



**Malvern  
Panalytical**  
a spectris company

# AERIS METALS EDITION



## OUTPERFORMING EXPECTATIONS... SURPRISINGLY INTUITIVE

The Metals edition of Aeris is Malvern Panalytical's X-ray diffractometer for everyone. Ease of use and maximum benefit are the key aspects. Experience for yourself how operation of the Metals edition of Aeris is just a breeze with its intuitive user interface on the built-in touch screen where all results you need are directly displayed.

At the same time, the Metals edition of Aeris is designed for low cost of ownership. With its low power consumption, virtually unlimited lifetime of the tube and limited infrastructural requirements it guarantees low running costs.

Malvern Panalytical engineers with their continuous drive to innovate have been able to outperform typical benchtop X-ray diffractometer performance. Aeris incorporates many technologies that were introduced on our high-end systems and have proven their benefits. The data quality and speed of analysis delivered by Aeris have previously only been seen on full-power systems.

Additionally, Aeris is the first benchtop X-ray diffraction (XRD) system that is fully automatable and can easily be incorporated in industrial production control.

**Excellent X-ray diffraction for everyone indeed!**

## PROCESS OPTIMIZATION IN THE METALS INDUSTRY

XRD represents a key technology at every step of the steel making process. It is a valuable tool for rapid and accurate materials characterization for raw and intermediate materials employed in the steel making process (such as iron ore, sinter and direct reduced iron). Application of XRD is also ideal for quality control of the final products as it provides fast and precise quantification of metal phases such as retained austenite.

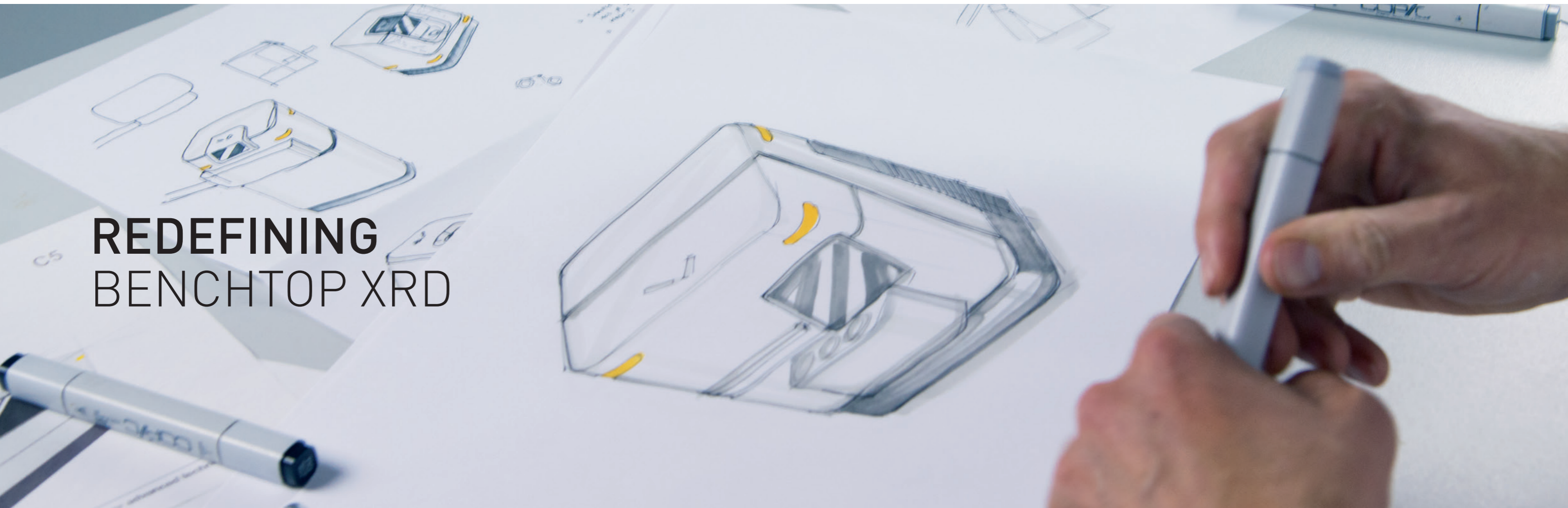
Application	Main benefit using XRD
Iron ore sinter	Fast and cost-effective analysis of FeO, basicity and other process parameters for process efficiency
Direct reduced iron	Fast and reliable process control by monitoring: <ul style="list-style-type: none"> <li>• Metallic iron content</li> <li>• Metallization</li> <li>• Total carbon</li> <li>• Mineralogical phase content</li> </ul>
Retained austenite	Full implementation of the E975 norm for retained austenite quantification for quality control purposes

What X-ray diffraction can tell about metals

### XRD for the metals industry

- Efficient method for directly obtaining phase information of different materials. With this methodology you are ready for ASTM E975 compliancy ensuring correct quantification of retained austenite in steel.
- Partner in process control and optimization at every stage of the metal production process, from raw material to final product
- Rapid analysis minimizes feedback loops and allows early intervention for process optimization
- Safe and non-destructive analysis tool

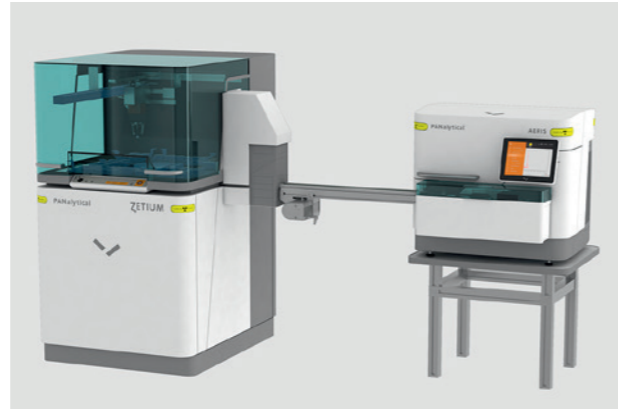
## REDEFINING BENCHTOP XRD



# COST-EFFECTIVE AND HIGH-QUALITY METALS PRODUCTION

Do you need to analyze retained austenite, direct reduced iron and iron sinter? Aeris is your partner to obtain reliable phase information of raw, intermediate and by-products during metals production. With its intuitive touch screen, operation of the instrument is so easy that everybody can use it.

Aeris' low cost of ownership delivers maximum return on investment: with its small footprint it has very limited infrastructural requirements and it does not need compressed air or cooling water. Aeris has a much lower power consumption compared to floor-standing X-ray diffraction systems and its X-ray tube has a virtually unlimited lifetime.



## SEAMLESS INTEGRATION IN AUTOMATION

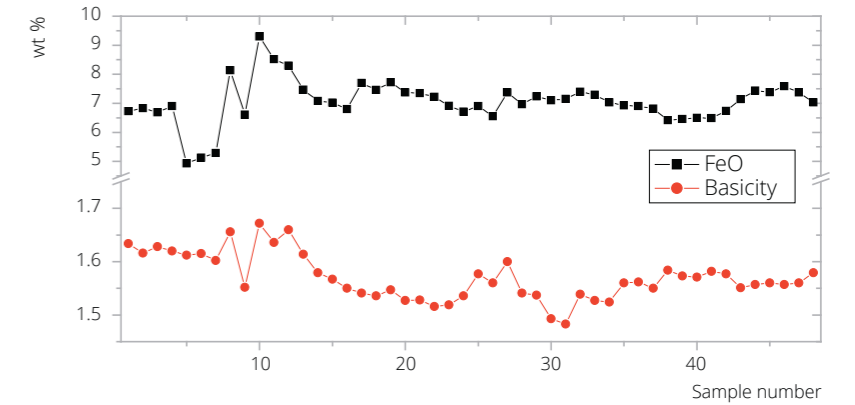
**The only automatable benchtop diffractometer for high sample throughput**  
Fully automatable benchtop connected with belt.

**The power of combining technologies**  
The twin solution, Aeris and Zetium, provides full material characterization by adding elemental composition information from Zetium to the phase identification by Aeris.

**Industry standard sample holders tailored to your needs**  
Either collection of 51.5 mm sample holders or 40 mm sample holders

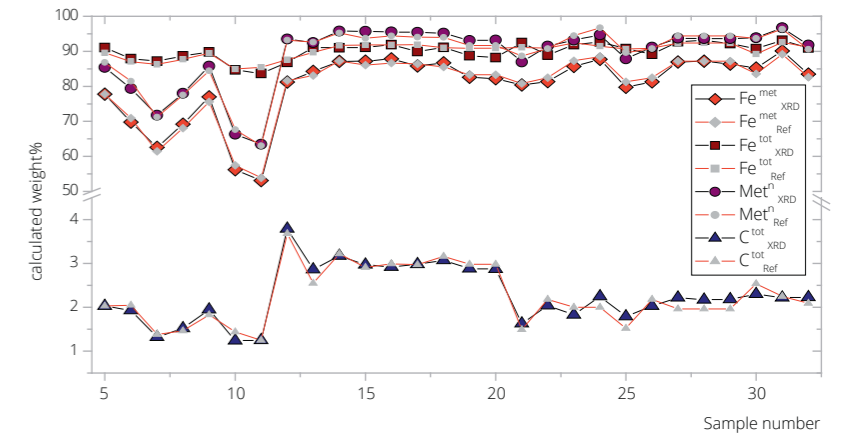
# EASY AND FLEXIBLE ANALYSIS OF ORES

**Fe-sinter**  
Partial least squares regression (PLSR) can be applied to the XRD raw data. In this case it was used to determine the basicity and the total FeO content.



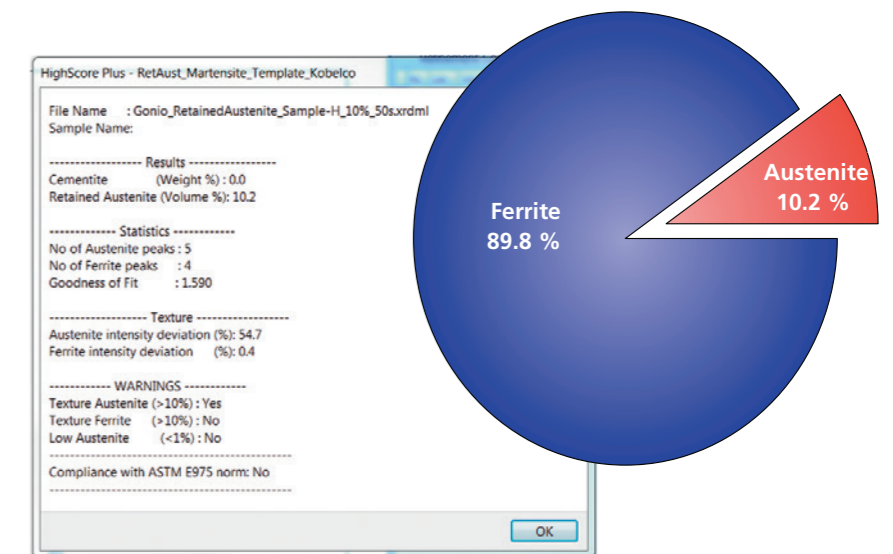
Trend analysis of FeO and basicity generated with XRD

**Direct reduced iron (DRI) analysis for process control**  
Process-critical parameters and quantification of metallic iron ( $Fe^{met}$ ), total Fe content, metallization ( $Met^n$ ) and total carbon content ( $C^{tot}$ ) based on a 10 min analysis using Aeris. For reference, data reported from wet chemistry, carbon analyzer and XRF analysis are shown (in grey).

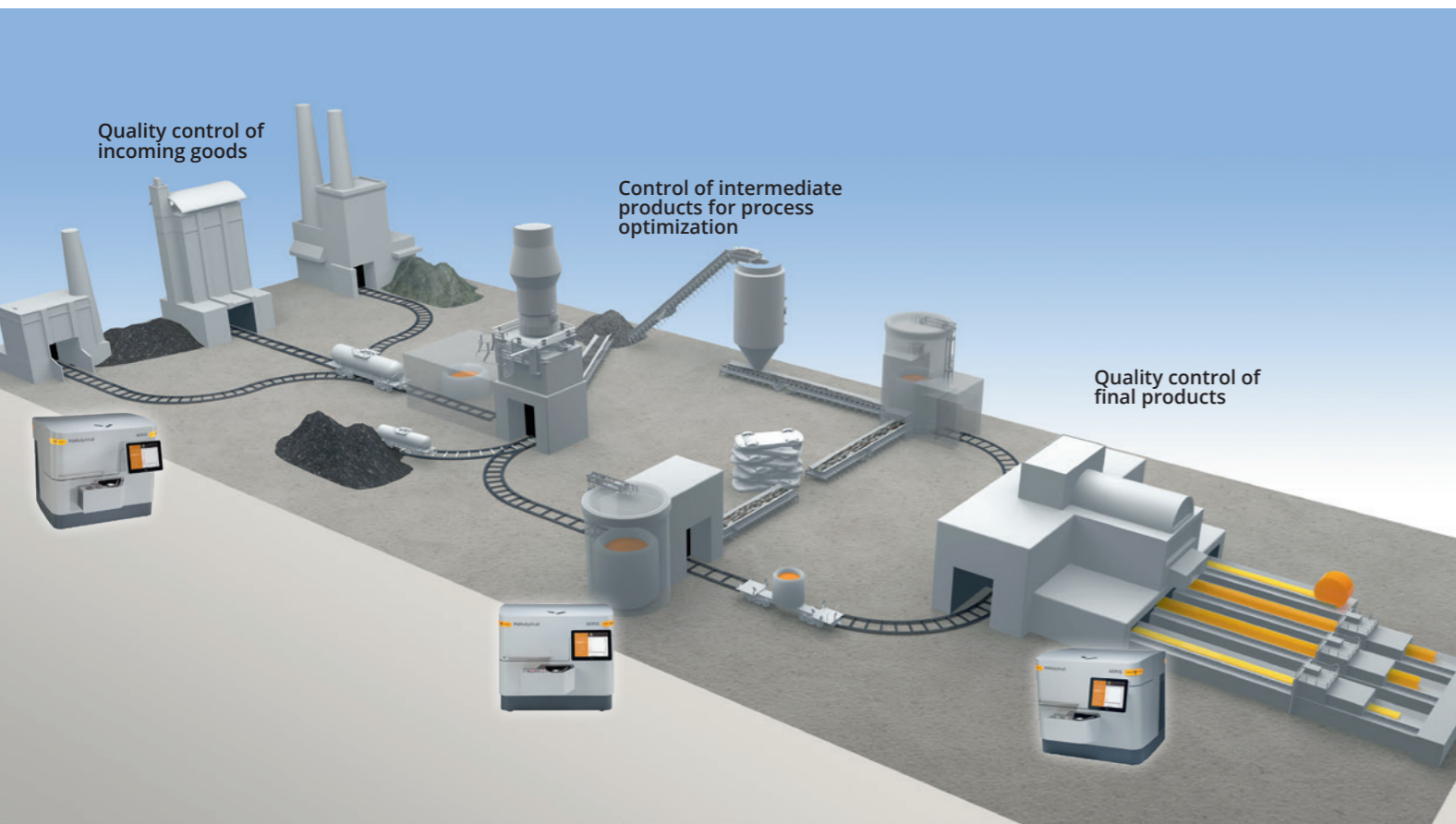


Comparison of  $Fe^{met}$ ,  $Fe^{tot}$ ,  $Met^n$  and  $C^{tot}$  obtained by XRD with independent reference values

**Retained austenite**  
Phase quantification results for retained austenite are automatically reported with a popup window also showing in real time warnings for exceeding the validity range of the ASTM E975 norm.



Example report screens showing the outcome of an individual analysis indicating the compliance with the ASTM E975 norm



## STRONG AND ROBUST

Fast and reliable feedback into the process is paramount for producing good-quality metals efficiently. Uptime of the analytical equipment is therefore key. From the ground up, Aeris has been designed for maximum uptime. This is additionally backed by Malvern Panalytical's global network of customer support and application specialists. Aeris is the first benchtop XRD, providing seamless integration in any industry standard automation system with a belt or a robot. Also Aeris complies with the most stringent safety standards.

### Rugged design

The only benchtop XRD with external sample loading for ultimate dust protection of the heart of the instrument.

### Minimum of infrastructural requirements

No cooling water, no chiller, no compressed air - the only thing you need is a single-phase power socket.

### Industry-ready

Compatible with all common industry standards; from LIMS interfacing protocols to various industry-standard sample holders.

### External sample changer

Easy-to-use sample changer with a continuous sample flow compatible with industry standard sample holders.

### Fully automatable

Aeris can be connected to a belt. Data transfer is provided with industry standard LIMS protocols.

### Easy operation

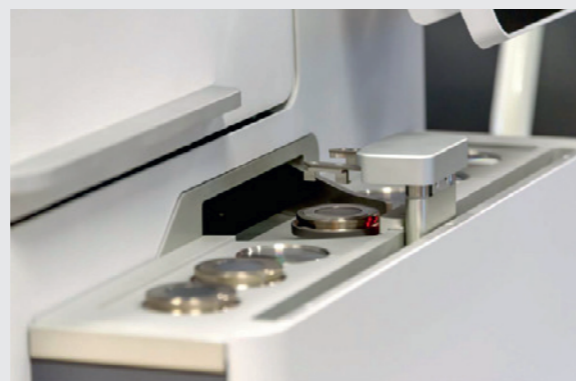
Intuitive operation via on-board high-resolution (1024 x 768) 10.4" LCD touch screen.

### Speed and sensitivity pack

Even faster analysis and improved detection of minor phases.

### Safety guaranteed

Aeris complies with the most stringent safety requirements. No chemicals are needed for sample preparation.



## AN EASY TOUCH

Accurate and reliable results in just a few steps



Place sample and enter sample information



Select measurement program and hit start





## WHY CHOOSE MALVERN PANALYTICAL?

We are global leaders in materials characterization, creating superior, customer-focused solutions and services which supply tangible economic impact through chemical, physical and structural analysis.

Our aim is to help you develop better quality products and get them to market faster. Our solutions support excellence in research, and help maximize productivity and process efficiency.

Malvern Analytical is part of Spectris, the productivity-enhancing instrumentation and controls company.

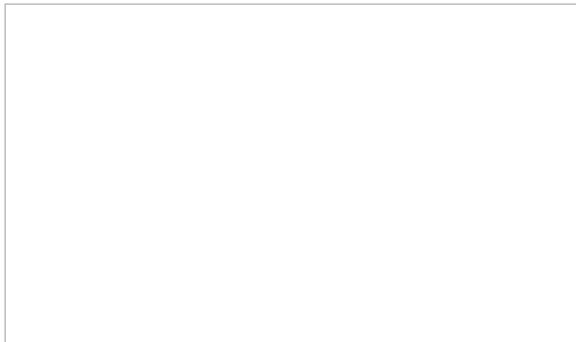
[www.spectris.com](http://www.spectris.com)

## SERVICE & SUPPORT

Malvern Analytical 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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