

AF 4000

Automatic Fusion Machine



Automated
Operation



Precise Temperature
Control



Rapid
Testing



Intelligent Dual
Control



AF 4000 Fully automatic Fusion machine powered by electric furnace with high productive Four fusion positions, mainly used for preparation of Glass Fusion Beads for XRF analysis & as well as borate and peroxide solutions for Atomic Absorption & ICP Spectroscopic analysis. It effectively reduces or even eliminates undesirable factors such as particle effect, matrix effect, mineral effect, etc. of samples, greatly improves the accuracy of Analytical performance & safety to the users. Widely used in Steel, Metallurgy, Chemical, Environmental, Geology, Cement, Cosmetics, Food, Pharma etc...

Why Fusion in Laboratory

Fusion is a sample preparation method developed in the mid-1950s.

A fully oxidized sample and a flux are melted into a liquid state using a platinum crucible at high temperature. The molten mixture is stirred and poured into a mold, where it is eventually cooled to form a glass frit suitable for XRF analysis.

Fusion technique has wide advantages when compared with other sample preparation techniques viz. Pelletising or acid digestion.

	Fusion Machine	Pellet Press
Mineral Effect	No	Yes
Affect of Particle size	No	Yes
Powder Size required	50 - 100 μm	10 - 30 μm
Error	Little ($\leq 1\%$)	Huge ($\leq 10\%$)
Calibration using synthetic Standards	Yes (Easy)	No
Matric Correction	Yes	No



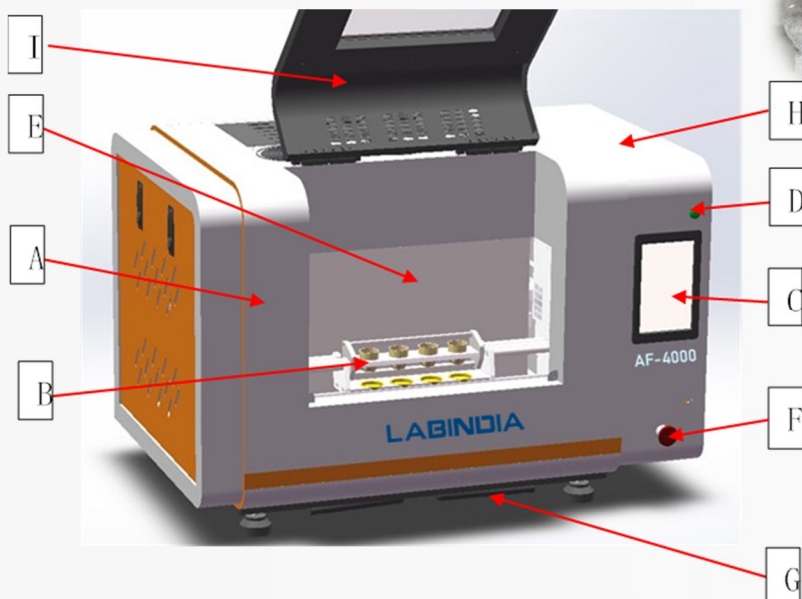
Advantages of AF 4000

- High productive 4-Fusion Positions with analysis time of 10 - 12 min. and a throughput of 20 - 24 samples / hour.
(Can be used 1 to 4 fusion positions as per requirement)
- Full automation with Minimal manual intervention & Ease of Operation.
- Intuitive full Touch-Screen Design with Intelligent Imported PLC control with Complete digitalised process: Process can be programmed in a single click with built-In Touch Screen Controller.
- Automatic fusion process with a single click on Touch Screen; just load the sample, set the melting curve through the touch screen, and the melting process can be completed automatically.
- Real-time temperature measurement by thermocouple, PID constant temperature adjustment, and PLC intelligent control ensure precise control of the sample preparation process and excellent sample preparation quality.
- User-adjustable automatic swing system with swing angle Max. up to $\pm 40^\circ$ to ensure the uniformity and quality of the melt, and adjustable inverted Mold moulding.
- Halogen exhaust channel: Real-time discharge of corrosive gases generated by high temperature to extend the service life of equipment consumables.
- Silicon Carbide heating elements & high-precision multiple thermocouples are used to monitor the temperature in the high-temperature furnace in real time, and the temperature in the furnace is accurately controlled in combination with the PID temperature control program, ensures stability & quality of the melt.
- Max. temperature up to 1350°C with operating temperature up to 1250°C with Accuracy of $\pm 1^\circ\text{C}$.
- Lining of the high-temperature furnace is made of high-quality refractory materials to ensure the thermal stability and long life of the high-temperature furnace.
- Integral ceramic bracket, the bracket as a whole does not contain any iron-based materials, does not fall off or crack after long-term use, and is easy to disassemble and assemble. The bracket as a whole can be pickled with hydrochloric acid and can be used repeatedly with a service life of more than 3 years.
- Cold-to-cold operation mode, no heat radiation and scalding risk.
- No ceramic rod above the melting crucible, which avoids the risk of pollutants falling during the melting process and achieves zero pollution in the melting process.
- Automatically complete melting and casting: Full automation programming one button of complete fusion process Pre-oxidation → Heating melting → Pouring → Cooling.
- The pouring is completed in the furnace, with less heat radiation to the human body. The forced Air-cooling system is designed to accelerate the cooling of the melt and improve efficiency.
- Platinum crucibles and moulds are designed with heat-resistant ceramic protection frame devices (temp-resistance to 1600°C) to extend their service life.
- Designed with multiple protections (Burn-Out, Over-temperature, swing motion limit protection, etc.), makes the instrument safer, more stable and reliable. Any programme can be interrupted at any time in an emergency.
- Integrated safety door design and fixed crucible rack, no gas, no flame, no high-frequency radiation, no risk of scalding, ensuring safety. Adjustable mold rack, the mold rack can adapt to molds of different sizes of 30/32/34/36/37/40mm.
- Designed with independent controllable safety door, supports opening mid-way.
- Remote control Operation through electronic peripherals Viz. PC or Mobile & Integration with LIMS.
- The complete test records can be checked and exported to other electronic peripherals.

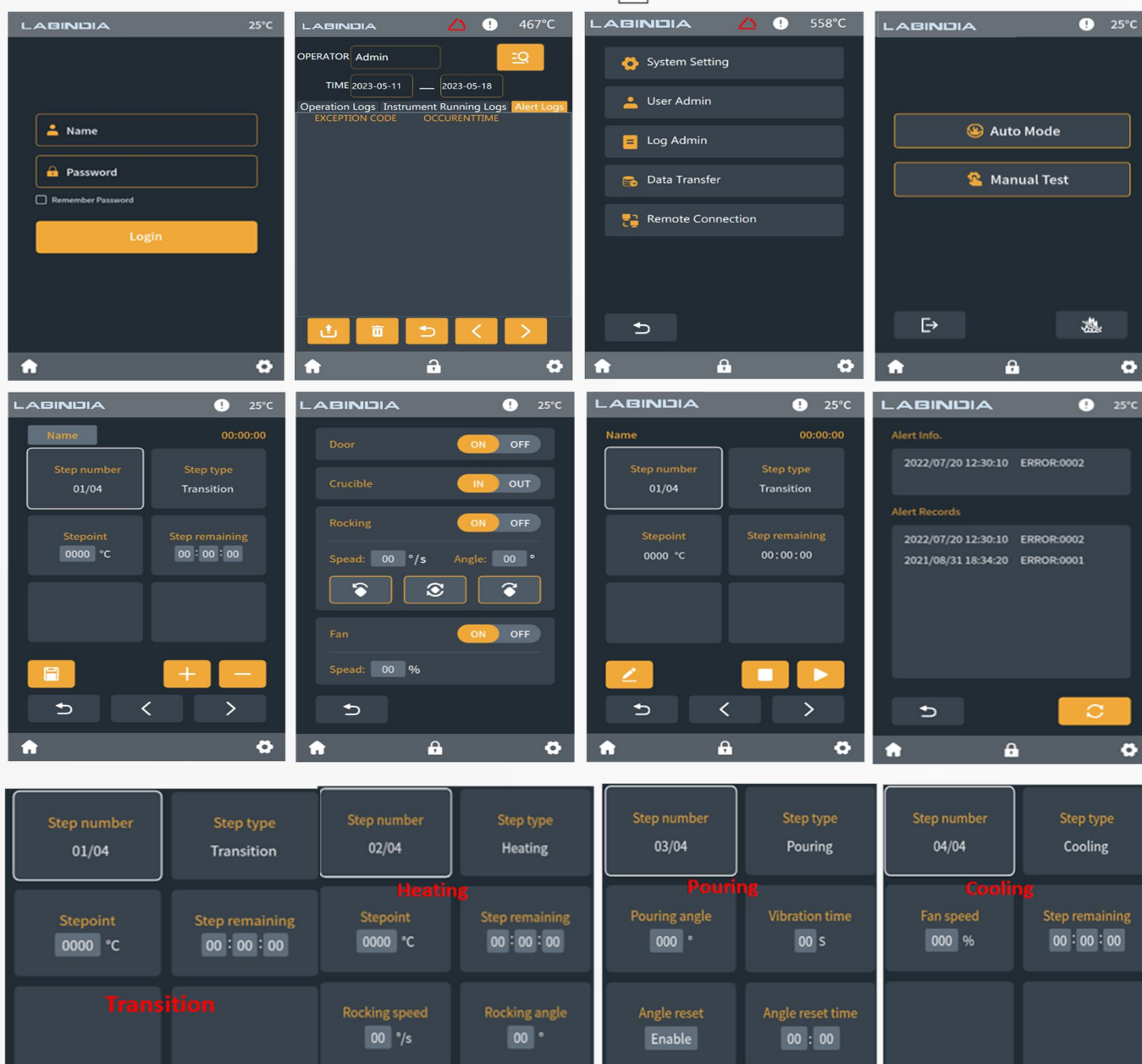
Technical Data (AF 4000 Automatic Fusion Machine)

Max. Temperature Range	: RT - 1350°C (Holder Operating Temperature Up to 1600°C)
Operating Temperature	: RT - 1250°C
Temperature Accuracy	: $\pm 1^\circ\text{C}$ (S-Type Platinum-Rhodium Thermocouple)
Heating ramp rate	: Max. up to 35°C/min (Melting and Heating Stage)
No. of Positions	: 4 sample positions (Can prepare 1 to 4 Samples simultaneously)
Heating	: Silicon Carbide Heating elements
Forming method	: Automatic mold pouring and molding
Throughput	: 4 Samples / 10-12 Minutes (Depending on Sample Complexity) (High Throughput of 24 Samples / Hour)
Working mode	: Automatic sampling → Preheating → Pre-oxidation → Heating melting → Pouring → Cooling. (The time of each stage can be adjuste)
Crucible swing angle	: $\pm 40^\circ$
Pourable angle	: 0-130°
Ceramic insulation protection resistance	: Silicon Nitride Ceramic material; withstand high-Temp. upto 1600°C
Control System	: 10.4" Large Colour Touchscreen Controller, Imported PLC Control, PID Thermostat.
Temperature Control System	: Uses a new AI artificial intelligence algorithm, with a new furnace structure and spiral heating element, rapid heating, and no temperature overshoot, to ensure the temperature requirements of sample melting throughout the process
Crucibles	: Platinum crucible (Pt/Au:95/5) Option: Other Crucibles viz. Zirconia, Nickel on request
Crucible holder material	: Integral ceramic bracket, the whole does not contain any iron-based materials, life span > 3 years
Safety Protection	: Integrated auto-locking protection shield with safety glass; Safety door design, Broken couple, broken rod, Over-Temperature protection, Swing movement limit position; Door Open; Emergency Stop
Remote Control Operation	: Can be connected to any electronic peripheral VIZ. PC or Mobile for remote control operation and also can be integrated with Laboratory Information Management System (LIMS). Test Records can be any time exported to other electronic peripherals.
Standard Operating Procedures / Methods	: Built-In 10 Pre-Loaded programme parameters with editable options and 10 Sample fusion parameters for different sample experiments can be set as per user's choice.
Certifications	: GMP / CE / ISO Certified
Protection	: IP66 Protected
Power Supply	: 8.0 kW / 35 Amp; Single Phase.; 220 V; 50 Hz; Grounded
Dimensions (LxWxH) mm	: 1020 x 650 x 670 (Main Instrument) Recommended size of the platform: 1400 x 800 x 800
Weight	: 136 Kg

Main Structure & Touch Screen Interface



- A: Instrument housing
- B: Crucible holder and mold holder
- C: Display
- D: Status indicator
- E: Heating furnace
- F: Emergency stop switch
- G: Handling handle
- H: Electric control box
- I: Instrument door





LABINDIA EQUIPMENTS

WHERE COMMITMENT IS CULTURE

HEAD OFFICE:

Thane: 201, Nand Chambers, LBS Marg, Near Vandana Cinema, Thane (W) - 400 602. Tel.: +91-22-2598 6000 / 2598 6110 E-mail: sales.mfd@labindia.com

REGIONAL OFFICES:

Delhi: Tel.: +91-11-4330 6001 / 10

Chennai: Tel.: +91-44-2434 7008 / 2432 0352

Kolkatta: Tel.: +91-33-2466 3362

BRANCH OFFICES:

Bangalore: Tel.: +91 80 4565 6200

Lucknow: Tel.: +91-522-2346 535 / 2346 496

Hyderabad: Tel.: 040 4444 3530

Vadodara: Tel.: +91-265-2986 005 / 2986 006

Pune: Tel.: +91-20-2545 3386

Chandigarh: Tel.: +91-172-4090 001-07 / 4090 009

FACTORY 1: Plot No. EL-72, Electronic Zone, TTC Industrial Area, Thane Belapur Road, Navi Mumbai - 400 705. Tel.: +91-22-6107 6666

FACTORY 2: Plot No. W-401, TTC, MIDC Industrial Area, Rabale, Thane-Belapur Road, Navi Mumbai 400 701. Tel.: +91-22-6107 6555

APPLICATION & TRAINING CENTRE: R-909, TTC Industrial Area, Thane Belapur Road, Rabale, Navi Mumbai - 400 701. Tel.: +91-22-6107 6555



Striving to become the best individuals, we endeavour to foster the best team. Performing sensibly, we try to achieve the best efficiency. Working innovatively, we seek to make the best products. Listening patiently, we excel to offer the best service. So, no matter what you needs are, You will always **GET THE BEST.**

LABINDIA reserves the right to change specifications without prior notice as part of its continuous programme of product development.