ISO 9615-1 Simplified Borate Fusion / WDXRF Analytical Method for Iron Ore Including Total Iron Analysis

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Whether it is dealing with high-grade hematite, low-grade hematite or magnetite, assays performed on exploration sample, concentrate, internal standard and/or reference material, will always be of paramount financial importance when it comes to the survival of a mining company. In this regard, the existence of a small bias associated with the total iron analysis process could result in millions of dollars of revenue losses for mining companies given the fact that their products are sold in millions of tons. The method entitled “Iron ores -- Determination of Various Elements by X-ray Fluorescence Spectrometry -- Part 1: Comprehensive Procedure” (ISO 9516-1:2003), is the current International Standard Method; it remains widely known and accepted among peers. The prevailing version of this standard however suffers a number of known and documented limitations; it lacks adaptability when dealing with recent developments in the fields of sample preparation by fusion and wavelength dispersive X-ray (WDXRF) spectrometry.

This paper examines a simplified version of the ISO 9615-1 analytical method for iron ores. One fusion method using a Claisse® M4™ fluxer is shown to prepare different iron ore types, regardless of where they originate. It also examines the most recent developments to select and apply the corrections (matrix and overlap) for the calibration.

This method allows for the simplification of both laboratory and spectrometry processes and so, in comparison with the original ISO method, becomes less restrictive in practice.

Furthermore, comparisons will be made between the data collected from this fusion method implemented in combination with a Bruker S4 Explorer WDXRF Spectrometer, and the analytical requirements of ISO. All modifications from the original ISO method parameters (calibration, standards, flux, fluxer, etc.) will also be presented and widely discussed.