



COAL CONCEPTS PROFICIENCY TESTING

GENERAL ANALYSIS SAMPLE

REPORT – ONE HUNDRED AND FORTY- THREE

Revision 00

Final report

DATE ISSUED 30 SEPTEMBER 2023

PARTICIPANT

LABORATORY CODE: a

R BABOOLAL (SCHEME MANAGER)

*Disclaimer: Opinions and interpretations expressed herein are outside the scope of SANAS accreditation
*Moisture in the analysis sample is not included in the SANAS schedule of accreditation as robust statistics cannot be applied.
Chlorine, Fluorine, Quick ash, ASTM ash and ASTM Volatiles is not included in the scope of accreditation.*

THINKING QUALITY, QUALITY THINKING

REGISTRATION NUMBER: 2006/149731/23 (RMB INDUSTRIAL STATIONERS cc t/a)

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EXECUTIVE SUMMARY

1. One hundred and twenty two samples were sent to participants with 122 results submitted timeously.
2. The total number of outliers detected were as follows (dry base):
 - Quick Ash x 2
 - Volatile matter x 5
 - Calorific value x 1
 - Total Sulphur x 1
 - Phosphorous x 1
 - AFT (Def x 1,)
3. Chlorine, ASTM Ash, ASTM Volatile Matter participants were insufficient to apply robust statistical calculations.
4. Trending for your laboratory is as follows:

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Dear Participant

RE: PROFICIENCY TESTING RESULTS FOR THE MONTH OF SEPTEMBER 2023

Thank you for your participation in the Coal Concepts proficiency testing scheme.

Your laboratory code is as per the cover page.

All results are totally confidential. Any results in ***Bold, Italics and Underlined*** are outliers. Where applicable, the most extreme outliers have been eliminated from calculations using the Grubbs estimate for outliers. Robust statistics has been applied where possible. Analysis results have been reported on air dry and dry base. The dry base results have been used to calculate the z-scores. The z-scores are calculated by subtracting the average from the participant result then dividing by the standard deviation. **Note : All decimals are carried in the z-score calculation and only rounded off at the end of the calculation.**

Please take note of the following:

1. Z-scores between -1 and +1 is deemed acceptable
2. Z-scores between -2 and -3 should serve as a warning that the analysis result could get worse
3. Z-scores between +2 and +3 should also serve as a warning that analysis results could get worse.
4. Z- scores lower than -3 and exceeding +3 should warrant an investigation
5. Compare your result to the robust average which will be the assigned value. The measurement of uncertainty (UoM) of the results is also stated.
6. Z-Score calculations can be made available upon request

The Coal Concepts scheme adheres to the requirements of ISO/IEC 17043:2010 – Conformity assessment – General requirements for proficiency testing.

Statistical analysis has been carried out using ISO/IEC 13528:2022-Statistical methods for use in proficiency testing by interlaboratory comparisons.

Please find results attached together with Z-score trends.

Best Regards

R Baboolal

LIST OF PARTICIPANTS

Afisam Dudfield	Leon Testing Pakistan
Africoal	Mafube Coal
Afrisam Ulco	Ministry of Energy and Mineral Resources - Kingdom of Jordan
AH Knight	Mitra SK Richards Bay
Anglo Coal Goedeheop North Plant	ML Coal
Anglo Greenside (Thungela)	Moruple
Anglo Landau	Mfulawamanzi
Aqua Specto	Msobo Coal
ArcelorMittal VDP	Nelson Mandela University
Best enough - 2 Seam	Noko Analytical laboratories (Witbank)
Best enough Laboratory -Springs	Noko NCC
Bestech Anthra Siding- Ermelo	Noko Ntshovelo
Bestech Madini Mining Witbank	Noko Piet Retief
Bestech Vlakfontein Mine-Ogies	Noko Welgemeend
Bestech Zomhlaba Resource Mine -Delmas	PJS Laboratories Middelburg
Botswana Power Corp - B Power Station	PJS Laboratories Woestaleen
Botswana Power Corporation - A Power Station	PJS Laboratories Salaria
Bureau Veritas Beira	Polyak Eynez Analiz Laboratuvarı
Bureau Veritas Inspectorate Laboratories - Alton	Quality Ensure Eastide Lab - Shift A
Bureau Veritas Inspectorate Laboratories - Middelburg	Quality Ensure Eastide Lab - Shift B
BV BELFAST	Richards Bay Minerals
BV Moatize	Ronewa Lab
BV Nacala	Ronewa Lab Vele
BV Tendele	Ronewa Wescoal
BVTISA -PTA	SA Labs Ihtuba – Kangra
Castle Peak Power Station	SA Labs Ihtuba – Khanye
CCIC Richards Bay	SA Labs Ihtuba – Phalandwa
Coal Concepts Richards Bay Lab	SA Labs Ihtuba – Ruvuma Coal LTD
Cotecna Phola	SA Labs Ihtuba – ZAC
Cotecna Lurco	SABS CSIR
Cotecna Mimosa	SABS Newcastle (RETAINED SPRINGLAKES LAB CODE)
Cotecna Nasonti	SABS Richards Bay
Cotecna OLF	SABS Secunda
Cotecna Richards Bay Lab	SABS Uitkomst
Cotecna Tselentis	Sappi
Cotecna Umbumbene DroogVallei	SB Mining Solutions - Middelburg
Cotecna Middelburg	Seriti Kriel Colliery
Diyarbakır Çevre Analiz Laboratuvarı Müh.San.Ltd.Şti -Turkey	Seriti New Denmark
DENG ÇEVRE ANALİZ LABORATUVARI SAN. VE TİC. LTD. ŞTİ.	Seriti New Vaal
Ensayos técnicos Labmin SRL-Peru	Sibonisiwe Clewer
Eskom Arnot	Sibonisiwe Elandsfontein
Eskom Duvha	Sibonisiwe Middelburg
Eskom Erid	Sibonisiwe Ritvlei
Eskom Erid TGA	Sibonisiwe WCP
Eskom Grootvlei	Sibonisiwe Mzimkhulu
Eskom Hendrina	Siza Arnotopco
Eskom Kendal	Siza Carolina
Eskom Kriel	Siza Coal Services - Botswana
Eskom Lethabo	Siza Coal Services - Kinross
Eskom Majuba	Siza Leeuwpn
Eskom Matimba	Siza Middelburg
Eskom Matla	Siza Minerals Lab - Gaborone
Eskom Medupi	Siza Mooiplaats
Eskom Tutuka	Siza NBC
Exxaro Grootegeeluk	Siza Sasol
Exxaro Matla	Siza WestCoal
Fauji Fertilizer Bin Qasim Limited	South 32 Khutala
G & W Minerals	SPT
General Directorate of Coal Enterprises of Turkey	Tata Steel Wales - Europe
Genet Inyanda	Turkey ELI
Genet Klipfontein	UAS
Genet Welgelegen	UAS Main Lab
Geoscience	UAS Overlooked
Glencore Boshhoek	UAS Sudor
Glencore Lion	UAS Twistdraai
Glencore Rustenburg	UAS VDD
Glencore Wonderkop	UIS
HighVeld Lab	Universal Geominerals Sdn Bhd - Malaysia
Hwange Colliery	Vitroviaan
Idwala Lime	Yildiz Labs - Turkey
Imbally (Pty) Ltd	
Jindal Kiepersol	
Jindal Mozambique	
Jugoinspekt Belgrade AD Serbia	
Laboratory for solid fuels-Mining Institute Belgrade	
Labrite Lab	

1. TYPE OF SAMPLE USED

The coal used in this proficiency testing round was bituminous coal.

2. PREPARATION OF SAMPLE

Approximately 1000kg's of coal with an approximate top size of 50mm was sourced. This was crushed to -4mm using a jaw crusher. The -4mm material was reduced to -212um using a cross beat pulveriser. The 212 material was sieved using a 212um screen. Any +212um material was pulverised and sieved until all material passed through the 212-um sieve.

All the -212um material was then mixed in a mixing drum for 4 hours.

3. HOMOGENEITY CHECK

There were 122 participants in this round, 10 portions of sample were randomly extracted. These were packaged in their final form i.e. in 200ml sample bottles. The bottles were labelled 1 to 10. The results were as follows:

SAMPLE NO.	TEST PORTION 1	TEST PORTION 2	sample av (Xt)	range (Wt)	range sqd
1	15.02	15.23	15.13	0.21	0.0441
2	15.02	15.04	15.03	0.02	0.0004
3	15.03	14.94	14.99	0.09	0.0081
4	15.03	14.90	14.97	0.13	0.0169
5	15.07	15.03	15.05	0.04	0.0016
6	15.13	15.07	15.10	0.06	0.0036
7	15.15	15.05	15.10	0.10	0.0100
8	15.03	15.03	15.03	0.00	0.0000
9	15.06	15.03	15.05	0.03	0.0009
10	15.14	14.97	15.06	0.17	0.0289
GENERAL AVERAGE			15.05		
STANDARD DEVIATION			0.050		
WITHIN SAMPLE STANDARD DEVIATION			0.076		
BETWEEN SAMPLE STANDARD DEVIATION			0.018		

The between sample standard deviation must be $\leq 0.3 \times \sigma$

(σ = std deviation for the proficiency assessment)

$\sigma = 0.301$ was used, which is the repeatability for ISO ash (Ash % > 10%)

Hence = $0.301 \times 0.3 = 0.090$

Since $0.018 < 0.090$, the samples are homogenous.

4. STABILITY CHECK

Samples were retained for sales as reference material. Ten of them were randomly chosen for stability testing. In order for the proficiency testing samples to be declared stable the general average from the homogeneity check and that of the stability check the difference in the general average should not differ by more than 0.3 X precision.

This test has been carried out about a month after the samples were received by the participating laboratories.

SAMPLE NO.	TEST PORTION 1	TEST PORTION 2	sample av (Xt)	range (Wt)	range sqd
1	14.94	15.11	15.03	0.17	0.0289
2	14.92	14.88	14.90	0.04	0.0016
3	15.02	14.86	14.94	0.16	0.0256
4	15.01	14.96	14.99	0.05	0.0025
5	14.98	14.83	14.91	0.15	0.0225
6	15.03	14.96	15.00	0.07	0.0049
7	15.13	15.00	15.07	0.13	0.0169
8	14.97	14.96	14.97	0.01	0.0001
9	15.07	14.92	15.00	0.15	0.0225
10	14.95	15.04	15.00	0.09	0.0081
GENERAL AVERAGE			14.98		
STANDARD DEVIATION			0.051		
WITHIN SAMPLE STANDARD DEVIATION			0.082		
BETWEEN SAMPLE STANDARD DEVIATION			0.027		

($\sigma = 0.301$ was used)

For this report $0.3 \times 0.301 = 0.090$

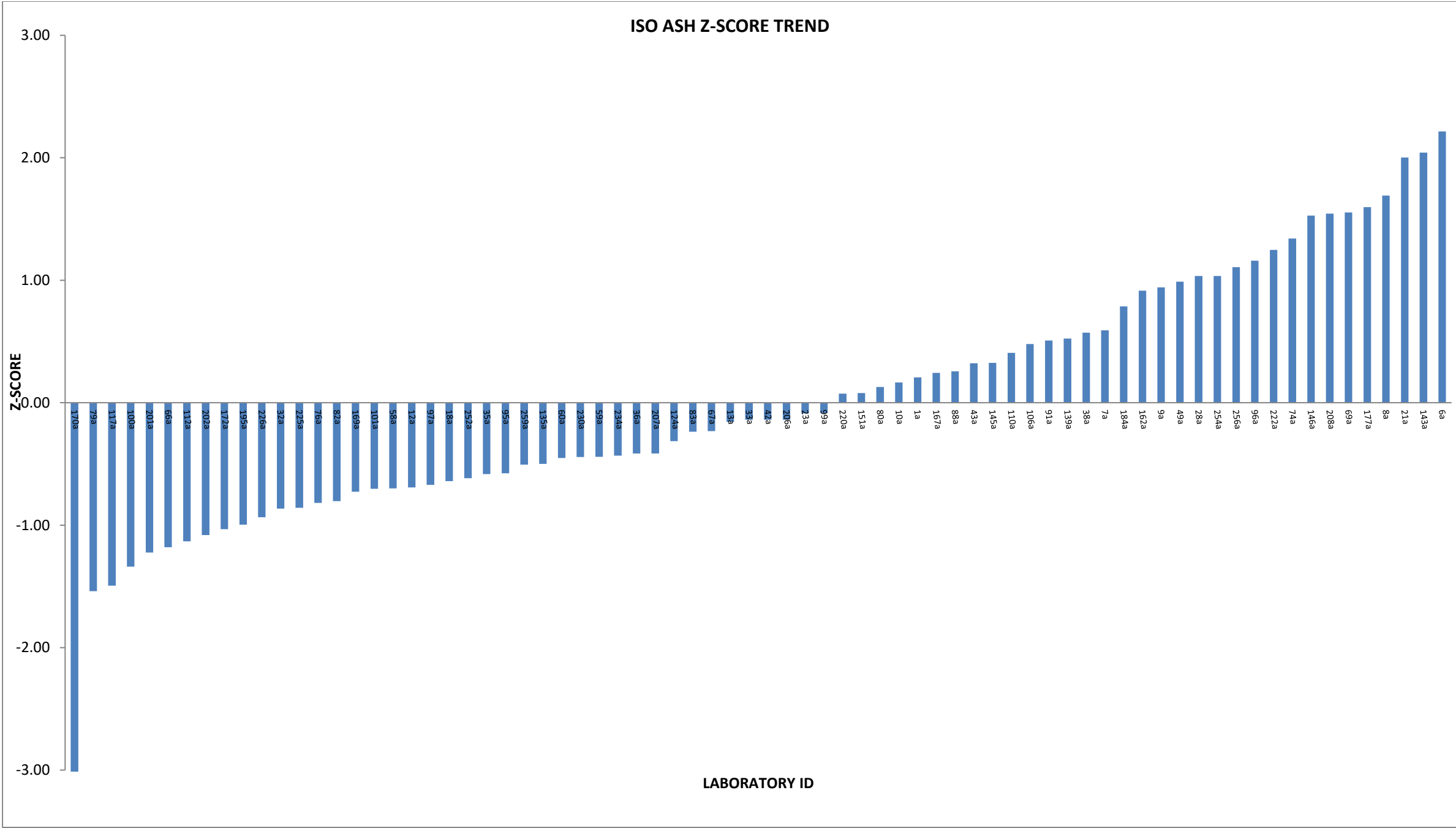
Absolute value of $(14.98 - 15.05) = 0.070$

Since $0.070 < 0.090$ the proficiency testing samples were stable

COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023

ANALYTICAL PARAMETER : ISO ASH (%)

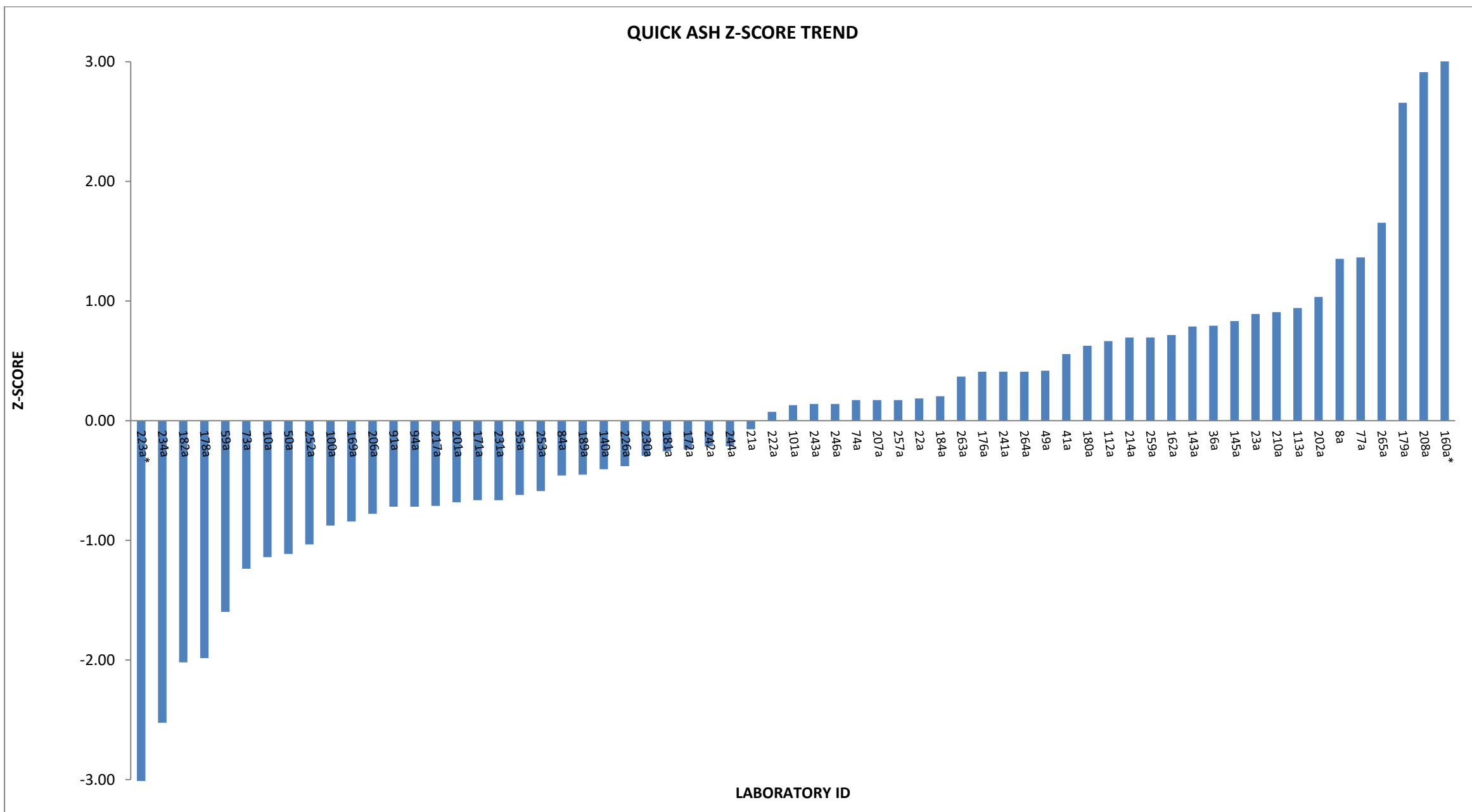
LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (%)	DRY BASE (%)	Z-SCORE (DRY BASE)
1a	3.43	15.16	15.70	0.21
6a	3.68	15.46	16.05	2.22
7a	3.08	15.28	15.77	0.59
8a	2.75	15.52	15.96	1.69
9a	2.70	15.40	15.83	0.94
10a	2.94	15.23	15.69	0.17
12a	3.61	14.98	15.54	-0.69
13a	2.91	15.18	15.63	-0.16
18a	2.83	15.11	15.55	-0.64
21a	3.33	15.48	16.01	2.00
23a	2.60	15.24	15.65	-0.09
28a	2.80	15.40	15.84	1.03
32a	2.52	15.12	15.51	-0.86
33a	2.80	15.20	15.64	-0.14
35a	3.60	15.00	15.56	-0.58
36a	2.50	15.20	15.59	-0.41
38a	2.30	15.40	15.76	0.57
42a	2.80	15.20	15.64	-0.14
43a	3.30	15.20	15.72	0.32
49a	2.75	15.40	15.84	0.99
58a	2.70	15.12	15.54	-0.70
59a	2.79	15.15	15.58	-0.44
60a	3.10	15.10	15.58	-0.45
66a	2.30	15.10	15.46	-1.18
67a	2.70	15.20	15.62	-0.23
69a	2.10	15.60	15.93	1.55
74a	2.50	15.50	15.90	1.34
76a	2.70	15.10	15.52	-0.82
79a	3.07	14.92	15.39	-1.54
80a	2.90	15.23	15.68	0.13
82a	2.20	15.18	15.52	-0.80
83a	2.31	15.26	15.62	-0.24
88a	2.28	15.35	15.71	0.26
91a	3.50	15.20	15.75	0.51
95a	2.90	15.11	15.56	-0.58
96a	2.62	15.45	15.87	1.16
97a	2.41	15.17	15.54	-0.67
99a	2.86	15.20	15.65	-0.08
100a	2.06	15.11	15.43	-1.34
101a	3.47	15.00	15.54	-0.70
106a	2.20	15.40	15.75	0.48
110a	2.63	15.32	15.73	0.41
112a	3.00	15.00	15.46	-1.13
117a	2.60	15.00	15.40	-1.49
124a	2.93	15.15	15.61	-0.31
135a	2.92	15.12	15.57	-0.50
139a	1.93	15.45	15.75	0.52
143a	3.06	15.53	16.02	2.04
145a	2.54	15.32	15.72	0.32
146a	2.70	15.50	15.93	1.53
151a	2.40	15.30	15.68	0.08
162a	3.24	15.31	15.82	0.91
167a	2.26	15.35	15.70	0.24
169a	2.67	15.12	15.53	-0.73
170a	2.32	14.74	15.09	-3.26
172a	2.14	15.15	15.48	-1.03
177a	3.15	15.44	15.94	1.60
184a	1.90	15.50	15.80	0.79
195a	3.02	15.02	15.49	-1.00
201a	2.90	15.00	15.45	-1.22
202a	3.12	14.99	15.47	-1.08
206a	2.80	15.20	15.64	-0.14
207a	2.50	15.20	15.59	-0.41
208a	4.60	15.20	15.93	1.54
220a	2.33	15.31	15.68	0.07
222a	2.40	15.50	15.88	1.25
225a	3.30	15.00	15.51	-0.86
226a	2.57	15.10	15.50	-0.94
230a	2.34	15.22	15.58	-0.44
234a	2.93	15.13	15.59	-0.43
252a	3.05	15.08	15.55	-0.62
254a	2.80	15.40	15.84	1.03
256a	3.13	15.36	15.86	1.11
259a	2.40	15.20	15.57	-0.51
Number of results	-	74	74	-
OUTLIERS	-	0	0	-
AVERAGE	-	2.78	15.23	15.66
STD DEVIATION	-	-	0.17	0.18
MEDIAN	-	-	15.20	15.64
%RSD	-	-	1.13	1.12
ROBUST AVERAGE	-	-	15.23	15.66
ROBUST STD DEVIATION	-	-	0.19	0.18
UoM	-	-	0.03	0.03



COAL CONCEPTS - PROFICIENCY TESTING -SEPTEMBER 2023

ANALYTICAL PARAMETER : QUICK ASH (%)

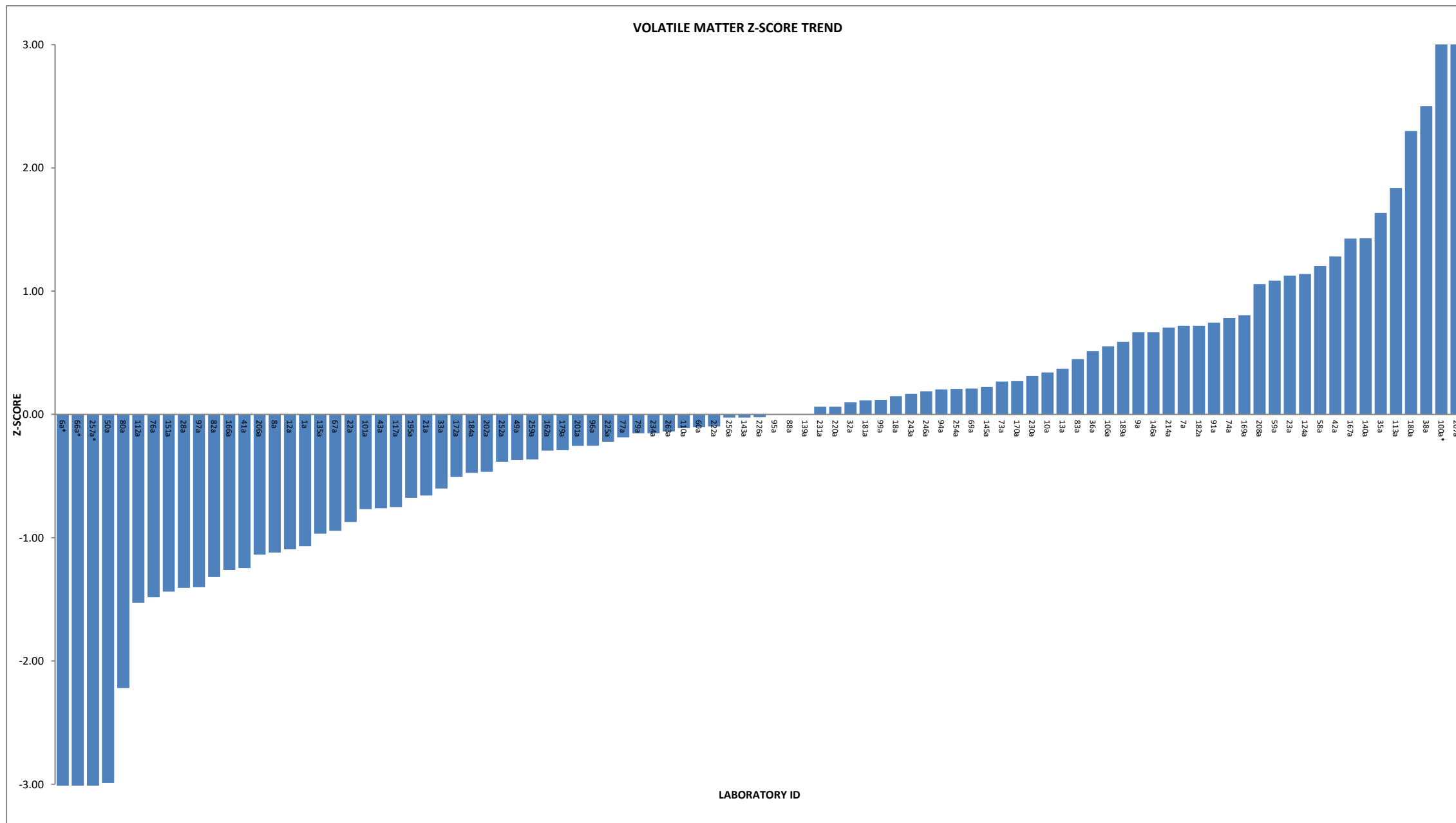
LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (%)	DRY BASE (%)	Z-SCORE (DRY BASE)
8a	2.75	15.55	15.99	1.35
10a	2.94	15.12	15.58	-1.14
21a	3.33	15.23	15.75	-0.07
22a	2.83	15.35	15.80	0.19
23a	2.60	15.50	15.91	0.89
35a	3.60	15.10	15.66	-0.62
36a	2.50	15.50	15.90	0.79
41a	2.26	15.50	15.86	0.56
49a	2.75	15.40	15.84	0.42
50a	2.84	15.14	15.58	-1.11
59a	2.79	15.07	15.50	-1.60
73a	2.07	15.24	15.56	-1.24
74a	2.50	15.40	15.79	0.17
77a	3.70	15.40	15.99	1.37
84a	3.51	15.14	15.69	-0.46
91a	3.50	15.10	15.65	-0.72
94a	3.50	15.10	15.65	-0.72
100a	2.06	15.30	15.62	-0.88
101a	3.47	15.24	15.79	0.13
112a	3.00	15.40	15.88	0.67
113a	3.34	15.39	15.92	0.94
140a	2.99	15.23	15.70	-0.41
143a	3.06	15.41	15.90	0.79
145a	2.54	15.50	15.90	0.83
160a*	2.74	16.00	16.45	4.15
162a	3.24	15.37	15.88	0.72
169a	2.67	15.21	15.63	-0.84
171a	3.30	15.14	15.66	-0.66
172a	2.14	15.39	15.73	-0.24
176a	2.74	15.40	15.83	0.41
178a	0.90	15.30	15.44	-1.98
179a	2.50	15.80	16.21	2.66
180a	1.70	15.60	15.87	0.63
181a	1.87	15.43	15.72	-0.26
182a	1.51	15.20	15.43	-2.02
184a	1.90	15.50	15.80	0.21
189a	2.88	15.24	15.69	-0.45
201a	2.90	15.20	15.65	-0.68
202a	3.12	15.44	15.94	1.04
206a	2.80	15.20	15.64	-0.78
207a	2.50	15.40	15.79	0.17
208a	4.60	15.50	16.25	2.91
210a	2.74	15.48	15.92	0.91
214a	2.40	15.50	15.88	0.70
217a	2.74	15.22	15.65	-0.71
222a	2.40	15.40	15.78	0.07
223a*	2.74	14.71	15.12	-3.89
226a	2.57	15.30	15.70	-0.38
230a	2.34	15.35	15.72	-0.29
231a	2.47	15.27	15.66	-0.66
234a	2.93	14.90	15.35	-2.52
241a	2.74	15.40	15.83	0.41
242a	2.74	15.30	15.73	-0.21
243a	3.10	15.30	15.79	0.14
244a	2.74	15.30	15.73	-0.21
246a	2.53	15.39	15.79	0.14
252a	3.05	15.12	15.60	-1.03
253a	2.74	15.24	15.67	-0.59
257a	2.50	15.40	15.79	0.17
259a	2.40	15.50	15.88	0.70
263a	2.70	15.40	15.83	0.37
264a	2.74	15.40	15.83	0.41
265a	2.74	15.60	16.04	1.65
Number of results	-	63	63	-
OUTLIERS	-	2	2	-
AVERAGE	-	2.74	15.33	15.77
STD DEVIATION	-	-	0.16	0.17
MEDIAN	-	-	15.37	15.79
%RSD	-	-	1.03	1.05
ROBUST AVERAGE	-	-	15.33	15.77
ROBUST STD DEVIATION	-	-	0.16	0.17
UoM	-	-	0.03	0.03



COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023

ANALYTICAL PARAMETER : ISO VOLATILE MATTER(%)

LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
1a	3.43	26.95	27.91	-1.07
6a*	3.68	25.49	26.46	-4.84
7a	3.08	27.71	28.59	0.72
8a	2.75	27.12	27.89	-1.12
9a	2.70	27.80	28.57	0.67
10a	2.94	27.61	28.45	0.34
12a	3.61	26.89	27.90	-1.09
13a	2.91	27.63	28.46	0.37
18a	2.83	27.57	28.37	0.15
21a	3.33	27.13	28.06	-0.66
22a	2.83	27.19	27.98	-0.87
23a	2.60	28.00	28.75	1.13
28a	2.80	27.00	27.78	-1.41
32a	2.52	27.64	28.35	0.10
33a	2.80	27.30	28.09	-0.60
35a	3.60	27.90	28.94	1.63
36a	2.50	27.80	28.51	0.51
38a	2.30	28.60	29.27	2.50
41a	2.26	27.21	27.84	-1.25
42a	2.80	28.00	28.81	1.28
43a	3.30	27.10	28.02	-0.76
49a	2.75	27.40	28.17	-0.37
50a	2.84	26.40	27.17	-2.99
58a	2.70	28.00	28.78	1.20
59a	2.79	27.93	28.73	1.09
60a	3.10	27.40	28.28	-0.10
66a*	2.30	25.90	26.51	-4.72
67a	2.70	27.20	27.95	-0.94
69a	2.10	27.80	28.40	0.21
73a	2.07	27.83	28.42	0.27
74a	2.50	27.90	28.62	0.78
76a	2.70	27.00	27.75	-1.48
77a	3.70	27.20	28.25	-0.19
79a	3.07	27.39	28.26	-0.15
80a	2.90	26.67	27.47	-2.22
82a	2.20	27.20	27.81	-1.32
83a	2.31	27.83	28.49	0.45
88a	2.28	27.68	28.32	0.00
91a	3.50	27.60	28.60	0.74
94a	3.50	27.40	28.39	0.20
95a	2.90	27.50	28.32	0.00
96a	2.62	27.48	28.22	-0.25
97a	2.41	27.11	27.78	-1.40
99a	2.86	27.55	28.36	0.12
100a*	2.06	28.97	29.58	3.30
101a	3.47	27.05	28.02	-0.77
106a	2.20	27.90	28.53	0.55
110a	2.63	27.53	28.27	-0.11
112a	3.00	26.90	27.73	-1.53
113a	3.34	28.05	29.02	1.84
117a	2.60	27.30	28.03	-0.75
124a	2.93	27.91	28.75	1.14
135a	2.92	27.13	27.95	-0.97
139a	1.93	27.77	28.32	0.00
140a	2.99	28.00	28.86	1.43
143a	3.06	27.44	28.31	-0.03
145a	2.54	27.68	28.40	0.22
146a	2.70	27.80	28.57	0.67
151a	2.40	27.10	27.77	-1.44
162a	3.24	27.29	28.20	-0.29
166a	2.33	27.19	27.83	-1.26
167a	2.26	28.21	28.86	1.43
169a	2.67	27.86	28.62	0.80
170a	2.32	27.76	28.42	0.27
172a	2.14	27.52	28.12	-0.51
179a	2.50	27.50	28.21	-0.29
180a	1.70	28.70	29.20	2.30
181a	1.87	27.83	28.36	0.12
182a	1.51	28.16	28.59	0.72
184a	1.90	27.60	28.13	-0.47
189a	2.88	27.72	28.54	0.59
195a	3.02	27.21	28.06	-0.68
201a	2.90	27.40	28.22	-0.26
202a	3.12	27.26	28.14	-0.47
206a	2.80	27.10	27.88	-1.14
207a*	2.50	29.90	30.67	6.14
208a	4.60	27.40	28.72	1.06
214a	2.40	27.90	28.59	0.70
220a	2.33	27.68	28.34	0.06
222a	2.40	27.60	28.28	-0.10
225a	3.30	27.30	28.23	-0.22
226a	2.57	27.58	28.31	-0.02
230a	2.34	27.77	28.44	0.31
231a	2.47	27.64	28.34	0.06
234a	2.93	27.43	28.26	-0.15
243a	3.10	27.50	28.38	0.17
246a	2.53	27.67	28.39	0.19
252a	3.05	27.31	28.17	-0.38
254a	2.80	27.60	28.40	0.21
256a	3.13	27.42	28.31	-0.03
257a*	2.50	25.90	26.56	-4.58
259a	2.40	27.50	28.18	-0.37
263a	2.70	27.50	28.26	-0.14
NUMBER OF RESULTS	-	93	93	-
OUTLIERS	-	-	6	-
AVERAGE	-	2.73	27.53	28.32
STD DEVIATION	-	-	0.38	0.38
MEDIAN	-	-	27.53	28.32
%RSD	-	-	1.40	1.35
ROBUST AVERAGE	-	-	27.53	28.31
ROBUST STD DEVIATION	-	-	0.40	0.40
UoM	-	-	0.05	0.05



COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023

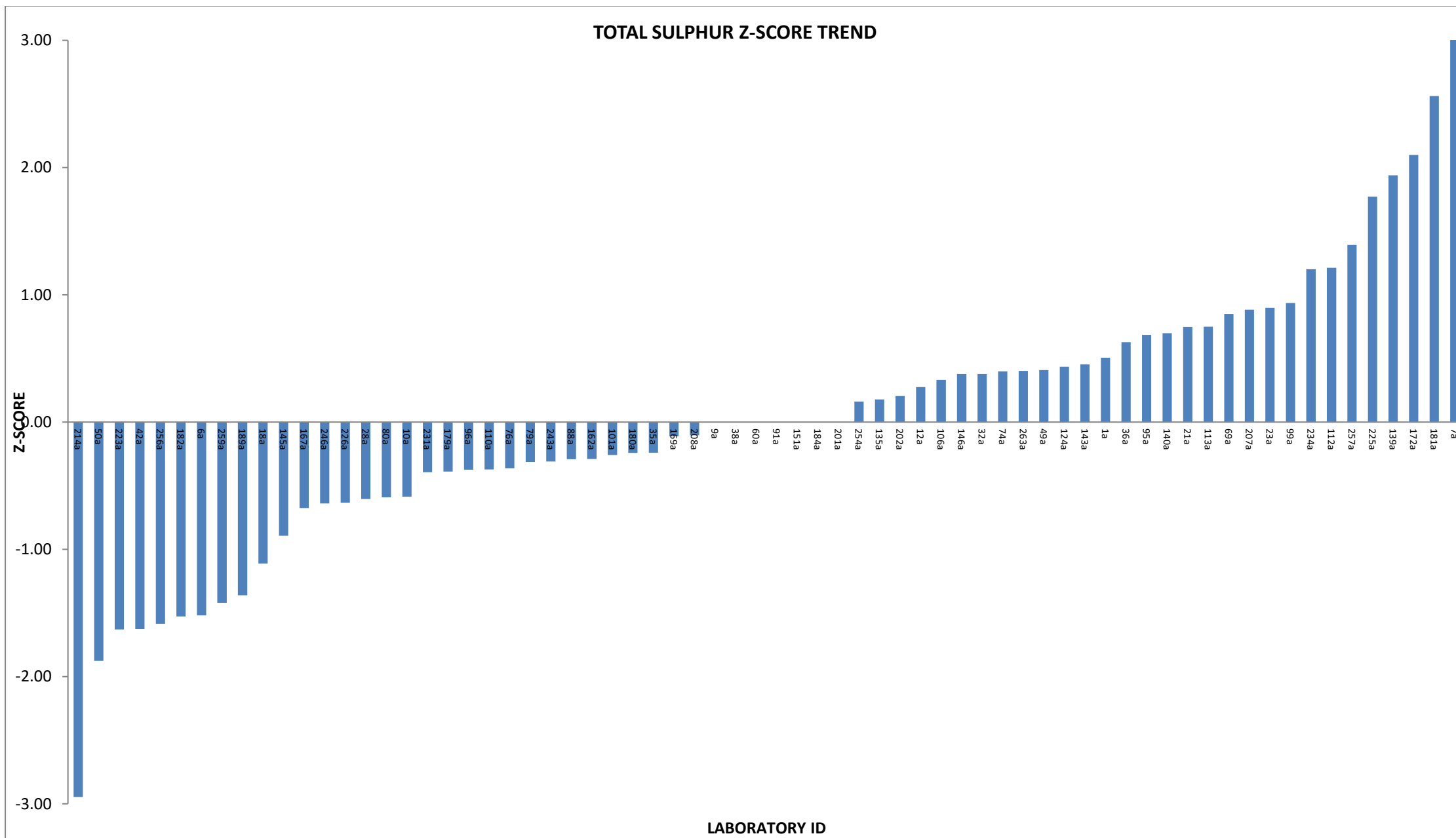
ANALYTICAL PARAMETER : CALORIFIC VALUE (MJ/kg)

	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (MJ/kg)	DRY BASE (MJ/kg)	Z-SCORE (DRY BASE)
	1a	3.43	26.66	27.61	0.17
	6a	3.68	26.48	27.49	-0.33
	8a	2.75	27.24	28.01	1.91
	9a	2.70	26.61	27.35	-0.95
	10a	2.94	26.72	27.53	-0.17
	12a	3.61	26.54	27.53	-0.15
	18a	2.83	26.69	27.47	-0.44
	21a	3.33	26.81	27.73	0.71
	23a	2.60	26.83	27.55	-0.10
	28a	2.80	26.90	27.67	0.46
	32a	2.52	26.78	27.47	-0.42
	33a	2.80	26.62	27.39	-0.79
	35a	3.60	26.77	27.77	0.87
	36a	2.50	26.94	27.63	0.27
	38a	2.30	27.00	27.64	0.29
	42a	2.80	26.80	27.57	0.00
	43a	3.30	27.00	27.92	1.53
	49a	2.75	26.83	27.59	0.09
	50a*	2.84	25.76	26.51	-4.57
	58a	2.70	26.83	27.57	0.00
	60a	3.10	26.70	27.55	-0.06
	66a	2.30	26.86	27.49	-0.33
	73a	2.07	27.06	27.63	0.27
	74a	2.50	26.70	27.38	-0.80
	76a	2.70	27.15	27.90	1.45
	77a	3.70	27.12	28.16	2.57
	79a	3.07	26.55	27.39	-0.77
	80a	2.90	26.78	27.58	0.00
	82a*	2.20	27.55	28.17	2.60
	83a	2.31	26.93	27.57	0.00
	84a	3.51	27.03	28.01	1.93
	88a	2.28	26.96	27.59	0.09
	91a	3.50	26.47	27.43	-0.60
	94a	3.50	27.08	28.06	2.14
	95a	2.90	26.92	27.72	0.67
	96a	2.62	26.92	27.64	0.33
	97a	2.41	26.69	27.35	-0.95
	99a	2.86	26.76	27.55	-0.09
	100a	2.06	26.90	27.47	-0.45
	101a	3.47	26.42	27.37	-0.86
	106a	2.20	26.87	27.47	-0.41
	110a	2.63	26.79	27.51	-0.24
	112a	3.00	26.62	27.44	-0.54
	117a	2.60	26.76	27.47	-0.41
	124a	2.93	26.71	27.52	-0.23
	135a	2.92	26.71	27.51	-0.24
	140a	2.99	26.69	27.51	-0.24
	143a	3.06	26.68	27.52	-0.20
	145a	2.54	26.84	27.54	-0.13
	151a	2.40	26.83	27.49	-0.34
	160a	2.76	26.57	27.32	-1.06
	162a	3.24	26.58	27.47	-0.43
	167a	2.26	26.91	27.53	-0.16
	169a	2.67	26.76	27.49	-0.32
	170a	2.32	26.77	27.41	-0.71
	171a	3.30	27.09	28.01	1.93
	172a	2.14	26.73	27.31	-1.10
	176a	2.76	26.88	27.64	0.32
	178a	0.90	26.75	26.99	-2.50
	179a	2.50	26.90	27.59	0.09
	180a	1.70	27.07	27.54	-0.13
	181a	1.87	26.50	27.00	-2.44
	182a	1.51	26.84	27.25	-1.37
	184a	1.90	26.67	27.19	-1.66
	189a	2.88	26.69	27.48	-0.38
	201a	2.90	26.62	27.42	-0.67
	202a	3.12	26.64	27.50	-0.31
	206a	2.80	26.91	27.69	0.50
	207a	2.50	26.93	27.62	0.22
	208a	4.60	26.91	28.21	2.77
	209a	3.48	26.72	27.68	0.50
	210a	2.76	26.29	27.04	-2.31
	214a	2.40	27.01	27.67	0.46
	220a	2.33	26.93	27.57	0.00
	222a	2.40	27.14	27.81	1.03
	223a	2.76	26.70	27.46	-0.48
	225a	3.30	26.71	27.62	0.23
	226a	2.57	27.27	27.99	1.82
	230a	2.34	26.75	27.39	-0.77
	231a	2.47	26.99	27.67	0.45
	234a	2.93	26.79	27.60	0.13
	241a	2.76	26.65	27.41	-0.70
	242a	2.76	26.67	27.43	-0.61
	243a	3.10	26.69	27.54	-0.11
	244a	2.76	26.44	27.19	-1.64
	244a	2.76	26.88	27.64	0.32
	246a	2.53	27.08	27.78	0.93
	250a	2.76	26.63	27.39	-0.79
	252a	3.05	26.75	27.59	0.10
	253a	2.76	27.21	27.98	1.79
	254a	2.80	26.87	27.64	0.33
	256a	3.13	26.67	27.53	-0.16
	257a	2.50	27.03	27.72	0.67
	259a	2.40	27.07	27.74	0.72
	263a	2.70	26.94	27.69	0.51
	264a	2.76	26.65	27.41	-0.70
	265a	2.76	26.47	27.22	-1.51
NUMBER OF RESULTS	-	97	97	97	-
OUTLIERS	-	-	2	1	-
AVERAGE	-	2.75	26.80	27.57	-
STD DEVIATION	-	-	0.19	0.23	-
MEDIAN	-	-	26.78	27.54	-
%RSD	-	-	0.72	0.84	-
ROBUST AVERAGE	-	-	26.80	27.57	-
ROBUST STD DEVIATION	-	-	0.21	0.25	-
UoM	-	-	0.03	0.03	-

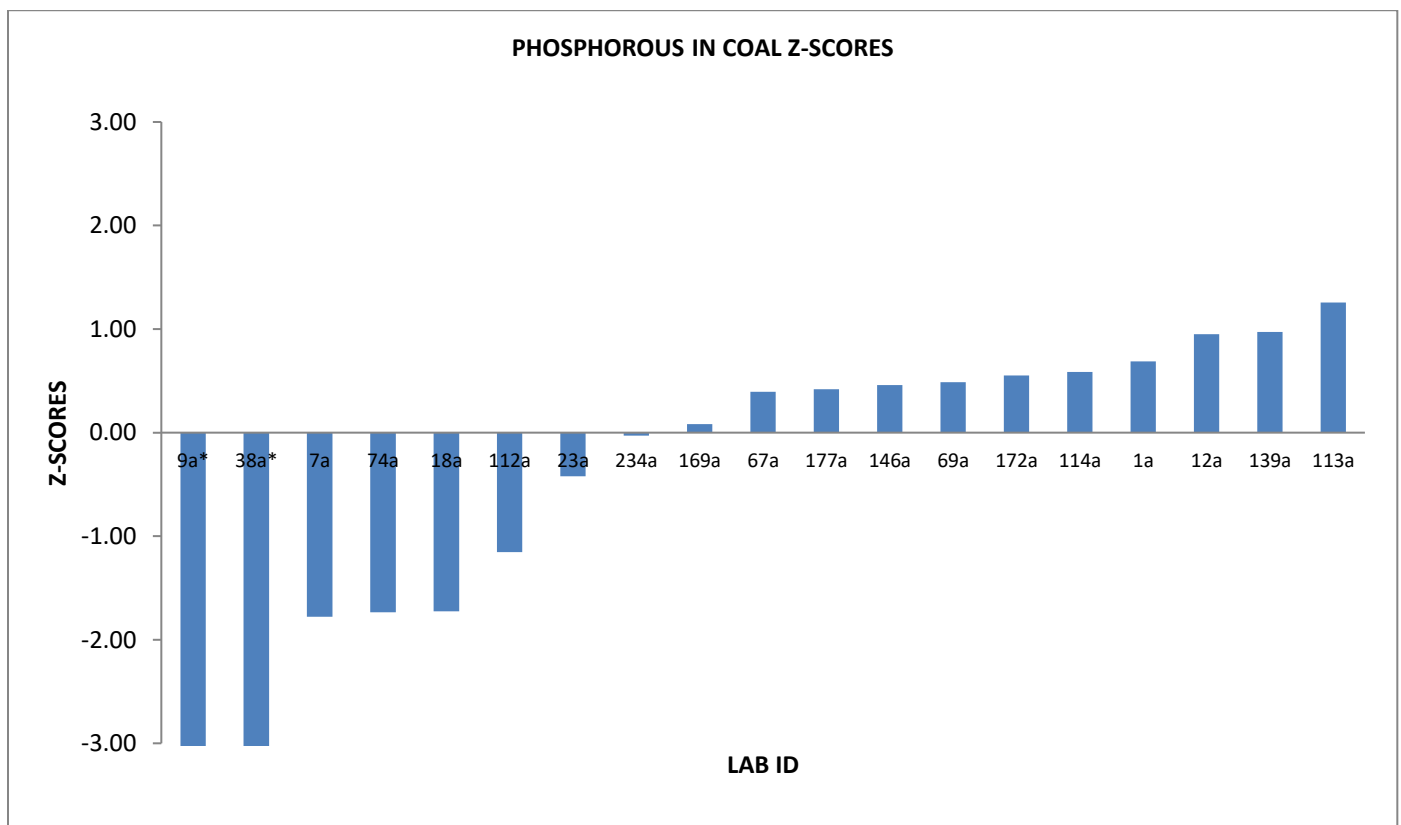
COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023

ANALYTICAL PARAMETER : TOTAL SULPHUR (%)

LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
1a	3.43	0.54	0.56	0.51
6a	3.68	0.46	0.48	-1.52
7a	3.08	0.89	0.92	9.50
9a	2.70	0.53	0.54	0.00
10a	2.94	0.50	0.52	-0.59
12a	3.61	0.53	0.55	0.27
18a	2.83	0.48	0.49	-1.11
21a	3.33	0.55	0.57	0.75
23a	2.60	0.56	0.57	0.90
28a	2.80	0.50	0.51	-0.60
32a	2.52	0.54	0.55	0.38
35a	3.60	0.51	0.53	-0.24
36a	2.50	0.55	0.56	0.63
38a	2.30	0.53	0.54	0.00
42a	2.80	0.46	0.47	-1.63
49a	2.75	0.54	0.56	0.41
50a	2.84	0.45	0.46	-1.88
60a	3.10	0.52	0.54	0.00
69a	2.10	0.56	0.57	0.85
74a	2.50	0.54	0.55	0.40
76a	2.70	0.51	0.52	-0.36
79a	3.07	0.51	0.53	-0.31
80a	2.90	0.50	0.51	-0.59
88a	2.28	0.52	0.53	-0.29
91a	3.50	0.52	0.54	0.00
95a	2.90	0.55	0.57	0.69
96a	2.62	0.51	0.52	-0.37
99a	2.86	0.56	0.58	0.94
101a	3.47	0.51	0.53	-0.26
106a	2.20	0.54	0.55	0.33
110a	2.63	0.51	0.52	-0.37
112a	3.00	0.57	0.59	1.21
113a	3.34	0.55	0.57	0.75
124a	2.93	0.54	0.56	0.43
135a	2.92	0.53	0.55	0.18
139a	1.93	0.61	0.62	1.94
140a	2.99	0.55	0.57	0.70
143a	3.06	0.54	0.56	0.45
145a	2.54	0.49	0.50	-0.89
146a	2.70	0.54	0.55	0.38
151a	2.40	0.53	0.54	0.00
162a	3.24	0.51	0.53	-0.29
167a	2.26	0.50	0.51	-0.68
169a	2.67	0.52	0.53	-0.11
172a	2.14	0.61	0.62	2.10
179a	2.50	0.51	0.52	-0.39
180a	1.70	0.52	0.53	-0.24
181a	1.87	0.63	0.64	2.56
182a	1.51	0.47	0.48	-1.53
184a	1.90	0.58	0.59	0.00
189a	2.88	0.47	0.48	-1.36
201a	2.90	0.52	0.54	0.00
202a	3.12	0.53	0.55	0.21
207a	2.50	0.56	0.57	0.88
208a	4.60	0.51	0.53	-0.10
214a	2.40	0.41	0.42	-2.95
223a	2.77	0.46	0.47	-1.63
225a	3.30	0.59	0.61	1.77
226a	2.57	0.50	0.51	-0.63
231a	2.47	0.51	0.52	-0.39
234a	2.93	0.57	0.59	1.20
243a	3.10	0.51	0.53	-0.31
246a	2.53	0.5	0.51	-0.64
254a	2.80	0.53	0.55	0.16
256a	3.13	0.46	0.47	-1.59
257a	2.50	0.58	0.59	1.39
259a	2.40	0.47	0.48	-1.42
263a	2.70	0.54	0.55	0.40
NUMBER OF RESULTS	68	68	68	-
OUTLIERS	-	1	1	-
AVERAGE	2.77	0.52	0.54	-
MEDIAN	-	0.52	0.54	-
STD DEVIATION	-	0.04	0.04	-
%RSD	-	7.57	7.48	-
ROBUST AVERAGE	-	0.52	0.54	-
ROBUST STD DEVIATION	-	0.04	0.04	-
UoM	-	0.01	0.01	-



COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023					
ANALYTICAL PARAMETER : PHOSPHOROUS IN COAL (%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	1a	3.43	0.091	0.094	0.69
	7a	3.08	0.052	0.054	-1.78
	9a*	2.70	0.011	0.011	-4.35
	12a	3.61	0.095	0.099	0.95
	18a	2.83	0.053	0.055	-1.72
	23a	2.60	0.074	0.076	-0.42
	38a*	2.30	0.019	0.019	-3.86
	67a	2.70	0.087	0.089	0.40
	69a	2.10	0.089	0.091	0.49
	74a	2.50	0.053	0.054	-1.74
	112a	3.00	0.062	0.064	-1.15
	113a	3.34	0.100	0.104	1.26
	114a	2.76	0.090	0.093	0.59
	139a	1.93	0.097	0.099	0.97
	146a	2.70	0.088	0.090	0.46
	169a	2.67	0.082	0.084	0.08
	172a	2.14	0.090	0.092	0.55
	177a	3.15	0.087	0.090	0.42
	234a	2.93	0.080	0.082	-0.03
Number of results	-	19	19	19	-
OUTLIERS	-	-	2	2	-
AVERAGE	-	2.76	0.081	0.083	-
STD DEVIATION	-	-	0.016	0.016	-
MEDIAN	-	-	0.087	0.090	-
ROBUST AVERAGE	-	-	0.081	0.083	-
ROBUST STD DEVIATION	-	-	0.019	0.019	-
UoM	-	-	0.006	0.006	-



COAL CONCEPTS - PROFICIENCY TESTING -SEPTEMBER 2023					
ANALYTICAL PARAMETER : TOTAL CARBON (%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	1a	3.43	66.66	69.03	0.03
	9a	2.70	67.38	69.25	0.30
	12a	3.61	66.45	68.94	-0.08
	18a	2.83	67.41	69.37	0.45
	42a	2.80	65.37	67.25	-2.13
	88a	2.28	66.79	68.34	-0.80
	177a	3.15	67.20	69.39	0.46
	202a	3.12	68.04	70.23	1.49
	234a	2.93	67.21	69.24	0.28
Number of results	-	9	9	9	-
OUTLIERS	-	-	0	0	-
AVERAGE	-	2.98	66.95	69.00	-
MEDIAN	-	-	67.20	69.24	-
STD DEVIATION	-	-	0.76	0.82	-
%RSD	-	-	1.13	1.19	-

COAL CONCEPTS - PROFICIENCY TESTING -SEPTEMBER 2023					
ANALYTICAL PARAMETER : HYDROGEN (%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	1a	3.43	3.88	4.02	-0.08
	9a	2.70	3.80	3.91	-0.61
	12a	3.61	3.84	3.98	-0.24
	18a	2.83	4.06	4.18	0.69
	42a	2.80	3.86	3.97	-0.30
	88a	2.28	3.52	3.60	-2.09
	177a	3.15	4.14	4.27	1.16
	202a	3.12	3.99	4.12	0.41
	234a	2.93	4.13	4.25	1.06
Number of results	-	9	9	9	-
OUTLIERS	-	-	0	0	-
AVERAGE	-	2.98	3.91	4.03	-
MEDIAN	-	-	3.88	4.02	-
STD DEVIATION	-	-	0.20	0.21	-
%RSD	-	-	5.00	5.18	-

COAL CONCEPTS - PROFICIENCY TESTING -SEPTEMBER 2023					
ANALYTICAL PARAMETER : NITROGEN(%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	1a	3.43	1.62	1.68	0.07
	9a	2.70	1.80	1.85	1.87
	12a	3.61	1.48	1.54	-1.42
	18a	2.83	1.60	1.65	-0.26
	42a	2.80	1.69	1.74	0.71
	88a	2.28	1.55	1.59	-0.89
	177a	3.15	1.64	1.69	0.23
	202a	3.12	1.59	1.64	-0.31
Number of results	-	8	8	8	-
OUTLIERS	-	-	0	0	-
AVERAGE	-	2.99	1.62	1.67	-
MEDIAN	-	-	1.61	1.66	-
STD DEVIATION	-	-	0.10	0.10	-
%RSD	-	-	5.87	5.73	-

COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023

ANALYTICAL PARAMETER : ASH FUSION TEMPERATURES (°C)

LAB ID	DEFORMATION	SOFTENING	HEMISPHERE	FLOW
9a	1430	1450	1470	1490
10a	1390	1410	1440	1460
18a	1390	1420	1450	1500
21a	1350	1390	1430	1490
23a	1350	1410	1480	1520
28a	1430	1440	1470	1490
36a	1380	1400	1420	1440
38a	1430	1450	1470	1490
<u>42a*</u>	<u>1500</u>	<u>1500</u>	1500	1500
49a	1390	1410	1430	1480
60a	1388	1412	1438	1500
80a	1420	1450	1480	1500
95a	1430	1450	1470	1490
106a	1380	1400	1410	1460
145a	1400	1430	1460	1470
151a	1360	1420	1440	1500
167a	1400	1430	1460	1490
234a	1370	1400	1440	1480
Number of results	18	18	18	18
Outliers	1	1	0	0
AVERAGE	1393	1422	1453	1486
MEDIAN	1390	1416	1455	1490
STDEV	27	20	24	19

Z-SCORES				
LAB ID	DEFORMATION	SOFTENING	HEMISPHERE	FLOW
9a	1.34	1.38	0.70	0.21
10a	-0.12	-0.58	-0.55	-1.39
18a	-0.12	-0.09	-0.14	0.74
21a	-1.58	-1.57	-0.97	0.21
23a	-1.58	-0.58	1.12	1.80
28a	1.34	0.89	0.70	0.21
36a	-0.49	-1.08	-1.39	-2.45
38a	1.34	1.38	0.70	0.21
<u>42a*</u>	<u>3.89</u>	3.85	1.96	0.74
49a	-0.12	-0.58	-0.97	-0.32
60a	-0.20	-0.49	-0.64	0.74
80a	0.97	1.38	1.12	0.74
95a	1.34	1.38	0.70	0.21
106a	-0.49	-1.08	-1.81	-1.39
145a	0.24	0.40	0.28	-0.86
151a	-1.22	-0.09	-0.55	0.74
167a	0.24	0.40	0.28	0.21
234a	-0.85	-1.08	-0.55	-0.32

COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023					
ANALYTICAL PARAMETER : CHLORINE (ppm)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	12a	3.61	129	134	-
	177a	3.15	137	141	-
Number of results	-	2	2	2	-
OUTLIERS	-	-	-	-	-
AVERAGE	-	3.38	133	138	-
STD DEVIATION	-	-	-	-	-
MEDIAN	-	-	-	-	-

COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023					
ANALYTICAL PARAMETER : FLUORINE (ppm)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY	DRY BASE	Z-SCORE (DRY BASE)
	169a	2.67	304	312	-
	177a	3.15	210	217	-
Number of results	-	2	2	2	-
OUTLIERS	-	-	-	-	-
AVERAGE	-	2.91	257	265	-
STD DEVIATION	-	-	na	na	-
MEDIAN	-	-	na	na	-

COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023					
ANALYTICAL PARAMETER : ASTM ASH (%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (%)	DRY BASE (%)	Z-SCORE (DRY BASE)
	1a	3.43	15.20	15.74	0.30
	12a	3.61	15.10	15.67	-0.21
	202a	3.12	15.03	15.51	-1.24
	209a	3.48	15.31	15.86	1.15
Number of results	-	4	4	4	-
OUTLIERS	-	-	0	0	-
AVERAGE	-	3.41	15.16	15.70	-
STD DEVIATION	-	-	0.12	0.15	-
MEDIAN	-	-	15.15	15.70	-
%RSD	-	-	0.81	0.93	-

COAL CONCEPTS - PROFICIENCY TESTING - SEPTEMBER 2023					
ANALYTICAL PARAMETER : ASTM VOLS (%)					
	LAB ID	MOISTURE IN ANALYSIS SAMPLE (%)	AIR DRY (%)	DRY BASE (%)	Z-SCORE (DRY BASE)
	1a	3.43	27.91	28.90	-0.52
	12a	3.61	27.70	28.74	-0.69
	202a	3.12	28.25	29.16	-0.26
	209a	3.48	29.79	30.86	1.48
Number of results	-	4	4	4	-
OUTLIERS	-	-	0	0	-
AVERAGE	-	3.41	28.41	29.41	-
STD DEVIATION	-	-	0.94	0.98	-
MEDIAN	-	-	28.08	29.03	-
%RSD	-	-	3.32	3.33	-

GENERAL CONCLUSIONS

1. The ISO Ash z-score trend is evenly distributed. The Robust average, Average and Median are similar. No outliers were detected.
2. The overall ISO volatile trend is evenly distributed. Five outliers were detected. These seemed to be due to calculation errors. An RSD of 1.35% indicated a high precision of results received.
3. Calorific value trend has a negative bias. One outlier was detected. The Average, Median and Robust Average are similar. A high precision of results received.
4. The sulphur z-score trend is evenly distributed. One outlier was detected. The Average and Robust Average are the same at 0.54%. A high precision of results received.
5. Phosphorous analysis: The z-score trend is evenly distributed. Two outliers were detected.
6. Generally acceptable results were obtained on Carbon, Hydrogen and Nitrogen.
7. Ash fusion: Generally, well done. Outlier detected on Deformation

COAL CONCEPTS: Terms and ConditionsReturn of results:

Laboratories participate in proficiency testing programs on the understanding that they will be sharing their results and information anonymously with other laboratories performing the same analysis. No return of results compromises the spirit of the programs, and reports will not be sent to laboratories unless they return results. Payment in full is required from all laboratories enrolling whether they return results or not.

Errors in Participant Proficiency Testing Results:

Proficiency testing reports should reflect the level of accuracy that a regular testing client would receive.

If a participant finds an error in their proficiency testing results, they may notify us in writing and change their submission **PRIOR** to the due date for return. Changes after this time will not be accepted.

Coal Concepts' reports results *as submitted* by participants.

On occasion, it seems as though participants have mixed up the samples or not processed the samples according to the instructions. Coal Concepts cannot make assumptions of this nature and change results 'to suit'. We also cannot compromise the integrity of the programs by suggesting to some participants that they should review their results prior to the due date. (This is unfair to other participants) It is the responsibility of the participants to check all aspects of the program, including sample identification, preparation, testing instructions, calculations and reporting of the results prior to results submission.

If samples are not in good condition on arrival to the participant laboratory, Coal Concepts must be notified in writing IMMEDIATELY, as often samples can be replaced in good time. Claims about samples received in bad condition will not be accepted after the report has been issued.

Late Enrolments and Late Results:

Late enrolment requests cannot always be accommodated, as sample manufacture must be scheduled well in advance to the shipping date of the program to allow all necessary quality assurance activities to be carried out.

Shipping of PT materials and evaluating test results from PTPs out of cycle with the mainstream programs is considerably time consuming and therefore costly.

In order not to disadvantage participants able to comply with time frames, Coal Concepts may charge a late fee in the following circumstances:

Requests that Coal concepts staff enters results on behalf of participants.

Requests to record results after the due date.

Requests for PTP participation that is out of cycle with the scheduled dates.

Shipping fees and Customs clearance:

Costs incurred for shipping samples and clearance of same through customs are the responsibility of the participating laboratory unless otherwise indicated.

Non-payment of fees:

Coal Concepts retains the right to withhold reports and/or test materials and services when invoices are outstanding.

Confidentiality of results:

All data and information received by Coal Concepts from its clients are considered confidential unless the client has given express permission to pass on information.

Definitions:

The dictionary definitions of "collusion" and "falsification" are as follows.

· *Collusion*: A secret agreement or cooperation for a fraudulent or deceitful purpose.

· *Falsification*: Deliberately changing something to be false. In proficiency testing terms, collusion is comparing data (and perhaps changing data) to fit in with a believed "correct" result. This is contrary to the spirit of proficiency testing programs, which are issued with the intention of providing an objective comparison of a laboratory's performance with others. Coal Concepts tries to minimise the occurrence of collusion by being aware that laboratories should be objective when they report their results and should therefore not know the intended results at the time, they are reporting to us.

Answers are not provided to clients until results have been submitted.

To prevent collusion and falsification our advice to clients is:

DON'T confer with others about PT samples or results.

DO accept the fact that everyone makes errors.

DON'T average the results or opinions of every person in the laboratory before selecting the answer to be submitted. Instead, use one of the answers AS SUBMITTED to you and take advantage of the Coal Concepts internal QA services and submit all answers generated by the technicians.

DO have confidence in your own results.

Proficiency Testing (PT) is a compulsory part of laboratory accreditation, but it is also an important tool for giving you confidence in your results. "Enhancing" your PT results with assistance from another participant cannot increase.

confidence in your laboratory's performance.

Coal concepts' testing staff are not told what the expected results are, nor what we are expecting.

We subject ALL results to analysis, even if they are different.

The staff have the right to check that the results we enter on their behalf are correctly transcribed.

Clients are always welcome to contact Coal Concepts to seek advice or information about collusion or falsification of data.

Policy for Participant Appeal of PT Performance Assessment:

If participants disagree with their performance assessment in a proficiency report, they should inform Coal Concepts in writing.

The response will include Coal Concepts interpretation of the outcome of the reassessment and an explanation of that outcome. (For example, explanation of a calculation, or the rationale for the outcome of the evaluation.)

If a mistake has been made by Coal Concepts, it will be dealt with via Coal Concepts' non-conformance system.

Liability

In no event shall a party's liability to the other party for direct damages exceed an amount equal to the value of the amount for the PT Programme, under that specific month.

End of report