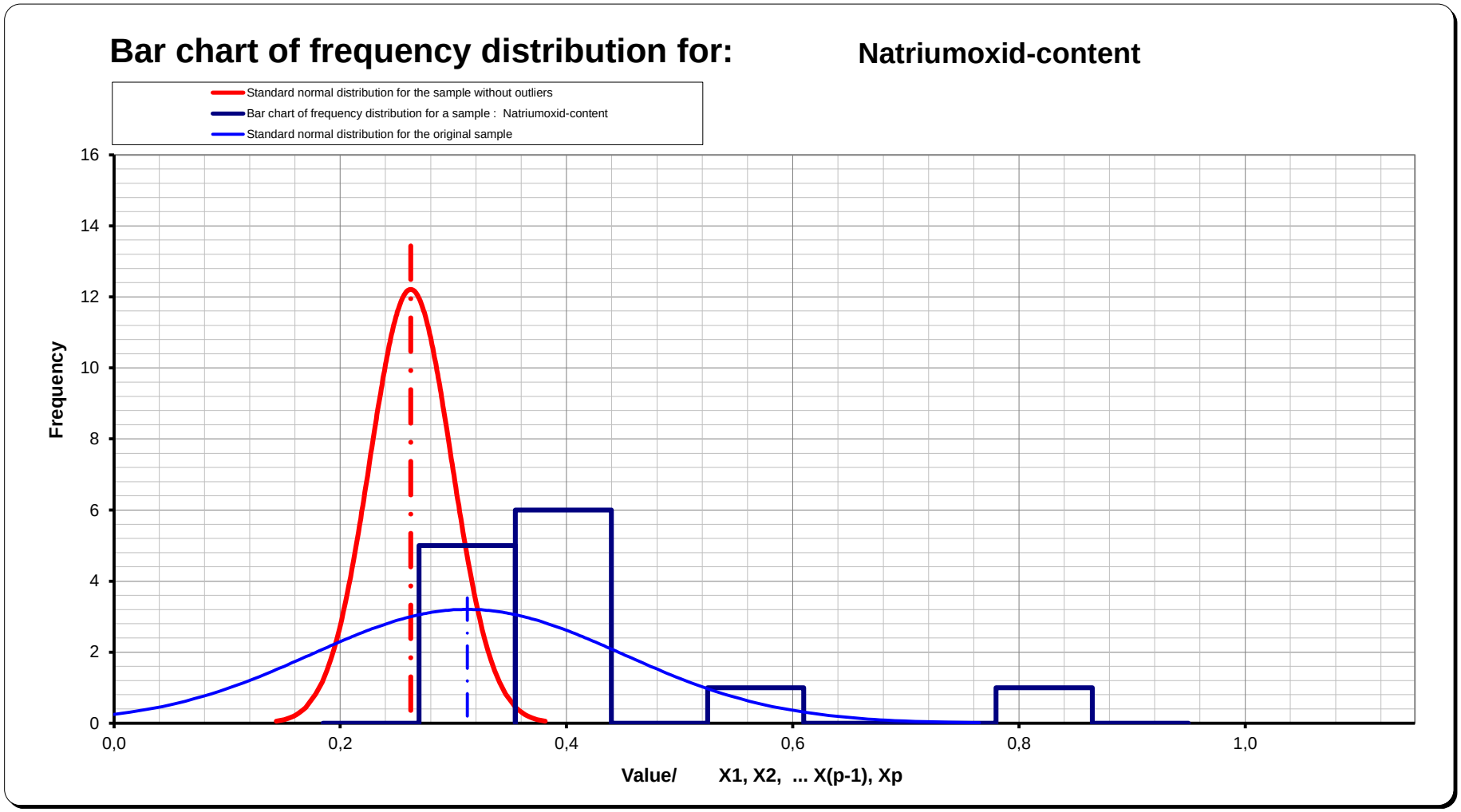
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Tests by Irwin for an afterelimination of outliers based on a level of signifiance of 5%** | | | |
| Irwin critical value (for P=95%) | $\lambda_{\alpha(n)}$ | 1,411 | | 1,441 | 1,477 | 1,441 | 1,477 |
| | $\lambda_{calc,1,2}$ | 0,038 | | 0,082 | 0,132 | 0,080 | 0,145 |
| | $\lambda_{calc,n,n-1}$ | 2,005 | | 1,976 | 1,948 | 2,155 | 0,581 |
| *Value x1 is not outlier* | | **1** | ... | **1** | **1** | **1** | **1** |
| *xp ** is an outlier* | | **0** | ... | **0** | **0** | **0** | **1** |

## B2) Tests by Grubb for an afterelimination of outliers or biased values

| | | | | | |
|---|---|---|---|---|---|
| Grubb_i=1 | $G_1$ | 0,744 | | 0,791 | |
| Grubb_i=p | $G_p$ | 2,963 | | 6,752 | |
| Upper critical values | $G_{h,1\%}$ | **2,699** | | **2,636** | **Test for an afterelimination of one outlier based on a level of signifiance of 1%** |
| for the Grubb-test | | **1** | ... | **1** ..... | Value x1 is not outlier |
| according to ISO 5725-2, | | **0** | ... | **0** ..... | xp ** is the outlier |
| clause 7.3.4.1 | $G_{h,5\%}$ | 2,462 | | 2,412 | **Test for an afterelimination of one biased value based on a level of signifiance of 5%** |
| | | **1** | ... | **1** ..... | Value x1 is not biased |
| | | **0** | ... | **0** ..... | xp * is the biased value |
| Grubb_i=1,2 | $G_{1,2}$ | 1,059 | | 1,059 | |
| Grubb_i=p,p-1 | $G_{p,p-1}$ | 0,068 | | 0,068 | |
| Lower critical values | $G_{d,1\%}$ | 0,202 | | 0,174 | **Test for an afterelimination of two outliers based on a level of signifiance of 5%** |
| for the Grubb-test | | **1** | ... | **1** ..... | Values x1, x2 are not outliers |
| according to ISO 5725-2, | | **0** | ... | **0** ..... | xp *, xp-1 * are biased values |
| clause 7.3.4.2 | $G_{d,5\%}$ | 0,284 | | 0,254 | **Test for an afterelimination of two biased values based on a level of signifiance of 5%** |
| | | **1** | ... | **1** ..... | Values x1, x2 are not outliers |
| | | **0** | ... | **0** ..... | xp *, xp-1 * are biased values |

## B3) Tests by Dixon for an afterelimination of outliers or biased values

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Test for an afterelimination of one biased value based on a level of signifiance of 5%** | | | |
| Dixon_i=1, ... $(x_2-x_1)$ | $Q_1$ | 0,010 | | 0,022 | 0,036 | 0,020 | 0,045 |
| Dixon_i=p, ...$(x_p-x_{(p-1)})$ | $Q_p$ | 0,520 | | 0,525 | 0,536 | 0,551 | 0,182 |
| Upper critical values | $Q_{v,\alpha,5\%}$ | **0,361** | | **0,376** | **0,392** | **0,376** | **0,392** |
| *Value x1 is not biased* | | **1** | ... | **1** | **1** | **1** | **1** |
| *xp * is the biased value* | | **0** | ... | **0** | **0** | **0** | **1** |


Bar chart of frequency distribution for: Natriumoxid-content
Standard normal distribution for the sample without outliers
Bar chart of frequency distribution for a sample : Natriumoxid-content
Standard normal distribution for the original sample
Frequency
16
14
12
10
8
6
4
2
0
0,0
0,2
0,4
0,6
0,8
1,0
Value/ X1, X2, ... X(p-1), Xp

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967/3 Studená Str., Bratislava 821 04, Slovak Republic

## A) Summary statistics for a sample : Potassiumoxid-content

| | | X1, X2, ... X(p-1), Xp | X2, X3, ... X(p-1), Xp | X3, X4... X(p-1), Xp | X1, X2, ... X(p-2), X(p-1) | X1, X2, ... X(p-3), X(p-2) | Sample without outliers |
|---|---|---|---|---|---|---|---|
| Count (Sample size) | n | 13 | 12 | 11 | 12 | 11 | 11 |
| Minimum value | $x_{min} = x_1$ | 0,22 | 0,59 | 0,67 | 0,22 | 0,22 | 0,67 |
| Maximum value | $x_{max} = x_p$ | 0,765 | 0,77 | 0,77 | 0,75 | 0,75 | 0,77 |
| Range of sample R = | $x_{max} - x_{min}$ | 0,545 | 0,18 | 0,10 | 0,53 | 0,53 | 0,10 |
| difference $L_{m95\%} - L_{M95\%}$ ..... | $\Delta L_{95\%}$ | 0,63 | | | | | 0,1358 |
| Lower confidence limitsafterelimination of outliers (for P=98%) | $L_{m98\%}$ | 0,2872 | | | | | 0,6399 |
| Lower confidence limitsafterelimination of outliers (for P=95%) | $L_{m95\%}$ | 0,3598 | | | | | 0,6563 |
| Lower Irwin confidence limit (for P=95%) | xminIw1-5% | 0,3901 | | | | | |
| Lower Grubbs confidence limit (for P=99%) | xminG1-1% | 0,2846 | 0,5826 | | | | |
| Lower Grubbs confidence limit (for P=95%) | xminG1-5% | 0,3188 | 0,5936 | | | | |
| Average (arithmetic mean) $\bar{x}$ = | $1/p\sum(x_i)$ = | 0,6748 | 0,7127 | 0,7242 | 0,6673 | 0,6596 | 0,7242 |
| Precision of a measure of the mean (for P=95%) | ± ε | 0,0909 | 0,0959 | 0,1019 | 0,0959 | 0,1019 | 0,0215 |
| Upper Grubbs confidence limit (for P=99%) | xmaxGp-5% | 1,0308 | | | 1,0251 | | |
| Upper Grubbs confidence limit (for P=95%) | xmaxGp-1% | 1,065 | | | 1,0583 | | |
| Upper Irwin confidence limit (for P=99%) | xmaxIw1-5% | 0,9469 | | | | | |
| Upper confidence limitsafterelimination of outliers (for P=95%) | $L_{M95\%}$ | 0,9898 | | | | | 0,7921 |
| Upper confidence limitsafterelimination of outliers (for P=98%) | $L_{M98\%}$ | 1,0624 | | | | | 0,8085 |
| Standard deviation of a sample | $s_{x,n-1}$ | 0,14458 | 0,04936 | 0,03049 | 0,14833 | 0,15309 | 0,03049 |
| Standard deviation | $s_{x,0}$ | 0,13891 | 0,04726 | 0,02907 | 0,14202 | 0,14597 | 0,02907 |
| Coefficient of variation | v | 21,4% | 6,9% | 4,2% | 22,2% | 23,2% | 4,2% |
| Standard skewness | $Sk_{est}$ | -3,006 | -1,708 | -0,810 | -2,925 | -2,818 | -0,810 |
| Standard kurtosis (exces) | $\gamma_2$ | 9,647 | 3,301 | 0,048 | 9,064 | 8,378 | 0,048 |
| t-value of the Student's distribution for P=95% | $t_{(n-1),\alpha=2,5\%}$ | 2,179 | 2,201 | 2,228 | 2,201 | 2,228 | 2,228 |
| t-value of the Student's distribution for P=98% | $t_{(n-1),\alpha=1,0\%}$ | 2,681 | 2,718 | 2,764 | 2,718 | 2,764 | 2,764 |

## B1) Tests by Irwin for an afterelimination of outliers

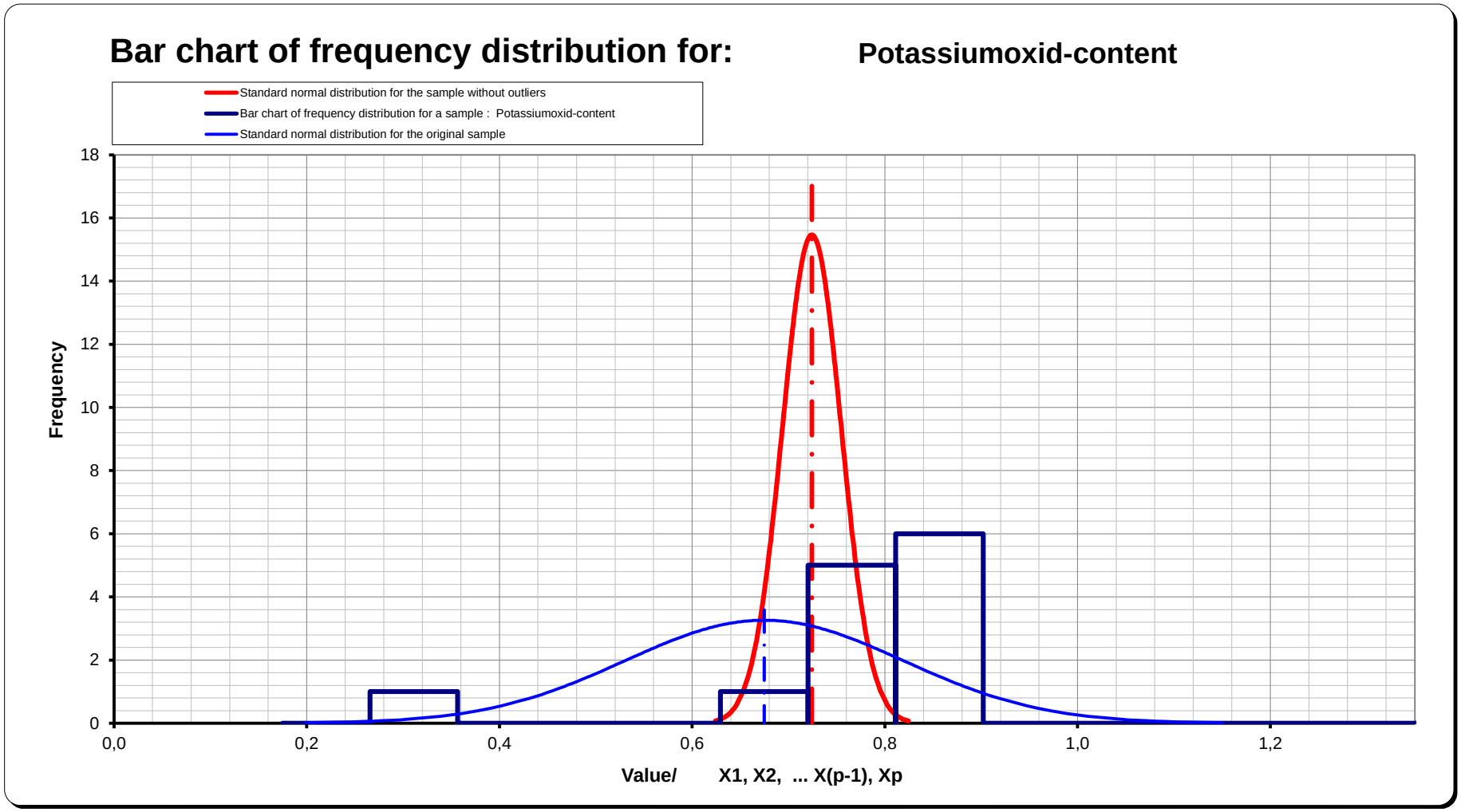
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Tests by Irwin for an afterelimination of outliers based on a level of signifiance of 5%** | | | | |
| Irwin critical value (for P=95%) | $\lambda_{\alpha(n)}$ | 1,411 | 1,441 | 1,477 | 1,441 | 1,477 |
| | $\lambda_{calc,1,2}$ | 2,635 | 1,672 | 0,516 | 2,577 | 2,507 |
| | $\lambda_{calc,n,n-1}$ | 0,101 | 0,296 | 0,482 | 0,042 | 0,000 |
| *x1 ** * | | **0** ... | **0** | **1** | **0** | **0** |
| *Value xp is not outlier* | | **1** ... | **1** | **1** | **1** | **1** |

## B2) Tests by Grubb for an afterelimination of outliers or biased values

| | | | | |
|---|---|---|---|---|
| Grubb_i=1 | $G_1$ | 3,146 | 9,982 | |
| Grubb_i=p | $G_p$ | 0,624 | 0,659 | |
| Upper critical values | $G_{h,1\%}$ | **2,699** | **2,636** | **Test for an afterelimination of one outlier based on a level of signifiance of 1%** |
| for the Grubb-test | | **0** ... | **0** ..... | x1 ** is the outlier |
| according to ISO 5725-2, | | **1** ... | **1** ..... | Value xp is not outlier |
| clause 7.3.4.1 | $G_{h,5\%}$ | 2,462 | 2,412 | **Test for an afterelimination of one biased value based on a level of signifiance of 5%** |
| | | **0** ... | **0** ..... | x1 * is the biased value |
| | | **1** ... | **1** ..... | Value xp is not biased |
| Grubb_i=1,2 | $G_{1,2}$ | 0,044 | 0,044 | |
| Grubb_i=p,p-1 | $G_{p,p-1}$ | 1,104 | 1,104 | |
| Lower critical values | $G_{d,1\%}$ | 0,202 | 0,174 | **Test for an afterelimination of two outliers based on a level of signifiance of 5%** |
| for the Grubb-test | | **0** ... | **0** ..... | x1 **, x2 ** are outliers |
| according to ISO 5725-2, | | **1** ... | **1** ..... | Values xp, xp-1 are not biased values |
| clause 7.3.4.2 | $G_{d,5\%}$ | 0,284 | 0,254 | **Test for an afterelimination of two biased values based on a level of signifiance of 5%** |
| | | **0** ... | **0** ..... | x1 *, x2 * are outliers |
| | | **1** ... | **1** ..... | Values xp, xp-1 are not biased values |

## B3) Tests by Dixon for an afterelimination of outliers or biased values

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Test for an afterelimination of one biased value based on a level of signifiance of 5%** | | | | |
| Dixon_i=1, ... $(x_2-x_1)$ | $Q_1$ | 0,672 | 0,441 | 0,150 | 0,689 | 0,697 |
| Dixon_i=p, ...$(x_p-x_{(p-1)})$ | $Q_p$ | 0,026 | 0,078 | 0,140 | 0,011 | 0,000 |
| Upper critical values | $Q_{v,\alpha,5\%}$ | **0,361** | **0,376** | **0,392** | **0,376** | **0,392** |
| *x1 * is the biased value* | | **0** ... | **0** | **1** | **0** | **0** |
| *Value xp is not biased* | | **1** ... | **1** | **1** | **1** | **1** |


Bar chart of frequency distribution for:
Potassiumoxid-content
Standard normal distribution for the sample without outliers
Bar chart of frequency distribution for a sample : Potassiumoxid-content
Standard normal distribution for the original sample
Frequency
18
16
14
12
10
8
6
4
2
0
0,0
0,2
0,4
0,6
0,8
1,0
1,2
Value/ X1, X2, ... X(p-1), Xp

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## A) Summary statistics for a sample :

**Slag-content - microscopically**

| | | X1, X2, ... X(p-1), Xp | X2, X3, ... X(p-1), Xp | X3, X4... X(p-1), Xp | X1, X2, ... X(p-2), X(p-1) | X1, X2, ... X(p-3), X(p-2) | Sample without outliers |
|---|---|---|---|---|---|---|---|
| Count (Sample size) | n | 5 | 4 | 3 | 4 | 3 | 3 |
| Minimum value | $x_{min} = x_1$ | 11,65 | 15,55 | 17,65 | 11,65 | 11,65 | 15,55 |
| Maximum value | $x_{max} = x_p$ | 23,5 | 23,50 | 23,50 | 22,35 | 17,65 | 22,35 |
| Range of sample R = | $x_{max} - x_{min}$ | 11,85 | 7,95 | 5,85 | 10,70 | 6,00 | 6,80 |
| difference $L_{m95\%} - L_{M95\%}$ ..... | $\Delta L_{95\%}$ | 27,136 | | | | | #HODNOTA! |
| Lower confidence limitsafterelimination of outliers (for P=98%) | $L_{m98\%}$ | -0,170 | | | | | #HODNOTA! |
| Lower confidence limitsafterelimination of outliers (for P=95%) | $L_{m95\%}$ | 4,572 | | | | | #HODNOTA! |
| Lower Irwin confidence limit (for P=95%) | $x_{minIw1-5\%}$ | 7,238 | | | | | |
| Lower Grubbs confidence limit (for P=99%) | $x_{minG1-1\%}$ | 9,52 | 14,108 | | | | |
| Lower Grubbs confidence limit (for P=95%) | $x_{minG1-5\%}$ | 9,759 | 14,164 | | | | |
| Average (arithmetic mean) $\overline{x}$ = | $1/p\sum(x_i)$ = | 18,140 | 19,763 | 21,167 | 16,800 | 14,950 | 18,517 |
| Precision of a measure of the mean (for P=95%) | ± ε | 6,784 | 8,979 | #HODNOTA! | 8,979 | #HODNOTA! | #HODNOTA! |
| Upper Grubbs confidence limit (for P=99%) | $x_{maxGp-5\%}$ | 26,521 | | | 23,402 | | |
| Upper Grubbs confidence limit (for P=95%) | $x_{maxGp-1\%}$ | 26,760 | | | 23,469 | | |
| Upper Irwin confidence limit (for P=99%) | $x_{maxIw1-5\%}$ | 30,662 | | | | | |
| Upper confidence limitsafterelimination of outliers (for P=95%) | $L_{M95\%}$ | 31,708 | | | | | #HODNOTA! |
| Upper confidence limitsafterelimination of outliers (for P=98%) | $L_{M98\%}$ | 36,450 | | | | | #HODNOTA! |
| Standard deviation of a sample | $s_{x,n-1}$ | 4,8868 | 3,7803 | 3,0993 | 4,4576 | 3,0447 | 3,4819 |
| Standard deviation | $s_{x,0}$ | 4,3709 | 3,2738 | 2,5306 | 3,8604 | 2,486 | 2,8429 |
| Coefficient of variation | v | 26,9% | 19,1% | 14,6% | 26,5% | 20,4% | 18,8% |
| Standard skewness | $Sk_{est}$ | -0,222 | -0,181 | 0,000 | 0,249 | -0,852 | 0,000 |
| Standard kurtosis (exces) | $\gamma_2$ | -1,515 | 0,000 | 0,000 | 0,000 | #DELENIENULOU! | 0,000 |
| t-value of the Student's distribution for P=95% | $t_{(n-1),\alpha=2,5\%}$ | 2,776 | 3,183 | #HODNOTA! | 3,183 | #HODNOTA! | #HODNOTA! |
| t-value of the Student's distribution for P=98% | $t_{(n-1),\alpha=1,0\%}$ | 3,747 | 4,541 | #HODNOTA! | 4,541 | #HODNOTA! | #HODNOTA! |

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## B1) Tests by Irwin for an afterelimination of outliers

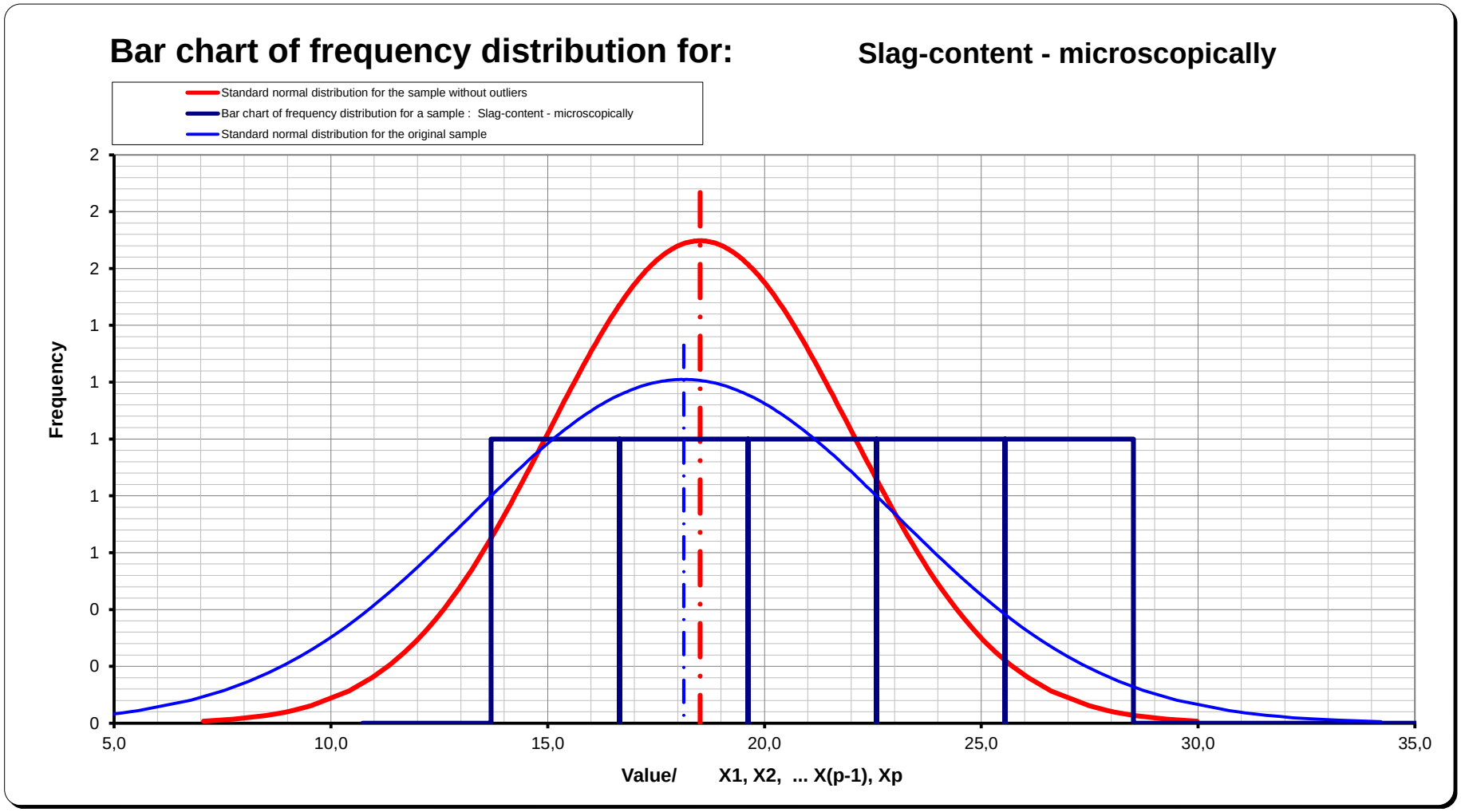
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Tests by Irwin for an afterelimination of outliers based on a level of signifiance of 5%** | | | | |
| Irwin critical value (for P=95%) | $\lambda_{\alpha(n)}$ | 1,902 | 2,064 | 2,307 | 2,064 | 2,307 |
| | $\lambda_{calc,1,2}$ | 0,892 | 0,641 | 1,857 | 1,010 | 1,569 |
| | $\lambda_{calc,n,n-1}$ | 0,263 | 0,351 | 0,454 | 1,217 | 0,845 |
| *Value x1 is not outlier* | | **1** ... | **1** | **1** | **1** | **1** |
| *Value xp is not outlier* | | **1** ... | **1** | **1** | **1** | **1** |

## B2) Tests by Grubb for an afterelimination of outliers or biased values

| | | | | |
|---|---|---|---|---|
| Grubb_i=1 | $G_1$ | 1,328 | 2,146 | |
| Grubb_i=p | $G_p$ | 1,097 | 1,503 | |
| Upper critical values | $G_{h,1\%}$ | 1,764 | 1,496 | **Test for an afterelimination of one outlier based on a level of signifiance of 1%** |
| for the Grubb-test | | **1** ... | **0** ..... | x1 ** is the outlier |
| according to ISO 5725-2, | | **1** ... | **0** ..... | xp ** is the outlier |
| clause 7.3.4.1 | $G_{h,5\%}$ | 1,715 | 1,481 | **Test for an afterelimination of one biased value based on a level of signifiance of 5%** |
| | | **1** ... | **0** ..... | x1 * is the biased value |
| | | **1** ... | **0** ..... | xp * is the biased value |
| Grubb_i=1,2 | $G_{1,2}$ | 0,335 | 0,335 | |
| Grubb_i=p,p-1 | $G_{p,p-1}$ | 0,324 | 0,324 | |
| Lower critical values | $G_{d,1\%}$ | 0,002 | 0,000 | **Test for an afterelimination of two outliers based on a level of signifiance of 5%** |
| for the Grubb-test | | **1** ... | **1** ..... | Values x1, x2 are not outliers |
| according to ISO 5725-2, | | **1** ... | **1** ..... | Values xp, xp-1 are not biased values |
| clause 7.3.4.2 | $G_{d,5\%}$ | 0,009 | 0,000 | **Test for an afterelimination of two biased values based on a level of signifiance of 5%** |
| | | **1** ... | **1** ..... | Values x1, x2 are not outliers |
| | | **1** ... | **1** ..... | Values xp, xp-1 are not biased values |

## B3) Tests by Dixon for an afterelimination of outliers or biased values

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Test for an afterelimination of one biased value based on a level of signifiance of 5%** | | | | |
| Dixon_i=1, ... $(x_2-x_1)$ | $Q_1$ | 0,329 | 0,264 | 0,803 | 0,364 | 0,650 |
| Dixon_i=p, ...$(x_p-x_{(p-1)})$ | $Q_p$ | 0,097 | 0,145 | 0,197 | 0,439 | 0,350 |
| Upper critical values | $Q_{v,\alpha,5\%}$ | 0,642 | 0,765 | 0,941 | 0,765 | 0,941 |
| *Value x1 is not biased* | | **1** ... | **1** | **1** | **1** | **1** |
| *Value xp is not biased* | | **1** ... | **1** | **1** | **1** | **1** |


Bar chart of frequency distribution for: Slag-content - microscopically
Standard normal distribution for the sample without outliers
Bar chart of frequency distribution for a sample : Slag-content - microscopically
Standard normal distribution for the original sample
Frequency
2
2
2
1
1
1
1
1
0
0
0
5,0
10,0
15,0
20,0
25,0
30,0
35,0
Value/ X1, X2, ... X(p-1), Xp