

# Alpha Resources, Inc. Certificate Of Analysis

AR-2773  
ULTIMATE COAL STANDARD

LOT# 721906

LID# 721906

## DRIED BASIS VALUES

### Proximate Analysis

|                        |        |
|------------------------|--------|
| % Ash.....             | 6.67   |
| % Volatile Matter..... | 44.86  |
| % Fixed Carbon.....    | 48.28  |
| % Sulfur.....          | 0.50   |
| Btu.....               | 11,918 |

### Ultimate Analysis

|                 |       |
|-----------------|-------|
| % Carbon.....   | 69.75 |
| % Hydrogen..... | 4.84  |
| % Nitrogen..... | 1.00  |
| % Chlorine..... | 0.01  |

### Sulfur Forms

|                |      |
|----------------|------|
| % Pyritic..... | 0.06 |
| % Organic..... | 0.43 |
| % Sulfate..... | 0.01 |
| % Total.....   | 0.50 |

### Ash Fusion Temperature

|                     |                      |             |             |
|---------------------|----------------------|-------------|-------------|
| Initial Deformation | Reducing / Oxidizing | (Degrees F) | 2103 / 2155 |
| Softening H = W     | Reducing / Oxidizing |             | 2121 / 2168 |
| Softening H = 1/2 W | Reducing / Oxidizing |             | 2141 / 2182 |
| Fluid               | Reducing / Oxidizing |             | 2183 / 2225 |

### Mineral Analysis

|                      |       |
|----------------------|-------|
| Silica.....          | 29.77 |
| Alumina.....         | 16.53 |
| Titania.....         | 1.42  |
| Ferric Oxide.....    | 4.90  |
| Calcium Oxide.....   | 23.38 |
| Magnesium Oxide..... | 3.47  |
| Strontium Oxide..... | 0.28  |

|                           |       |
|---------------------------|-------|
| Potassium Oxide.....      | 0.28  |
| Sodium Oxide.....         | 1.53  |
| Sulfur Trioxide.....      | 15.11 |
| Phosphorus Pentoxide..... | 0.60  |
| Manganese Oxide.....      | 0.05  |
| Barium Oxide.....         | 0.57  |
| Undetermined.....         | 0.00  |

The Following ASTM Procedures Were Employed In The Analysis Of All Samples:

|                        |             |                   |             |
|------------------------|-------------|-------------------|-------------|
| Preparation.....       | ASTM D 2013 | Ash Analysis..... | ASTM D 3682 |
| Carbon & Hydrogen..... | ASTM D 3178 | Ash.....          | ASTM D 3174 |
| Volatile Matter.....   | ASTM D 3175 | Fusibilities..... | ASTM D 1857 |
| Sulfur.....            | ASTM D 3177 | BTU.....          | ASTM D 2015 |
| Nitrogen.....          | ASTM D 3179 | Sulfur Forms..... | ASTM D 2492 |

The material used in production of this standard was sampled in accordance with ARI 031. The above values relate only to the material used to produce this standard.

The overall direction and coordination of the analytical measurements leading to certification were performed by J.R. Shingledecker at Alpha Resources.

Remedies for any claimed defect in this product will be limited to product replacement or refund of the purchase price. In no event shall Alpha Resources be liable for incidental or consequential damages.

This is a Certified Reference Material (CRM). For good laboratory practice it is recommended that all standards be verified prior to use.

**EXPIRATION DATE**  
**THIS CRM IS VALID FOR TWO YEARS FROM THE DATE OF PURCHASE WHICH**  
**APPEARS ON THE BOTTLE**

*J.R. Shingledecker*