



**Malvern  
Panalytical**  
a spectris company

# OMNIAN

The benchmark for standardless analysis





# OMNIAN ESSENTIALS

## Setup samples to obtain an instrument calibration

- **Traceable**  
The procedure to obtain the instrument calibration is transparent and can be repeated any time.
- **Non in-type samples**  
The samples are not specific for any application and only used to determine the instrument sensitivity.
- **Accuracy**  
The samples are measured with the customer's instrument to obtain the most accurate instrument calibration.



# OMNIAN ADVANTAGES

### The right result every time

- Advanced technology for robust results.
- Precise results for almost any sample using the default setup.
- Accuracy and detection enhancement with ASC and selected peak measurements.

### Problem solving power for your analytical challenges

- Quantitative analysis
- Batch and materials control
- Quick screening
- R&D analysis tool
- Failure analysis
- Comparative analysis.

### Easy to use

- Scalable from routine to advanced usage.
- Easy data retrieval.

### Advanced, market leading FP matrix modeling, including smart features

- Variable sample thickness response
- Finite thickness (FT) correction

- Sample volume/ geometry effects
- FVG corrections

- Undetected elements
- Dark matrix corrections by use of Compton scattering lines.

Omnia's exclusive FP algorithm is based on decades of experience and improvements by Malvern Panalytical's team of XRF scientists.

# ANALYTICAL STRATEGIES

### Dedicated solutions – highest performance

Working with well-characterized samples, Malvern Panalytical's exclusive range of certified reference materials, specific standards and analysis packages set the benchmark in industrial applications, from cement to super alloys. This approach provides the highest analytical accuracy and is ideal where there is a need to control a critical process, or when traceability of results is essential.

### Standardless analysis – highest flexibility

When faced with unknown samples or in situations where certified standards matching specific sample characteristics are not available, standardless analysis is proven to be a reliable and accurate source of information for samples in a variety of forms (solid, fused, powder or liquid).



- Highest precision
- Highest accuracy
- Highest measurement efficiency
- Full traceability

- Full flexibility
- Good accuracy without in-type standards
- Good comparative data/ trend analysis
- Ideal screening tool



## Adaptive sample characterization

### Flexibility to adapt the strategy for higher accuracies

- With only a few steps Omnia can be customized to suit specific sample characteristics.
- This one-time setup with in-type standards will significantly boost the accuracy of the analysis.
- ASC bridges the gap between standardless and conventional analysis.

# OMNIAN SETS THE BENCHMARK FOR STANDARDLESS ANALYSIS IN XRF SPECTROMETRY

## Problem-solving power

For characterization and analysis of unknown samples, or in situations where certified standards that match specific sample characteristics are not available, Malvern Panalytical's Omnian package is the solution of choice. Important applications include sample quantification, screening, failure analysis, as well as the comparison of different materials.

Omnian is designed to provide fast, reliable quantification in the default 'black box' mode. However, the data collected is fully accessible and can be reviewed more extensively to allow:

- Comparative analysis: Comparing quantitative results and scans of different samples in a single view.
- Use as a R&D analysis tool: All types of samples can be analyzed and results can be investigated in detail
- Troubleshooting.

## Simple daily operation



1. Place your sample



2. Enter sample preparation details if applicable and push 'measure' button

Compound	Concentration (wt %)
MgO	0.659
Al <sub>2</sub> O <sub>3</sub>	0.589
SiO <sub>2</sub>	3.022
P	0.024
S	0.064
CaO	5.334
Mn	53.159
Fe	6.762

3. Results after a few minutes measuring

## Flexible

Omnian can handle a wide variety of sample types such as solids, pressed powders, fused beads, loose powders and liquids. The software is scalable according to the user's level of experience or operation mode.

The user interface guides the daily operator easily through the process, whereas knowledgeable users will enjoy the freedom to fine-tune analytical parameters. Importantly Omnian corrects for sample characteristics like thickness, volume and unmeasured 'dark matrix' compounds, and adapts automatically to sample characteristics and associated matrix effects.

Depending on the instrument configuration, analysis of elements from Be to U is possible.

### The right result every time

The basis of a good result is the collection of the best quality data. Omnian makes no compromises in data quality:

- Accurate net intensities ensure accurate results.
- Advanced algorithms determine background profiles, search and match all peaks and correct for line overlaps.

## Seamless integration

### Easy data retrieval

Omnian builds on Malvern Panalytical's proven software approach and delivers a simple user interface for analysis, retrieval and integration:

- Results integrate fully into results viewer for advanced data analysis.
- Easily compare, print or transfer data files to LIMS.
- Easily import results into Word for reporting.

### Transparent analysis programs

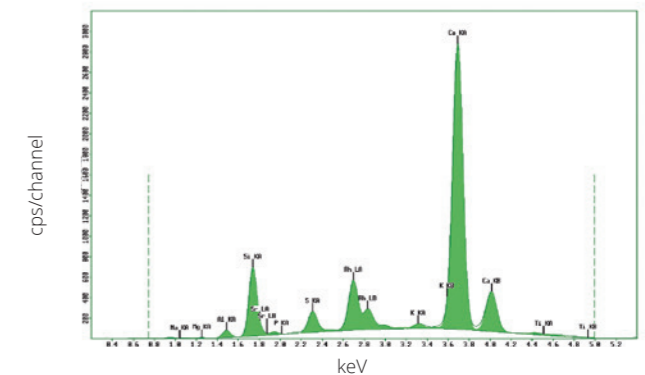
The knowledge of Malvern Panalytical's application specialists is available through the algorithms built into Omnian.

- Default setup of analysis programs which are fully transparent and can be inspected with the user interface.
- The analysis program is automatically adjusted, depending on the spectrometer configuration.

## Visual inspection of spectra and scans

Spectra and/or scans give a comprehensive picture of the sample:

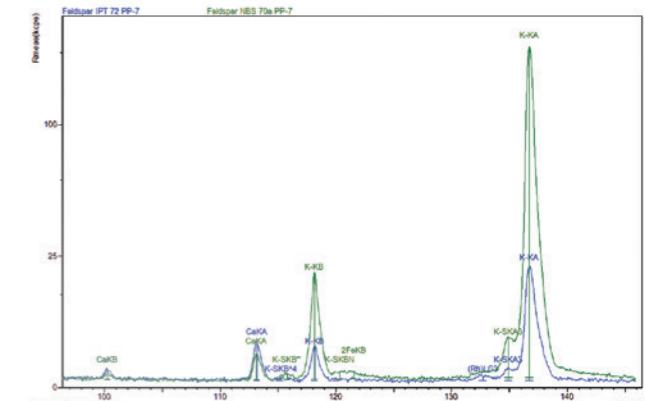
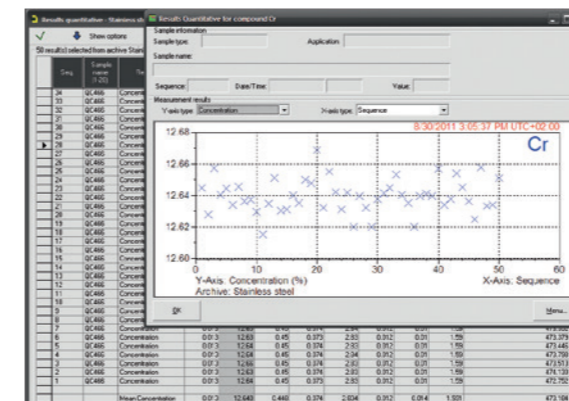
- Allowing both qualitative and quantitative analysis – for a quick visual screening and/or full quantification of all elements detected.
- Providing an accurate background profile, superior to the estimations obtained from fixed background positions.
- Providing a view of all peaks and backgrounds across the periodic table – reduces the chance of incorrect element identification.



Typical EDXRF spectrum with identified peaks

### Trend analysis

Seamless result integration allows for trend analysis and statistics for completely unknown samples just like a conventional application.



Overlay comparison of two feldspar samples

# SOME REPRESENTATIVE RESULTS

Obtained using the Epsilon benchtop range



## Cement



- Fused bead
- 1 g sample + 10 g flux
- LOI as balance

NIST 1881a		
Compound	Certified (wt %)	Measured (wt %)
Na <sub>2</sub> O	0.2	ND
MgO	2.98	2.65
Al <sub>2</sub> O <sub>3</sub>	7.06	6.79
SiO <sub>2</sub>	22.26	22.21
P <sub>2</sub> O <sub>5</sub>	0.15	0.05
SO <sub>3</sub>	3.37	3.27
K <sub>2</sub> O	1.23	1.15
CaO	57.58	57.44
TiO <sub>2</sub>	0.37	0.38
Cr <sub>2</sub> O <sub>3</sub>	0.059	0.068
Mn <sub>2</sub> O <sub>3</sub>	0.104	0.099
Fe <sub>2</sub> O <sub>3</sub>	3.09	3.04
ZnO	0.049	0.054
SrO	0.036	0.040

## Wear metals in lube oil



- 5 g sample in liquid cup (with 6 µm PP foil)
- CH<sub>2</sub> as balance

VHG standard 4		
Compound	Certified (wt %)	Measured (wt %)
Mg	0.05	0.026
Al	0.05	0.041
Si	0	0.049
P	0.07	0.063
S	-	-
Ca	0.005	0.005
V	0.01	0.011
Mn	0.005	0.005
Fe	0.04	0.04
Ni	0.002	0.002
Zn	0.01	0.01
Mo	0.003	0.002
Ag	-	0.001
Sn	0.03	0.028
Sb	0.02	0.012
Ba	0.003	0.001
Pb	0.004	0.003
CH <sub>2</sub>	-	99.41

## Low alloy steel



- SS 403 standard
- Fe as balance

SS403		
Compound	Certified (wt %)	Measured (wt %)
Si	0.08	0.09
P	0.064	0.062
S	0.036	0.055
V	0.24	0.25
Cr	0.42	0.46
Mn	1.69	1.74
Ni	0.24	0.23
Cu	0.17	0.17
Mo	0.08	0.074

Obtained using the Zetium spectrometer



## Boron in glass

Dark matrix corrections accurately account for the effect of unmeasured compounds on the entire sample analysis. The example includes B<sub>2</sub>O<sub>3</sub> in glass. The correction greatly improves the accuracy relative to the traditional 'balance compound' calculations.

NBS 1411			
Compound	Certified (wt %)	Measured (wt %) B <sub>2</sub> O <sub>3</sub> from Compton	Measured (wt %) B <sub>2</sub> O <sub>3</sub> from Balance
B <sub>2</sub> O <sub>3</sub>	10.94	10.1	20.2
F	~0.5	ND	ND
Na <sub>2</sub> O	10.14	11.1	10.3
MgO	0.33	0.32	0.29
Al <sub>2</sub> O <sub>3</sub>	5.68	6.04	5.43
SiO <sub>2</sub>	58.04	57.9	51.6
K <sub>2</sub> O	2.97	2.7	2.33
CaO	2.18	2.2	1.89
Fe <sub>2</sub> O <sub>3</sub>	0.05	0.059	0.049
ZnO	3.85	4.04	3.36
SrO	0.09	0.092	0.076
BaO	5	5.33	4.35
TiO <sub>2</sub>	0.02	ND	ND

## FastScan analysis

Omnian couples with the unique FastScan capability of your Zetium to deliver a quantitative measurement in under a minute. This provides a very rapid determination of the sample composition and is ideal for samples that may be damaged by X-rays, such as liquids, polymers or biological material.

## Combine best of both worlds of peak hopping and scanning

The scan-based program can be augmented with peak measurements for higher precision and lower detection limits for key elements without compromising the total analysis time.



## Aluminium alloy

CDK 238 Al alloy		
Element	Certified (wt %)	Measured (wt %)
Mg	0.21	0.212
Si	7.46	7.849
Ti	0.025	0.027
Mn	0.095	0.088
Fe	0.23	0.227
Ni	0.36	0.361
Cu	0.21	0.237
Zn	0.05	0.041
Ga		0.007
Zr		0.001
Al (bal)		90.945

## Limestone (pressed powder)

GBW 07215A		
Compound	Certified (wt %)	Measured (wt %)
CO <sub>2</sub>	42.57	42.20
MgO	2.29	2.37
Al <sub>2</sub> O <sub>3</sub>	0.77	0.83
SiO <sub>2</sub>	1.80	1.84
SO <sub>3</sub>	0.755	0.710
K <sub>2</sub> O	0.168	0.158
CaO	51.2	51.3
Fe <sub>2</sub> O <sub>3</sub>	0.446	0.513

The Epsilon 1 and 4 are ready for unprepared samples

A large area is provided for placing irregularly shaped samples, which can be as tall as 10 cm.





## 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.

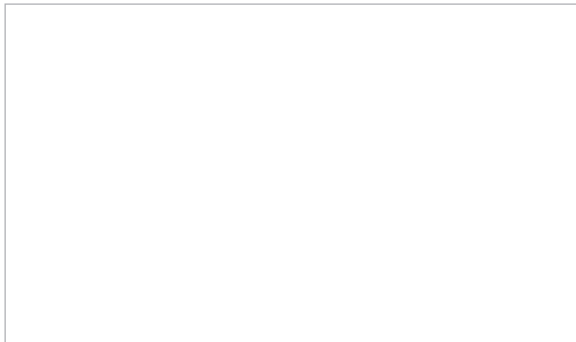
[www.spectris.com](http://www.spectris.com)

## 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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