



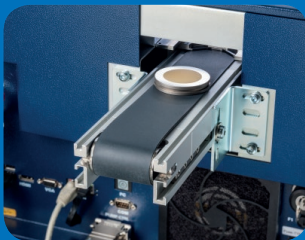
# S2 PUMA Automation

- The Automated Benchtop EDXRF for Professionals – Elemental Analysis in Automated Labs

# S2 PUMA Automation – Your Reliable Partner in Process Control



S2 PUMA: EDXRF with WDXRF  
sample handling



Sample feed to the back of the  
instrument



Sample transportation into the instrument  
from conveyer belt or robot arm



Integrated sample flipper enables careful  
sample transportation on conveyer belt



Insertion of sample into sample  
chamber directly or via buffer positions

Stringent process control is required in more and more industries to ensure ever closer margins for increased profitability. This includes many applications, and one of the most important ones are process and product quality control.

Traditional techniques quickly are overstrained by the requirements, as they are either too slow or too expensive. X-ray fluorescence (XRF) is a well-established technique for elemental analysis in many industrial segments. Larger XRF instruments are used all over the world in different fully automated industry labs as a means to fast and reliable elemental data.

## The S2 PUMA Automation now combines the advantages of industry standard automation features with a smaller benchtop XRF instrument.

This small but powerful energy-dispersive XRF (EDXRF) unit is set up to run 24/7 in industrial environments. It is purpose-built for high instrument uptime and low running costs through an array of active and passive instrument protection components and only needs electrical power as consumable.

This makes it the ideal choice to run process control analysis either standalone or as backup system for larger wavelength-dispersive XRF (WDXRF) units.

## Features for reliability

The S2 PUMA Automation can be connected to a conveyer belt or a robot arm for sample feed. The **AXSCOM** software ensures that the system can be integrated seamlessly into new or existing automated labs. When running autonomously, an integrated **HD camera** can take pictures of every analyzed specimen for sample verification.

Our intelligent uninterruptible power supply (**Smart UPS**) ensures that the samples gets retrieved from the chamber before shutting down the system safely in case of a power outage. Our dedicated **SampleCare™** system against instrument contamination and the **heavy duty filter box** for dusty environments increase instrument uptime and add peace of mind. **Measurements under vacuum** increase analytical performance and reduce running cost due to the omission of expensive helium gas.

Industry-specific pre-calibrated **QUANTs** offer turn-key solutions with certified reference materials (CRMs) according to required norms, e.g. ASTM C114. These means, that the instrument is up-and-running without lengthy analytical installation routines.

# Analytical Performance in Shortest Time – Every Time, all the Time

Instrument Features and Benefits	
Sample feed interface	Automated sample feed to the back of the instrument, leaves front accessible for out-of-line samples
Sample flipper	Ensures untouched sample surface gets analyzed for best analytical reliability
Buffer positions	Compensates for irregularities in the sample output of the automation process
EasyLoad tray	20 position sample tray for all non-automated samples
AXSCOM	Communication software to ensure full integration of the instrument into the automated lab environment
LIMS	Full lab information & management system (LIMS)-compatibility for data exchange
TouchControl	Easy and safe instrument control for routine analysis directly at the instrument and without external PC
HD camera	Integrated camera takes pictures of samples within chamber for verification
HighSense LE SDD	Fast X-ray silicon drift detector with short measurement times even for light elements (LE)
50 W X-ray tube	High-power X-ray tube for highest intensities contributes to short measurement times
Sample rotation	For best analysis results for pressed pellet samples
Vacuum atmosphere	Lowest running cost and highest analytical performance without the need for helium flushing
SampleCare	Multilayer system to protect vital instrument components against contamination for highest operational uptime and lowest running cost
Smart UPS	Intelligent Uninterruptible Power Supply (UPS) which lets instrument retrieve sample from chamber before shutting down safely in case of a power outage
Heavy duty filter box	Additional filter box for dusty environments, an extra layer of safety to increase instrument uptime
QUANTs	Industry-specific turn-key solutions based on CRMs (e.g. CEMENT-QUANT, GEO-QUANT Basic)
Bruker Support	Worldwide 24/7 WebEx support availability

To demonstrate the short measurement times and high precision on the S2 PUMA Automation, a cement raw meal pressed pellet sample was analyzed 10 times under vacuum. The sample was retrieved from the chamber after every analysis. Measurement time was 100 seconds.

	Na <sub>2</sub> O	MgO	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	P <sub>2</sub> O <sub>5</sub>	SO <sub>3</sub>	Cl	K <sub>2</sub> O	CaO	TiO <sub>2</sub>	MnO	Fe <sub>2</sub> O <sub>3</sub>	SrO
	[wt.-%]												
Rep-01	0.137	1.81	4.45	15.91	0.026	0.680	0.126	0.418	39.84	0.228	0.021	2.50	0.019
Rep-02	0.136	1.84	4.44	15.85	0.027	0.685	0.125	0.422	39.79	0.223	0.024	2.48	0.020
Rep-03	0.142	1.87	4.51	15.86	0.026	0.678	0.126	0.422	39.87	0.225	0.022	2.49	0.021
Rep-04	0.145	1.85	4.48	15.97	0.027	0.683	0.127	0.429	39.82	0.222	0.025	2.49	0.019
Rep-05	0.134	1.83	4.46	15.90	0.027	0.679	0.125	0.422	39.75	0.225	0.023	2.49	0.019
Rep-06	0.140	1.79	4.44	15.84	0.027	0.676	0.125	0.425	39.81	0.220	0.021	2.48	0.019
Rep-07	0.148	1.84	4.45	15.89	0.027	0.681	0.124	0.423	39.78	0.224	0.022	2.49	0.020
Rep-08	0.145	1.83	4.47	15.99	0.026	0.683	0.125	0.424	39.82	0.227	0.023	2.48	0.017
Rep-09	0.140	1.84	4.47	15.94	0.026	0.674	0.125	0.422	39.87	0.230	0.022	2.48	0.016
Rep-10	0.145	1.85	4.44	15.96	0.026	0.685	0.125	0.422	39.86	0.225	0.022	2.48	0.020
Average [wt.-%]	0.141	1.83	4.46	15.91	0.027	0.680	0.125	0.423	39.82	0.225	0.023	2.49	0.019
Std. Dev. [wt.-%]	0.005	0.022	0.023	0.052	0.001	0.004	0.001	0.003	0.042	0.003	0.001	0.007	0.001
Rel. Std. Dev. [%]	3.25	1.20	0.52	0.33	1.99	0.55	0.66	0.66	0.10	1.30	5.64	0.27	7.85

### Your S2 PUMA automation advantages

- Professional automation solution for benchtop EDXRF based on WDXRF sample handling technology
- Instrument retains its full analytical capabilities through sample feed interface at the back
- Powerful tube and detector for shortest measurement times and highest analytical performance
- Versatile software for seamless integration into fully automated labs
- Easy to use operation without external PC via integrated touchscreen
- Integrated HD camera for subsequent sample verification
- Active and passive instrument protection systems for reliability and uptime
- Needs electrical power as only consumable for lowest running cost
- Global support through our industry specialists
- Turn-key solutions ensure a quick-start into operation

### The S2 PUMA is the ideal solution...

- ...in small automated labs for autonomous standalone process control analysis
- ...and together with larger WDXRF instruments as backup solution in complex environments where there is no margin for error.



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