



FORJ Claisse technology

The essential link in a strong analytical chain



Making sample preparation faster, more robust, and more accurate than ever

Introduction

By working closely with partners across the industry, Malvern Panalytical's experts have developed a fusion instrument that delivers unmatched value to customers: FORJ™. This game-changing product in our Claisse technology range takes sample preparation to a whole new level.

Based on our expertise in X-ray fluorescence (XRF), inductively coupled plasma (ICP) analysis, sample preparation, and indeed the entire analytical chain, FORJ is designed to meet the highest material quality standards for elemental analysis. In fact, it delivers the highest levels of robustness, unmatched productivity, and superior-quality results. What's more, this user-friendly instrument is suitable for full laboratory integration – and comes with the support of our worldwide network of experienced engineers.

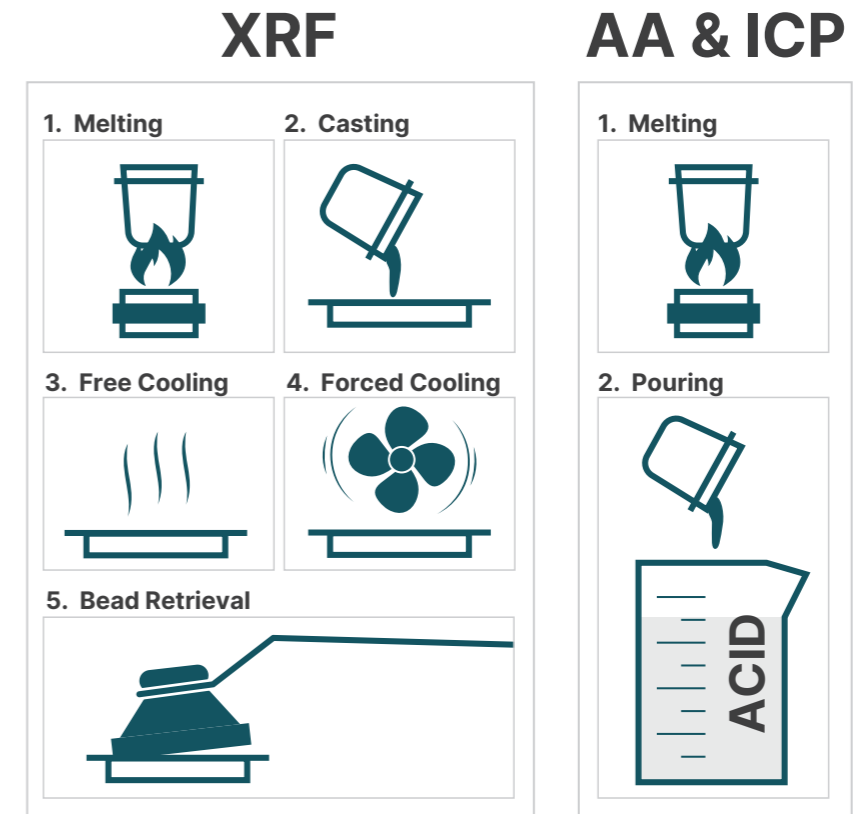
Total compatibility for absolute peace of mind

For the most reliable X-ray analysis, you need the perfect analytical chain – and sample preparation is a crucial link. Our FORJ fusion instrument enables you to forge the strongest analytical chain possible, helping you minimize the risk of errors and optimize your X-ray analysis.



What is fusion?

Developed in the mid-1950s, fusion is a sample preparation method that consists of dissolving a fully oxidized sample at a high temperature in a suitable solvent (a flux), using a platinum, zirconium, or graphite crucible. The melted mixture is agitated and poured into either a mold, to create a glass disk ready for XRF analysis, or a beaker, to create a solution for ICP or atomic absorption (AA) analysis.



Why should I use fusion in my lab?

As the chart shows, this universal technique has numerous benefits compared to other sample preparation methods such as pressed pellets or acid digestion.

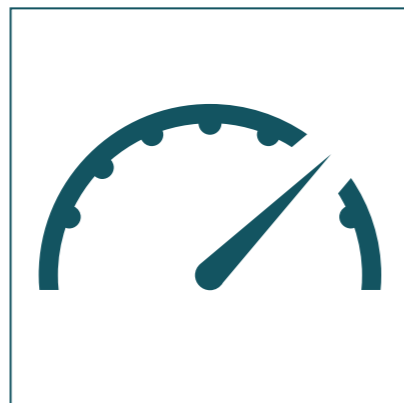
	Fusion	Pressed pellet
Affected by mineralogy	No	Yes
Affected by particle size	No	Yes
Desirable size of powder (microns)	50-100 (easy)	5-30 (difficult)
Accuracy	≤1%	≤10%
Easy calibration with synthetic standards	Yes	No
Application of matrix correction	Yes	No

What makes FORJ so unique?



First-class robustness and reliability

You want to avoid downtime and part replacement? We developed FORJ so it withstands harsh conditions with a minimum level of maintenance. Since there is less thermal stress on the components of the instrument, there is potentially less damage and more productivity. Crucibles are never in contact with the rod during the fusion process, so there are less contamination risks and replacement of parts. The furnace materials are protected thanks to a dedicated airflow which forces fumes to get out of the heating chamber by chimneys. The mold sensor option eliminates damages that could occur while pouring without a mold, and the sample monitoring option streamlines sample tracking and allows monitoring of overall fusion rates.



Speed and high throughput

We know productivity in the lab matters – which is why we designed our FORJ to be the fastest sample preparation fusion instrument in the world. The tray loader option means that while one set of samples is cooling, a second can begin its fusion cycle in the furnace. This boosts productivity by up to 25%, for high throughput with no increase in bench space. Meanwhile, to avoid heat loss, the furnace is completely closed, with the handling mechanism eliminating the need for opening the side of the furnace. FORJ also clearly indicates when your samples are ready to be picked up – so you can run your next batch as soon as possible.



Top-quality analytical results

Repeatable results are a key goal for any analytical process – and for that, you need consistent heating between fusion positions during your sample preparation. Thanks to a thermocouple located between the refractory layers, fusion cycles in FORJ will only start once the instrument detects complete furnace stability, thus avoiding non-repeatable results. In addition, the non-wetting agent (NWA) pills injector function contributes to homogeneous melt and helps avoid disk breakage. Plus, FORJ contains no metal inside the heating chamber, preventing contamination and supporting superior analytical results.



Easy to install and use

Looking for headache-free sample preparation? Look no further: FORJ is easy to install and use, with ergonomically placed crucibles and molds and simple switching from one mode to another. Its full cold-to-cold operation ensures operators' safety, and its user interface is intuitive for experienced users and beginners alike.



Support anywhere, any time

At Malvern Panalytical, our experts provide high-quality advice, support, and training all along the X-ray analysis journey. With our worldwide technical and application support network, we're here for you, wherever you are.





Upgrade your sample preparation with optional features

Tray loader

With this option, FORJ helps maximize your productivity – allowing you to load up to 12 samples at a time and enabling a fusion cycle to start without the presence of an operator. The result? No time wasted in the heating chamber, up to 25% productivity increase and significantly lower operation time.

Connectivity and sample monitoring

There are all kinds of benefits to connectivity and sample monitoring with FORJ. From streamlined sample tracking, which associates a sample ID with each fusion position and decreases the chance of losing track of samples in the analytical chain, to simplified troubleshooting, by means of marking individual samples as having succeeded or failed, there is plenty to gain from this option. You can also control the instrument remotely, sending data directly to your lab information management system (LIMS).



FORJ technical specifications

Productivity

6 fusion positions	Pre-loading of 6 additional samples with tray loader option
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Robustness and operation

- Mold detection by camera
- Ergonomic manipulation
- Integrated supercapacitor
- Power-saving: programmable pre-heat and shut-off timer
- Light tower
- Usable with WROXI-CRM

Fusion success enhancers

- Pause and inspection function
- Controlled heat ramp
- Fast heat drop
- Non-wetting agent pill injector
- Furnace refractory monitoring
- Performant pre-set programs with full method descriptions for the most common applications
- Adaptable temperature, step duration, agitation speed, cooling airflow, magnetic agitation, and pouring approach
- Multiple program views: remaining time, temperature vs time graph, and fusion step details

Modes

Disks (XRF)	Crucibles and molds	Crucimolds
Borate solution (ICP/AA)	In beaker with diluted acid	
Peroxide fusion (ICP/AA)	Low-volume crucibles: 25 ml	High-volume crucibles: 50 ml
Thermal treatment	Heat sample in crucible at required temperature and time	

Connectivity and software

- Fusion success monitoring
- Sample tracking
- Remote control
- Ethernet connection and USB ports

Safety

- Cold-to-cold operation
- CSA-CA, CSA-US, CE, RoHS, UKCA
- Coated PCB for high corrosion resistance

Dimensions and weight

Height	71 cm (27.9 in)
Depth	72 cm (28.3 in)
Width	102 cm (40.2 in)
Weight	127 kg (280 lb)

Electrical requirements

Canada and USA	Other countries
208-240 V	200-240 V
60 Hz	50/60 Hz
30 A, 5500 VA	

Maximum operating temperature

Periodic: 1250°C	Steady: 1200°C
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Fume extraction

Exhaust adapter or installation under a hood



About Malvern Panalytical

We draw on the power of our analytical instruments and services to make the invisible visible and the impossible possible.

Through the chemical, physical and structural analysis of materials, our high precision analytical systems and top-notch services support our customers in creating a better world. We help them improve everything from the energies that power us and the materials we build with, to the medicines that cure us and the foods we enjoy.

We partner with many of the world's biggest companies, universities and research organizations. They value us not only for the power of our solutions, but also for the depth of our expertise, collaboration and integrity.

We are committed to Net Zero in our own operations by 2030 and in our total value chain by 2040. This is woven into the fabric of our business, and we help our employees and customers think about their part in creating a healthier, cleaner, and more productive world.

With over 2300 employees, we serve the world, and we are part of Spectris plc, the world-leading precision measurement group.

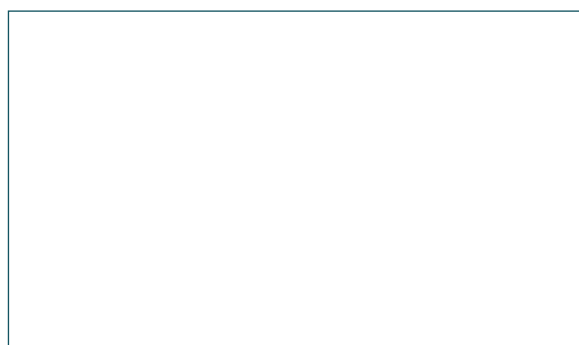
Malvern Panalytical. We're BIG on small™

Service & Support

Malvern Panalytical provides the global training, service and support you need to continuously drive your analytical processes at the highest level. We help you increase the return on your investment with us, and ensure that as your laboratory and analytical needs grow, we are there to support you.

Our worldwide team of specialists adds value to your business processes by ensuring applications expertise, rapid response and maximum instrument uptime.

- Local and remote support
- Full and flexible range of support agreements
- Compliance and validation support
- Onsite or classroom-based training courses
- e-Learning training courses and web seminars
- Sample and application consultancy



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