Introducing Navas Instruments' FTA-2000

Advanced Multi-Sample Bead Fusion System for Precise XRF Analysis with Simultaneous LOI/LOF Determination

Fusion Thermogravimetric Analyzer
An automated system for the simultaneous fusion of 4–16 samples—with batch times of 20 to 30 minutes—and integrated LOI/LOF determination. The FTA-2000 delivers consistent bead quality, high throughput, and seamless integration into XRF workflows.

Key Features of the FTA-2000 Bead Fusion System

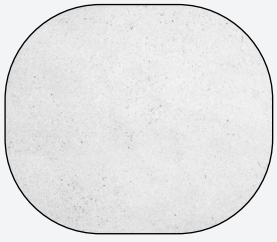
- Engineered with simplicity and reliability—fewer parts mean fewer breakdowns
- Compact size fits securely on any robust tabletop
- Automated fusion and handling of 4–16 samples; weights recorded via external balance
- Integrated LOI/LOF measurement during fusion
- Lithium bromide–free flux enhances aluminum oxide analysis accuracy
- Electric furnace with automatic temperature control for safe operation—only 2 kW power consumption
- Internal balance for real-time weight tracking
- No need to pour molten beads thanks to single-crucible design; minimal crucible cleaning required
- Designed for easy automation in container-based labs
- User-friendly software with customizable methods and data export
- Compatible with a wide range of fluxes and sample types
- Improves repeatability, throughput, and operator safety

Cement

Iron ore

Bauxite

Nickel

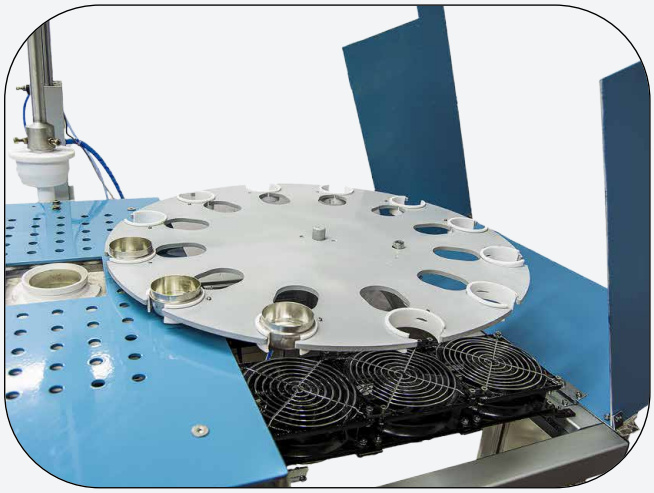


Lime stone

And more ...

Revolutionizing Sample Preparation for XRF

Introducing the FTA-2000 (Fusion Thermogravimetric Analyzer): an automatic, multi-sample bead fusion system engineered for XRF laboratories requiring precision, speed, and automation. It processes 4 to 16 samples per batch in just 20 to 30 minutes, simultaneously fusing beads and providing real-time LOI/LOF data. Navas Instruments also supplies fully equipped container laboratories, integrating the FTA-2000 with collaborative robotics for rapid, on-site deployment.



Autoloader supporting 12 to 16 crucible positions

Carousel supporting 12 to 16 crucible positions

High-Performance Multi-Sample Fusion for XRF Analysis

The furnace carousel holds platinum crucibles, where samples are automatically heated and mixed during the fusion cycle. The system minimizes operator intervention, ensuring consistent results through fully automated weighing, heating, and mixing processes.

Accurate Weighing with Data Integration

Crucibles, samples, and flux are weighed using an external analytical balance connected to the system's Windows-based software. Alternatively, all weights—including those of crucibles, samples, and flux, as well as sample identification data—can be imported directly from a Laboratory Information Management System (LIMS). Crucibles may be pre-weighed or weighed individually by the operator using the external balance. After weighing, each crucible is placed onto the autoloader, enabling a streamlined and flexible sample preparation workflow.

Precision balance for crucibles, samples, and flux

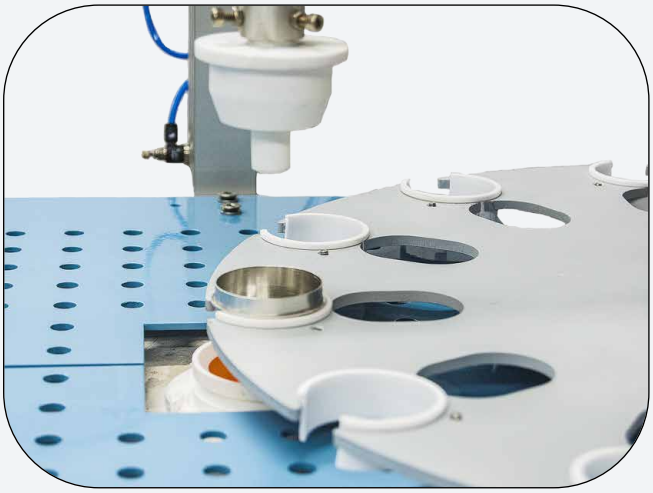
Crucibles for XRF fusion and TGA

Dual-Function System for Fast LOI and Bead Preparation

The instrument supports both 35 mm and 40 mm beads and can also function as a thermogravimetric analyzer (TGA) using quartz crucibles—without producing fused beads—for fast LOI determination. The continuously heated furnace, maintained at 1050°C, enables results in just 20 to 30 minutes—much faster than conventional TGAs, which typically take 2 to 3 hours to heat up and complete analysis.

Precision Loading and Automation Begins

The automation sequence begins at the autoloader. First, the furnace plug is raised to allow access. Crucibles are then accurately positioned by the autoloader carousel. Once a crucible is aligned with the furnace orifice, the sample lifter raises it into position. The autoloader then retracts, and the lifter lowers the crucible into the furnace chamber for heating—all fully automated.



Crucible on autoloader, lifter down

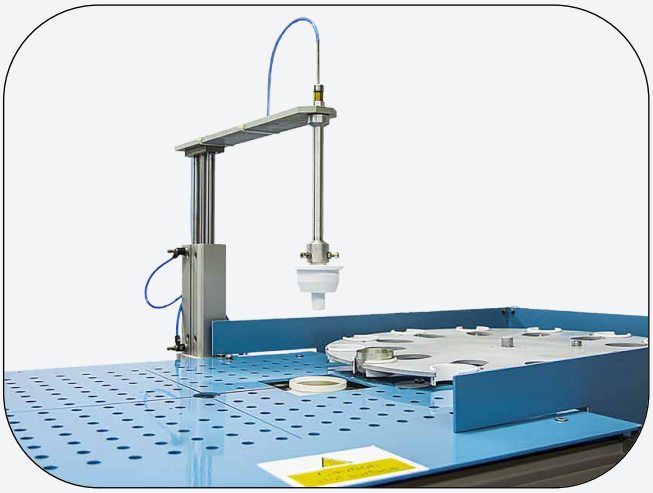
Crucible passing through furnace top

Automated Crucible Transfer into the Furnace

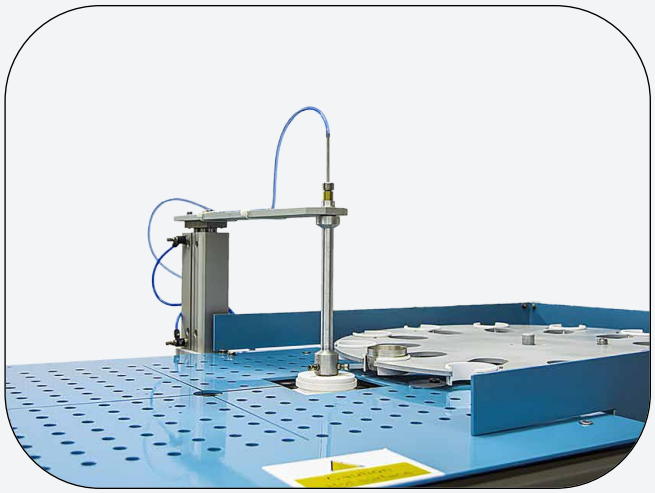
The platinum crucible rests on the lifter piston, positioned for automatic insertion into the high-temperature furnace. This precise and reliable mechanism ensures smooth crucible handling, reducing operator intervention and enabling consistent, repeatable sample processing.

Always-Hot Furnace — Fusion at a Steady 1050°C

Once all crucibles are inside, the furnace plug automatically lowers to seal the chamber, ensuring a stable, uniform thermal environment. The electric furnace maintains precise temperature control near 1050°C for optimal fusion conditions. Integrated weighing during the process enables real-time tracking of LOI/LOF, delivering accurate loss-on-ignition data alongside bead formation.



Plug raised for crucible transfer



Plug down for furnace heating

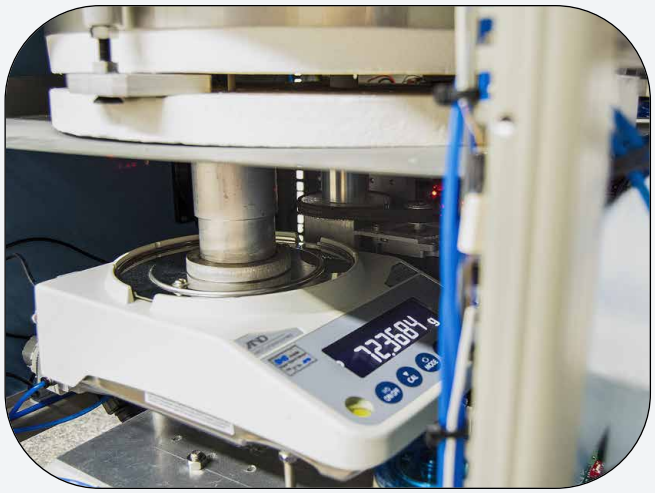
Optimized Fusion Timing and Automated Additive Dosing for Accurate XRF Results

During initial setup, the operator can monitor the live weight-loss curve to identify when the sample stabilizes, allowing for optimized fusion time. After the final bead weight is recorded, a programmable microdose of diluted (40:1) non-wetting agent is automatically added through the furnace plug—minimizing weight variation, reducing toxic gas emissions, and eliminating the variability associated with lithium bromide-based fluxes. This enhances the accuracy of aluminum oxide and other key element measurements.

Tilting, Weighing & Agitation for Accurate XRF

During fusion, the carousel rotates, agitates, tilts, and weighs the crucibles—ensuring consistent motion and optimal mixing. The system calculates the LOI of each sample based on its individual weight loss during heating. To correct for the LOI of the flux, users can either include a blank sample containing only flux within the batch or use a pre-calibrated correction based on the measured weight loss of a flux-only sample determined prior to the run. This option allows the full batch capacity to be used exclusively for actual samples. This patented process guarantees homogeneous bead formation, essential for accurate and reproducible XRF analysis.

Crucibles tilting in carousel for mixing



Balance pedestal located inside furnace base

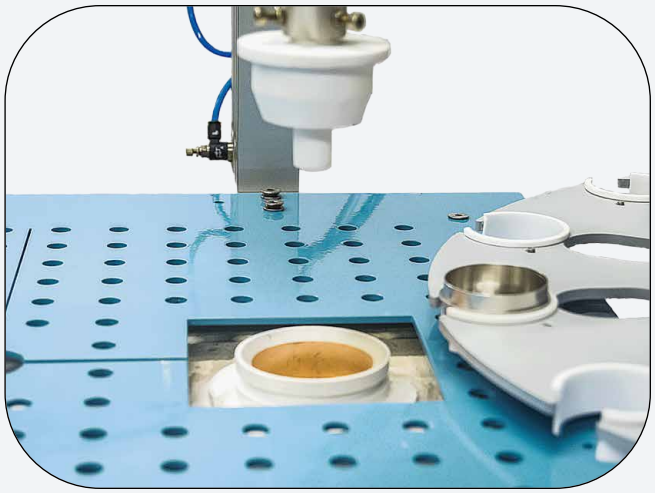
Integrated Balance with Automated Crucible Weighing

Beneath the furnace, a high-precision analytical balance with 0.1 mg sensitivity captures real-time weight data during fusion and LOI determination. A slender rod passes through a small orifice at the furnace base, supporting a pedestal where crucibles are temporarily deposited by the rotating furnace carousel for automated weighing.

Efficient Unloading and Cost-Saving Bead Extraction

After fusion, crucibles are automatically returned to the autoloader, where integrated fans cool them uniformly. Cooling parameters are fully configurable through the software. Once cooled, beads are extracted directly from the platinum crucibles—eliminating the need for traditional bead pouring. This innovative process reduces reliance on additional platinum ware, minimizes cleaning requirements, and lowers operating costs while ensuring safe and efficient sample handling.

Crucible passing through furnace top



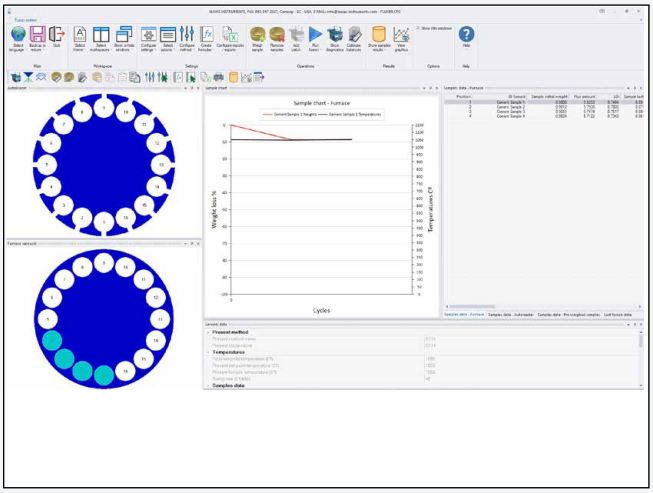
Crucible on autoloader, piston retracted

Fully Automated Crucible Unloading

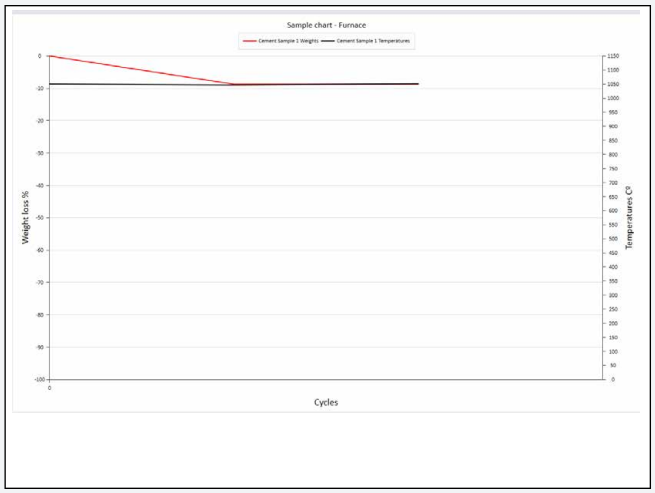
The autoloader rotates, advances, and unloads each crucible from the furnace, then retracts before repeating the sequence for the next crucible. Once all crucibles are unloaded, the system initiates cooling of the platinum crucibles under integrated fans—completing a fully automated post-fusion process.

Powerful and User-Friendly Fusion Software

Our Windows-based software features an intuitive interface designed for seamless operation and complete process control.
All fusion and analysis parameters—including temperatures, fusion and cooling times, and additional settings—are fully configurable to meet specific application needs.
Initial crucible, sample, and flux weights are automatically recorded from the connected analytical balance or, alternatively, imported from your Laboratory Information Management System (LIMS) along with sample identification data.
The entire process—including sample loading, fusion, LOI determination, non-wetting agent addition, and unloading to the autoloader—is fully automatic, requiring no operator intervention.



Fusion software main screen



Weight loss and temperature chart

Seamless Data Management and XRF Integration

Upon completion, results are displayed on screen and can be printed or exported in various formats, including TXT, CSV, Microsoft Excel, or directly to LIMS for easy integration into any lab workflow.
The software provides comprehensive data, including LOI/LOF values, complete time and temperature logs, and weights, along with an individual chart for each sample.
Fusion data can be automatically transmitted to the XRF analyzer. We handle all integration with the spectrometer, and if your model is not yet supported by our software, we welcome the opportunity to collaborate.

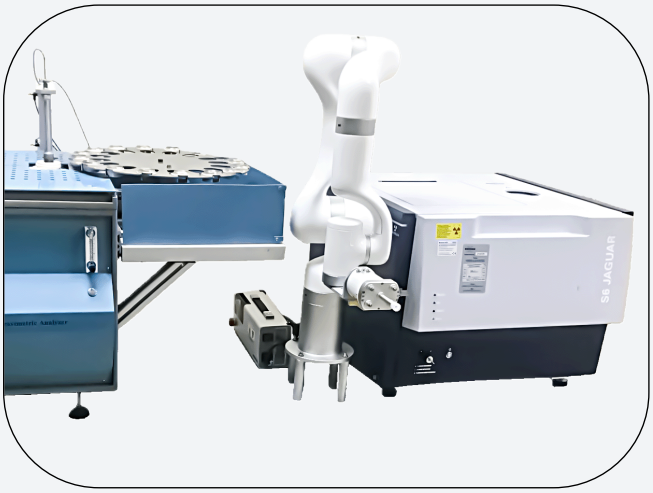
Key Benefits of the FTA-2000 Bead Fusion System

- Maximizes efficiency through automation—freeing operators from routine tasks
- Engineered with simplicity and reliability—fewer parts mean fewer breakdowns
- Small footprint saves bench space without compromising performance
- Easy-to-Use Windows Software for Seamless Operation
- Eliminates Fusion Variability
- Provides Fused Beads + LOI/LOF for Several Samples Simultaneously
- Minimizes Toxic Gas Emissions for a Safer, Greener Lab Environment
- High Throughput with Flexible Capacity
- Low Maintenance & Minimal Consumables
- Fast ROI and Operational Efficiency
- Streamlined Design for Easy Automation and Container Labs

FTA-2000: Fusion Thermogravimetric Analyzer by Navas Instruments

Mobile Container Labs — Flexible, Fully Automated XRF Solutions

Navas Instruments offers a range of mobile container labs equipped with scalable XRF automation—from semi-automatic setups to fully autonomous systems. Available features include collaborative robotic arms for automatic pouring of mixed flux and samples from glass vials, fully automated bead fusion, non-wetting agent addition, unloading to autoloader, and automatic transfer to the XRF spectrometer with automatic triggering of the analysis. Final bead disposal into a bin is also automated. Conveyor-based configurations are available for high-throughput operations.



Automated fusion system with XRF spectrometer and collaborative robot arm

Container lab with fusion system, collaborative robot arm, and XRF spectrometer

Versatile On-Site Applications Across Key Industries

- Remote Mining Operations (Ore Exploration and Quality Control)
- Cement Plants (Quality Control of Raw Materials and Clinker)
- Port Facilities and Bulk Material Handling Hubs
- Construction Megaprojects (Infrastructure Quality Assurance)
- Rare Earth Element (REE) Exploration and Processing
- Battery Materials Mining (Lithium, Cobalt, Graphite)
- Environmental Remediation Projects
- Mobile Laboratories for Government Inspection Agencies
- Third-Party Quality Certification Services

Your Partner in XRF Sample Preparation and Automation

Discover the Future of Sample Preparation
Visit our website to explore our full range of automated bead fusion systems and thermogravimetric analyzers. For detailed information, personalized quotations, or to schedule an on-site demonstration, we invite you to contact us directly.
www.navas-instruments.com
Let our solutions help you achieve safer, faster, and more reliable XRF analysis.

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