

**AR 147**  
**COPPER PIN STANDARD**  
**OXYGEN & SULFUR**  
**LOT # 120400**

**PPM OXYGEN**  
**MEAN = 13 PPM**  
**ONE SIGMA = +/- 1.5 PPM**  
**TWO SIGMA = +/- 3.0 PPM**  
**RANGE = 10 - 16 PPM**

**PPM SULFUR**  
**MEAN = 26 PPM**  
**ONE SIGMA = +/- 3**  
**TWO SIGMA = +/- 6**  
**RANGE = 20 - 32 PPM**

**PPM CARBON = 24 PPM (REFERENCE ONLY)**  
**PPM NITROGEN = 1.1 PPM (REFERENCE ONLY)**  
**PPM HYDROGEN = 1.3 PPM +/- 0.3 (REFERENCE ONLY)**

Methods of Analysis

Oxygen	Inert Gas Fusion IR Detection
Sulfur	Combustion - Iodate Titration / IR Detection
Carbon	Combustion - IR Detection
Nitrogen	Inert Gas Fusion TC Detection
Hydrogen	Inert Gas Fusion TC Detection (Gas dose)

Standard Reference Materials employed were  
NIST SRM 1097, 1098, 885, 2159, 2165, 343a, 348  
NCS 11011, 20504  
JSS 244-5, GS-2C

Notes:

The mean analytical values were derived by a number of data sets obtained by the above methods.

The precision value is based on the standard deviation, two times the standard deviation, and complete range of analysis obtained by the data sets. Carbon, Hydrogen, and Nitrogen are given for reference only.

The statistical analysis of the certification was performed by K.E. Dyer at Alpha Resources. The overall direction and coordination of the analytical measurements leading to certification were performed by K.E. Dyer 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), and is traceable to the above-mentioned standards. For good laboratory practice it is recommended that all standards be verified prior to use.

Certified May, 2001

