

## Assigned Values for Pressed Powder Pellets

### OREAS-463\*-P

#### Assigned Values

Analyte	Value	Unc. (95% CL)	Unit	Method
Li	10.5	2.2	ppm	B, C
Be	5.47	0.39	ppm	B, C
Na	0.173	0.006	g/100g	C
Mg	1.02	0.06	g/100g	B, C
Al	5.55	0.18	g/100g	B, C
Si	12.85	0.32	g/100g	B
P	0.610	0.046	g/100g	B, C
S	648	89	ppm	B, C
K	0.114	0.018	g/100g	B, C
Ca	1.20	0.06	g/100g	B, C
Sc	66	2	ppm	C
Ti	1.92	0.05	g/100g	B
V	360	12	ppm	B
Cr	574	21	ppm	B
Mn	0.116	0.010	g/100g	B, C
Fe	34.14	1.65	g/100g	A, B, C
Co	14.4	2.7	ppm	B, C
Ni	74	11	ppm	B, C
Cu	74	7	ppm	B
Zn	407	64	ppm	B, C
Ga	63	9	ppm	B
As	31.3	1.2	ppm	C
Rb	6.09	0.37	ppm	B, C
Sr	947	47	ppm	B, C
Y	178	8	ppm	B, C
Zr	576	17	ppm	B
Nb	1495	51	ppm	B
Mo	57	3	ppm	B, C

#### Assigned Values

Analyte	Value	Unc. (95% CL)	Unit	Method
In	1.01	0.01	ppm	B
Sn	31.4	2.0	ppm	B
Sb	2.23	0.32	ppm	B, C
Te	0.35	0.05	ppm	C
Cs	0.42	0.05	ppm	B, C
Ba	1121	47	ppm	B, C
La	4928	258	ppm	A, B, C
Ce	0.659	0.025	g/100g	A, B, C
Pr	994	80	ppm	A, B, C
Nd	3669	226	ppm	A, B, C
Sm	528	95	ppm	A, B, C
Eu	118	6	ppm	B, C
Gd	243	11	ppm	B, C
Tb	20.4	0.7	ppm	B, C
Dy	71	2	ppm	B, C
Ho	8.54	0.47	ppm	B, C
Er	16.0	0.6	ppm	B
Tm	1.57	0.05	ppm	B
Yb	7.03	0.21	ppm	B
Lu	0.79	0.02	ppm	B
Hf	13.8	0.2	ppm	B
Ta	25.2	0.6	ppm	B
W	3.74	0.54	ppm	B
Tl	0.094	0.003	ppm	C
Pb	126	9	ppm	B, C
Bi	2.84	0.40	ppm	B, C
Th	301	47	ppm	A, B, C
U	7.70	0.31	ppm	B, C

\*The original manufacturer (OREAS) is not liable for any issues occurring from the use of this material since they took no part in the manufacturing of the pellets.

The assigned values are the present best estimates of the true content for each element in the original powder. They are based on the evaluation and combination of the respective certified values given for different analytical methods in the original certificate of analysis and represent the mean of means.

The uncertainty is based on the standard error between the method specific values given in the original certificate as well as each respective method specific confidence interval at the 95 % level. If a value, originates from only one method the original 95 % confidence interval is reported as its uncertainty.

Detailed information and background data can be found in the original certificate of analysis and corresponding data package issued by OREAS. The information was retrieved on 13.10.2022.

#### Calculation Example:

##### Original OREAS Mean Values for Aluminium (Al):

Borate Fusion XRF	8.02 g/100 g	0.03 g/100 g CL @ 95 %
Peroxide / Borate Fusion ICP	7.81 g/100 g	0.08 g/100 g CL @ 95 %
Four acid digestion	8.02 g/100 g	0.47 g/100 g CL @ 95 %

Mean of Means	7.95 g/100 g
Standard Error	0.07 g/100 g

$$\text{Error Propagation Final Uncertainty} \quad \sqrt{0.07^2 + 0.03^2 + 0.08^2 + 0.47^2} = 0.48 \quad (1)$$

Final Value	7.95 g/100 g
Uncertainty	0.48 g/100 g

#### List of analytical methods used for calculation of the mean of means:

- A Borate fusion for full suite X-Ray Fluorescence (REE Suite XRF package)
- B Borate/peroxide fusion for full elemental suite ICP-OES and ICP-MS
- C 4-acid digestion (HF-HNO<sub>3</sub>-HClO<sub>4</sub>-HCl) for full elemental suite ICP-OES and ICP-MS finish

Please note that only full to nearly full dissolution methods were considered in the calculation. An example of nearly full dissolution would be a so-called four acid digestion, which is capable of dissolving most minerals, but not all. The methods considered are given for each analyte, the nearly full dissolution methods, e.g. the four acid digestion, were only included into the calculation of the final value when in statistical agreement with the full dissolution values.

#### Document History

Version	Date	Changes applied
1.0	14.07.2023	First publication

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