



## TECHNICAL REPORT

### ACIRS-H3-2013

#### Set of 4 Reference Materials for Hardgrove Grindability Index

Date of Certification: November 7, 2013  
Valid to: May, 2015  
Report Number: AD-H3-2013  
Previous ACIRS-H series: Replaces ACIRS-H2-2012  
withdrawn from sale November, 2013

## 1. Introduction

This report describes the preparation and analysis of ACIRS-H3-2013, 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-H3-2013 Certified Values

ACIRS-H3-2013	Hardgrove Grindability Index	Standard deviation
Sample A	29	0.28
Sample B	48	0.49
Sample C	62	0.43
Sample D	86	1.16

## 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

Approximately 150 kg samples 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 (2013-25-17). Values so generated, which were used in the creation of the calibration graph for ACIRS-H3-2013, are provided in Table 2.

Table 2 Calibration of National Hardgrove Machine

ASTM certified reference material set (2013-25-17)	
HGI	Mean mass - 75 $\mu\text{m}$ (g)
41	3.60
57	6.69
76	9.12
90	11.28
Linear regression HGI = 6.556x + 15.878. R <sup>2</sup> = 0.992	

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 2013-25-17 (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-H3-2013 certification data\*

	SAMPLE A		SAMPLE B		SAMPLE C		SAMPLE D	
	Mean mass -75 $\mu\text{m}$ (g)	HGI						
Test #1	2.02	29.1	4.74	47.0	6.92	61.2	10.67	85.8
Test #2	2.01	29.1	4.81	47.4	7.11	62.5	10.70	86.0
Test #3	2.02	29.1	4.89	47.9	7.04	62.0	10.52	84.8
Test #4	1.99	28.9	4.86	47.7	7.07	62.2	10.59	85.3
Test #5	1.95	28.6	4.83	47.6	7.00	61.8	10.69	86.0
Test #6	2.02	29.1	4.76	47.0	7.04	62.0	10.72	86.1
Test #7	1.97	28.8	4.89	47.9	7.07	62.2	10.92	87.5
Test #8	2.04	29.2	4.85	47.7	7.09	62.4	10.57	85.2
Average	2.00	29.0	4.83	47.5	7.04	62.0	10.67	85.8
Standard Deviation	0.28		0.49		0.43		1.16	
Yield, % -1.18+0.60mm	69.1		68.8		68.3		63.9	

\* Based on Regression Equation in Table 2

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