AUSTRALIAN COAL INDUSTRY REFERENCE SAMPLES

TECHNICAL REPORT

ACIRS-H4-2014

Set of 4 Reference Materials for

Hardgrove Grindability Index

Certified:	September, 2014
Valid to:	March, 2017
Report Number:	ACIRS-H4-Techncial-Report-03*
Previous ACIRS-H series:	Supersedes ACIRS-H3-2013

1. Introduction

This report describes the preparation and analysis of ACIRS–H4-2014, comprising a set of four jars each having a different HGI value. The intended use of these samples is as a quality control tool and for calibration of Hardgrove grindability machines**.**

Each sample contains a mass of 2 kg, prepared at a nominal top-size of -4.75 mm, in accordance with AS 1038.20-2002 and ASTM D409/D409M-12.

2. Certified Values

Table 1 ACIRS-H4-2014 Certified Vales

ACIRS-H4-2014	Hardgrove Grindability Index	Standard deviation
Sample A	30	0.39
Sample B	47	0.47
Sample C	64	0.55
Sample D	87	0.75

a. Traceability

ACIRS-H4-2014 samples meet the traceability requirements of AS ISO/IEC 17025 through traceability to certified (primary) reference materials as per section 4.b.

3. Instructions for Use

Sample bottles should be kept tightly sealed and stored in a cool, dark place. Do not freeze.

The reference material should be thoroughly mixed by end-over-end rotation before sub-sampling. Samples should be prepared and analysed in accordance with the most recent version AS 1038.20 or equivalent.

4. Sample Preparation, Homogeneity Testing and Certification

Sample preparation, homogeneity assessment and certification were conducted by an AS ISO/IEC 17025 accredited facility in accordance with Annex A1-A5 of ASTM D409/D409M-12.

a. Sample Source and Preparation

Samples of mass greater than 200 kg of each of 4 coals were obtained:

Sample A: High volatile thermal coal, South-East Qld

Sample B: High volatile thermal coal, Hunter Valley, NSW

Sample C: High rank bituminous thermal coal, Central Qld

Sample D: High rank bituminous coking coal, Central Qld

b. Homogeneity Testing and Certification

The National HGI machine was calibrated against the Penn State University ASTM certified reference material set (2014-27-22). Values so generated, which were used in the creation of the calibration graph for ACIRS-H4-2014, are provided in Table 2.

Table 2 Calibration of National Hardgrove Machine

ASTM certified reference material set (2014-27-22)	
HGI	**Mean mass - 75 µm (g)**
41	3.86
61	6.90
77	9.06
92	11.38
Linear regression HGI = 6.8295x + 14.463. R^2= 0.999	

Using a process of multiple rotary sub-division, two 1 kg test portions were extracted from each of 4 randomly selected sub-samples of ACIRS-H3-2013 Samples, A, B, C and D. These portions were prepared and duplicate determinations carried out using the National Hardgrove Machine calibrated against ASTM certified reference material set 2014-27-22 (see table 2). These results are provided in Table 3.

Homogeneity of each sample was confirmed. The certified values and standard deviation of each sample is provided in Table 1.

Table 3 ACIRS-H4-2014 certification data*

	SAMPLE A		SAMPLE B		SAMPLE C		SAMPLE D	
	Mean mass -75 µm (g)	**HGI**	**Mean mass -75 µm (g)**	**HGI**	**Mean mass -75 µm (g)**	**HGI**	**Mean mass -75 µm (g)**	**HGI**
Test #1	2.19	29.4	4.69	46.5	7.28	64.2	10.63	87.1
Test #2	2.21	29.6	4.75	46.9	7.41	65.1	10.59	86.8
Test #3	2.24	29.8	4.78	47.1	7.39	64.9	10.64	87.1
Test #4	2.27	29.9	4.74	46.8	7.23	63.8	10.58	86.7
Test #5	2.29	30.1	4.78	47.1	7.40	65.0	10.67	87.3
Test #6	2.27	29.9	4.80	47.2	7.34	64.6	10.54	86.4
Test #7	2.25	29.8	4.78	47.1	7.26	64.0	10.62	87.0
Test #8	2.20	29.5	4.91	48.0	7.31	64.4	10.66	87.3
Test #9	2.14	29.0	4.87	47.7	7.30	64.3	10.54	86.4
Test #10	2.18	29.4	4.80	47.2	7.36	64.7	10.55	86.5
Average	**2.22**	**29.6**	**4.79**	**47.2**	**7.33**	**64.5**	**10.60**	**86.9**
Standard Deviation		0.39		0.47		0.55		0.75
Yield, % -1.18+0.60mm		69.0		67.2		66.6		60.6

* Based on Regression Equation in Table 2

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