

# S2 RANGER

## ANALYSIS OF RAW MEAL

This report demonstrates the analytical performance of the S2 RANGER for the analysis of raw meal samples, especially regarding the analytical accuracy and long term reproducibility.



addition of a binder to ensure a stable specimen. For this application, the samples were prepared with the addition of 4% wax. 5 grams of the mixture were pressed with a pressure of 10 tons for 20s.

### Measurement

The measurement was performed using the pre-defined and precalibrated Cement Solution of the S2 RANGER with a total measuring time of 200s.

### Introduction

In the cement production process, the raw meal is characterized with respect to its elemental composition. The S2 RANGER benchtop ED-XRF spectrometer may be utilized to successfully perform raw meal analysis using a precalibrated Cement Solution. The accompanying tables show the capabilities of the ED-XRF system.

### Instrumentation

The S2 RANGER is a compact benchtop ED-XRF spectrometer with easy-to-use touch-screen operation, requiring only a mains power supply.

### Sample Preparation

Typically, the raw meal samples are prepared as pressed pellets from pure material or with the

Comp.	Chem. Conc. (%)	XRF Conc. (%)	Abs. Deviat. (%)	Rel. Deviat. (%)
MgO	1.12	1.15	0.03	2.7
Al <sub>2</sub> O <sub>3</sub>	2.11	2.14	0.03	1.4
SiO <sub>2</sub>	11.66	11.86	0.20	1.7
SO <sub>3</sub>	0.29	0.30	0.01	3.4
Cl	0.017	0.016	0.001	5.9
K <sub>2</sub> O	0.44	0.43	0.01	2.3
CaO	45.61	45.36	0.25	0.5
Mn <sub>2</sub> O <sub>3</sub>	0.07	0.07	0.00	0.0
Fe <sub>2</sub> O <sub>3</sub>	1.18	1.17	0.01	0.8

Table 1: Typical results of a raw meal sample

	MgO [%]	Al <sub>2</sub> O <sub>3</sub> [%]	SiO <sub>2</sub> [%]	SO <sub>3</sub> [%]	K <sub>2</sub> O [%]	CaO [%]	Mn <sub>2</sub> O <sub>3</sub> [%]	Fe <sub>2</sub> O <sub>3</sub> [%]
27/06 10:30	1.09	3.20	17.27	0.322	0.684	40.39	0.137	2.29
28/06 10:45	1.28	3.12	17.14	0.316	0.690	40.15	0.136	2.27
29/06 10:57	1.06	3.13	17.14	0.315	0.656	40.42	0.140	2.29
30/06 10:30	1.13	3.11	17.08	0.315	0.717	40.39	0.132	2.27
01/07 10:53	1.15	3.11	17.20	0.314	0.644	40.22	0.140	2.30
01/07 18:08	1.18	3.09	17.25	0.317	0.670	40.34	0.130	2.29
02/07 10:03	1.08	3.09	17.14	0.314	0.699	40.42	0.140	2.28
03/07 10:13	1.05	3.13	17.24	0.310	0.684	40.32	0.140	2.28
04/07 10:32	1.19	3.12	17.20	0.317	0.719	40.32	0.140	2.27
04/07 18:15	1.16	3.16	17.27	0.319	0.648	40.46	0.140	2.29
Average	1.14	3.13	17.19	0.320	0.680	40,34	0.137	2.28
Abs. Std. Dev.	0.07	0.03	0.06	0.003	0.025	0.09	0.004	0.01
Rel. Std. Dev.	6.5	1.0	0.4	1.0	3.7	0.2	3.1	0.5

Table 2: Long term reproducibility of a typical raw meal sample

### Results

Typical analytical results of a raw meal sample measured with the S2 RANGER are shown in Table 1. The long term reproducibility of the S2 RANGER was demonstrated by running one sample 10 times during a period of one week. These results are shown in Table 2.

### Remark:

The given results are typical values and depend strongly on the reference material used, the specimen preparation, and the measuring parameters (such as irradiated sample area, excitation, etc.), and may be improved by optimizing single measuring parameters.

Author: Kai Behrens, Bruker AXS GmbH, Karlsruhe, Germany

BRUKER AXS GMBH  
OESTLICHE RHEINBRUECKENSTR. 49  
D-76187 KARLSRUHE  
GERMANY  
TEL. (+49) (721) 595-2888  
FAX (+49) (721) 595-4587  
EMAIL [info@bruker-axs.de](mailto:info@bruker-axs.de)  
WWW [www.bruker-axs.de](http://www.bruker-axs.de)

BRUKER AXS, INC.  
5465 EAST CHERYL PARKWAY  
MADISON, WI 53711-5373  
USA  
TEL. (+1) (800) 234-XRAY  
TEL. (+1) (608) 276-3000  
FAX (+1) (608) 276-3006  
EMAIL [info@bruker-axs.com](mailto:info@bruker-axs.com)  
WWW [www.bruker-axs.com](http://www.bruker-axs.com)

BRUKER AXS LTD.  
MEADOWSIDE MOUNTBATTEN WAY  
CONGLETON CHESHIRE CW12 1DN  
GREAT BRITAIN  
TEL. (+44) (1260) 296-900  
FAX (+44) (1260) 296-939  
EMAIL [info@bruker-axs.co.uk](mailto:info@bruker-axs.co.uk)  
WWW [www.bruker-axs.co.uk](http://www.bruker-axs.co.uk)