Bahnhofstraße 14 // D-37181 Hardegsen // T +49 (0)5505 94098-0
Geschäftsführer: Ralf Klaus Blecher // Amtsgericht Göttingen HRB 130263
www.crb-gmbh.de // labor@crb-gmbh.de

CRB
Analyse Service GmbH

Fluxana, Deutschland - Siliciumcarbid SiC 85 - RV-2016-01

Veranstalter des Ringversuchs: FluXana GmbH & Co. KG, Borschelstr. 3, 47551 Bedburg-Hau

Ringversuchsmaterial: RV-2016-01 - SiC 85

RV geschlossen: 2017 - 2

Literatur: Proficiency Test Teport RV_2016_01 SiC 85 (CRB Laborcode = 13)

Hauptelemente [MA%]

	CRB	RV	1sRV	Z-Score
Al	0,360	0,330	0,062	0,460
Ca	0,230	0,200	0,062	0,360
C free	5,400	5,120	0,671	0,410
C total	31,210	31,170	0,408	0,080
Fe	0,740	1,168	0,333	1,300
LOI	3,510	3,501	0,215	0,040
Mg	0,020	0,013	0,011	0,690
Ni	0,013	0,019	0,008	-0,890
S	0,100	0,078	0,023	0,950
SiC	86,150	86,682	1,437	-0,370
Si free	n.b.	0,139		
SiO$_2$	5,850	4,338	0,972	1,560
Si total	63,110	63,190	0,674	-0,130
TiO$_2$	0,034	0,047	0,020	-0,670
V	0,053	0,078	0,034	-0,720

Legende

CRB: Ergebnisse CRB – **RV:** Ergebnisse Ringversuch -- **1s-RV:** Standardabweichung Ringversuch

Z-Score: Differenz des Messwertes vom Mittelwert des Ringversuchs -- * Wert nicht zertifiziert

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Preliminary Proficiency Test Report RV-2016-01 for SiC

SiC 37 , SiC 85

Bedburg-Hau, 13 February 2017

Coordinator of PT	**Head of Laboratory**	**Statistics and Report**
Charlotte Winkels-Herding	Dr. Barbara Schäfer	Dr. Rainer Schramm

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SiC 37	Mean %	U (95%)	s_R	s_r	Mean - 2*s_R	Mean + 2*s_R
Al	0,352	0,062	0,052	0,006	0,249	0,456
Ca	0,243	0,045	0,041	0,005	0,161	0,324
C free	19,269	0,215	0,434	0,143	18,400	20,137
C total	31,703	0,190	0,388	0,123	30,927	32,478
Fe	1,313	0,269	0,259	0,036	0,796	1,830
LOI	18,709	0,226	0,240	0,037	18,230	19,188
Mg	0,083	0,024	0,023	0,004	0,037	0,130
Ni	0,019	0,009	0,008	0,001	0,004	0,034
S	0,336	0,037	0,049	0,004	0,238	0,433
SiC	40,680	1,251	1,837	0,216	37,006	44,354
Si free	0,093	0,068	0,067	0,009	-0,040	0,227
SiO_2	34,590	5,286	4,728	0,124	25,134	44,045
Si total	45,790	0,430	0,422	0,189	44,947	46,634
Ti	0,046	0,012	0,012	0,003	0,023	0,070
V	0,055	0,014	0,013	0,002	0,029	0,082

SiC 85	Mean %	U (95%)	s_R	s_r	Mean - 2*s_R	Mean + 2*s_R
Al	0,332	0,065	0,062	0,005	0,207	0,456
Ca	0,203	0,058	0,062	0,009	0,078	0,327
C free	5,123	0,514	0,671	0,063	3,781	6,464
C total	31,171	0,316	0,408	0,047	30,355	31,986
Fe	1,168	0,279	0,333	0,027	0,503	1,834
LOI	3,501	0,200	0,215	0,028	3,072	3,930
Mg	0,013	0,009	0,011	0,001	-0,009	0,034
Ni	0,025	0,013	0,013	0,002	-0,001	0,050
S	0,078	0,020	0,023	0,004	0,031	0,125
SiC	86,682	0,941	1,437	0,220	83,809	89,556
Si free	0,139	0,056	0,074	0,008	-0,009	0,288
SiO_2	4,338	1,067	0,972	0,114	2,394	6,282
Si total	63,190	0,804	0,674	0,052	61,843	64,537
Ti	0,047	0,023	0,020	0,003	0,007	0,087
V	0,078	0,040	0,034	0,005	0,010	0,147

All values are in mass % and are based on dried sample material (1h at 105°C).

Mean	calculated
U (95%)	uncertainty calculated for a confidence interval of 95% (k=2)
s_R	Reproducibility standard deviation
s_r	Repeatability standard deviation
Range of tolerance	Mean $\pm 2* s_R$; all labs within this range show satisfactory performance

Introduction

X-ray fluorescence analysis is a widely used technique for the analysis of oxidic materials.

However, for the calibration of XRF instruments dedicated standard material is needed. As a worldwide supplier for XRF laboratories, FLUXANA has developed a number of services to support XRF users. One of these services is the production of new reference materials and the organization of proficiency tests (PT).

In 2011, FLUXANA introduced its own quality management.

In February 2014, FLUXANA received accreditation from German DAKKS according DIN EN ISO/IEC 17025 for the test laboratory in Bedburg-Hau.

The production of reference materials and the performance of proficiency tests is not yet accredited. However, FLUXANA has applied for the accreditation process at DAKKS.

Nevertheless, all evaluations are performed in agreement with DIN EN ISO/IEC 17043:2010-05, ISO Guide 34:2009, ISO Guide 31:2000 and ISO Guide 35:2006.

Hazardous situation

For this material an actual MSDS is available.

Proficiency test provider / Ordering address for the samples

FLUXANA GmbH & CO.KG
Borschelstrasse 3
47551 Bedburg-Hau, Germany
info@fluxana.de
Coordinator: Charlotte Winkels-Herding, QM
Responsible for evaluation and data processing: Dr. Rainer Schramm, CEO
Responsible for in-house analytical tests: Dr. Barbara Schäfer, Head of test laboratory

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Subcontractors

Delivery of material by ESD-SIC bv
Performing of analysis by Participants of PT

Proficiency test items

This test material was produced from commercial product. Material was taken directly from the production stream.

Performing of analysis by Participants of PT.

About 5 kg of each material were delivered to and homogeneously distributed into 250 ml bottles by FLUXANA. The bottles were then vacuum packed for storage.

Test item	Description
SIC 37	Siliconcarbide
SIC 85	Siliconcarbide

Homogeneity and stability

The material was used as delivered. Based on ISO Guide 35:2006 and DIN ISO 13528:2009-01,
a homogeneity and stability study of the materials was performed.

Metrological traceability

The analytical methods used by the participants must be in accordance with international measurement standards (XRF fusion, combustion, ICP or any other wet chemical methods), which are considered as traceable. Other methods, like XRF pressed pellet or XRF standardless methods, are not recognized as being traceable. Values from these methods will not be taken into account for calculation of the assigned values and the target standard deviation. However, all values will be shown in the report and the laboratory evaluation report.

Participant accreditation

It is important to know whether or not the participant laboratory works under ISO 17025 accreditation. Therefore, we will ask this information for each parameter. Which values were determined under accreditation will be shown anonymously in the final report.

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Number of participants

The minimum number of participants is 10.

Potential major sources of errors

- The sample must be dried before the analysis (see sample preparation)

Recommended rules for the analysis

1 g of sample that has been annealed to a constant mass (typically 1 hour at 950 °C) and 8 g flux should be weighed into a platinum crucible (with 5% gold) and mixed. Then a normal fusion should be performed manually or with an automatic machine.

When using the electrical fusion machine from FLUXANA, the program A0 is recommended. When using the gas fusion machine from FLUXANA, the program P0 is recommended.

Evaluation

According to DIN EN ISO/IEC 17043:2010-05, we will use robust statistical methods in agreement with DIN ISO 13528:2009-01, ISO/TS 20612:2007 and DIN 38402-45:2014-06.

Advantages of using robust statistics

Statistical methods are robust in the sense that any outliers have only a limited effect on the overall result. Steps were taken to ensure that the results are still meaningful, even if the proportion of outliers is 1/3. Robust statistics are also preferable for small populations.

Outliers

Outliers in the statistical sense are typically not detected when using robust statistical methods because the robust A+S algorithms were found to work better than the classical approach (which is outlier detection plus arithmetic mean and classical s.d. formula). Outliers shown in the evaluation are only based on z-scores and marked with yellow or red colors. Based on ISO 5725-02 there was also a Cochran outlier test performed to check the repeatability of the single laboratories. Test statistics from laboratories which are greater than 1% critical value were marked with "C" in the column remark. This is an information only.

Number of measurements

All participants are requested to perform two measurements, for some methods up to six measurements are recommended. This is necessary to perform the repeatability standard deviation for the laboratories. Participants who send only one or more than two values must first ask for permission. Otherwise, they will be excluded.

Publication of the results

All participants will be informed about the results of the PT with a report. Which results were delivered by which laboratory will be kept confidential. All laboratories are encoded, and the code is only known to the organizer and the individual laboratory. Within one month, the final report will be sent to every participant.

Laboratory performance

Each participant will receive a performance evaluation report based on z-scores. The diagram shows the relative difference to the assigned values

Further Information

For this proficiency test, the participants' results must be submitted to the organizer using only the "Result Sheet" Excel table, which must not be altered. Paper sheets or other Excel tables will only be accepted in special cases in prior agreement with the organizer. In this way, we want to improve the data quality and avoid any transmission errors.

Participants

Koltex Color S.r.o.	Czech Republik
AMCO united samplers and assayers GmbH	Germany
CRB Analyse Service GmbH	Germany
Dorfner Analysenzentrum und Anlagenplanungsgesellschaft mbH	Germany
ESK-SIC GmbH	Germany
GPS Kessl GmbH u. Co. KG	Germany
HuK-Umweltlabor GmbH	Germany
Thyssen Krupp Steel Europe AG	Germany
ESD-SIC bv	Netherlands
Elkem AS, Technology	Norway
Georg Fisher Automotive AG	Switzerland
Auburn Analytical Labs, Inc.	USA
Miller and Company	USA

Statistical Evaluation used for this PT

Calculation of Mean m

The mean m for all laboratories is calculated using the Hampel estimator (ISO/TS 20612:2007 9.2.3) based on the laboratory means μ.

Calculation of reproducibility standard deviation s_R

The reproducibility standard deviation s_R is calculated using the Q-method (ISO/TS 20612:2007 9.2.3).

Calculation of repeatability standard deviation s_r

The repeatability standard deviation s_r is also calculated using the Q-method.

Uncertainty of Mean U

The **uncertainty** for a confidence interval of P=95% (k=2) can be calculated from the **reproducibility standard deviation** s_R (factor 1.25 for average median, robust statistics):

$$(1) \qquad U = 2 * 1.25 * \frac{s_R}{\sqrt{p}}$$

Laboratory performance

The laboratory proficiency assessment is based on z-scores.
From all laboratory means μ, the **z-score** z is calculated:

$$(2) \qquad z = \frac{m - μ}{s_R}$$

m	Mean value of all laboratories (assigned value)
μ	Mean value of individual laboratory
s_R	Reproducibility standard deviation

Assessment of z-scores:

$\|z\| <= 2.0$	indicates "satisfactory" performance = generates no signal
$2.0 < \|z\| < 3.0$	indicates "questionable" performance = generates a warning signal
$\|z\| >= 3.0$	indicates "unsatisfactory" performance = generates an action signal

All laboratory means μ with $3 >= \|z\| >= 2$ are highlighted with a yellow color, z-scores with $\|z\| >= 3$ are highlighted with a red color.

Cochran's outlier test (ISO 5725-2:2002-12)

$$(3) \qquad C = \frac{s_{r,max}^2}{\sum_{i=1}^{p} s_{r,i}^2}$$

C	Cochran's test statistic
$s_{r,max}$	highest repeatability standard deviation
$s_{r,i}$	repeatability standard deviation of laboratory i
P	number of laboratories

Assessment on C:

C <= 5% cv	item tested is accepted as correct
5% cv < C < 1% cv	item tested is called a straggler
C > 1% cv	item tested is called a statistical outlier and marked with an 'C'
	cv: critical value

This outlier test was performed as additional information only. The robust statistics used took all values which were traceable independent on the Cochran test.

Summary results

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Sample:	**SiC 37**	**Reprod. s.d.**	**0,052 % TM**
Measurand:	**Al**	**Repeat. s.d**	**0,006 % TM**
Mean ± U(Mean):	**0,352 ± 0,062 % TM**	**Range of tolerance:**	**0,249 - 0,456 % TM (|z-score| <= 2,000)**
No. of laboratories:	**7**	**Statistical method**	**Q/Hampel**
Assigned value	**0,352 % TM (Empirical value)**	**Target s.d.**	**0,052 % TM (Empirical value)**
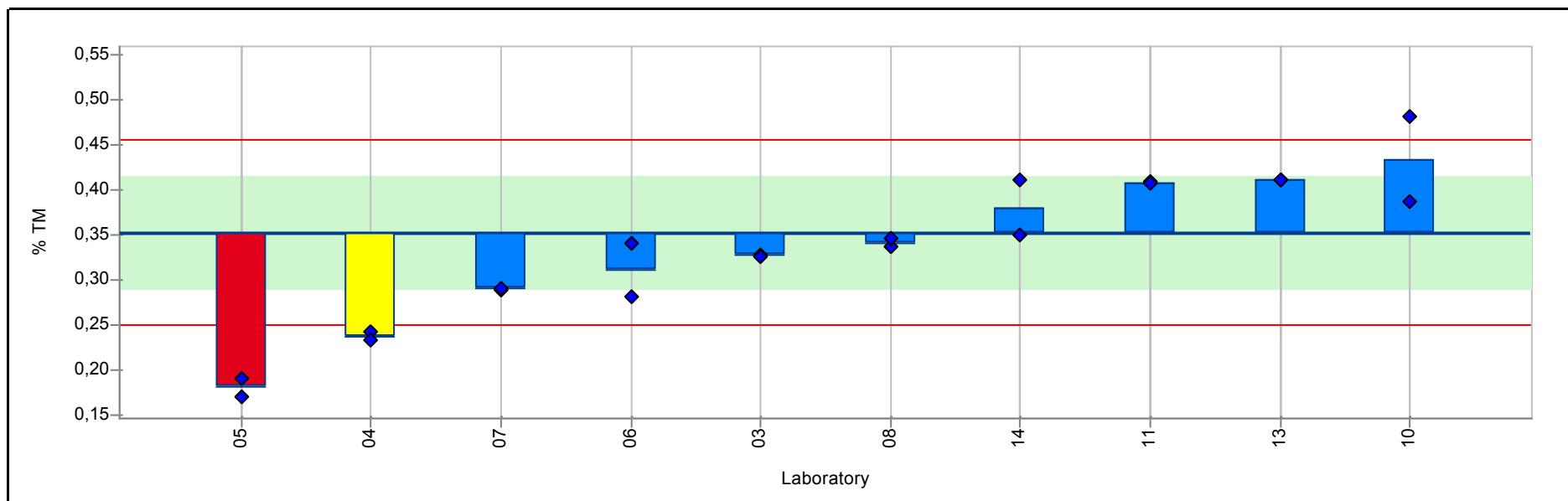
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment

RV_2016_01_SiC

03	0,327	0,002	-0,498	0,328	0,325	no accreditation	XRF fusion	
04	0,237	0,007	-2,231	0,242	0,232	no accreditation	Other Method	info only
05	0,180	0,014	-3,334	0,170	0,190	ISO 17025	Other Method	info only
06	0,311	0,042	-0,798	0,281	0,341	ISO 17025	XRF fusion	
07	0,289	0,002	-1,214	0,288	0,291	no accreditation	Other Method	ICP
08	0,341	0,006	-0,217	0,337	0,345	ISO 17025	Other Method	ICP-OES
10	0,433	0,067	1,574	0,481	0,386	ISO 17025	Other Method	info only
11	0,407	0,002	1,070	0,409	0,406	ISO 17025	XRF fusion	
13	0,410	0,000	1,119	0,410	0,410	ISO 17025	XRF fusion	
14	0,380	0,042	0,538	0,350	0,410	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	**SiC 37**	**Reprod. s.d.**	**0,041 % TM**
Measurand:	**Ca**	**Repeat. s.d**	**0,005 % TM**
Mean ± U(Mean):	**0,243 ± 0,045 % TM**	**Range of tolerance:**	**0,161 - 0,324 % TM (|z-score| <= 2,000)**
No. of laboratories:	**7**	**Statistical method**	**Q/Hampel**
Assigned value	**0,243 % TM (Empirical value)**	**Target s.d.**	**0,041 % TM (Empirical value)**
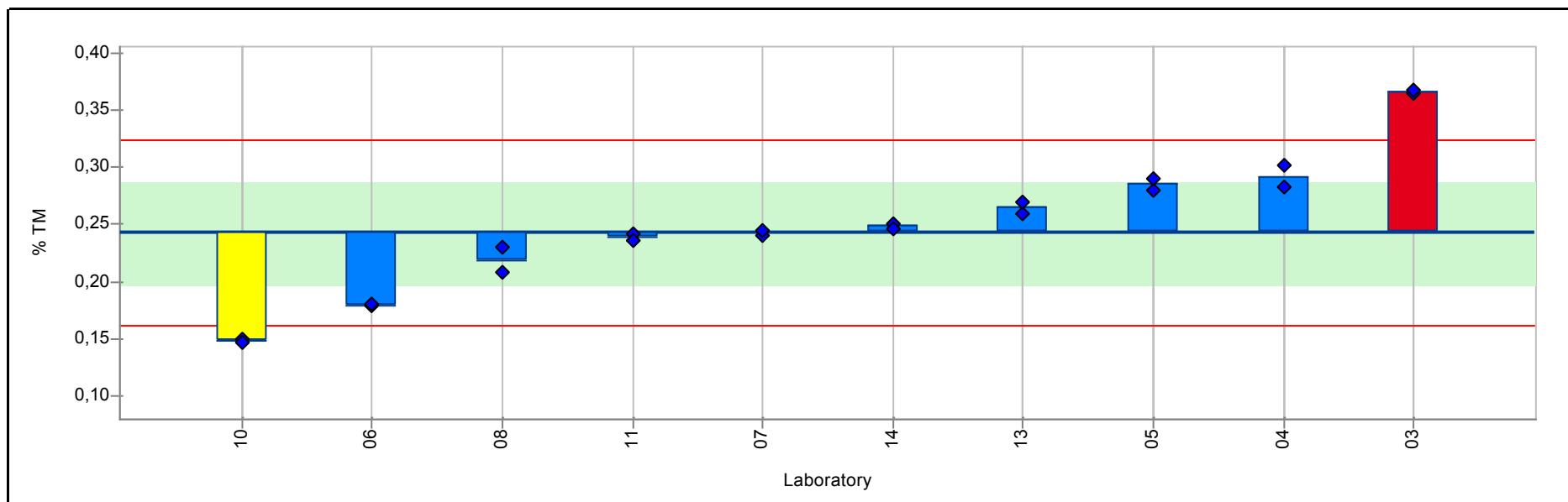
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,366	0,002	3,047	0,365	0,368	no accreditation	XRF fusion	
04	0,291	0,013	1,204	0,301	0,282	no accreditation	Other Method	info only
05	0,285	0,007	1,044	0,280	0,290	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,179	0,001	-1,549	0,179	0,180	ISO 17025	XRF fusion	
07	0,243	0,003	0,013	0,241	0,245	no accreditation	Other Method	ICP
08	0,219	0,016	-0,578	0,208	0,230	ISO 17025	Other Method	ICP-OES
10	0,148	0,002	-2,311	0,150	0,147	ISO 17025	Other Method	info only
11	0,239	0,004	-0,087	0,242	0,236	ISO 17025	XRF fusion	
13	0,265	0,007	0,552	0,260	0,270	ISO 17025	XRF fusion	
14	0,248	0,004	0,147	0,251	0,246	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	**SiC 37**	**Reprod. s.d.**	**0,434 % TM**
Measurand:	**C free**	**Repeat. s.d**	**0,143 % TM**
Mean ± U(Mean):	**19,269 ± 0,215 % TM**	**Range of tolerance:**	**18,400 - 20,137 % TM (|z-score| <= 2,000)**
No. of laboratories: 11		**Statistical method**	**Q/Hampel**
Assigned value	**19,269 % TM (Empirical value)**	**Target s.d.**	**0,434 % TM (Empirical value)**
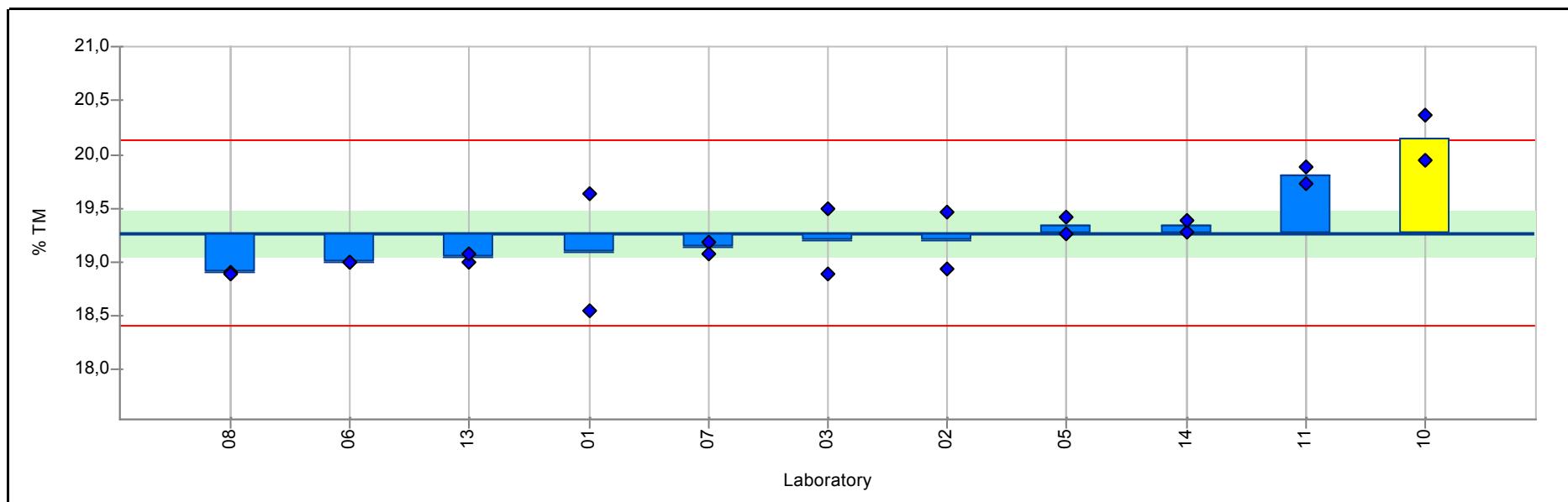
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	19,090	0,770	-0,410	19,635	18,546	no accreditation	Combustion for C and S	Leco CS230
02	19,200	0,382	-0,158	18,930	19,470	no accreditation	Combustion for C and S	
03	19,195	0,431	-0,170	19,500	18,890	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
05	19,335	0,106	0,153	19,410	19,260	ISO 17025	ISO 21068-2:2008-12	
06	19,000	0,000	-0,619	19,000	19,000	ISO 17025	ISO 21068-2:2008-12	
07	19,135	0,078	-0,308	19,190	19,080	no accreditation	ISO 21068-2:2008-12	
08	18,900	0,014	-0,849	18,910	18,890	ISO 17025	ISO 21068-2:2008-12	
10	20,155	0,290	2,042	20,360	19,950	ISO 17025	Other Method	Calculation
11	19,805	0,108	1,235	19,728	19,881	ISO 17025	ISO 21068-2:2008-12	
13	19,040	0,057	-0,527	19,000	19,080	ISO 17025	ISO 21068-2:2008-12	
14	19,335	0,078	0,153	19,280	19,390	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	SiC 37	**Reprod. s.d.**	0,388 % TM
Measurand:	C total	**Repeat. s.d**	0,123 % TM
Mean ± U(Mean):	31,703 ± 0,190 % TM	**Range of tolerance:**	30,927 - 32,478 % TM (|z-score| <= 2,000)
No. of laboratories:	11	**Statistical method**	Q/Hampel
Assigned value	31,703 % TM (Empirical value)	**Target s.d.**	0,388 % TM (Empirical value)
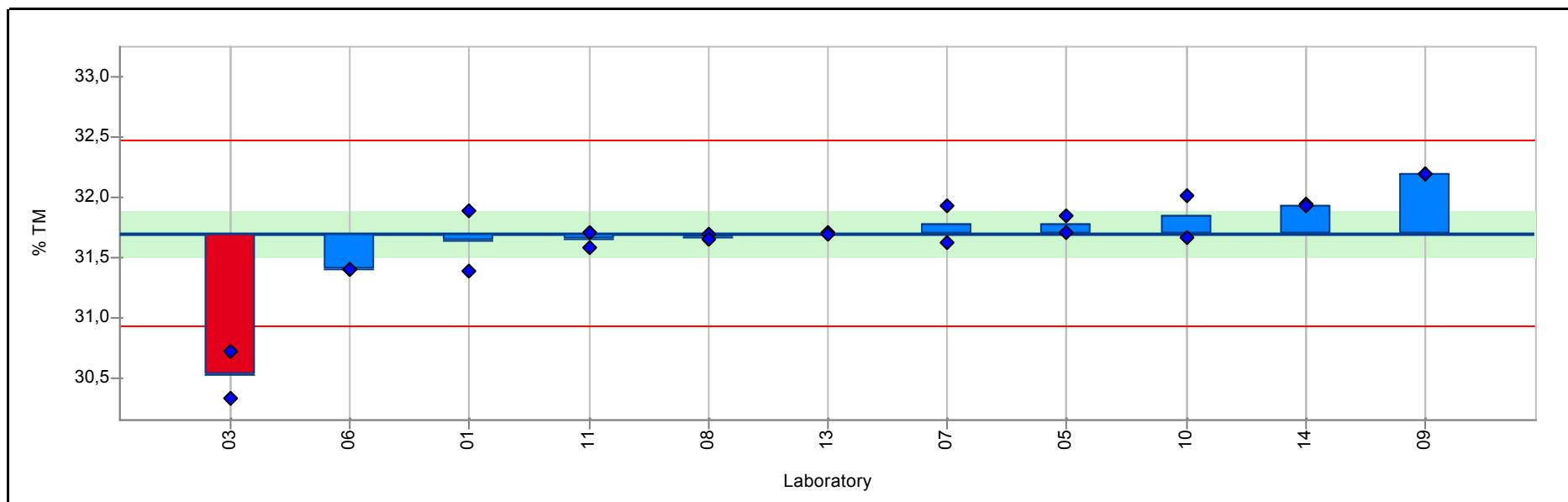
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	31,645	0,352	-0,148	31,894	31,396	no accreditation	Combustion for C and S	Leco CS230
03	30,530	0,269	-3,025	30,720	30,340	no accreditation	ISO 21068-2:2008-12	
05	31,780	0,099	0,200	31,850	31,710	ISO 17025	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	31,400	0,000	-0,781	31,400	31,400	ISO 17025	ISO 21068-2:2008-12	
07	31,775	0,219	0,187	31,620	31,930	no accreditation	ISO 21068-2:2008-12	
08	31,670	0,028	-0,084	31,690	31,650	ISO 17025	ISO 21068-2:2008-12	
09	32,197	0,008	1,275	32,191	32,202	no accreditation	Combustion for C and S	
10	31,845	0,247	0,368	32,020	31,670	ISO 17025	Combustion for C and S	
11	31,650	0,085	-0,135	31,590	31,710	ISO 17025	Combustion for C and S	
13	31,700	0,014	-0,006	31,710	31,690	ISO 17025	ISO 21068-2:2008-12	
14	31,935	0,007	0,600	31,940	31,930	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	**SiC 37**	**Reprod. s.d.**	**0,259 % TM**
Measurand:	**Fe**	**Repeat. s.d**	**0,036 % TM**
Mean ± U(Mean):	**1,313 ± 0,269 % TM**	**Range of tolerance:**	**0,796 - 1,830 % TM (|z-score| <= 2,000)**
No. of laboratories:	**7**	**Statistical method**	**Q/Hampel**
Assigned value	**1,313 % TM (Empirical value)**	**Target s.d.**	**0,259 % TM (Empirical value)**
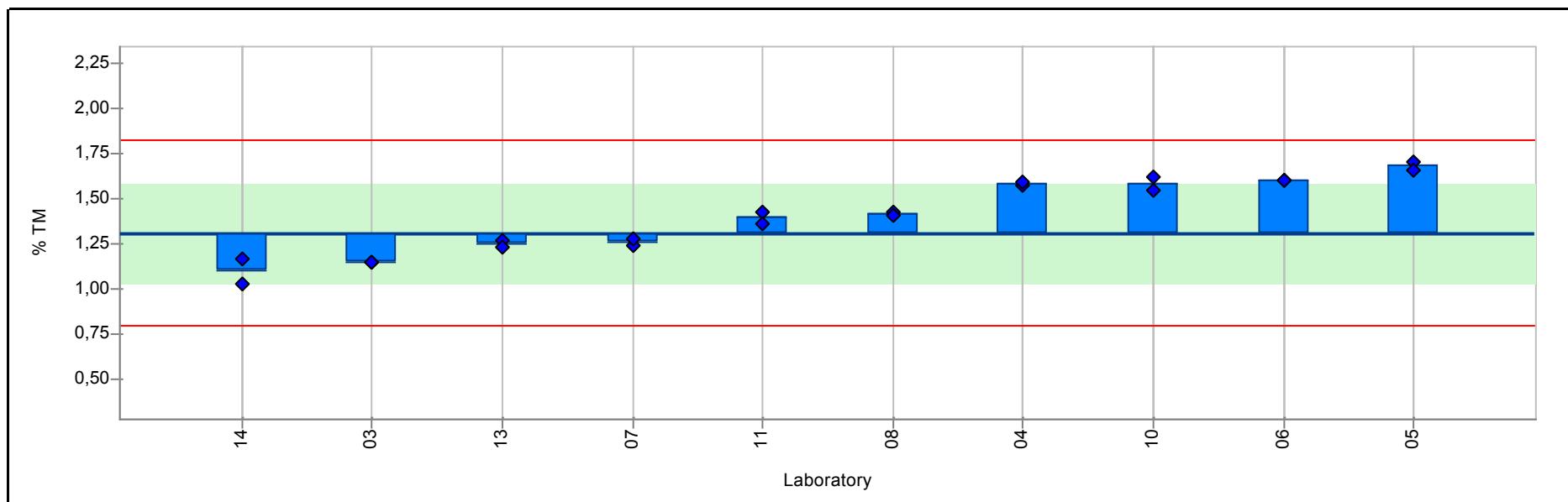
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	1,151	0,002	-0,626	1,150	1,153	no accreditation	XRF fusion	
04	1,584	0,016	1,047	1,573	1,595	no accreditation	Other Method	info only
05	1,685	0,035	1,438	1,710	1,660	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	1,606	0,006	1,133	1,602	1,610	ISO 17025	XRF fusion	
07	1,263	0,024	-0,194	1,246	1,280	no accreditation	Other Method	ICP
08	1,423	0,012	0,427	1,432	1,415	ISO 17025	Other Method	ICP-OES
10	1,584	0,052	1,047	1,547	1,621	ISO 17025	Other Method	info only
11	1,397	0,041	0,324	1,426	1,368	ISO 17025	XRF fusion	
13	1,250	0,028	-0,245	1,270	1,230	ISO 17025	XRF fusion	
14	1,102	0,095	-0,819	1,169	1,034	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	**SiC 37**	**Reprod. s.d.**	**0,240 % TM**
Measurand:	**LOI @750°C**	**Repeat. s.d**	**0,037 % TM**
Mean ± U(Mean):	**18,709 ± 0,226 % TM**	**Range of tolerance:**	**18,230 - 19,188 % TM (|z-score| <= 2,000)**
No. of laboratories:	**10**	**Statistical method**	**Q/Hampel**
Assigned value	**18,709 % TM (Empirical value)**	**Target s.d.**	**0,240 % TM (Empirical value)**
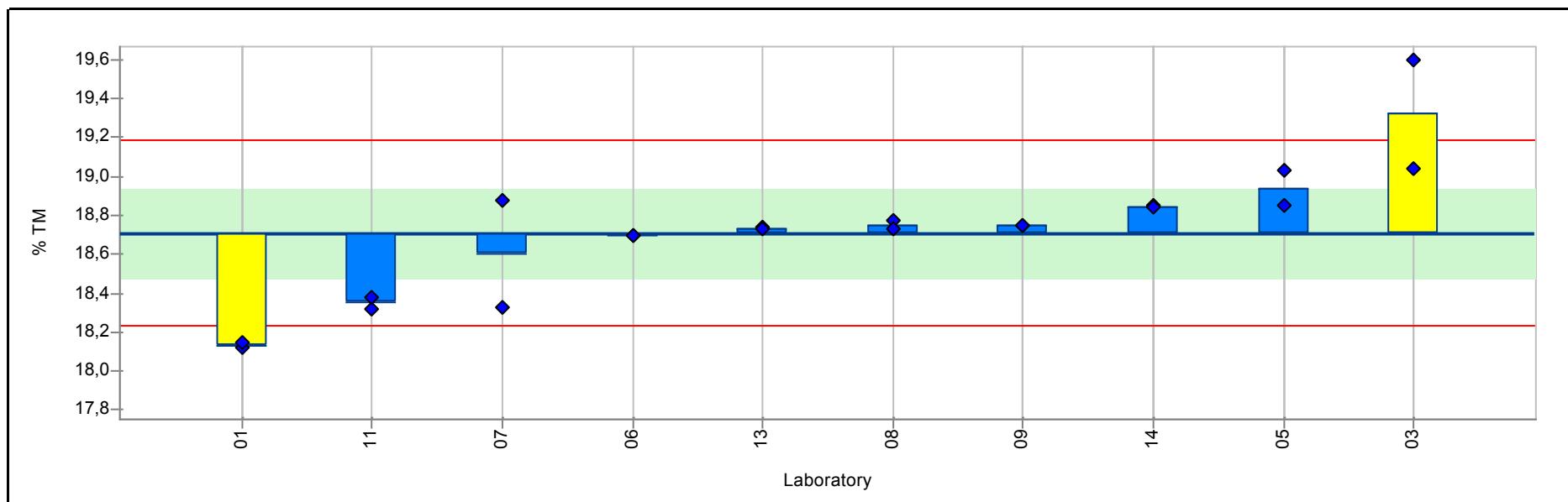
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	18,132	0,020	-2,411	18,118	18,146	no accreditation	Combustion for C and S	Leco TGA701
03	19,320	0,396	2,549	19,600	19,040	no accreditation	ISO 21068-2:2008-12	
05	18,940	0,127	0,963	18,850	19,030	ISO 17025	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	18,700	0,000	-0,039	18,700	18,700	ISO 17025	ISO 21068-2:2008-12	
07	18,605	0,389	-0,436	18,330	18,880	no accreditation	ISO 21068-2:2008-12	
08	18,750	0,028	0,170	18,770	18,730	ISO 17025	ISO 21068-2:2008-12	
09	18,750	0,001	0,170	18,751	18,749	no accreditation	ISO 21068-2:2008-12	
11	18,350	0,042	-1,500	18,320	18,380	ISO 17025	Combustion for C and S	
13	18,735	0,007	0,107	18,740	18,730	ISO 17025	ISO 21068-2:2008-12	
14	18,845	0,007	0,566	18,850	18,840	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	**SiC 37**	**Reprod. s.d.**	**0,023 % TM**
Measurand:	**Mg**	**Repeat. s.d**	**0,004 % TM**
Mean ± U(Mean):	**0,083 ± 0,024 % TM**	**Range of tolerance:**	**0,037 - 0,130 % TM (|z-score| <= 2,000)**
No. of laboratories:	**7**	**Statistical method**	**Q/Hampel**
Assigned value	**0,083 % TM (Empirical value)**	**Target s.d.**	**0,023 % TM (Empirical value)**
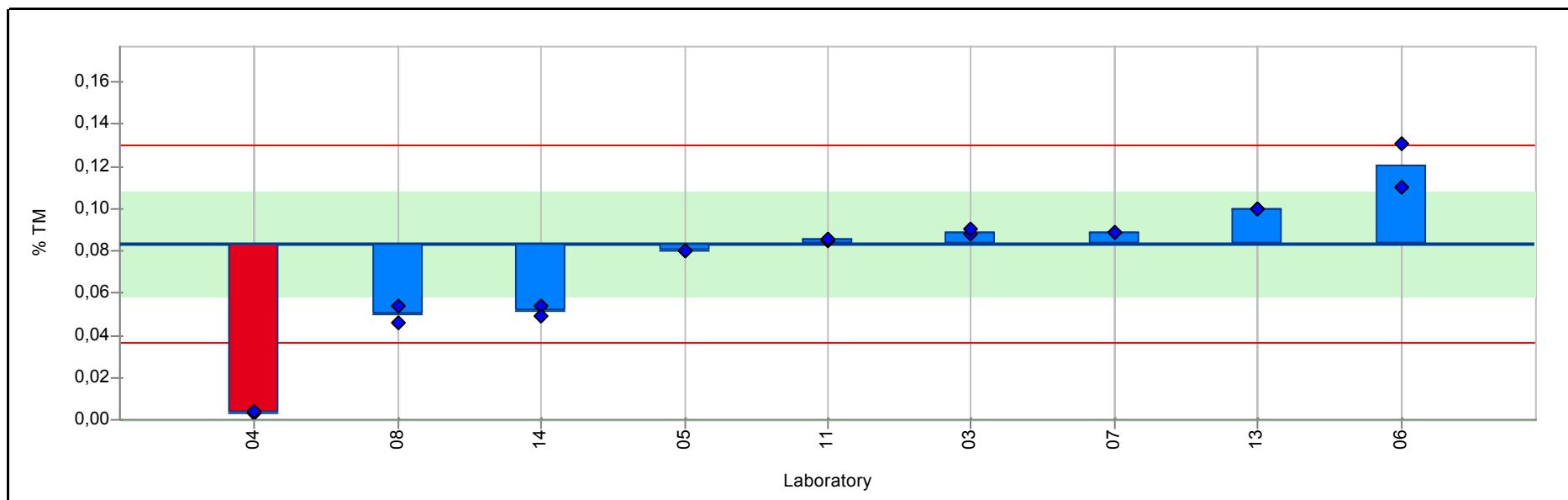
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,089	0,001	0,242	0,088	0,090	no accreditation	XRF fusion	
04	0,004	0,001	-3,418	0,003	0,004	no accreditation	Other Method	info only
05	0,080	0,000	-0,143	0,080	0,080	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,120	0,015	1,591	0,110	0,131	ISO 17025	XRF fusion	'C'
07	0,089	0,000	0,242	0,089	0,089	no accreditation	Other Method	ICP
08	0,050	0,006	-1,427	0,046	0,054	ISO 17025	Other Method	ICP-OES
11	0,085	0,001	0,092	0,085	0,086	ISO 17025	Other Method	ICP
13	0,100	0,000	0,713	0,100	0,100	ISO 17025	XRF fusion	
14	0,052	0,004	-1,363	0,054	0,049	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	**SiC 37**	**Reprod. s.d.**	**0,008 % TM**
Measurand:	**Ni**	**Repeat. s.d**	**0,001 % TM**
Mean ± U(Mean):	**0,019 ± 0,009 % TM**	**Range of tolerance:**	**0,004 - 0,034 % TM (|z-score| <= 2,000)**
No. of laboratories: 6		**Statistical method**	**Q/Hampel**
Assigned value	**0,019 % TM (Empirical value)**	**Target s.d.**	**0,008 % TM (Empirical value)**
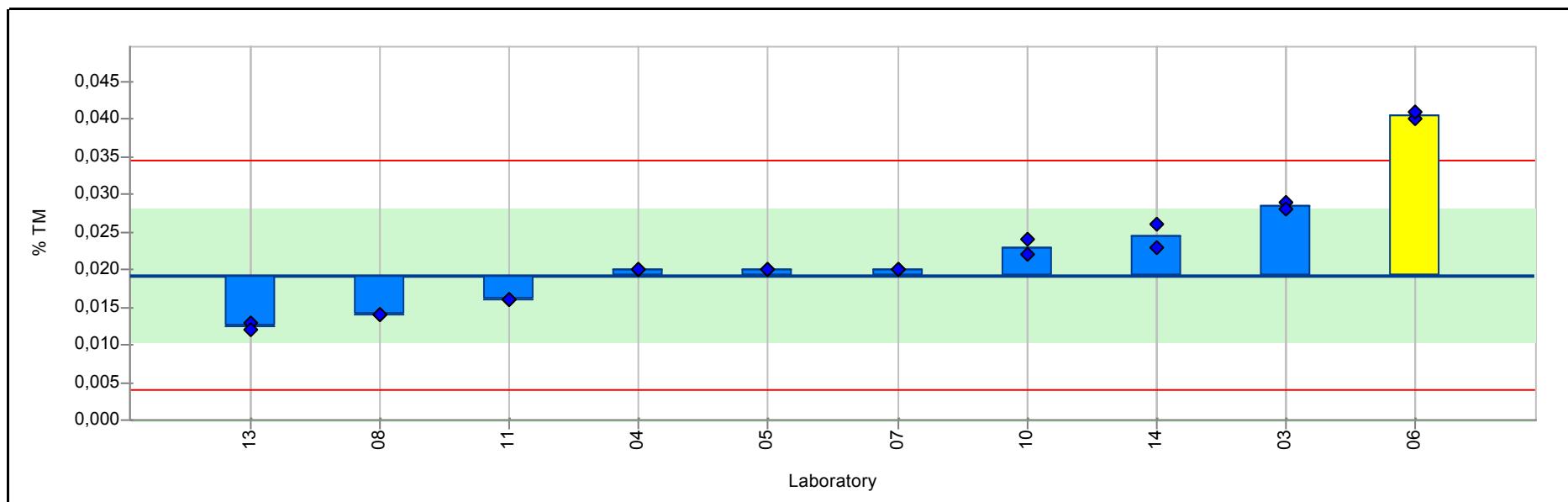
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,029	0,001	1,216	0,029	0,028	no accreditation	XRF fusion	
04	0,020	0,000	0,099	0,020	0,020	no accreditation	Other Method	info only
05	0,020	0,000	0,099	0,020	0,020	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,041	0,001	<mark>2,793</mark>	0,040	0,041	ISO 17025	Other Method	info only
07	0,020	0,000	0,099	0,020	0,020	no accreditation	Other Method	ICP
08	0,014	0,000	-0,690	0,014	0,014	ISO 17025	Other Method	ICP-OES
10	0,023	0,001	0,493	0,024	0,022	ISO 17025	Other Method	info only
11	0,016	0,000	-0,427	0,016	0,016	ISO 17025	Other Method	ICP
13	0,013	0,001	-0,887	0,013	0,012	ISO 17025	XRF fusion	
14	0,025	0,002	0,690	0,026	0,023	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	SiC 37	**Reprod. s.d.**	0,049 % TM
Measurand:	S	**Repeat. s.d**	0,004 % TM
Mean ± U(Mean):	0,336 ± 0,037 % TM	**Range of tolerance:**	0,238 - 0,433 % TM (|z-score| <= 2,000)
No. of laboratories:	9	**Statistical method**	Q/Hampel
Assigned value	0,336 % TM (Empirical value)	**Target s.d.**	0,049 % TM (Empirical value)
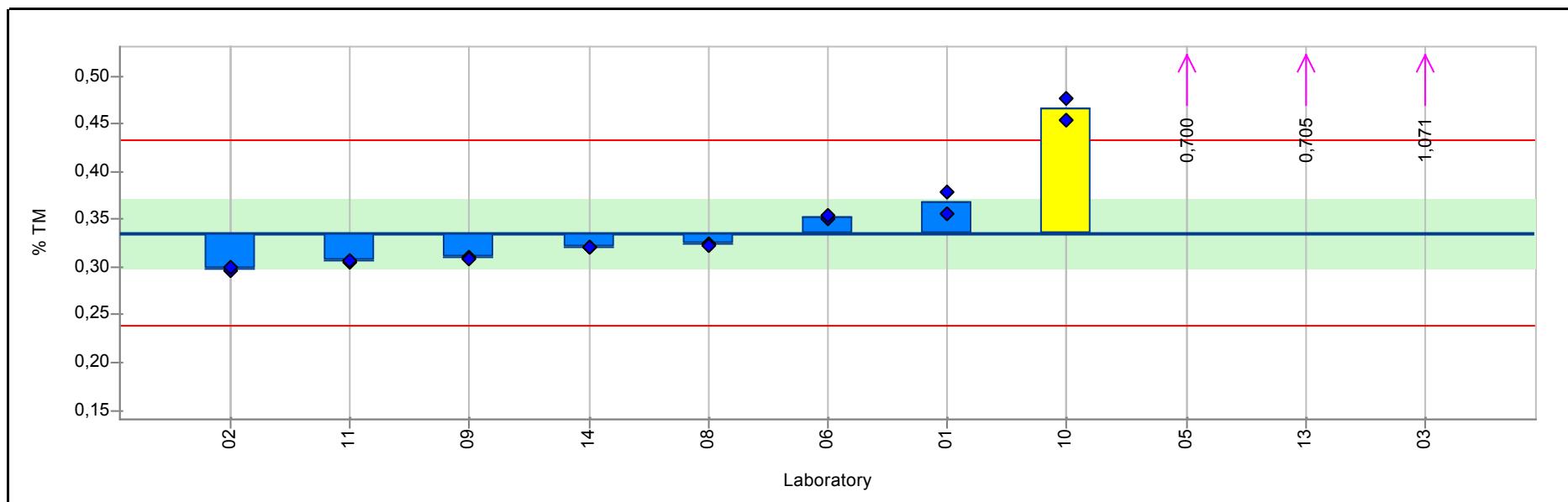
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	0,367	0,016	0,650	0,356	0,379	no accreditation	Combustion for C and S	Leco CS230 D4239 B
02	0,298	0,003	-0,773	0,296	0,300	no accreditation	Combustion for C and S	
03	1,071	0,003	15,060	1,073	1,069	no accreditation	XRF fusion	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
05	0,700	0,014	7,461	0,690	0,710	ISO 17025	Other Method	info only
06	0,352	0,003	0,333	0,350	0,354	ISO 17025	Combustion for C and S	
08	0,324	0,001	-0,251	0,324	0,323	ISO 17025	Combustion for C and S	DIN EN ISO 15350
09	0,310	0,001	-0,527	0,311	0,309	no accreditation	Combustion for C and S	
10	0,466	0,016	2,658	0,477	0,454	ISO 17025	Combustion for C and S	
11	0,306	0,001	-0,609	0,305	0,307	ISO 17025	Combustion for C and S	
13	0,705	0,021	7,563	0,690	0,720	ISO 17025	Combustion for C and S	
14	0,320	0,000	-0,323	0,320	0,320	no accreditation	Combustion for C and S	

RV_2016_01_SiC

Sample:	**SiC 37**	**Reprod. s.d.**	**1,837 % TM**
Measurand:	**SiC**	**Repeat. s.d**	**0,216 % TM**
Mean ± U(Mean):	**40,680 ± 1,251 % TM**	**Range of tolerance:**	**37,006 - 44,354 % TM (|z-score| <= 2,000)**
No. of laboratories: 11		**Statistical method**	**Q/Hampel**
Assigned value	**40,680 % TM (Empirical value)**	**Target s.d.**	**1,837 % TM (Empirical value)**
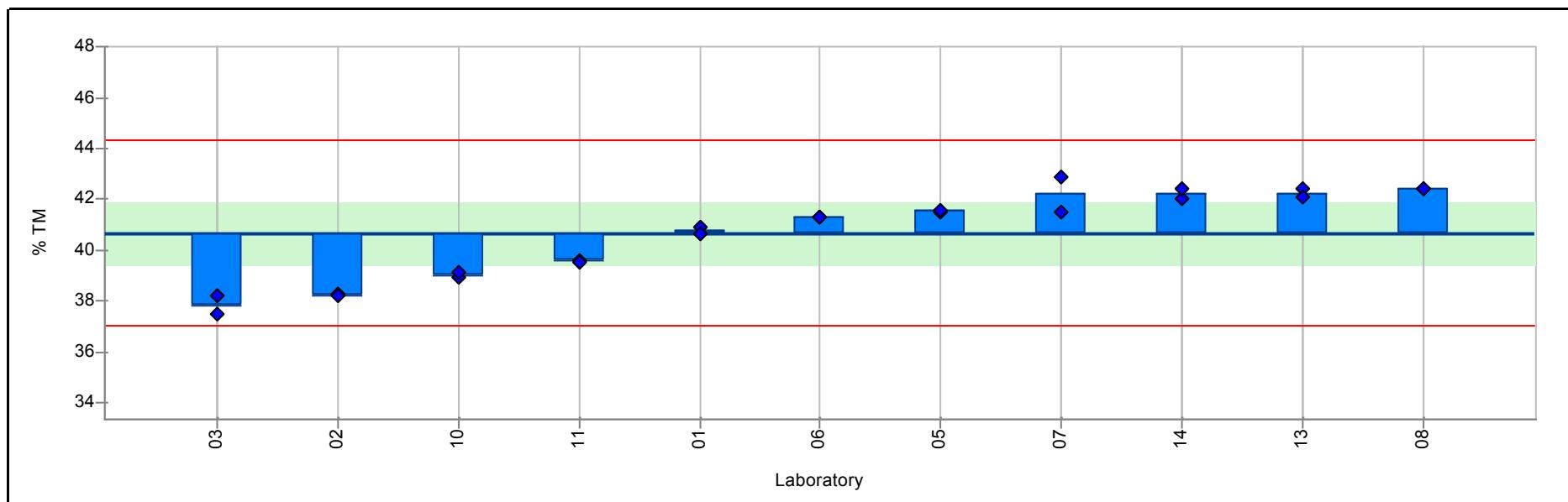
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	40,793	0,182	0,061	40,921	40,664	no accreditation	Combustion for C and S	4511
02	38,230	0,057	-1,334	38,270	38,190	no accreditation	Combustion for C and S	
03	37,845	0,544	-1,543	37,460	38,230	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
05	41,545	0,035	0,471	41,520	41,570	ISO 17025	ISO 21068-2:2008-12	
06	41,333	0,000	0,355	41,333	41,333	ISO 17025	ISO 21068-2:2008-12	
07	42,200	0,990	0,827	41,500	42,900	no accreditation	ISO 21068-2:2008-12	
08	42,425	0,007	0,950	42,430	42,420	ISO 17025	ISO 21068-2:2008-12	
10	39,020	0,141	-0,904	38,920	39,120	ISO 17025	Other Method	Calculation
11	39,564	0,078	-0,608	39,619	39,508	ISO 17025	ISO 21068-2:2008-12	
13	42,250	0,212	0,854	42,400	42,100	ISO 17025	ISO 21068-2:2008-12	
14	42,200	0,283	0,827	42,000	42,400	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	**SiC 37**		**Reprod. s.d.**	**0,067 % TM**
Measurand:	**Si free**		**Repeat. s.d**	**0,009 % TM**
Mean ± U(Mean):	**0,093 ± 0,068 % TM**		**Range of tolerance:**	**-0,040 - 0,227 % TM (|z-score| <= 2,000)**
No. of laboratories:	**7**		**Statistical method**	**Q/Hampel**
Assigned value	**0,093 % TM (Empirical value)**		**Target s.d.**	**0,067 % TM (Empirical value)**
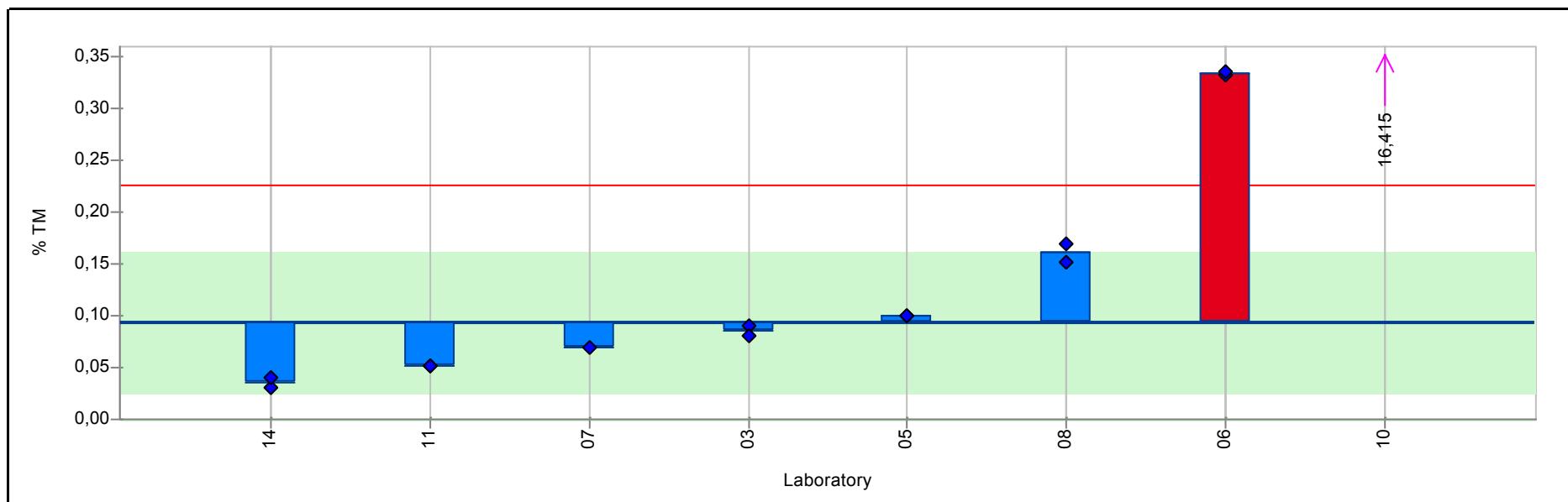
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,085	0,007	-0,126	0,090	0,080	no accreditation	ISO 21068-2:2008-12	
05	0,100	0,000	0,099	0,100	0,100	ISO 17025	Other Method	XRD, Rietveld
06	0,335	0,002	3,621	0,333	0,336	ISO 17025	ISO 21068-2:2008-12	ICP

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
07	0,070		-0,352	0,070		no accreditation	ISO 21068-2:2008-12	
08	0,161	0,013	1,008	0,151	0,170	ISO 17025	ISO 21068-2:2008-12	
10	16,415	0,148	245,165	16,310	16,520	no accredition	Other Method	'C'; info only
11	0,051	0,001	-0,630	0,051	0,052	ISO 17025	ISO 21068-2:2008-12	
14	0,035	0,007	-0,877	0,030	0,040	no accreditation	ISO 21068-2:2008-12	gas volumetric method

RV_2016_01_SiC

Sample:	SiC 37	**Reprod. s.d.**	4,728 % TM
Measurand:	SiO2	**Repeat. s.d**	0,124 % TM
Mean ± U(Mean):	34,590 ± 5,286 % TM	**Range of tolerance:**	25,134 - 44,045 % TM (|z-score| <= 2,000)
No. of laboratories:	5	**Statistical method**	Q/Hampel
Assigned value	34,590 % TM (Empirical value)	**Target s.d.**	4,728 % TM (Empirical value)
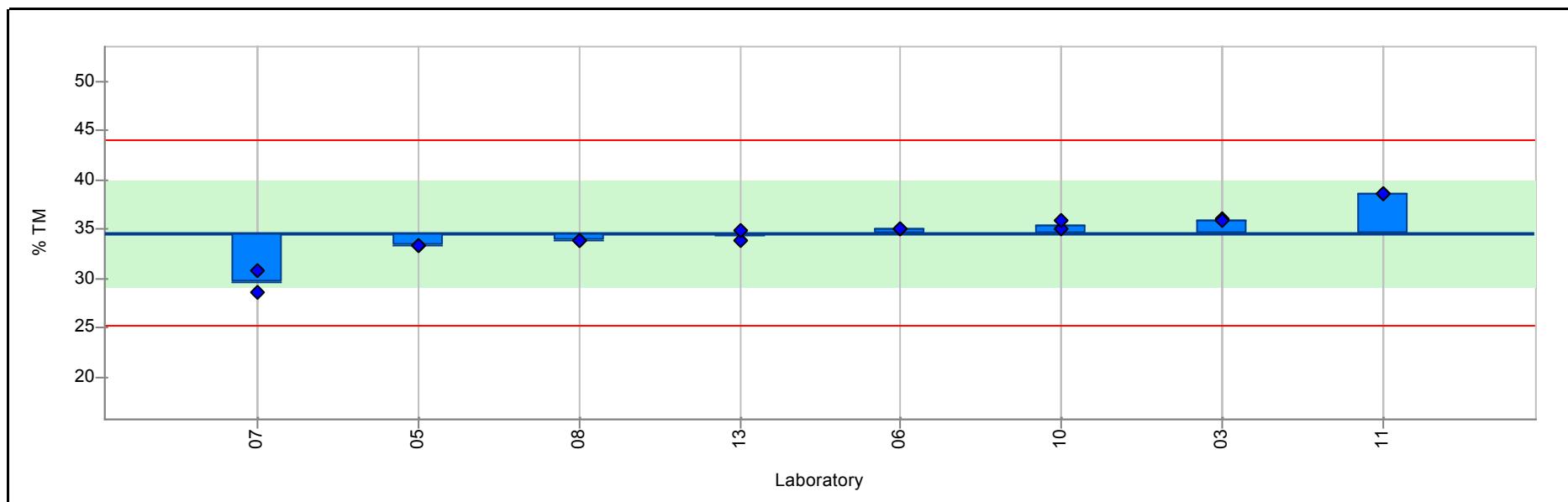
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	35,940	0,113	0,286	36,020	35,860	no accreditation	ISO 21068-2:2008-12	
05	33,400	0,000	-0,252	33,400	33,400	ISO 17025	Other Method	info only
06	35,010	0,000	0,089	35,010	35,010	ISO 17025	Other Method	Calculation

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
07	29,625	1,563	-1,050	28,520	30,730	no accreditation	ISO 21068-2:2008-12	
08	33,809	0,049	-0,165	33,844	33,775	ISO 17025	ISO 21068-2:2008-12	Calculation
10	35,435	0,502	0,179	35,080	35,790	no accredition	Other Method	info only
11	38,563	0,095	0,840	38,496	38,630	ISO 17025	ISO 21068-2:2008-12	Calculation
13	34,350	0,636	-0,051	33,900	34,800	ISO 17025	ISO 21068-2:2008-12	info only

RV_2016_01_SiC

Sample:	SiC 37	**Reprod. s.d.**	0,422 % TM
Measurand:	Si total	**Repeat. s.d**	0,189 % TM
Mean ± U(Mean):	45,790 ± 0,430 % TM	**Range of tolerance:**	44,947 - 46,634 % TM (|z-score| <= 2,000)
No. of laboratories:	5	**Statistical method**	Q/Hampel
Assigned value	45,790 % TM (Empirical value)	**Target s.d.**	0,422 % TM (Empirical value)
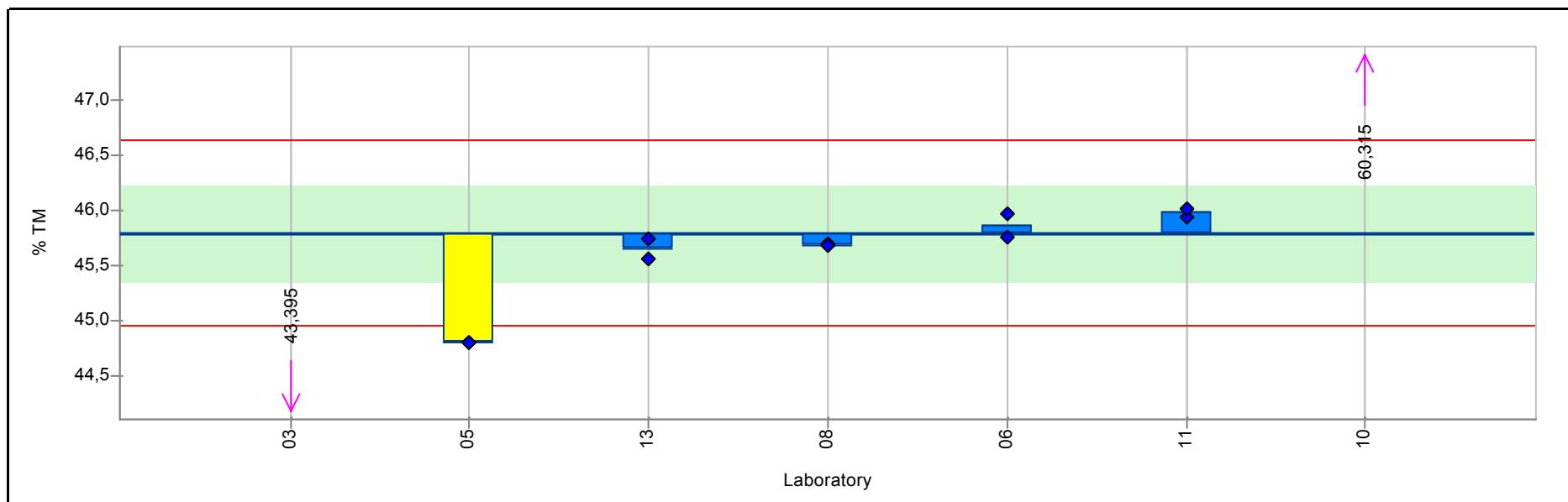
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	43,395	0,318	-5,681	43,170	43,620	no accreditation	ISO 21068-2:2008-12	
05	44,800	0,000	-2,349	44,800	44,800	ISO 17025	Other Method	info only
06	45,853	0,153	0,150	45,745	45,962	ISO 17025	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
08	45,680	0,014	-0,261	45,690	45,670	ISO 17025	Other Method	Volumetric
10	60,315	0,488	34,449	59,970	60,660	no accredition	Other Method	info only
11	45,977	0,053	0,444	45,940	46,015	ISO 17025	XRF fusion	
13	45,650	0,127	-0,333	45,560	45,740	ISO 17025	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	**SiC 37**	**Reprod. s.d.**	**0,012 % TM**
Measurand:	**Ti**	**Repeat. s.d**	**0,003 % TM**
Mean ± U(Mean):	**0,046 ± 0,012 % TM**	**Range of tolerance:**	**0,023 - 0,070 % TM (|z-score| <= 2,000)**
No. of laboratories: 6		**Statistical method**	**Q/Hampel**
Assigned value	**0,046 % TM (Empirical value)**	**Target s.d.**	**0,012 % TM (Empirical value)**
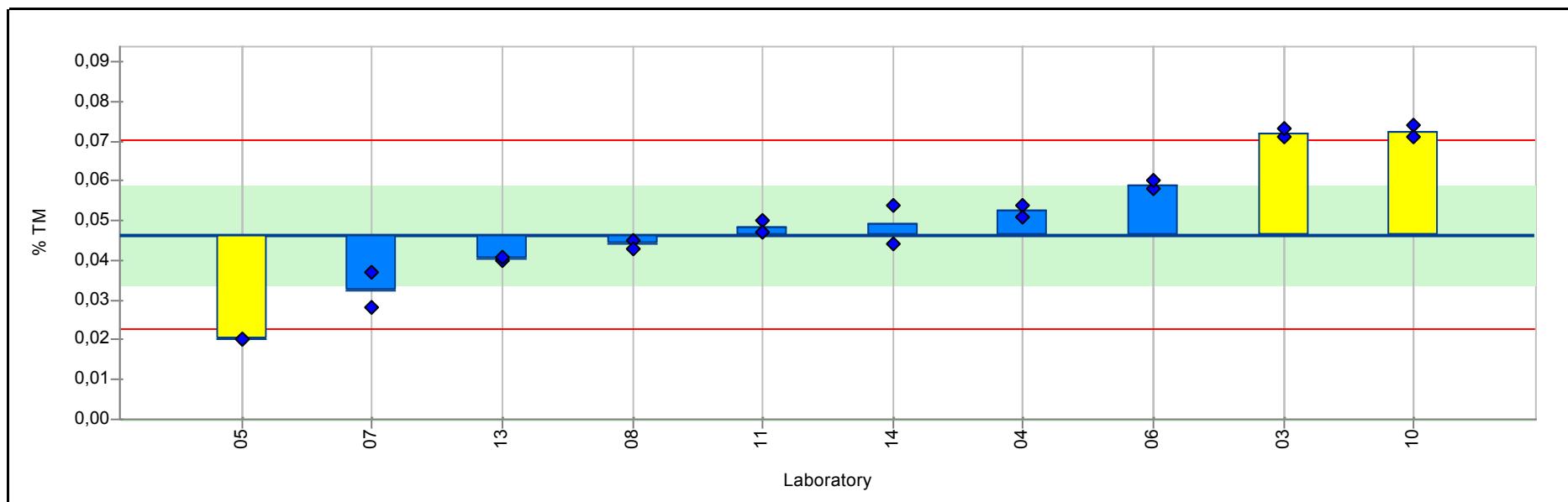
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,072	0,001	2,159	0,071	0,073	no accreditation	XRF fusion	
04	0,052	0,002	0,511	0,054	0,051	no accreditation	Other Method	info only
05	0,020	0,000	-2,235	0,020	0,020	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,059	0,001	1,060	0,058	0,060	ISO 17025	Other Method	info only
07	0,033	0,006	-1,179	0,037	0,028	no accreditation	Other Method	ICP
08	0,044	0,001	-0,207	0,045	0,043	ISO 17025	Other Method	ICP-OES
10	0,072	0,002	2,201	0,074	0,071	ISO 17025	Other Method	info only
11	0,049	0,002	0,173	0,050	0,047	ISO 17025	Other Method	ICP
13	0,041	0,001	-0,503	0,040	0,041	ISO 17025	XRF fusion	
14	0,049	0,007	0,215	0,044	0,054	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	SiC 37	**Reprod. s.d.**	0,013 % TM	
Measurand:	V	**Repeat. s.d**	0,002 % TM	
Mean ± U(Mean):	0,055 ± 0,014 % TM	**Range of tolerance:**	0,029 - 0,082 % TM (|z-score| <= 2,000)	
No. of laboratories:	6	**Statistical method**	Q/Hampel	
Assigned value	0,055 % TM (Empirical value)	**Target s.d.**	0,013 % TM (Empirical value)	
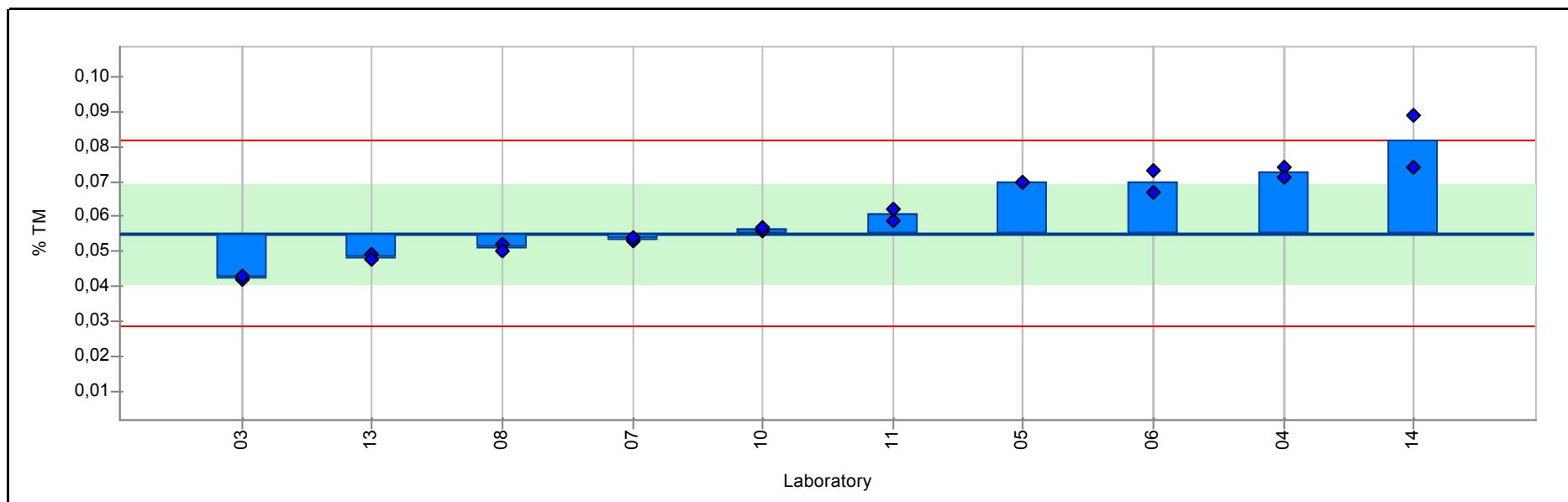
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,042	0,001	-0,953	0,042	0,043	no accreditation	XRF fusion	
04	0,072	0,002	1,300	0,074	0,071	no accreditation	Other Method	info only
05	0,070	0,000	1,112	0,070	0,070	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,070	0,004	1,112	0,067	0,073	ISO 17025	Other Method	info only
07	0,053	0,001	-0,127	0,053	0,054	no accreditation	Other Method	ICP
08	0,051	0,001	-0,315	0,052	0,050	ISO 17025	Other Method	ICP-OES
10	0,057	0,001	0,098	0,056	0,057	ISO 17025	Other Method	info only
11	0,060	0,002	0,398	0,062	0,059	ISO 17025	Other Method	ICP
13	0,049	0,001	-0,503	0,049	0,048	ISO 17025	XRF fusion	
14	0,081	0,011	1,976	0,074	0,089	no accreditation	Other Method	'C'; ICP

RV_2016_01_SiC

Sample:	**SiC 85**	**Reprod. s.d.**	**0,062 % TM**
Measurand:	**Al**	**Repeat. s.d**	**0,005 % TM**
Mean ± U(Mean):	**0,332 ± 0,065 % TM**	**Range of tolerance:**	**0,207 - 0,456 % TM (|z-score| <= 2,000)**
No. of laboratories:	**7**	**Statistical method**	**Q/Hampel**
Assigned value	**0,332 % TM (Empirical value)**	**Target s.d.**	**0,062 % TM (Empirical value)**
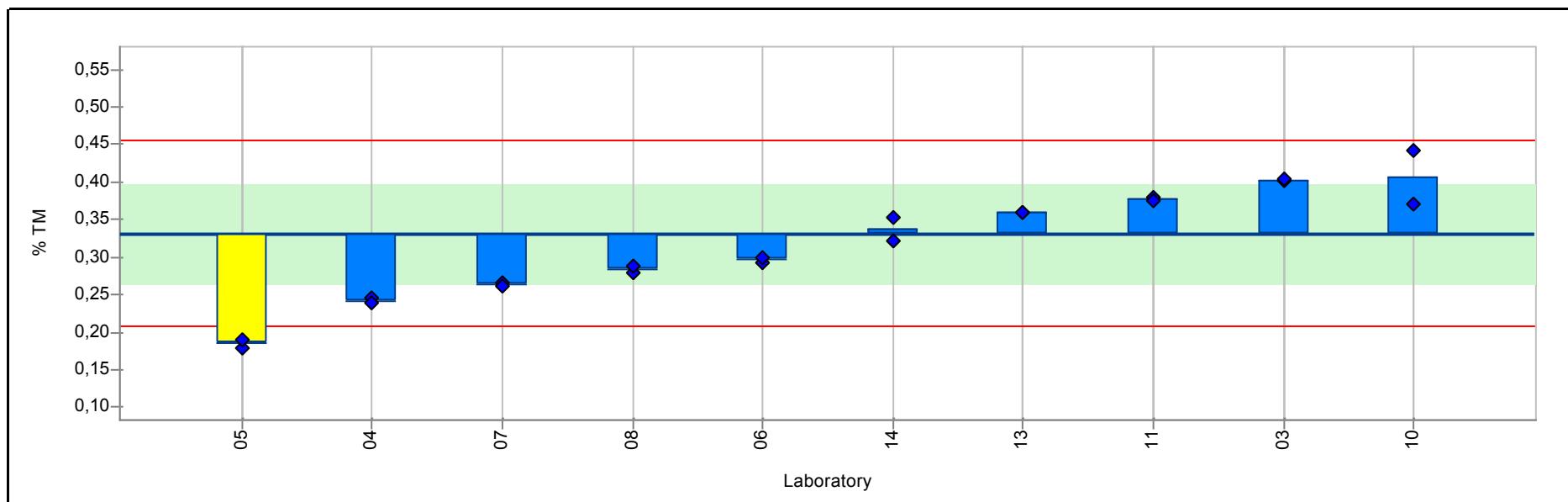
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,403	0,003	1,147	0,401	0,405	no accreditation	XRF fusion	
04	0,242	0,004	-1,436	0,245	0,240	no accreditation	Other Method	info only
05	0,185	0,007	-2,361	0,180	0,190	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,296	0,005	-0,567	0,293	0,300	ISO 17025	XRF fusion	
07	0,264	0,004	-1,098	0,266	0,261	no accreditation	Other Method	ICP
08	0,284	0,006	-0,760	0,280	0,289	ISO 17025	Other Method	ICP-OES
10	0,407	0,051	1,212	0,443	0,371	ISO 17025	Other Method	'C'; info only
11	0,378	0,003	0,745	0,380	0,376	ISO 17025	XRF fusion	
13	0,360	0,000	0,455	0,360	0,360	ISO 17025	XRF fusion	
14	0,337	0,022	0,077	0,321	0,352	no accreditation	Other Method	'C'; ICP

RV_2016_01_SiC

Sample:	**SiC 85**	**Reprod. s.d.**	**0,062 % TM**
Measurand:	**Ca**	**Repeat. s.d**	**0,009 % TM**
Mean ± U(Mean):	**0,203 ± 0,058 % TM**	**Range of tolerance:**	**0,078 - 0,327 % TM (|z-score| <= 2,000)**
No. of laboratories:	**7**	**Statistical method**	**Q/Hampel**
Assigned value	**0,203 % TM (Empirical value)**	**Target s.d.**	**0,062 % TM (Empirical value)**
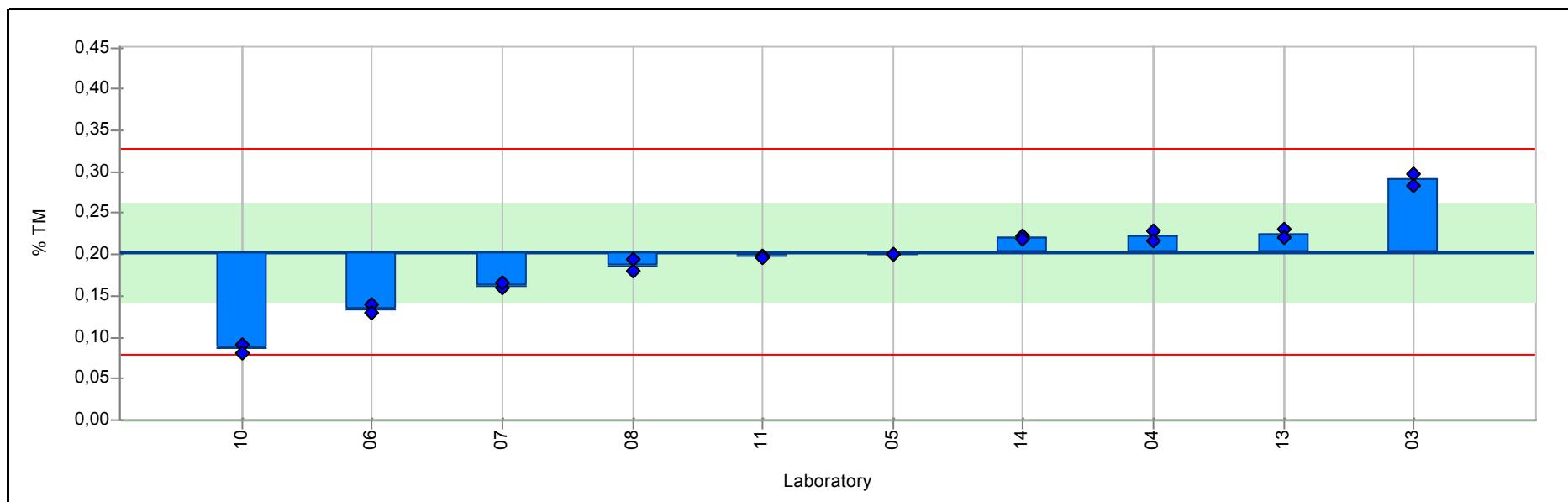
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,290	0,011	1,416	0,298	0,283	no accreditation	XRF fusion	
04	0,223	0,008	0,322	0,228	0,217	no accreditation	Other Method	info only
05	0,200	0,000	-0,040	0,200	0,200	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,135	0,006	-1,094	0,139	0,130	ISO 17025	XRF fusion	
07	0,163	0,005	-0,644	0,159	0,166	no accreditation	Other Method	ICP
08	0,187	0,010	-0,249	0,180	0,194	ISO 17025	Other Method	ICP-OES
10	0,086	0,008	-1,867	0,092	0,081	ISO 17025	Other Method	info only
11	0,198	0,001	-0,072	0,199	0,197	ISO 17025	XRF fusion	
13	0,225	0,007	0,362	0,230	0,220	ISO 17025	XRF fusion	
14	0,220	0,003	0,282	0,222	0,218	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	**SiC 85**		**Reprod. s.d.**	**0,671 % TM**
Measurand:	**C free**		**Repeat. s.d**	**0,063 % TM**
Mean ± U(Mean):	**5,123 ± 0,514 % TM**		**Range of tolerance:**	**3,781 - 6,464 % TM (|z-score| <= 2,000)**
No. of laboratories: 11			**Statistical method**	**Q/Hampel**
Assigned value	**5,123 % TM (Empirical value)**		**Target s.d.**	**0,671 % TM (Empirical value)**
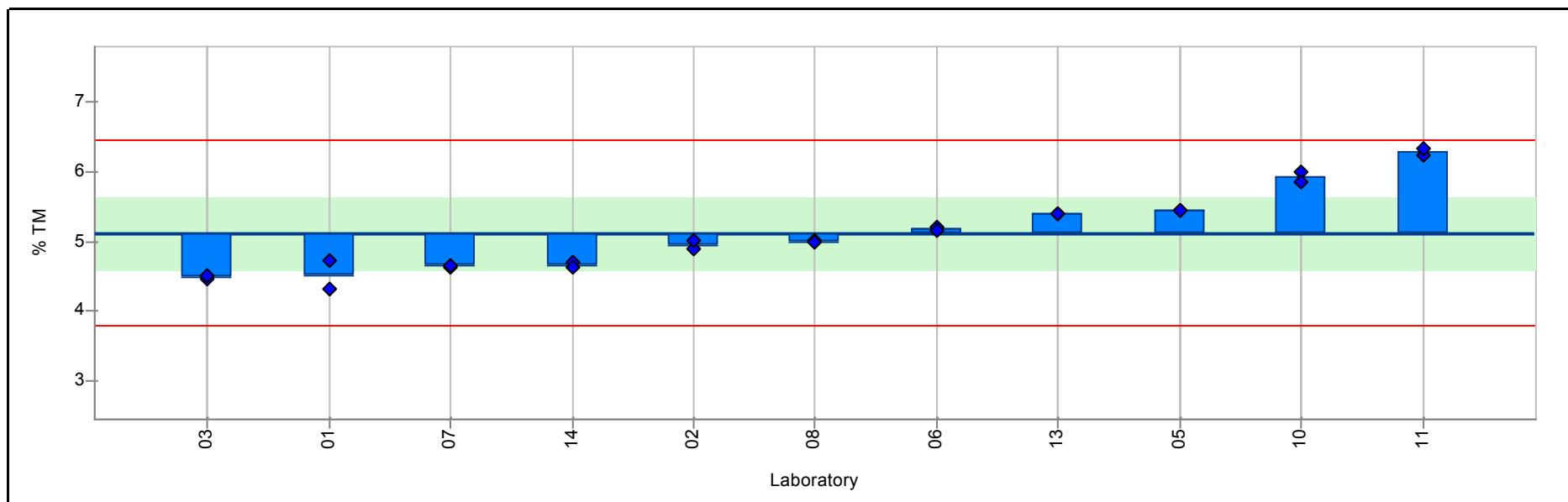
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	4,516	0,280	-0,905	4,318	4,714	no accreditation	Combustion for C and S	'C'; Leco CS230
02	4,950	0,085	-0,258	4,890	5,010	no accreditation	Combustion for C and S	
03	4,490	0,042	-0,943	4,460	4,520	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
05	5,445	0,007	0,480	5,440	5,450	ISO 17025	ISO 21068-2:2008-12	
06	5,191	0,029	0,101	5,211	5,170	ISO 17025	ISO 21068-2:2008-12	
07	4,650	0,014	-0,705	4,640	4,660	no accreditation	ISO 21068-2:2008-12	
08	4,995	0,021	-0,190	5,010	4,980	ISO 17025	ISO 21068-2:2008-12	
10	5,920	0,099	1,189	5,990	5,850	ISO 17025	Other Method	Calculation
11	6,287	0,055	1,736	6,248	6,326	ISO 17025	ISO 21068-2:2008-12	
13	5,400	0,014	0,413	5,410	5,390	ISO 17025	ISO 21068-2:2008-12	
14	4,665	0,064	-0,683	4,710	4,620	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	**SiC 85**	**Reprod. s.d.**	**0,408 % TM**
Measurand:	**C total**	**Repeat. s.d**	**0,047 % TM**
Mean ± U(Mean):	**31,171 ± 0,316 % TM**	**Range of tolerance:**	**30,355 - 31,986 % TM (|z-score| <= 2,000)**
No. of laboratories: 11		**Statistical method**	**Q/Hampel**
Assigned value	**31,171 % TM (Empirical value)**	**Target s.d.**	**0,408 % TM (Empirical value)**
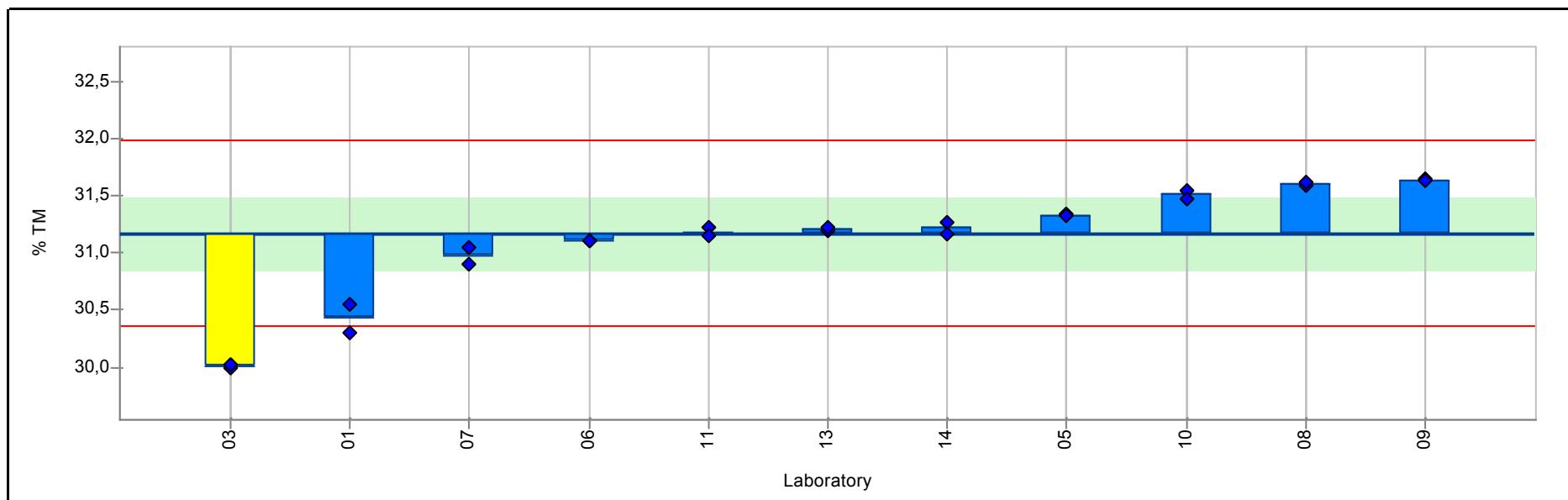
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	30,428	0,173	-1,823	30,305	30,550	no accreditation	Combustion for C and S	Leco CS230
03	30,010	0,014	-2,848	30,000	30,020	no accreditation	ISO 21068-2:2008-12	
05	31,330	0,014	0,391	31,340	31,320	ISO 17025	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	31,110	0,000	-0,149	31,110	31,110	ISO 17025	ISO 21068-2:2008-12	
07	30,970	0,099	-0,492	31,040	30,900	no accreditation	ISO 21068-2:2008-12	
08	31,600	0,014	1,054	31,590	31,610	ISO 17025	ISO 21068-2:2008-12	
09	31,633	0,013	1,135	31,642	31,624	no accreditation	Combustion for C and S	
10	31,510	0,057	0,833	31,550	31,470	ISO 17025	Combustion for C and S	
11	31,185	0,049	0,035	31,220	31,150	ISO 17025	Combustion for C and S	
13	31,205	0,021	0,084	31,190	31,220	ISO 17025	ISO 21068-2:2008-12	
14	31,215	0,078	0,109	31,270	31,160	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	**SiC 85**		**Reprod. s.d.**	**0,333 % TM**
Measurand:	**Fe**		**Repeat. s.d**	**0,027 % TM**
Mean ± U(Mean):	**1,168 ± 0,279 % TM**		**Range of tolerance:**	**0,503 - 1,834 % TM (|z-score| <= 2,000)**
No. of laboratories:	7		**Statistical method**	**Q/Hampel**
Assigned value	**1,168 % TM (Empirical value)**		**Target s.d.**	**0,333 % TM (Empirical value)**
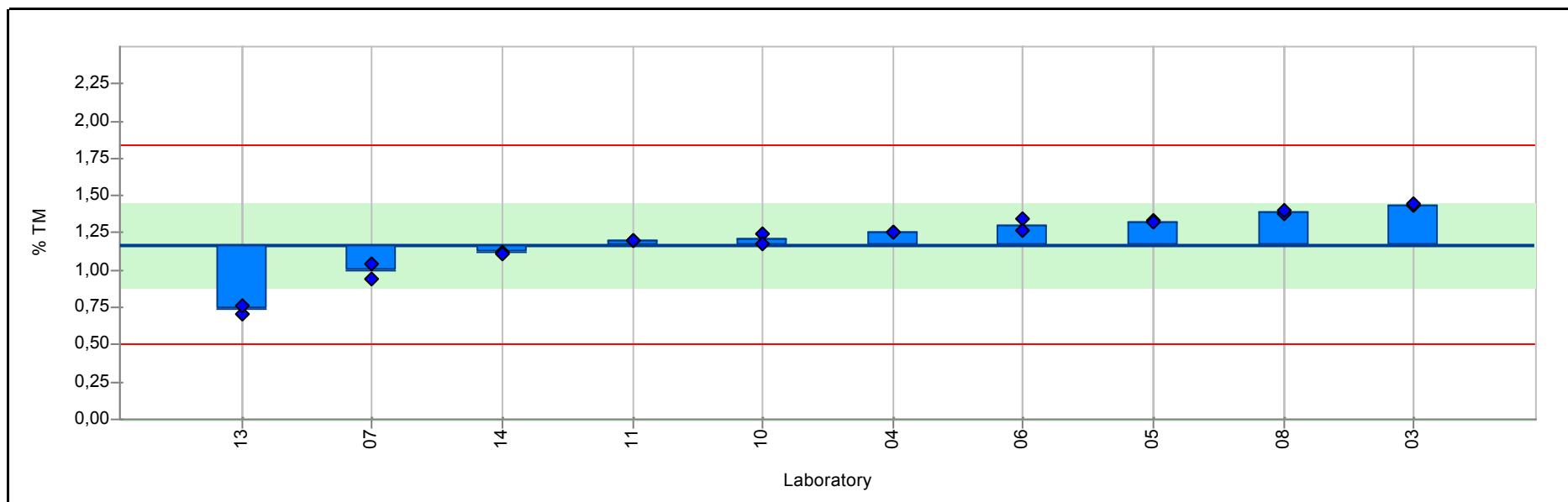
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	1,441	0,006	0,817	1,436	1,445	no accreditation	XRF fusion	
04	1,256	0,004	0,262	1,253	1,258	no accreditation	Other Method	info only
05	1,325	0,007	0,470	1,330	1,320	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	1,305	0,058	0,410	1,346	1,264	ISO 17025	XRF fusion	
07	0,992	0,069	-0,529	0,944	1,041	no accreditation	Other Method	ICP
08	1,387	0,018	0,657	1,374	1,400	ISO 17025	Other Method	ICP-OES
10	1,208	0,050	0,117	1,243	1,172	ISO 17025	Other Method	info only
11	1,202	0,004	0,099	1,199	1,204	ISO 17025	XRF fusion	
13	0,735	0,035	-1,302	0,710	0,760	ISO 17025	XRF fusion	
14	1,118	0,009	-0,153	1,124	1,111	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	SiC 85	**Reprod. s.d.**	0,215 % TM
Measurand:	LOI @750°C	**Repeat. s.d**	0,028 % TM
Mean ± U(Mean):	3,501 ± 0,200 % TM	**Range of tolerance:**	3,072 - 3,930 % TM (|z-score| <= 2,000)
No. of laboratories:	10	**Statistical method**	Q/Hampel
Assigned value	3,501 % TM (Empirical value)	**Target s.d.**	0,215 % TM (Empirical value)
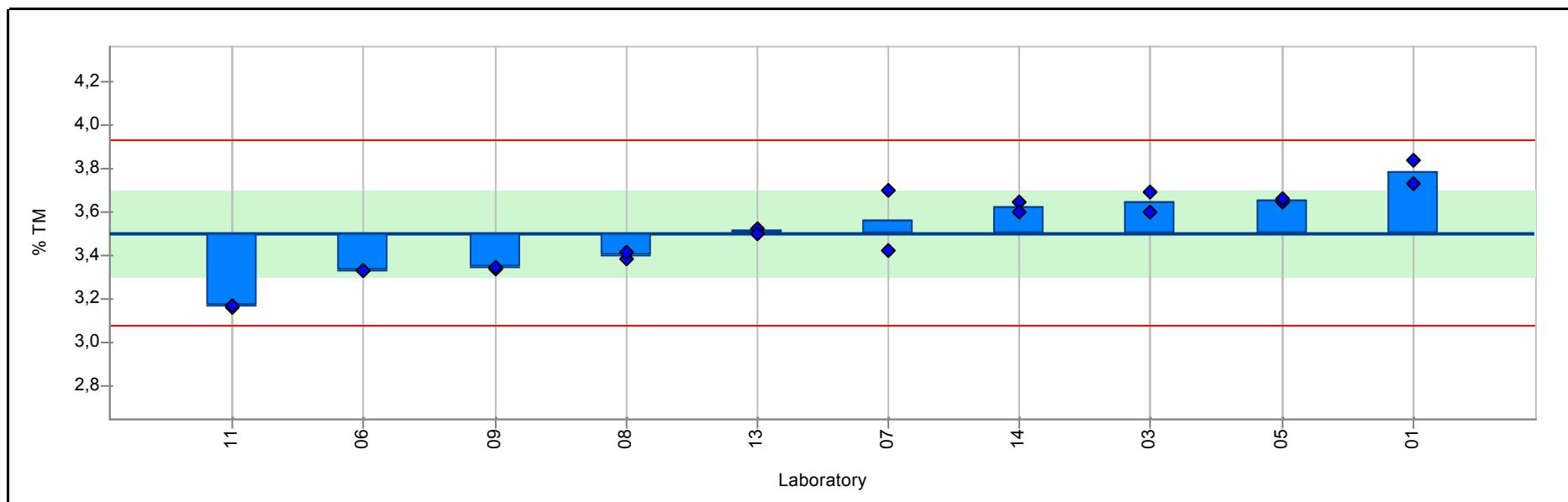
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	3,782	0,080	1,312	3,726	3,839	no accreditation	Combustion for C and S	Leco TGA701
03	3,645	0,064	0,671	3,690	3,600	no accreditation	ISO 21068-2:2008-12	
05	3,650	0,014	0,694	3,640	3,660	ISO 17025	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	3,330	0,000	-0,797	3,330	3,330	ISO 17025	ISO 21068-2:2008-12	
07	3,559	0,197	0,270	3,420	3,698	no accreditation	ISO 21068-2:2008-12	'C'
08	3,395	0,021	-0,494	3,380	3,410	ISO 17025	ISO 21068-2:2008-12	
09	3,340	0,002	-0,753	3,338	3,341	no accreditation	ISO 21068-2:2008-12	
11	3,165	0,007	-1,567	3,160	3,170	ISO 17025	Combustion for C and S	
13	3,510	0,014	0,042	3,520	3,500	ISO 17025	ISO 21068-2:2008-12	
14	3,620	0,028	0,555	3,640	3,600	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	**SiC 85**		**Reprod. s.d.**	**0,011 % TM**
Measurand:	**Mg**		**Repeat. s.d**	**0,001 % TM**
Mean ± U(Mean):	**0,013 ± 0,009 % TM**		**Range of tolerance:**	**-0,009 - 0,034 % TM (|z-score| <= 2,000)**
No. of laboratories:	**7**		**Statistical method**	**Q/Hampel**
Assigned value	**0,013 % TM (Empirical value)**		**Target s.d.**	**0,011 % TM (Empirical value)**
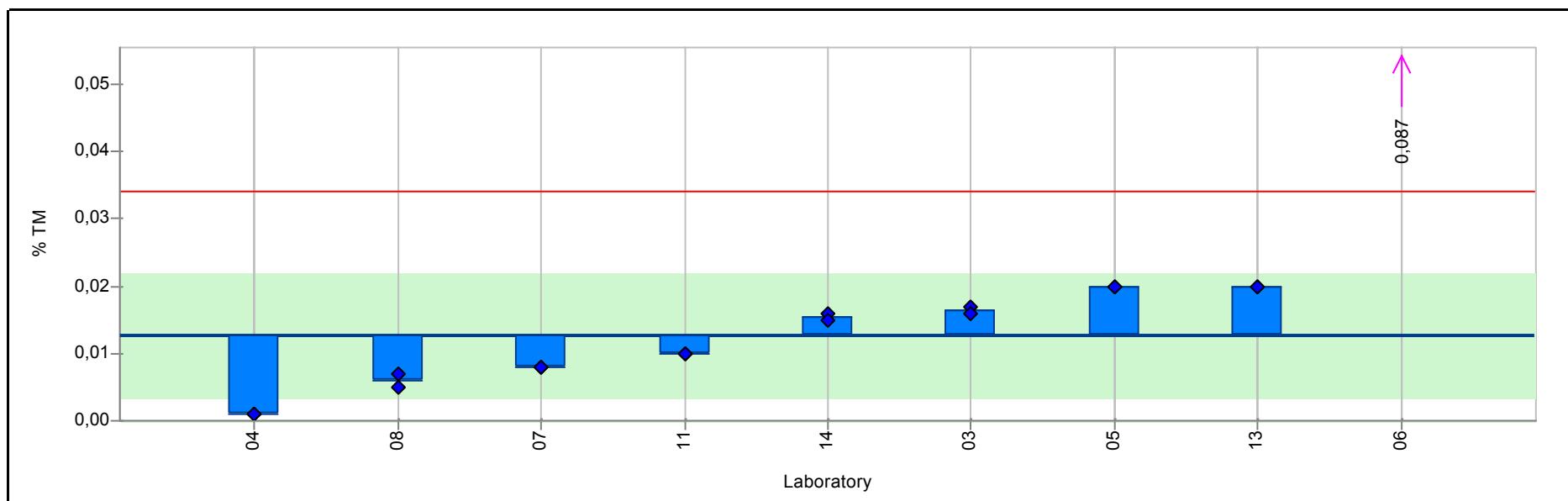
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,017	0,001	0,358	0,017	0,016	no accreditation	XRF fusion	
04	0,001	0,000	-1,090	0,001	0,001	no accreditation	Other Method	info only
05	0,020	0,000	0,685	0,020	0,020	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,087	0,001	6,994	0,088	0,087	ISO 17025	XRF fusion	
07	0,008	0,000	-0,436	0,008	0,008	no accreditation	Other Method	ICP
08	0,006	0,001	-0,623	0,005	0,007	ISO 17025	Other Method	ICP-OES
11	0,010	0,000	-0,249	0,010	0,010	ISO 17025	Other Method	ICP
13	0,020	0,000	0,685	0,020	0,020	ISO 17025	XRF fusion	
14	0,015	0,001	0,265	0,016	0,015	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	**SiC 85**	**Reprod. s.d.**	**0,013 % TM**
Measurand:	**Ni**	**Repeat. s.d**	**0,002 % TM**
Mean ± U(Mean):	**0,025 ± 0,013 % TM**	**Range of tolerance:**	**-0,001 - 0,050 % TM (|z-score| <= 2,000)**
No. of laboratories: 6		**Statistical method**	**Q/Hampel**
Assigned value	**0,025 % TM (Empirical value)**	**Target s.d.**	**0,013 % TM (Empirical value)**
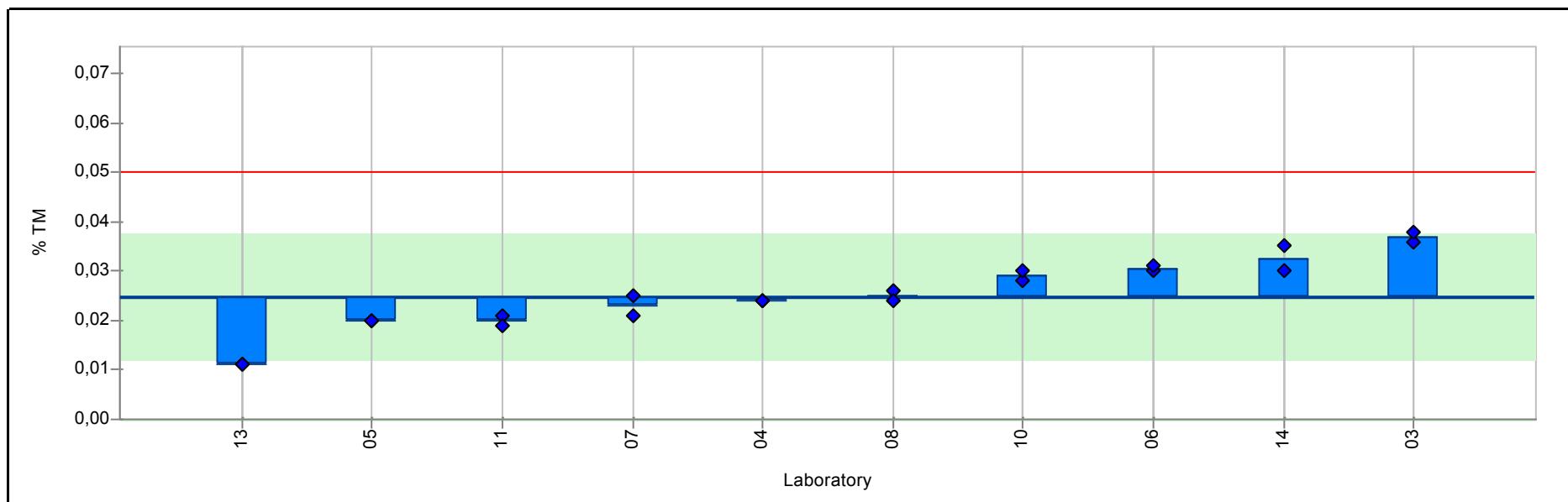
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,037	0,001	0,968	0,036	0,038	no accreditation	XRF fusion	
04	0,024	0,000	-0,059	0,024	0,024	no accreditation	Other Method	info only
05	0,020	0,000	-0,375	0,020	0,020	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,030	0,001	0,454	0,030	0,031	ISO 17025	Other Method	info only
07	0,023	0,003	-0,138	0,021	0,025	no accreditation	Other Method	ICP
08	0,025	0,001	0,020	0,026	0,024	ISO 17025	Other Method	ICP-OES
10	0,029	0,001	0,336	0,028	0,030	ISO 17025	Other Method	info only
11	0,020	0,001	-0,375	0,021	0,019	ISO 17025	Other Method	ICP
13	0,011	0,000	-1,086	0,011	0,011	ISO 17025	XRF fusion	
14	0,033	0,004	0,612	0,035	0,030	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	**SiC 85**	**Reprod. s.d.**	**0,023 % TM**
Measurand:	**S**	**Repeat. s.d**	**0,004 % TM**
Mean ± U(Mean):	**0,078 ± 0,020 % TM**	**Range of tolerance:**	**0,031 - 0,125 % TM (|z-score| <= 2,000)**
No. of laboratories: 9		**Statistical method**	**Q/Hampel**
Assigned value	**0,078 % TM (Empirical value)**	**Target s.d.**	**0,023 % TM (Empirical value)**

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	0,083	0,008	0,224	0,077	0,089	no accreditation	Combustion for C and S	Leco CS230 D4239 B
02	0,086	0,001	0,353	0,087	0,085	no accreditation	Combustion for C and S	
03	0,185	0,021	4,583	0,170	0,200	no accreditation	XRF fusion	info only
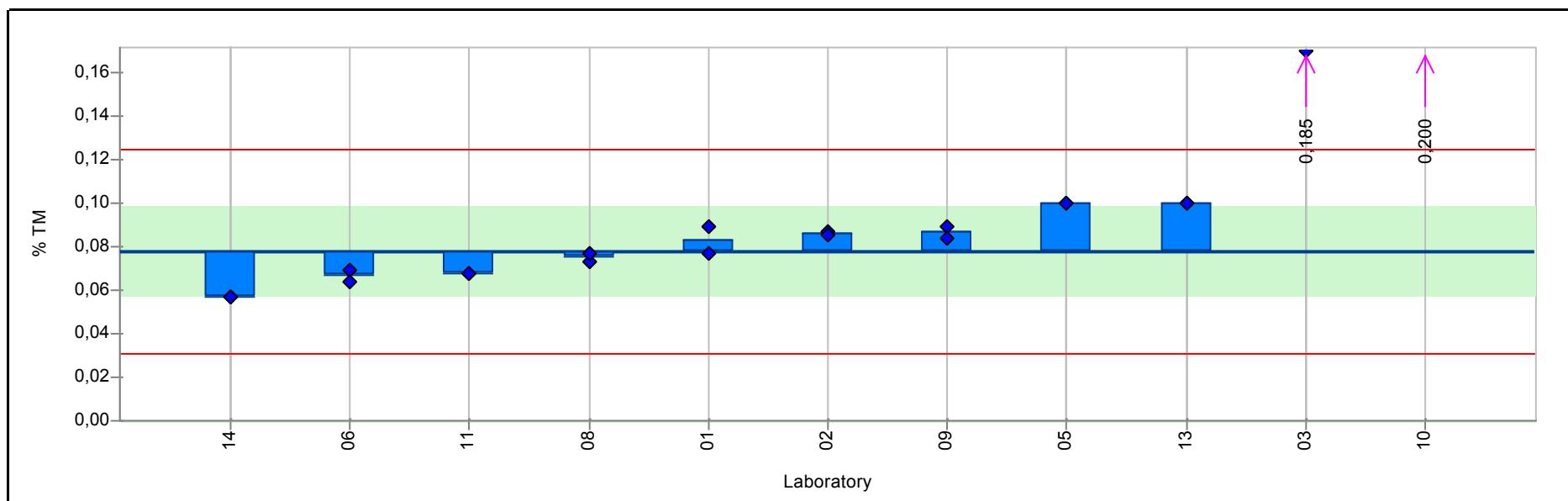
RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
05	0,100	0,000	0,951	0,100	0,100	ISO 17025	Other Method	info only
06	0,067	0,004	-0,481	0,069	0,064	ISO 17025	Combustion for C and S	
08	0,075	0,003	-0,118	0,073	0,077	ISO 17025	Combustion for C and S	DIN EN ISO 15350
09	0,086	0,004	0,374	0,089	0,084	no accreditation	Combustion for C and S	
10	0,200	0,020	5,224	0,214	0,186	ISO 17025	Combustion for C and S	
11	0,068	0,000	-0,417	0,068	0,068	ISO 17025	Combustion for C and S	
13	0,100	0,000	0,951	0,100	0,100	ISO 17025	Combustion for C and S	
14	0,057	0,000	-0,887	0,057	0,057	no accreditation	Combustion for C and S	

RV_2016_01_SiC

Sample:	**SiC 85**		**Reprod. s.d.**	**1,437 % TM**
Measurand:	**SiC**		**Repeat. s.d**	**0,220 % TM**
Mean ± U(Mean):	**86,682 ± 0,941 % TM**		**Range of tolerance:**	**83,809 - 89,556 % TM (|z-score| <= 2,000)**
No. of laboratories: 11			**Statistical method**	**Q/Hampel**
Assigned value	**86,682 % TM (Empirical value)**		**Target s.d.**	**1,437 % TM (Empirical value)**
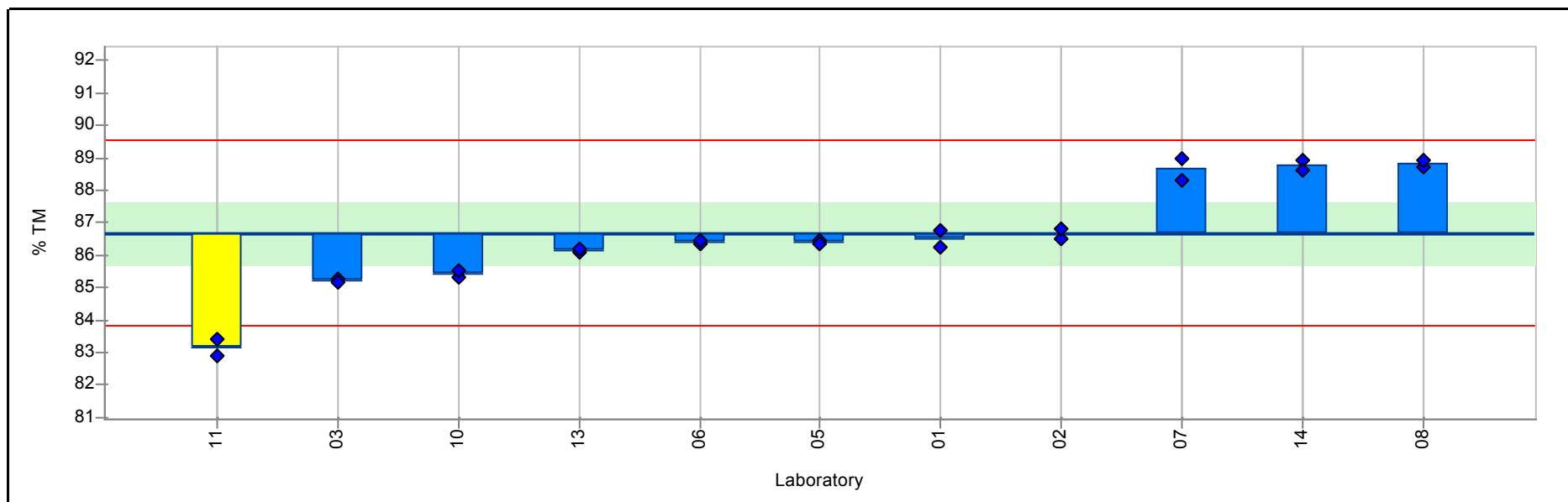
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
01	86,493	0,356	-0,132	86,745	86,241	no accreditation	Combustion for C and S	4511
02	86,660	0,240	-0,016	86,490	86,830	no accreditation	Combustion for C and S	
03	85,205	0,092	-1,028	85,270	85,140	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
05	86,405	0,078	-0,193	86,460	86,350	ISO 17025	ISO 21068-2:2008-12	
06	86,397	0,097	-0,198	86,329	86,466	ISO 17025	ISO 21068-2:2008-12	
07	88,650	0,495	1,369	88,300	89,000	no accreditation	ISO 21068-2:2008-12	
08	88,845	0,148	1,505	88,740	88,950	ISO 17025	ISO 21068-2:2008-12	
10	85,430	0,141	-0,872	85,330	85,530	ISO 17025	Other Method	Calculation
11	83,160	0,349	-2,452	83,406	82,913	ISO 17025	ISO 21068-2:2008-12	
13	86,150	0,071	-0,370	86,100	86,200	ISO 17025	ISO 21068-2:2008-12	
14	88,750	0,212	1,439	88,900	88,600	no accreditation	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	SiC 85	**Reprod. s.d.**	0,074 % TM
Measurand:	Si free	**Repeat. s.d**	0,008 % TM
Mean ± U(Mean):	0,139 ± 0,056 % TM	**Range of tolerance:**	-0,009 - 0,288 % TM (|z-score| <= 2,000)
No. of laboratories:	7	**Statistical method**	Q/Hampel
Assigned value	0,139 % TM (Empirical value)	**Target s.d.**	0,074 % TM (Empirical value)
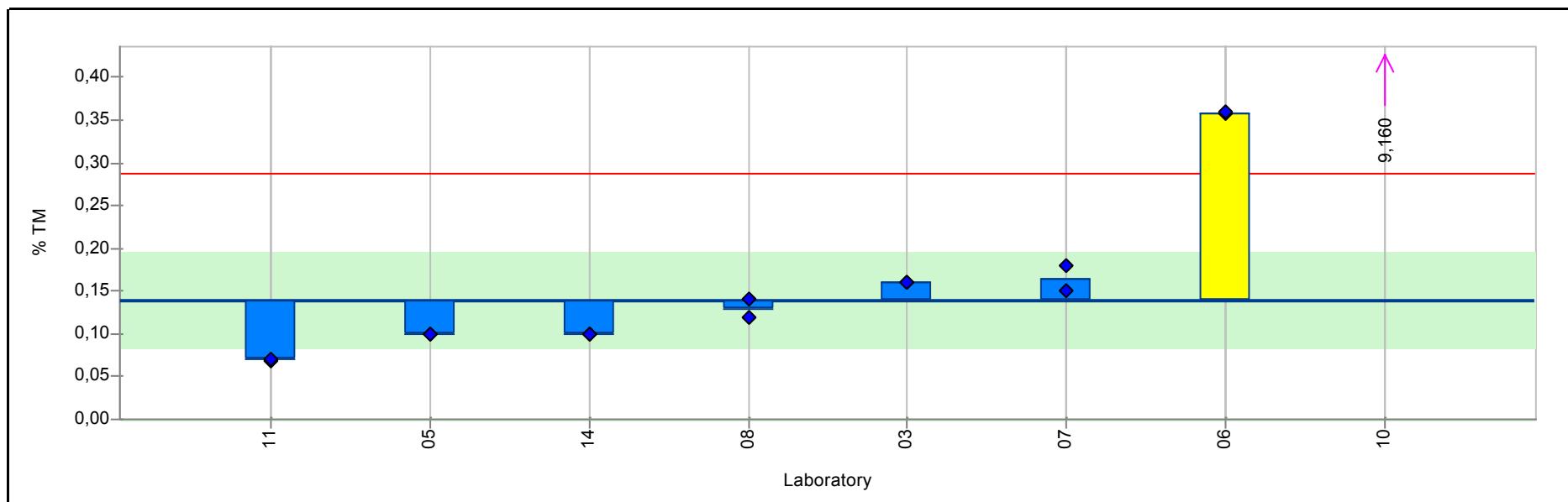
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,160	0,000	0,279	0,160	0,160	no accreditation	ISO 21068-2:2008-12	
05	0,100	0,000	-0,530	0,100	0,100	ISO 17025	Other Method	XRD, Rietveld
06	0,358	0,001	2,949	0,357	0,359	ISO 17025	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
07	0,165	0,021	0,347	0,150	0,180	no accreditation	ISO 21068-2:2008-12	
08	0,130	0,014	-0,125	0,140	0,120	ISO 17025	ISO 21068-2:2008-12	
10	9,160	0,113	121,627	9,080	9,240	no accredition	Other Method	'C'; info only
11	0,070	0,002	-0,941	0,068	0,071	ISO 17025	ISO 21068-2:2008-12	GC (WLD)
14	0,100	0,000	-0,530	0,100	0,100	no accreditation	ISO 21068-2:2008-12	gas volumetric method

RV_2016_01_SiC

|			
Sample:	SiC 85	**Reprod. s.d.**	0,972 % TM
Measurand:	SiO2	**Repeat. s.d**	0,114 % TM
Mean ± U(Mean):	4,338 ± 1,067 % TM	**Range of tolerance:**	2,394 - 6,282 % TM (|z-score| <= 2,000)
No. of laboratories:	5	**Statistical method**	Q/Hampel
Assigned value	4,338 % TM (Empirical value)	**Target s.d.**	0,972 % TM (Empirical value)
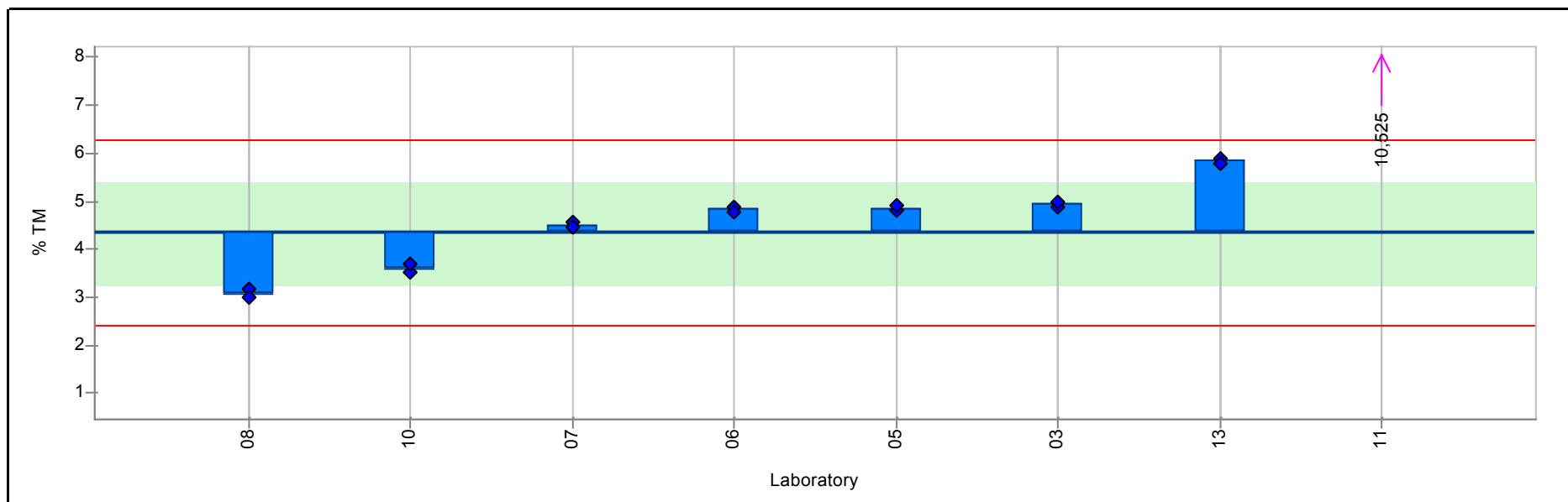
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	4,935	0,064	0,614	4,890	4,980	no accreditation	ISO 21068-2:2008-12	
05	4,850	0,071	0,526	4,800	4,900	ISO 17025	Other Method	info only
06	4,832	0,077	0,507	4,886	4,777	ISO 17025	Other Method	Calculation

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
07	4,505	0,078	0,171	4,560	4,450	no accreditation	ISO 21068-2:2008-12	
08	3,082	0,132	-1,293	3,175	2,989	ISO 17025	ISO 21068-2:2008-12	Calculation
10	3,595	0,120	-0,765	3,510	3,680	no accredition	Other Method	info only
11	10,525	0,071	6,365	10,475	10,575	ISO 17025	ISO 21068-2:2008-12	Calculation
13	5,850	0,071	1,555	5,900	5,800	ISO 17025	ISO 21068-2:2008-12	info only

RV_2016_01_SiC

Sample:	**SiC 85**	**Reprod. s.d.**	**0,674 % TM**
Measurand:	**Si total**	**Repeat. s.d**	**0,052 % TM**
Mean ± U(Mean):	**63,190 ± 0,804 % TM**	**Range of tolerance:**	**61,843 - 64,537 % TM (|z-score| <= 2,000)**
No. of laboratories:	**5**	**Statistical method**	**Q/Hampel**
Assigned value	**63,190 % TM (Empirical value)**	**Target s.d.**	**0,674 % TM (Empirical value)**
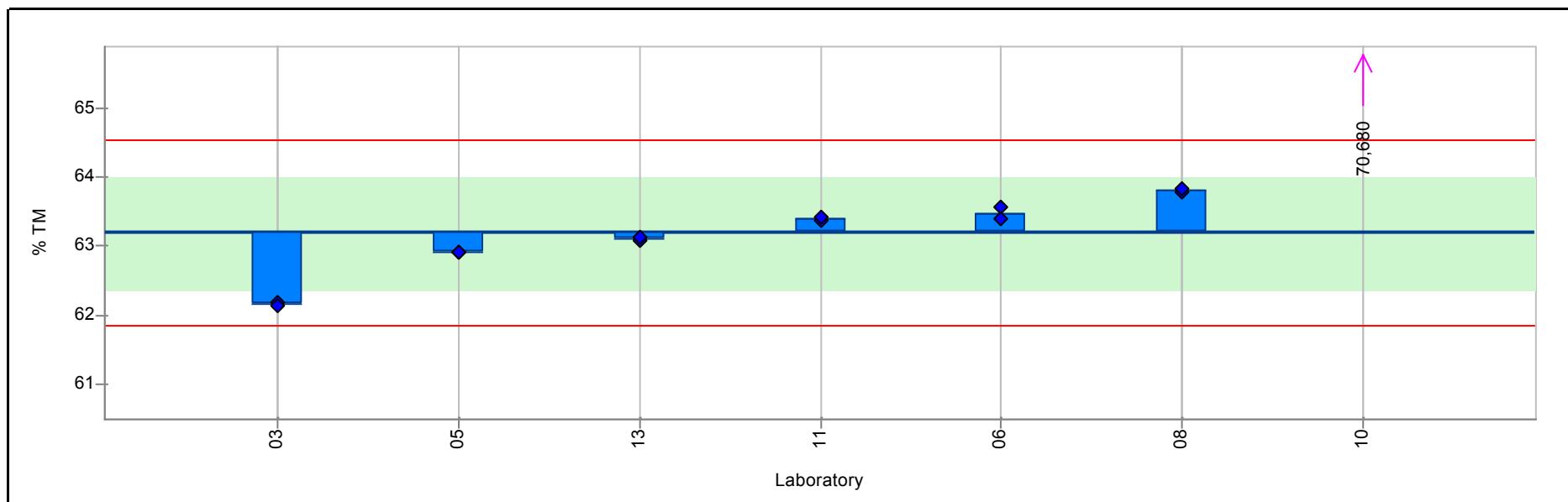
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	62,155	0,035	-1,536	62,180	62,130	no accreditation	ISO 21068-2:2008-12	
05	62,900	0,000	-0,430	62,900	62,900	ISO 17025	Other Method	info only
06	63,476	0,132	0,425	63,569	63,383	ISO 17025	ISO 21068-2:2008-12	

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
08	63,800	0,028	0,906	63,780	63,820	ISO 17025	Other Method	Volumetric
10	70,680	0,269	11,122	70,490	70,870	no accredition	Other Method	info only
11	63,388	0,033	0,294	63,364	63,411	ISO 17025	XRF fusion	
13	63,105	0,049	-0,126	63,070	63,140	ISO 17025	ISO 21068-2:2008-12	

RV_2016_01_SiC

Sample:	**SiC 85**	**Reprod. s.d.**	**0,020 % TM**
Measurand:	**Ti**	**Repeat. s.d**	**0,003 % TM**
Mean ± U(Mean):	**0,047 ± 0,023 % TM**	**Range of tolerance:**	**0,007 - 0,087 % TM (|z-score| <= 2,000)**
No. of laboratories: 6		**Statistical method**	**Q/Hampel**
Assigned value	**0,047 % TM (Empirical value)**	**Target s.d.**	**0,020 % TM (Empirical value)**
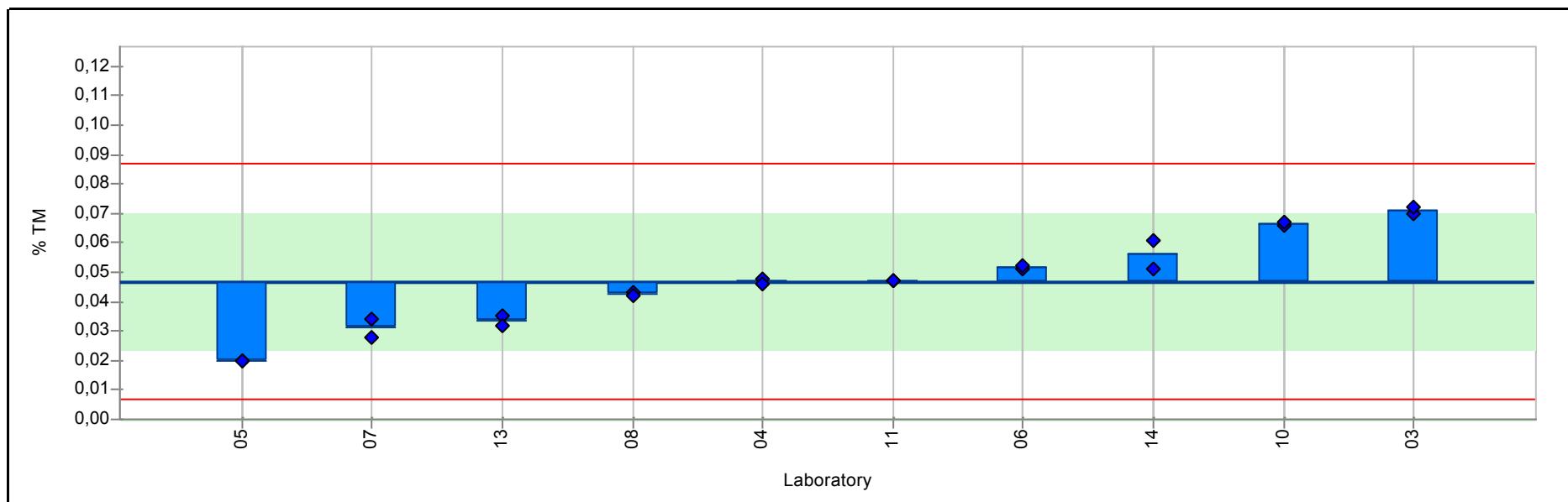
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,071	0,001	1,210	0,070	0,072	no accreditation	XRF fusion	
04	0,047	0,001	0,008	0,048	0,046	no accreditation	Other Method	info only
05	0,020	0,000	-1,344	0,020	0,020	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,051	0,001	0,234	0,051	0,052	ISO 17025	Other Method	info only
07	0,031	0,004	-0,793	0,028	0,034	no accreditation	Other Method	ICP
08	0,042	0,001	-0,217	0,043	0,042	ISO 17025	Other Method	ICP-OES
10	0,067	0,001	0,985	0,066	0,067	ISO 17025	Other Method	info only
11	0,047	0,000	0,008	0,047	0,047	ISO 17025	Other Method	ICP
13	0,034	0,002	-0,668	0,035	0,032	ISO 17025	XRF fusion	
14	0,056	0,007	0,459	0,051	0,061	no accreditation	Other Method	ICP

RV_2016_01_SiC

Sample:	**SiC 85**	**Reprod. s.d.**	**0,034 % TM**
Measurand:	**V**	**Repeat. s.d**	**0,005 % TM**
Mean ± U(Mean):	**0,078 ± 0,040 % TM**	**Range of tolerance:**	**0,010 - 0,147 % TM (|z-score| <= 2,000)**
No. of laboratories:	**6**	**Statistical method**	**Q/Hampel**
Assigned value	**0,078 % TM (Empirical value)**	**Target s.d.**	**0,034 % TM (Empirical value)**
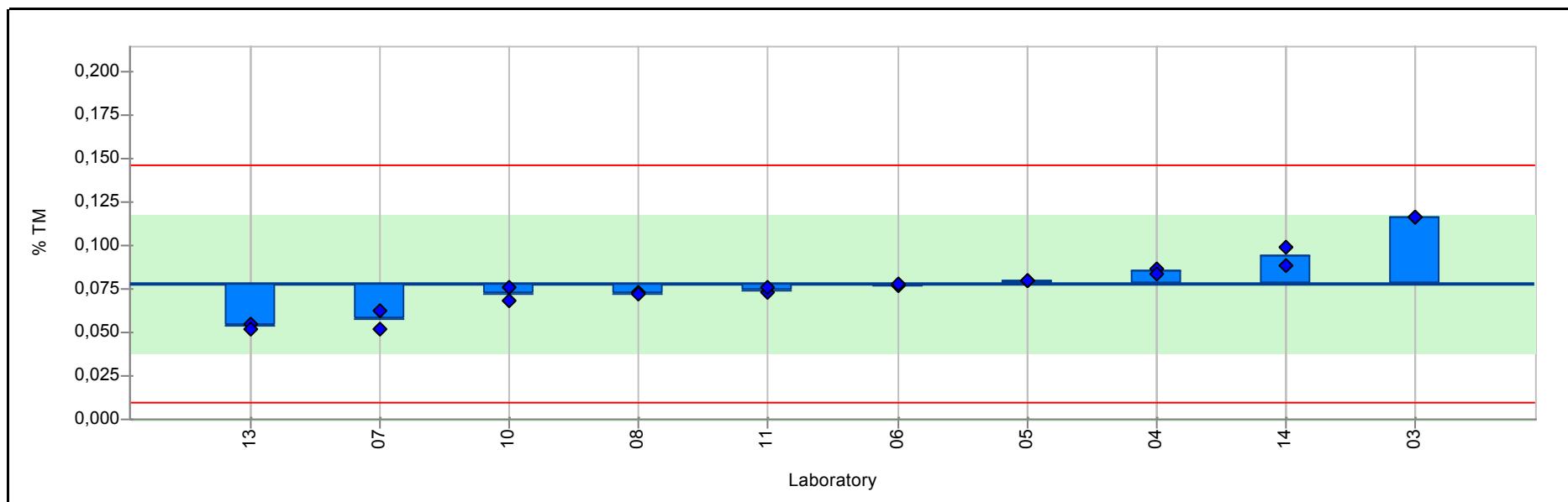
Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
03	0,117	0,000	1,136	0,117	0,117	no accreditation	XRF fusion	
04	0,085	0,002	0,215	0,087	0,084	no accreditation	Other Method	info only
05	0,080	0,000	0,054	0,080	0,080	ISO 17025	Other Method	info only

RV_2016_01_SiC

Lab code	Lab mean	s.d.	z-score	Conc. 1	Conc. 2	Accreditation	Analytical method	Comment
06	0,077	0,001	-0,020	0,077	0,078	ISO 17025	Other Method	info only
07	0,057	0,008	-0,605	0,052	0,063	no accreditation	Other Method	ICP
08	0,072	0,001	-0,166	0,073	0,072	ISO 17025	Other Method	ICP-OES
10	0,072	0,006	-0,180	0,076	0,068	ISO 17025	Other Method	info only
11	0,074	0,002	-0,107	0,073	0,076	ISO 17025	Other Method	ICP
13	0,053	0,002	-0,722	0,055	0,052	ISO 17025	XRF fusion	
14	0,094	0,007	0,463	0,089	0,099	no accreditation	Other Method	ICP