TSÚS, Building Testing and Research Institute, Notified body 1301
967/3 Studená Str., Bratislava 821 04, Slovak Republic

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)	γ_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

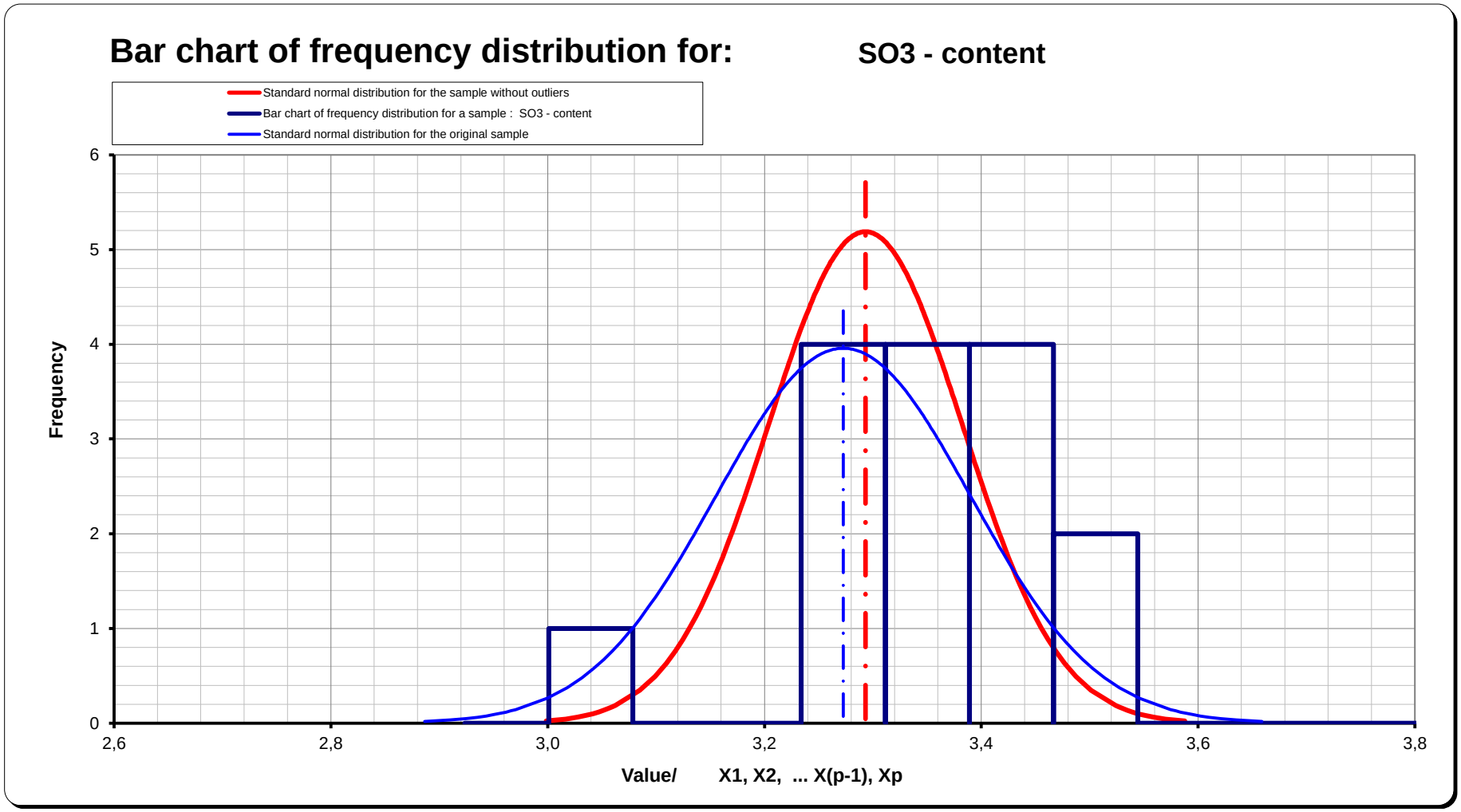
				Tests by Irwin for an afterelimination of outliers based on a level of significance of 5%			
Irwin critical value (for P=95%)	$\lambda_{\alpha(n)}$	1,359		1,383	1,411	1,383	1,411
	$\lambda_{calc,1,2}$	1,632		0,116	0,487	1,735	1,893
	$\lambda_{calc,n,n-1}$	0,088		0,116	0,122	0,750	0,051
	*x1 ** *	**0**	...	**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)	γ_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

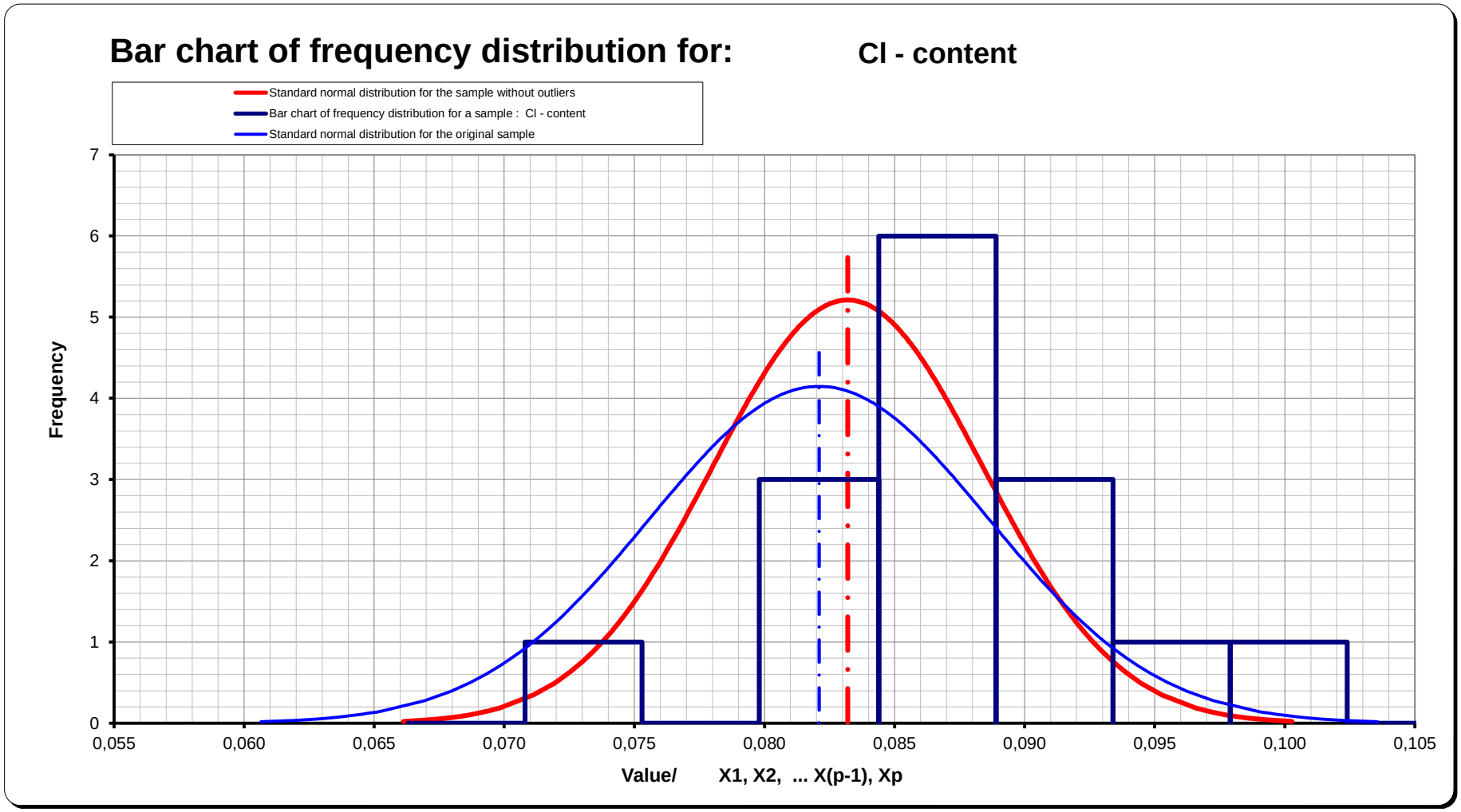
				Tests by Irwin for an afterelimination of outliers based on a level of significance of 5%			
Irwin critical value (for P=95%)	$\lambda_{\alpha(n)}$	1,359		1,383	1,441	1,383	1,411
	$\lambda_{calc,1,2}$	1,587		0,000	0,215	1,773	2,012
	$\lambda_{calc,n,n-1}$	0,317		0,400	0,429	0,709	0,402
	*x1 ** *	**0**	...	**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)	γ_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

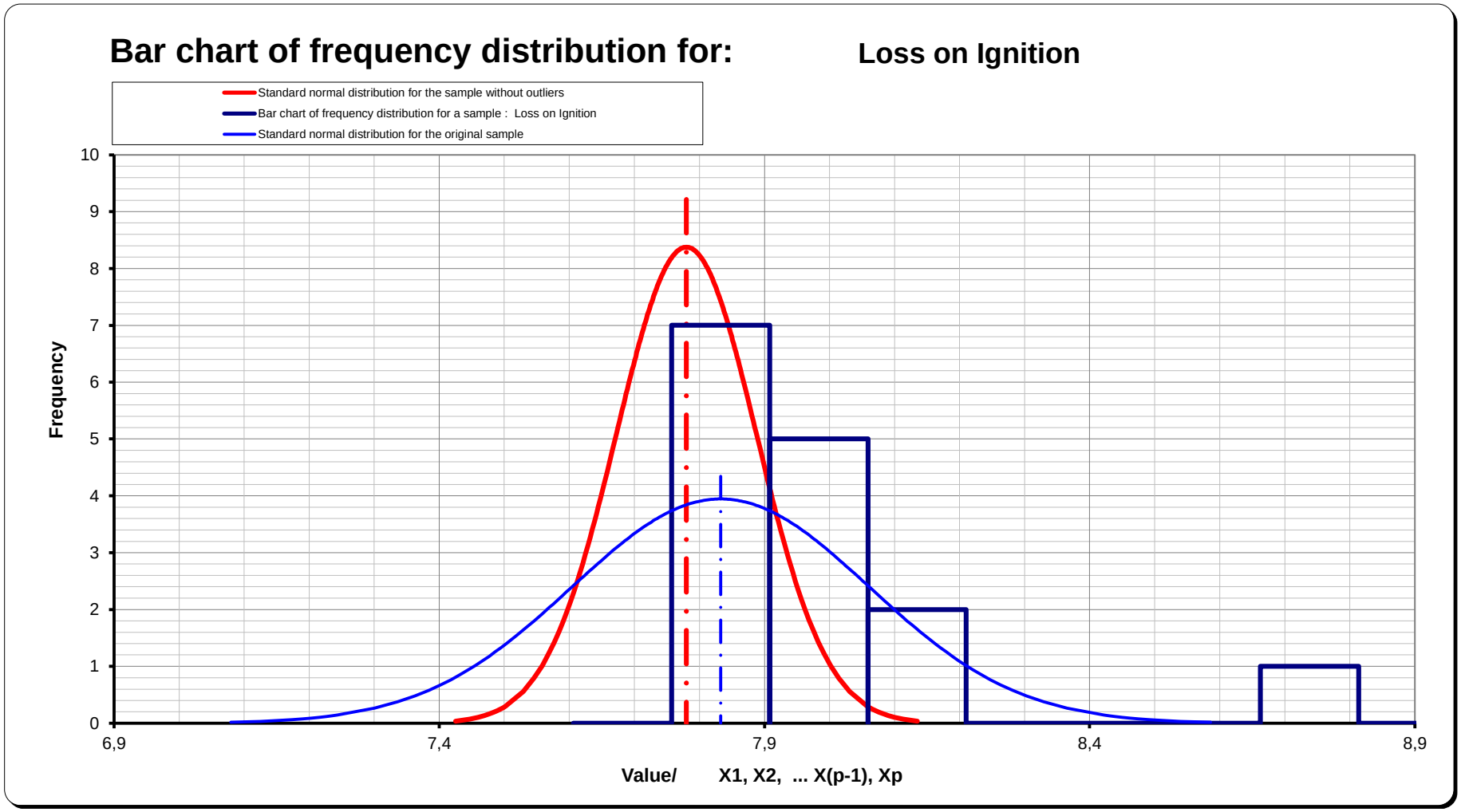
				Tests by Irwin for an afterelimination of outliers based on a level of signifiance of 5%			
Irwin critical value (for P=95%)	$\lambda_{\alpha(n)}$	1,359		1,411	1,441	1,383	1,411
	$\lambda_{calc,1,2}$	0,000		0,110	0,022	0,000	0,000
	$\lambda_{calc,n,n-1}$	2,487		2,425	2,396	0,818	0,664
Value x1 is not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

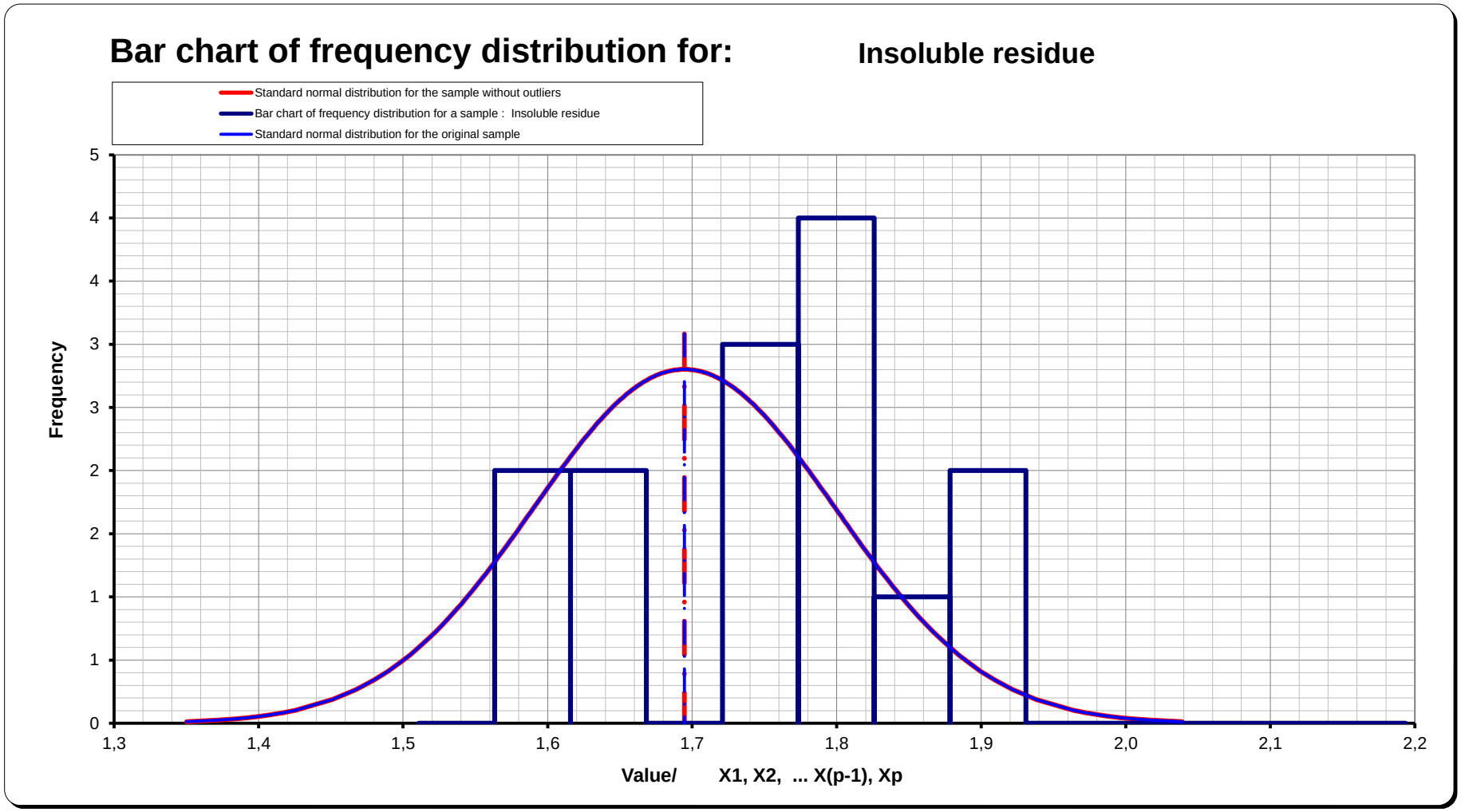
B2) Tests by Grubb for an afterelimination of outliers or biased values

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	12
Minimum value	$x_{min} = x_1$	0,21	0,22	0,22	0,21	0,21	0,21
Maximum value	$x_{max} = x_p$	0,455	0,46	0,46	0,32	0,30	0,32
Range of sample R =	$x_{max} - x_{min}$	0,245	0,24	0,24	0,11	0,09	0,11
difference $L_{m95\%} - L_{M95\%}$	$\Delta L_{95\%}$	0,2818					0,1608
Lower confidence limitsafterelimination of outliers (for P=98%)	$L_{m98\%}$	0,1004					0,1595
Lower confidence limitsafterelimination of outliers (for P=95%)	$L_{m95\%}$	0,1329					0,1784
Lower Irwin confidence limit (for P=95%)	$x_{minIw1-5\%}$	0,1273					
Lower Grubbs confidence limit (for P=99%)	$x_{minG1-1\%}$	0,0992	0,1091				
Lower Grubbs confidence limit (for P=95%)	$x_{minG1-5\%}$	0,1145	0,1236				
Average (arithmetic mean) $\bar{x}$ =	$1/p\sum(x_i)$ =	0,2738	0,2792	0,2850	0,2588	0,2532	0,2588
Precision of a measure of the mean (for P=95%)	$\pm \varepsilon$	0,0407	0,0429	0,0456	0,0429	0,0456	0,0242
Upper Grubbs confidence limit (for P=99%)	$x_{maxGp-5\%}$	0,4331			0,3469		
Upper Grubbs confidence limit (for P=95%)	$x_{maxGp-1\%}$	0,4484			0,3551		
Upper Irwin confidence limit (for P=99%)	$x_{maxIw1-5\%}$	0,4077					
Upper confidence limitsafterelimination of outliers (for P=95%)	$L_{M95\%}$	0,4147					0,3392
Upper confidence limitsafterelimination of outliers (for P=98%)	$L_{M98\%}$	0,4472					0,3581
Standard deviation of a sample	$s_{x,n-1}$	0,06469	0,06453	0,06427	0,03652	0,03252	0,03652
Standard deviation	$s_{x,0}$	0,06215	0,06178	0,06128	0,03496	0,03101	0,03496
Coefficient of variation	v	23,6%	23,1%	22,6%	14,1%	12,8%	14,1%
Standard skewness	Sk_{est}	1,927	1,959	2,008	0,129	0,022	0,129
Standard kurtosis (exces)	γ_2	4,932	5,040	5,191	-1,264	-1,652	-1,264
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	2,201
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	2,718

B1) Tests by Irwin for an afterelimination of outliers

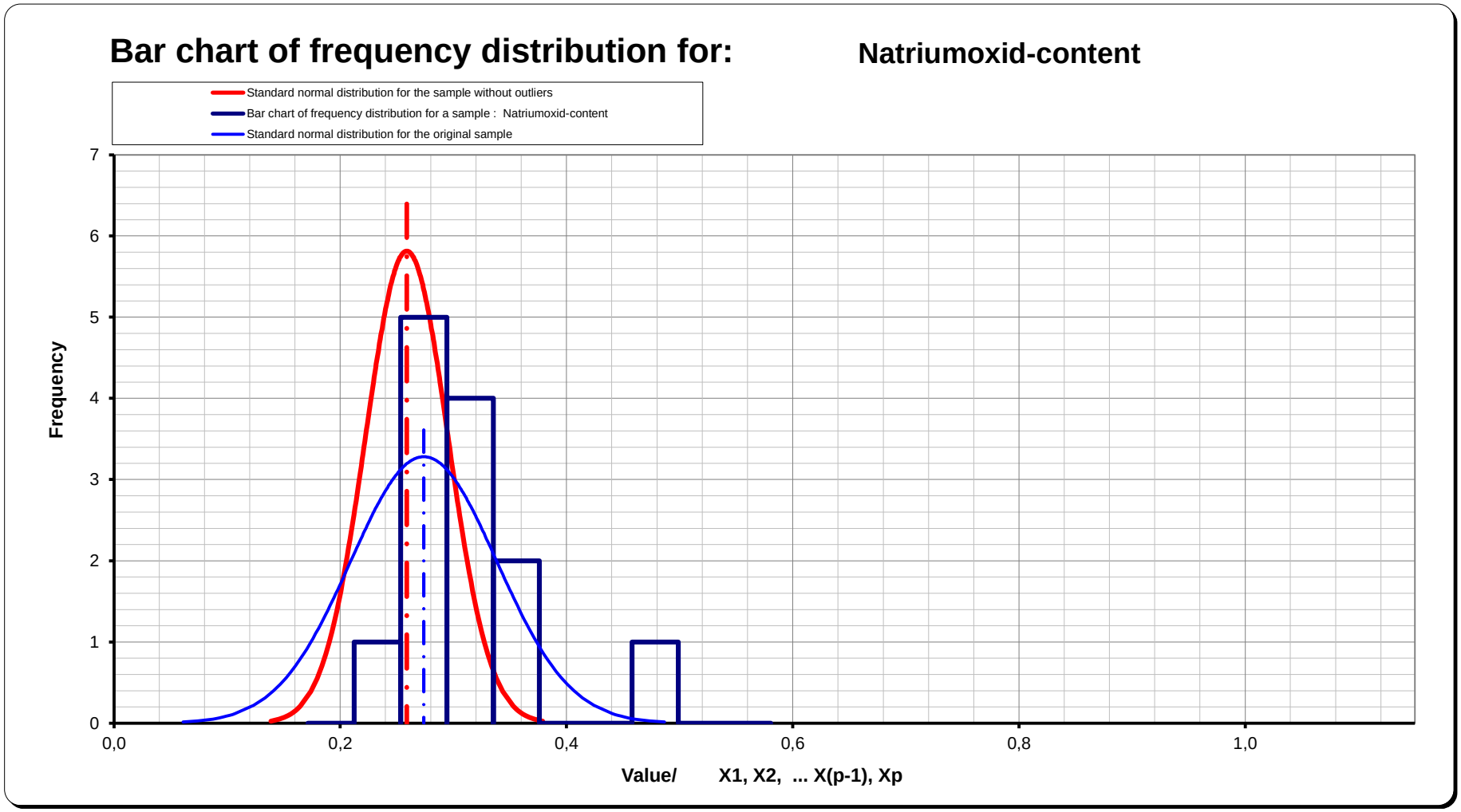
				Tests by Irwin for an afterelimination of outliers based on a level of signifiance of 5%			
Irwin critical value (for P=95%)	$\lambda_{\alpha(n)}$	1,411		1,441	1,477	1,441	1,477
	$\lambda_{calc,1,2}$	0,080		0,081	0,098	0,143	0,161
	$\lambda_{calc,n,n-1}$	2,172		2,185	2,203	0,572	0,322
Value x1 is not 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	0,986		1,072	
Grubb_i=p	G_p	2,801		5,372	
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	$G_{1,2}$	0,972		0,972	
Grubb_i=p,p-1	$G_{p,p-1}$	0,249		0,249	
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,		**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%**
		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	0,020		0,021	0,026	0,045	0,056
Dixon_i=p, ...$(x_p-x_{(p-1)})$	Q_p	0,551		0,563	0,574	0,182	0,111
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**	**1**	**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
0
1
2
3
4
5
6
7
0,0
0,2
0,4
0,6
0,8
1,0
Value/ X1, X2, ... X(p-1), Xp

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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	12
Minimum value	$x_{min} = x_1$	0,586	0,67	0,68	0,59	0,59	0,67
Maximum value	$x_{max} = x_p$	0,765	0,77	0,77	0,75	0,75	0,77
Range of sample R =	$x_{max} - x_{min}$	0,179	0,10	0,09	0,17	0,16	0,10
difference $L_{m95\%} - L_{M95\%}$	$\Delta L_{95\%}$	0,2062					0,128
Lower confidence limitsafterelimination of outliers (for P=98%)	$L_{m98\%}$	0,5864					0,6447
Lower confidence limitsafterelimination of outliers (for P=95%)	$L_{m95\%}$	0,6101					0,6598
Lower Irwin confidence limit (for P=95%)	$x_{minIw1-5\%}$	0,6009					
Lower Grubbs confidence limit (for P=99%)	$x_{minG1-1\%}$	0,5855	0,6471				
Lower Grubbs confidence limit (for P=95%)	$x_{minG1-5\%}$	0,5967	0,6536				
Average (arithmetic mean) $\bar{x}$ =	$1/p\sum(x_i)$ =	0,7132	0,7238	0,7292	0,7089	0,7051	0,7238
Precision of a measure of the mean (for P=95%)	± ε	0,0298	0,0314	0,0333	0,0314	0,0333	0,0193
Upper Grubbs confidence limit (for P=99%)	$x_{maxGp-5\%}$	0,8297			0,8214		
Upper Grubbs confidence limit (for P=95%)	$x_{maxGp-1\%}$	0,8409			0,8319		
Upper Irwin confidence limit (for P=99%)	$x_{maxIw1-5\%}$	0,8151					
Upper confidence limitsafterelimination of outliers (for P=95%)	$L_{M95\%}$	0,8163					0,7878
Upper confidence limitsafterelimination of outliers (for P=98%)	$L_{M98\%}$	0,8400					0,8029
Standard deviation of a sample	$s_{x,n-1}$	0,0473	0,02909	0,02352	0,04665	0,04692	0,02909
Standard deviation	$s_{x,0}$	0,04544	0,02785	0,02243	0,04467	0,04473	0,02785
Coefficient of variation	v	6,6%	4,0%	3,2%	6,6%	6,7%	4,0%
Standard skewness	Sk_{est}	-1,794	-0,789	-0,609	-1,885	-1,866	-0,789
Standard kurtosis (exces)	γ_2	3,801	0,279	0,654	3,962	3,825	0,279
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	2,201
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	2,718

B1) Tests by Irwin for an afterelimination of outliers

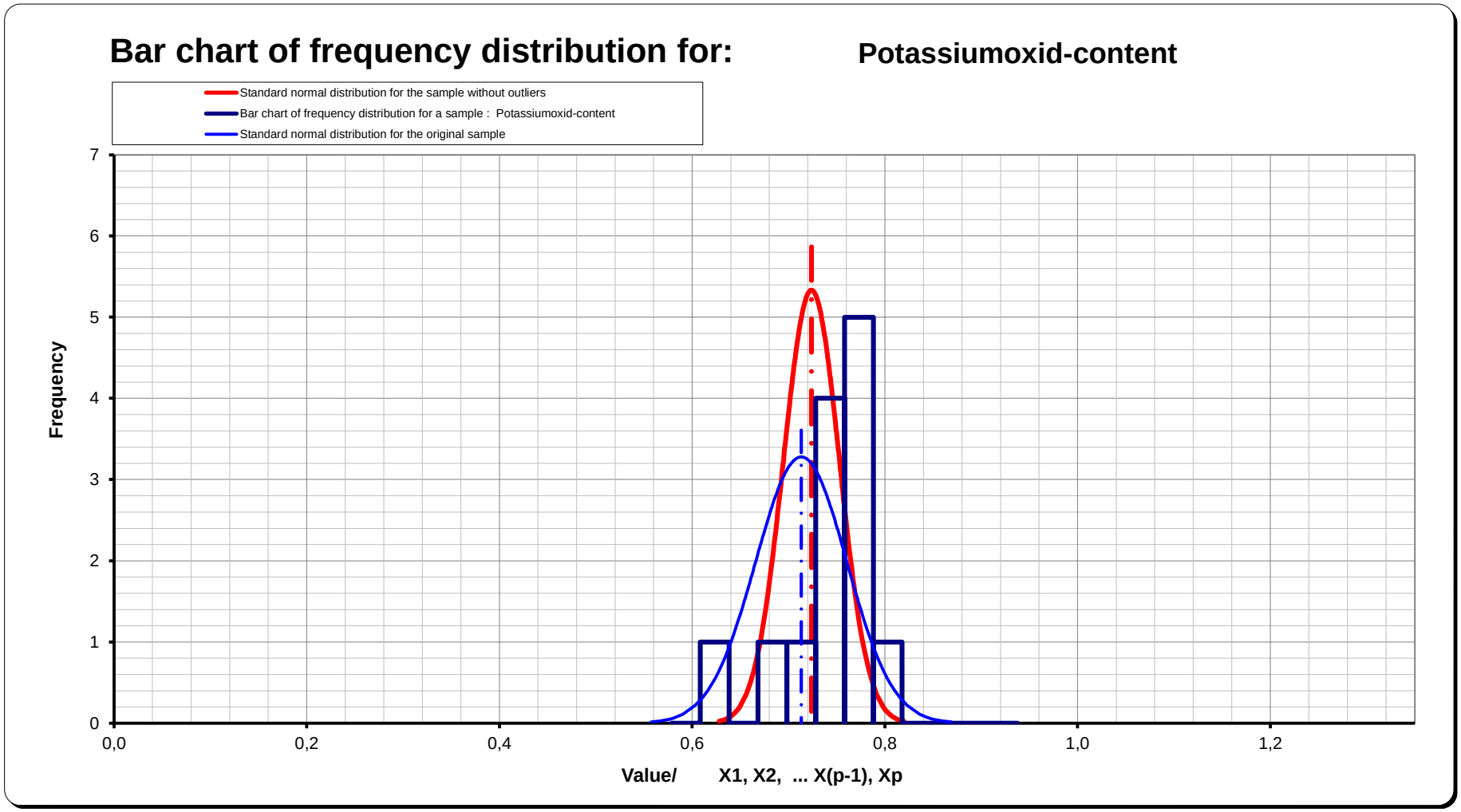
				Tests by Irwin for an afterelimination of outliers based on a level of significance of 5%			
Irwin critical value (for P=95%)	$\lambda_{\alpha(n)}$	1,411		1,441	1,477	1,441	1,477
	$\lambda_{calc,1,2}$	1,739		0,539	1,337	1,769	1,766
	$\lambda_{calc,n,n-1}$	0,308		0,503	0,624	0,134	0,000
	*x1 ** *	**0**	...	**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	2,689		4,737	
Grubb_i=p	G_p	1,095		1,203	
Upper critical values	$G_{h,1\%}$	2,699		2,636	**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	$G_{h,5\%}$	2,462		2,412	**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	$G_{1,2}$	0,244		0,244	
Grubb_i=p,p-1	$G_{p,p-1}$	0,969		0,969	
Lower critical values	$G_{d,1\%}$	0,202		0,174	**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	$G_{d,5\%}$	0,284		0,254	**Test for an afterelimination of two biased values based on a level of significance 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 significance of 5%			
Dixon_i=1, ... (x_2-x_1)	Q_1	0,441		0,150	0,353	0,479	0,497
Dixon_i=p, ...$(x_p-x_{(p-1)})$	Q_p	0,078		0,140	0,165	0,036	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**	...	**1**	**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
0
1
2
3
4
5
6
7
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)	γ_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

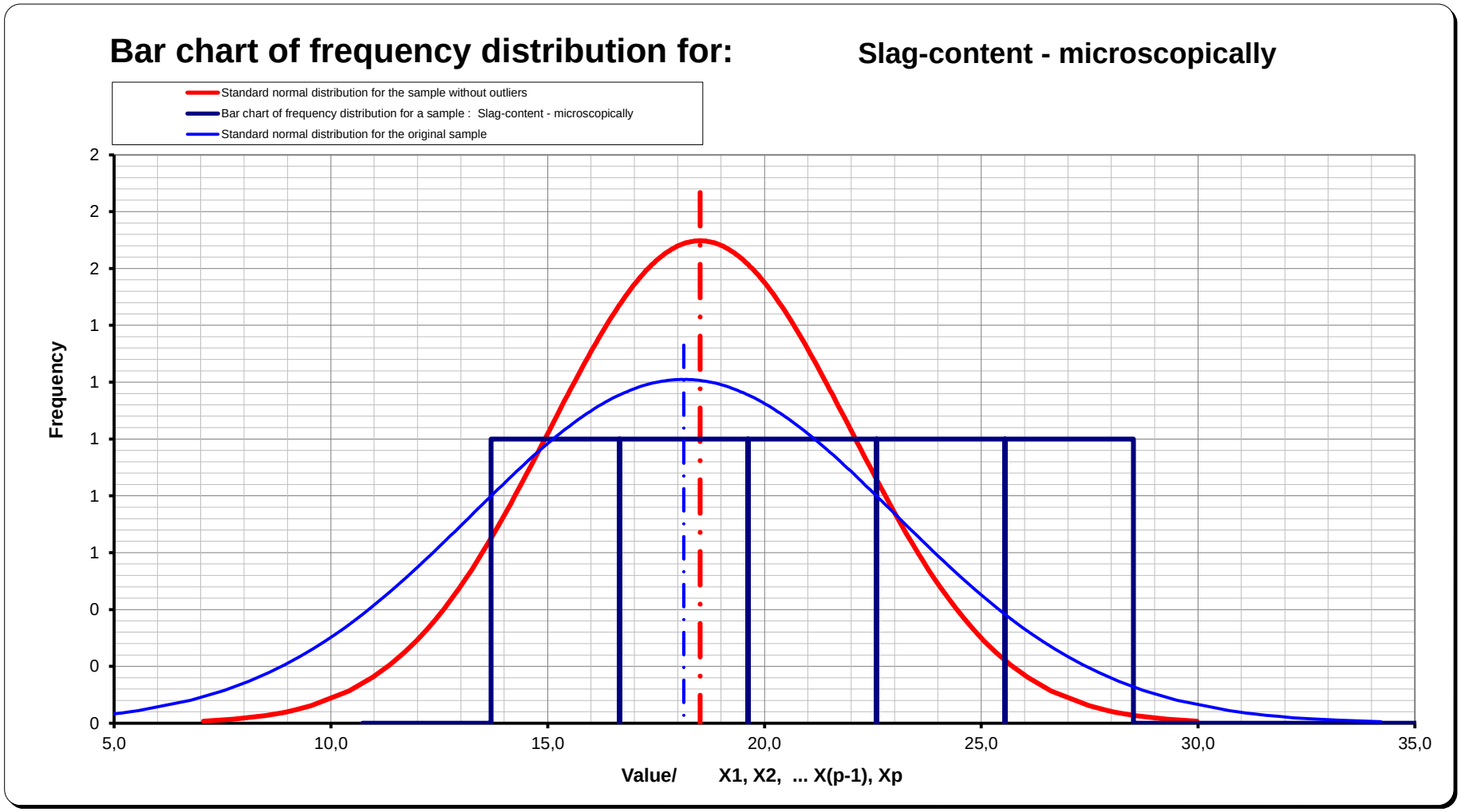
			Tests by Irwin for an afterelimination of outliers based on a level of signifiance of 5%				
Irwin critical value (for P=95%)	$\lambda_{\alpha(n)}$	1,902	2,064	2,307	2,064	2,307
	$\lambda_{calc,1,2}$	0,892	0,641	1,857	1,010	1,569
	$\lambda_{calc,n,n-1}$	0,263	0,351	0,454	1,217	0,845
Value x1 is not outlier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

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A) Summary statistics for a sample : Cr-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	11	10	9	10	9	10
Minimum value	$x_{min} = x_1$	1,15	2,02	2,17	1,15	1,15	2,02
Maximum value	$x_{max} = x_p$	5,1	5,10	5,10	4,39	3,65	5,10
Range of sample R =	$x_{max} - x_{min}$	3,95	3,08	2,93	3,24	2,50	3,08
difference $L_{m95\%} - L_{M95\%}$	$\Delta L_{95\%}$	4,924					4,156
Lower confidence limitsafterelimination of outliers (for P=98%)	$L_{m98\%}$	0,145					0,812
Lower confidence limitsafterelimination of outliers (for P=95%)	$L_{m95\%}$	0,737					1,326
Lower Irwin confidence limit (for P=95%)	$x_{minIw1-5\%}$	0,464					
Lower Grubbs confidence limit (for P=99%)	$x_{minG1-1\%}$	0,366	1,124				
Lower Grubbs confidence limit (for P=95%)	$x_{minG1-5\%}$	0,596	1,3				
Average (arithmetic mean) $\overline{x}$ =	$1/p\sum(x_i)$ =	3,199	3,404	3,558	3,009	2,856	3,404
Precision of a measure of the mean (for P=95%)	$\pm \varepsilon$	0,779	0,833	0,901	0,833	0,901	0,693
Upper Grubbs confidence limit (for P=99%)	$x_{maxGp-5\%}$	5,802			5,2		
Upper Grubbs confidence limit (for P=95%)	$x_{maxGp-1\%}$	6,032			5,384		
Upper Irwin confidence limit (for P=99%)	$x_{maxIw1-5\%}$	5,946					
Upper confidence limitsafterelimination of outliers (for P=95%)	$L_{M95\%}$	5,661					5,482
Upper confidence limitsafterelimination of outliers (for P=98%)	$L_{M98\%}$	6,253					5,996
Standard deviation of a sample	$s_{x,n-1}$	1,1051	0,9186	0,8266	0,9567	0,8746	0,9186
Standard deviation	$s_{x,0}$	1,0537	0,8714	0,7793	0,9076	0,8246	0,8714
Coefficient of variation	v	34,5%	27,0%	23,2%	31,8%	30,6%	27,0%
Standard skewness	Sk_{est}	-0,239	0,217	0,372	-0,752	-1,087	0,217
Standard kurtosis (exces)	γ_2	0,236	0,340	1,174	0,182	0,039	0,340
t-value of the Student's distribution for P=95%	$t_{(n-1),\alpha=2,5\%}$	2,228	2,262	2,306	2,262	2,306	2,262
t-value of the Student's distribution for P=98%	$t_{(n-1),\alpha=1,0\%}$	2,764	2,821	2,897	2,821	2,897	2,821

B1) Tests by Irwin for an afterelimination of outliers

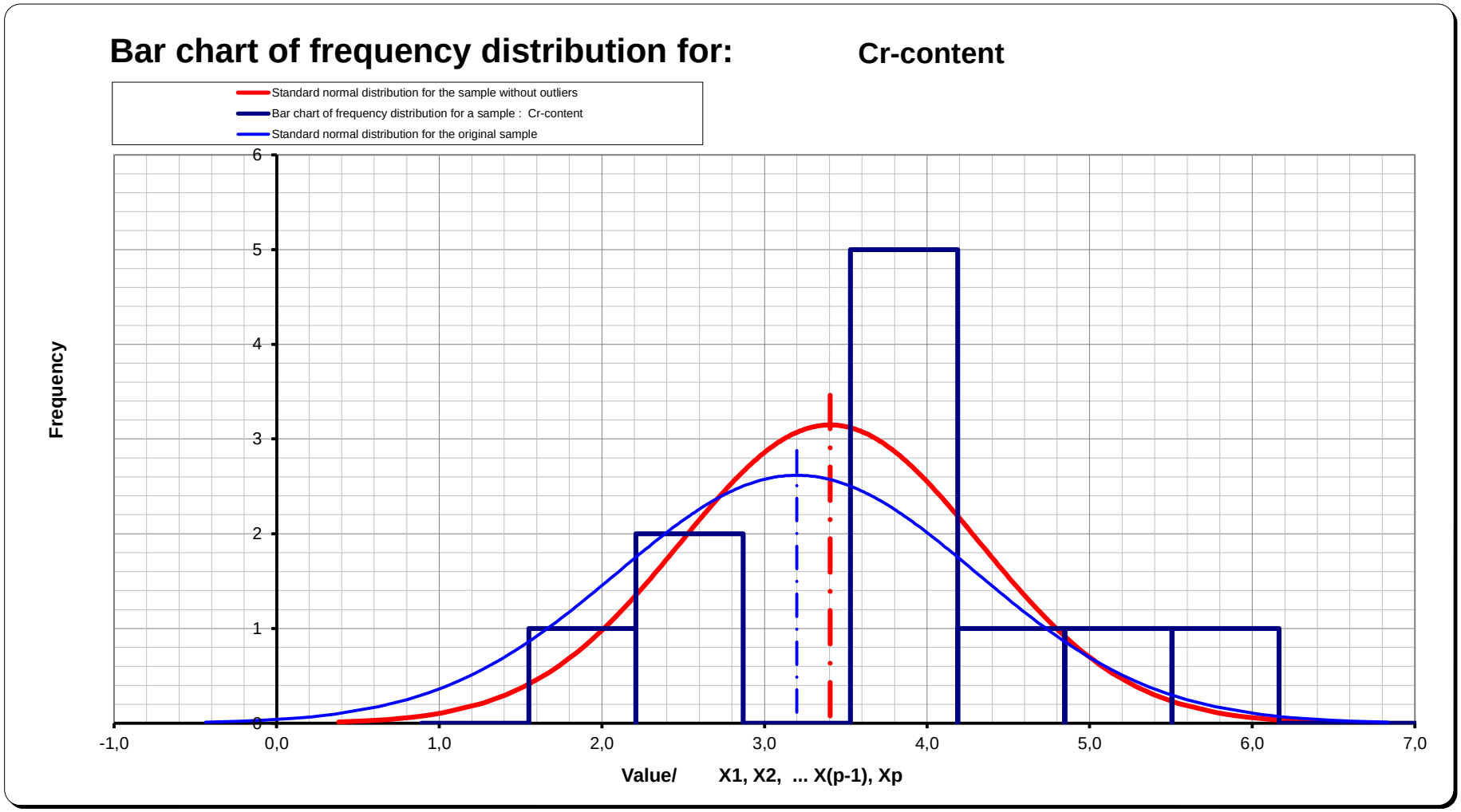
				Tests by Irwin for an afterelimination of outliers based on a level of significance of 5%			
Irwin critical value (for P=95%)	$\lambda_{\alpha(n)}$	1,477		1,518	1,566	1,518	1,566
	$\lambda_{calc,1,2}$	0,826		0,172	0,962	0,959	1,055
	$\lambda_{calc,n,n-1}$	0,674		0,815	0,911	0,815	0,182
Value x1 is not 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	1,854		2,454	
Grubb_i=p	G_p	1,720		2,186	
Upper critical values	$G_{h,1\%}$	2,564		2,482	**Test for an afterelimination of one outlier based on a level of significance 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	$G_{h,5\%}$	2,355		2,290	**Test for an afterelimination of one biased value based on a level of significance of 5%**
		1	...	**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	$G_{p,p-1}$	0,612		0,612	
Lower critical values	$G_{d,1\%}$	0,145		0,115	**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	$G_{d,5\%}$	0,221		0,186	**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	0,220		0,049	0,256	0,269	0,348
Dixon_i=p, ...(x_p-$x_{(p-1)}$)	Q_p	0,180		0,231	0,242	0,228	0,060
Upper critical values	$Q_{v,\alpha,5\%}$	0,392		0,412	0,437	0,412	0,437
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: Cr-content
Standard normal distribution for the sample without outliers
Bar chart of frequency distribution for a sample : Cr-content
Standard normal distribution for the original sample
Frequency
0
1
2
3
4
5
6
-1,0
0,0
1,0
2,0
3,0
4,0
5,0
6,0
7,0
Value/ X1, X2, ... X(p-1), Xp