

# XRF Scientific Ltd

## Iron

Fusion Example

### HIGH IRON

**High Iron contents** 40 up to 98 %  $FE_2O_3$  content (Sinter, hematite, steel)  
Oxidation: Is highly recommended (cf. general method).  
Recommended fusion temperature: 1200 °C (1350°C temperature of flames)  
Recommended flux:  
XRFS17/5 G and XRFS17/5 Sr G (when the sample contains reduced Iron)  
XRFS5050 (when dosage of sodium is not requested) Fluosid 21, XRFS119  
Phoenix Time settings: times depend on fusion mass.  
Pre-melt 70 sec. Melting 80 sec. Swirling 280 sec. Cooling 160 sec. Mould delay 80 sec.

### **Ferro-alloys**

Recommended PARTICLE SIZE of the sample: below 100  $\mu m$  preferably 63  $\mu m$ .  
A good mix of lithium carbonate/nitrate. Sample and a part of flux are placed on a bed of flux.  
Temperature of fusion: 1200-1300 °C. A preliminary oxidation is necessary with lithium nitrate at 800°C or with a mix of strontium nitrate and lithium nitrate 50 %, 50 %.  
On Pre-Melt mode the temperature is set to 845°C, duration 5-10 minutes.  
Caution: it is highly recommended to check if the oxidation step is completed. For most cases we recommend first to mix the sample with oxidant in the platinum crucible and place this mixture overnight in a well-ventilated muffle furnace.

Flux type: XRFS100, XRFS100G,  
Gas burners: Temperature 1450 °C. (Temperature of the flames)  
Alternatives:  
XRFS65 and XRFS65 G, XRFS35, XRFS50, XRFS20 (Temperature of flames 1350°C)

Additives: Lithium iodide or bromide, potassium or sodium iodate (when the dosage of these elements is not overlapping)  
Oxidant: XRFS oxidant mix, lithium, strontium, potassium, sodium nitrate, and sodium perborate. Vanadium pent oxide.  
Lithium carbonate is used as an initiator for the decomposition of nitrates.

Note: The method described by R. Rutherford is also highly recommended:  
e.g. fuse approximately 2/3 of the flux in the crucible to produce a protective wall. After cooling, introduce the sample mix with oxidant (lithium nitrate with the remaining part of flux) and carry on the oxidation in a muffle furnace at 600°-800°C overnight then fuse as usual. (It would also be possible to oxidise the Ferro-alloys directly on the Phoenix machine using the protective wall method as described in section)

Please contact your local distributor for more information on our applications. XRFS offers a sample preparation service free of charge to intended customers.

## Recommended References

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## **Fusion XRF Procedure - Iron Ore**

[ISO 9516-1:2003 : Iron ores - Determination of various elements by X-ray fluorescence spectrometry - Part 1: Comprehensive procedure](#)

### Abstract

ISO 9516-1:2003 sets out a wavelength dispersive X-ray fluorescence procedure for the determination of iron, silicon, calcium, manganese, aluminium, titanium, magnesium, phosphorus, sulphur, potassium, tin, vanadium, chromium, cobalt, nickel, copper, zinc, arsenic, lead and barium in iron ores. The method has been designed to cope with iron ores having high ignition losses.

The method is applicable to iron ores regardless of mineralogical type.