

**Certificate of Analysis  
Part No. B2761  
Steel Chip Standard**

Certificate Number 219E  
Page 1 of 1

**% Carbon**  
**Mean = 0.182**  
**Standard Deviation =  $\pm 0.002$**   
**Expanded Uncertainty =  $\pm 0.004$**   
**(k=2, @ 95% confidence) n=39**

**% Sulphur**  
**Mean = 0.107**  
**Standard Deviation =  $\pm 0.003$**   
**Expanded Uncertainty =  $\pm 0.007$**   
**(k=2, @ 95% confidence) n=38**

**% Nitrogen**  
**Mean = 0.0086**  
**Standard Deviation =  $\pm 0.0003$**   
**Expanded Uncertainty =  $\pm 0.0007$**   
**(k=2, @ 95% confidence) n=28**

Method of analysis is ASTM E 1019-18 and ARI 033  
Primary (NMI)/GUIDE 34/ISO 17034 Reference Standards Employed:  
NIST SRM 293, 50c, 12h, 368, 163, 129c, 8k, 133b  
NCS HC11111  
EURO 238/2, 306/1, 232/2, 079-1, 058-2  
ALPHA AR957-717F, AR957-914E, AR957-1013D,  
AR951-814F, AR956-817A, AR960-814B,  
AR896-1114A

Notes:

The intended use of this reference material standard is for the calibration and verification of Carbon/Sulphur/Nitrogen analysis as described by ASTM E-1019. The mean analytical values were derived by data sets showing traceability to the above-mentioned references. The minimum and typical size for testing was 1g. The precision values represent the estimated mean, standard deviation, and expanded uncertainty derived from the data sets, using ISO Guide 35, ANOVA, and the Guide to Uncertainty Measurement. Metrological traceability is to the SI derived unit of mass fraction expressed as percent. Refer to your test method for additional uncertainty information. When necessary, professional judgment is applied toward consideration of data and statistical information.

The material used in production of this reference material 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 product. This bottle contains 150g, clean chips, to be used directly from the bottle with no preparation needed. 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 Reference Material is traceable to the above-mentioned reference materials. For good laboratory practice, it is recommended that all references be verified as fit for purpose prior to use.

Certified July 18, 2019