Brammer Standard Company, Inc.

Certificate of Analysis

BS 103 Iron Ore
BS 104 Iron Ore Sinter

	Percent by mass Expressed as Oxides			Percent by mass Expressed as element	
	BS 103	**BS 104**		**BS 103**	**BS 104**
CaO	1.27	8.72	**Ca**	0.91	6.24
SiO_2	8.12	7.70	**Si**	3.80	3.60
Al_2O_3	0.96	1.26	**Al**	0.51	0.65
MgO	0.34	3.06	**Mg**	0.21	1.84
TiO_2	0.04	0.08	**Ti**	0.024	0.05
Total Fe			**Fe**	59.41	55.32
MnO	0.61	0.79	**Mn**	0.47	0.61
P_2O_5	0.133	0.127	**P**	0.058	0.056
S			**S**	0.065	0.011
Na_2O	(0.05)	(0.06)	**Na**	(0.04)	(0.045)
K_2O	(0.07)	(0.15)	**K**	(0.06)	(0.125)

The certificate values are the average results of chemical analysis. The analysis in parentheses are not certified and are provided for general information. The values shown as oxides have been calculated buy converting the concentrations of the elements to the equivalent oxide forms.

Dry the material for one hour at 105° C and mix well before using. The material has been pulverized to pass a number 100 sieve.

Revision: This reference material was originally certified April 24, 1989. This revision demonstrates stability for BS 104 only with additional laboratory testing from ISO 17025 accredited laboratories. Revised values for all elements except Na_2O, K_2O, Na, and K are presented. The new revised values all fall within the previous uncertainties, proving stability. BS 103 is currently being analyzed for stability.

Validity statement: ISO Guide 31 states that the certification should contain an expiration date for all materials where instability has been demonstrated or is considered possible, after which the certified value is no longer guaranteed by the certifying body. The certification of BS 104 is valid for at least 20 years at which time stability is verified and a new certificate will be issued. The material needs to be stored in cool, dry conditions to avoid any moisture contamination. The certification is nullified if this RM is damaged, contaminated, or otherwise modified.

Certificate Number: The unique identification number for this certificate of analysis is 103-104-REV050616. You may obtain information on revisions of certificates from the internet at www.brammerstandard.com

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Uncertainty: This reference material has no individual uncertainties, however it is common to use 10% of the certified value to estimate this and similiar RM's.

The certified data for BS 103 and BS 104 Reference Materials is the average analysis from the following laboratories:

Alkav Laboratories, Neeville Island, PA
Allegheny Ludlum Steel Corporation, Brackenridge, PA
Crobaugh labortatiories, Cleveland, OH
J & L Steel Corporation, Aliquippa, PA
Kaiser Steel, Fontana, CA
Andrew S. McCreath & Son, Harrisburgh, PA
Pittsburgh Testing Laboratories, Pittsburgh, PA
Spectrochemical Laboratories, Cleveland, OH
Exova, Glendale Heights, IL (stability test for BS 104 - A2LA 17025)

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Certified by: _____ on May 5, 2016.
Beau R. Brammer