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Certificate Number 719A  
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**% Oxygen**  
**Mean = 0.0010**  
**Standard Deviation = ±0.0001**  
**Expanded Uncertainty = ±0.0003**  
**(k=2, @ 95% confidence, n=45)**

**% Nitrogen**  
**Mean = 0.0024**  
**Standard Deviation = ±0.0002**  
**Expanded Uncertainty = ±0.0005**  
**(k=2, @ 95% confidence, n=44)**

Method of analysis is ASTM E 1019-18 and ARI 034

Primary (NMI) Standards Employed

NIST	1096, 1098
NCS	NS21007
JSS	512-7, 367-9, SS 2-76, 030-8

ALPHA – AR668-1014B, AR656-618A, AR661-A9574H, AR668-409303609, AR1653-815D

Notes

This pin reference standard is intended to be a calibration or QC validation of Oxygen and Nitrogen on inert gas fusion analysers utilizing infrared and thermal conductivity detection as described in ASTM E1019. The analytical sample and minimum size used for testing was 1 pin (0.5g nominal). The precision values represent the estimated mean, standard deviation, and expanded uncertainty. Metrological traceability is to the SI derived unit of mass fraction expressed as percent. Refer to your test method and or your instrument manufacturer for the expanded method derived uncertainty. When necessary, professional judgment is applied toward consideration of data and statistical information.

The material used in production of this standard was identified in accordance with ARI 032. The samples for round-robin testing were selected in accordance with ARI 014. The above values relate only to the material used to produce this reference standard. This reference contains 50g, 0.5g pins (nominal), to be used directly from the bottle with no preparation. While unable to determine a definite shelf life, this reference should be reviewed every 25 years from the date of certification. Keep sealed and store under normal laboratory conditions.

Remedies for any claimed defect in this product will be limited to product replacement or refund of the purchase price. In no event, shall Elemental Microanalysis Ltd be liable for incidental or consequential damages. This certificate cannot be reproduced except in full.

This is reference material is traceable to the above-mentioned reference standards. For good laboratory practice, it is recommended that all reference materials be verified fit for purpose prior to use.

Certified September 5<sup>th</sup>, 2019

Elemental Microanalysis Limited

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