

Report on Preparation and Certification  
of Australian Coal Industry Reference Samples

General Coal Reference Sample  
(ACIRS – G4-2012).

Report No: AD-G4 -2012

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# ANALYSIS AND TESTING REPORT

## General Coal Reference Sample (ACIRS – G4-2012).

### 1. Introduction

This report describes the preparation and analysis of ACIRS-G4-2012, which comprises a sealed jar of coal used in the determination of various elements and properties of coals.

The end use of these samples is as a quality control tool and to calibrate analytical elemental instruments.

### 2. Previous ACIRS- G series Preparation

ACIRS-G3-2010 released for sale 05-11-2010

### 3. Sample preparation

Approximately a 180 kg sample of bulk material from a colliery in the Northern Bowen Basin, Queensland, and of –50 mm size was obtained.

The material was stabilised in storage for several months before being crushed, air-dried and pulverised in a swing hammer mill to a nominal top size of 4 mm. The pulverised coal was repeatedly mixed by rotary sample division (RSD).

The coal was then milled to a nominal top size of 212µm and the product placed in plastic bags in plastic jars each containing approximately 250g.

11% of the jars were randomly selected and tested for homogeneity by determining and recording the ash and moisture content of each.

### 4. Test program

Jars of the product were used in a test program organized by ALS, Gladstone. 28 laboratories participated in the program who were asked to undertake determinations and to submit duplicate results on a dry basis for each test.

BMA, Gladstone, carried out the statistical analysis and the complete results were checked by the ACIRS Steering Committee.

## 5. Statistical analysis of results

Statistics for the sample were generated using robust statistical procedures which included the number of results, median, range, repeatability and reproducibility.

Table 1  
Outcome of statistical processing

Test	No. of laboratories returning results	No of determinations considered:		Notes
		for ACIRS stats	for final certified values	
Ash	28	28	26	
Volatile Matter	28	28	27	
Total Carbon	9	9	7	Indicative
Hydrogen	9	9	7	Indicative
Nitrogen	8	8	8	Indicative
Total Sulfur	27	27	27	
Pyritic Sulfur	2	2	2	Indicative
Sulfate Sulfur	2	2	2	Indicative
Chlorine	12	12	12	
Phosphorus	10	10	9	
Carbonate Carbon	9	9	7	Indicative
Relative Density	21	21	21	
Gross calorific value	25	25	22	

## 6. Certified Values

Table 2  
ACIRS – G4 – 2012 Certified Values

Determinations	Mean	SD
Ash	10.62 % dry basis	0.093
Volatile Matter	20.32 % dry basis	0.191
Total Sulfur	0.567 % dry basis	0.014
Chlorine	0.040 % dry basis	0.005
Phosphorus	0.026 % dry basis	0.003
Relative Density (dry basis)	1.37	0.017
Gross calorific value	32.42 MJ/kg dry basis	0.102
<b><u>Indicative values</u></b>		
Total Carbon	79.38 %dry basis	0.330
Hydrogen	4.39 % dry basis	0.091
Nitrogen	1.78 % dry basis	0.067
Carbonate Carbon	0.040 % dry basis	0.010
Pyritic Sulfur	0.041 % dry basis	0.008
Sulfate Sulfur	0.11 % dry basis	0.010

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**Australian Coal Industry Reference Sample  
(ACIRS)**

**Certified reference coal  
ACIRS- G4-2012**

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**Certificate of Analysis**

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<b>Certified values</b>		<b>Standard deviation</b>
Ash	10.62 % dry basis	0.093
Volatile Matter	20.32 % dry basis	0.191
Total Sulfur	0.567 % dry basis	0.014
Chlorine	0.040 % dry basis	0.005
Phosphorus	0.026 % dry basis	0.003
Relative Density	1.37	0.017
Gross calorific value	32.42 MJ/kg dry basis	0.102
<b><u>Indicative values only</u></b>		
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Hydrogen	4.39 % dry basis	0.091
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Carbonate Carbon	0.040 % dry basis	0.010
Pyritic Sulfur	0.041 % dry basis	0.008
Sulfate Sulfur	0.011 % dry basis	0.010

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