



# Certificate of Analysis

AR 1622

## ULTIMATE RESIDUAL OIL STANDARD

LOT # 622318

LID ID 622318

			Uncertainty	Method(s)
*Mean Weight % Sulfur	=	2.01	±0.05	ASTM D4294
*BTU/Pound	=	18,861	±72	ASTM D 240
Mean ug/g Iron	=	(9.9)	--	ASTM D5708, D5863, IP501
Mean ug/g Nickel	=	2.39	±0.71	ASTM D5708, D5863, IP501
Mean ug/g Silicon	=	<0.01	--	ASTM D5708, D5863, IP501
Mean ug/g Sodium	=	(2.6)	--	ASTM D5708, D5863, IP501
Mean ug/g Copper	=	<0.01	--	ASTM D5708, D5863, IP501
Mean Weight % Carbon	=	86.34	±0.67	ASTM D5291
Mean Weight % Hydrogen	=	11.95	±1.02	ASTM D5291
Mean Weight % Nitrogen	=	0.16	±0.03	ASTM D5291, D5762

() Reference only \* Traceable to NIST 1622d, 1620b, 1620c, 39j

The intended use of this reference material is for the validation of analysis of residual oil and other petroleum materials by valid test methods. This reference standard was produced gravimetrically using high purity materials, with balances calibrated and checked by precision NIST traceable weights and verified using the above ASTM testing methods. The precision value represents the expanded standard deviation (k=2, 95% confidence limits) derived from analysis utilizing ISO Guide 35 and the Guide to Uncertainty Measurement. When necessary, professional judgment is applied toward consideration of data and statistical information. The statistical analysis and the overall direction and coordination of the analytical measurements leading to certification were performed by K.E. Dyer, Chief Chemist at Alpha Resources. Normal ASTM procedures should be employed when using this standard. This includes using the *reproducibility* and *repeatability* factors for the ASTM method you wish to employ. The material used in the production of this reference material was identified by ARI 041. The samples for round robin testing were selected using ARI 031. Produced in accordance to ISO Guide 31 and ISO 17034 (non-scope).

This bottle contains 100ml of residual fuel oil. Before use, the contents of the bottle should be mixed through vigorous shaking. The contents should not be exposed to air for a lengthy period of time. Store tightly sealed, and upright, under normal laboratory conditions. While unable to determine a definite shelf life this reference should be reviewed 20 years from the date of certification. Once opened this product has a 2-year shelf life. Consult your test method or instrument manufacturer for the minimum or analytical sample size needed.

This is a Certified Reference Material (CRM), and is verified by the above-mentioned testing standards. For good laboratory practice it is recommended that all standards be verified as fit for purpose prior to use. 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.

### EXPIRATION DATE

THIS CRM IS VALID FOR TWO YEARS FROM THE DATE OF OPENING

July 11, 2018