

Report on Preparation and Certification
of Australian Coal Industry Reference Samples

Reference Samples for Hardgrove Grindability Index
(ACIRS – H2-2012).

Report No: AD–H2-2012

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ANALYSIS AND TESTING REPORT

Reference Samples for Hardgrove Grindability Index (ACIRS – H2-2012).

1. Introduction

This report describes the preparation and analysis of ACIRS–H2-2012, comprising a set of four jars each having a different HGI value.

The end use of these samples is, as a quality control tool and to calibrate Hardgrove grindability machines.

2. Previous ACIRS- H series Preparation

- ACIRS–H1-2010

Supplied by: ACIRL, Ipswich Laboratory, Qld

Date: 26-03-2010

Equation used: $HGI = 7.345x + 13.422$, $R^2 = 1.000$

3. Samples

Approximately 150 kg samples of each of 4 coals were obtained: -

Sample A : New Acland Thermal Coal, QLD

Sample B : Hunter Valley Thermal Coal, NSW

Sample C : Blackwater Thermal Coal, QLD

Sample D : Norwich Park Coking Coal, QLD

Each sample was crushed to a nominal top size of 4.75 mm, air-dried, blended thoroughly and divided into 2kg sub-samples by rotary sample division.

4. Verification of Apparatus Performance

The verification program consisted of calibration against the ASTM certified reference material set (2012-22-17) purchased from Penn State University, and subsequent check against ACIRS – H1-2010 (refer Tables 1 & 2). All HGI determinations as per AS1038.20.

TABLE 1: 2010-22-17

Certified HGI	Mass passing 75 mm test sieve, g Date: Mar. 2012		Mass passing 75 mm test sieve, g (Mean) Previous Test Date:
	Values	Mean	
41	3.52	3.51	New series not previously used.
56	6.17	6.28	
84	9.86	9.91	
97	11.98	12.10	

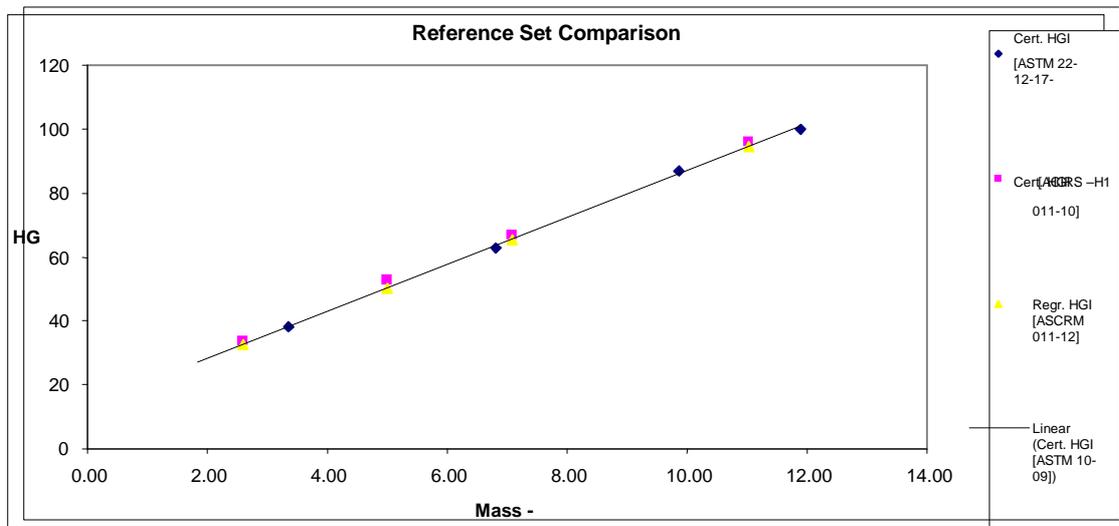
TABLE 2: ACIRS – H1-2010

Certified HGI	Mass passing 75 mm test sieve, g Date: Mar. 2012		Mass passing 75 mm test sieve, g (Mean) Previous Test Date: Mar. 2010
	Values	Mean	
26	1.55	1.58	1.63
49	4.69	4.72	4.89
70	7.42	7.44	7.64
94	10.98	11.01	11.02

5. Regression Equation

A linear regression was performed on the ASTM CRM data (eqn. below). Additionally the ACIRS –H1-2010 data was processed using the new equation and verified.

$$HGI = 6.730x + 16.220, R^2 = 0.998$$



6. Determination of Hardgrove Grindability Index of Standard Reference Samples

1 kg test portions were extracted from each of 4 sub-samples of samples, A, B, C and D. These portions were prepared and duplicate determinations carried out using the National Hardgrove Machine and the regression equation determined in Section 5.

Table 3: ACIRS – H2- 2012

	A Mass passing 75 µm test sieve,		B Mass passing 75 µm test sieve,		C Mass passing 75 µm test sieve,		D Mass passing 75 µm test sieve,	
	g	Calc.* HGI	g	Calc.* HGI	g	Calc.* HGI	g	Calc.* HGI
Test 1	1.64	27.26	4.63	47.38	7.15	64.34	10.86	89.31
	1.63	27.19	4.65	47.52	7.21	64.75	10.79	88.84
Test 2	1.61	27.06	4.63	47.38	7.13	64.21	10.82	89.04
	1.62	27.12	4.66	47.58	7.18	64.54	10.77	88.71
Test 3	1.59	26.92	4.67	47.65	7.12	64.14	10.84	89.18
	1.61	27.06	4.66	47.58	7.14	64.28	10.77	88.71
Test 4	1.62	27.12	4.60	47.18	7.15	64.34	10.82	89.04
	1.63	27.19	4.61	47.25	7.12	64.14	10.81	88.98
Mean	1.62	27.11	4.64	47.44	7.15	64.34	10.81	88.98
Std. Dev.	-	0.10	-	0.17	-	0.21	-	0.22
Range	-	0.34	-	0.47	-	0.61	-	0.61

* Based on Regression Eqn. on previous page

60 Sub-samples of each reference sample were sealed in polythene containers and despatched to the Australian Coal Preparation Society for storage and despatch.

7 Certified Values

ACIRS – H2 - 2012

	Sample A	Sample B	Sample C	Sample D
<i>HGI</i>	27	47	64	89

NOTE: To minimise deterioration of the samples, containers should be kept tightly sealed and the samples stored in a cool, dark place.