

## Preliminary

# Product Information Sheet

## Microanalytical Reference Material

# RS3\*-NP

## Nano-particulate pressed powder pellet

### Confirmed Value

Analyte	Value	Uncertainty (95% CL)	Unit
CaO	56.03	0.280	g/100g

This confirmed value including its uncertainty is taken from the original certificate of analysis for the original powder, since the value was reproduced exactly in a control measurement of the nano-particulate powder using ICP-OES.

### Assigned Values LA-ICP-MS

Analyte	Value	Uncertainty (95% CL)	Unit	Analyte	Value	Uncertainty (95% CL)	Unit
Li	0.164	0.024	µg/g	Fe	113	0.658	µg/g
B	0.702	0.106	µg/g	Zn	2.46	0.493	µg/g
Na	56.9	10.4	µg/g	Rb	0.048	0.035	µg/g
Mg	217	1.92	µg/g	Sr	165	3.09	µg/g
Al	2.06	0.716	µg/g	Ba	49.5	14.9	µg/g
Si	6885	381	µg/g	Pb	0.064	0.005	µg/g
Mn	2.84	0.118	µg/g				

The assigned values LA-ICP-MS were obtained through a round robin utilising only LA-ICP-MS as means of analysis. Only data from nano-particulate pressed powder pellets were considered. Each Laboratory's performance was statistically analysed using Mandel's h and k in order to identify and reject outliers. The values represent the mean of means of all remaining data submissions. The uncertainty is calculated as a 95% confidence level.

### Assigned Values Liquid ICP-MS

Analyte	Value	Uncertainty (95% CL)	Unit	Analyte	Value	Uncertainty (95% CL)	Unit
Li	0.128	0.002	µg/g	Sr	168	5	µg/g
Ti	5.26	2.714	µg/g	Y	0.011	0.0003	µg/g
V	0.013	0.004	µg/g	Mo	0.015	0.003	µg/g
Cr	0.479	0.117	µg/g	Cd	0.051	0.007	µg/g
Mn	3.51	0.853	µg/g	Cs	0.007	0.001	µg/g
Cu	0.914	0.092	µg/g	Ba	45.8	1.346	µg/g
Zn	1.79	0.418	µg/g	La	0.019	0.001	µg/g
Ga	0.008	0.001	µg/g	Ce	0.046	0.010	µg/g
Rb	0.120	0.008	µg/g	Pr	0.004	0.0005	µg/g

Analyte	Value	Uncertainty (95% CL)	Unit
Nd	0.019	0.004	μg/g
Sm	0.007	0.002	μg/g
Eu	0.005	0.001	μg/g
Gd	0.006	0.004	μg/g
Tb	0.001	0.001	μg/g
Dy	0.003	0.002	μg/g
Ho	0.001	0.001	μg/g
Er	0.002	0.002	μg/g

Analyte	Value	Uncertainty (95% CL)	Unit
Tm	0.001	0.001	μg/g
Yb	0.003	0.003	μg/g
Lu	0.001	0.001	μg/g
Hf	0.003	0.002	μg/g
Tl	0.004	0.001	μg/g
Pb	0.136	0.015	μg/g
Th	0.002	0.001	μg/g
U	0.004	0.001	μg/g

These assigned values Liquid ICP-MS result from a liquid ICP-MS measurement of the nano-particulate powder. The value is the mean of three replicate measurements and the uncertainty is calculated as a 95% confidence level. The digestion was performed using aqua regia and hydrofluoric acid.

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

### Intended Use

This microanalytical reference material (MRM) is designed for use by laboratories undertaking the determination of major and trace element mass fractions in calcium carbonate and equivalent matrices with LA-ICP-MS (Laser Ablation Inductively Coupled Plasma Mass Spectrometry), μXRF/XRF (Micro X-ray Fluorescence Spectroscopy) and LIBS (Laser-Induced Breakdown Spectroscopy). It is suitable for calibration and as a secondary reference material for the assessment of a measurement procedure and quality control. Note that the material may only be used for a single purpose in the same measurement process. For example, it must not be used for calibration and method validation at the same time.

### Description of the MRM

This MRM is a nanoparticulate pressed powder pellet of the calcium carbonate powder "RS3". The original powder, purchased from the Bundesanstalt für Materialforschung- und prüfung (Federal Institute of Material testing- and research) (BAM), was subjected to our own material-specific milling protocol and pressed without any binders using a programmable hydraulic press. The fortification of contrasting colour surrounding the reference material is, according to the manufacturer, an "organic compound". The exact composition is not specified any closer. The certificate of analysis is available on demand.

### Handling advice and Storage

Avoid touching the pellet's surface directly in order to prevent contamination. Also, do not clean the surface with any liquids as it may compromise the pellet's integrity.

Please note the label marks the bottom of the pellet.

If using a pressed pellet not ordered specifically for μXRF and or XRF please consider the sample thickness. Store the MRM in a desiccator and or in a dark and dry environment.

The myStandards GmbH cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially with respect to opened samples.

### Period of Validity

Provided the storage and handling conditions are met, no chemical alteration is known to exist, and the assigned values will remain stable. Therefore, the product information and assigned values for this MRM are valid for one year from the date of dispatch. This validity may be extended as further evidence of stability becomes available. The manufacturer will inform the customer if any alterations occur.

Date of dispatch: {LIEFERDATUM}

### Safety instructions

Nano-particulate powders can cause harm if ingested, inhaled or in contact with skin. In their pressed form however, they do not exhibit any dusting. If a pellet should accidentally break, we advise wearing a dust mask during clean up.

### Further Information

This MRM has been produced in accordance with the recommendations specified in ISO Guides 30 to 35. Due to processing a part of the sample material may be seen on the fortification, this does not reduce the performance of the MRM. Please refrain from using this part of the pellet.

The pellets are sold exclusively via the myStandards GmbH and authorised subcontractors.

**Pellet serial number:** {SERIENNUMMER}

**Manufactured for:** {METHODE}

**Size:** {GROESSE}

### Document History

Version	Date	Changes applied
1.0	21.01.2019	First publication
1.1	24.04.2019	Changed Description of Assigned Values, Description of the MRM, Handling advice and Storage, Period of Validity and Further Information; Insert footnote to Legal notice; Added Document History
1.2	27.08.2020	Correction of a rounding error for the uncertainty of element Y
2.0	06.11.2020	Changed Description of the MRM, Handling advice and Storage, Further Information, Intended Use (adding LIBS, XRF and calibration) and Period of Validity (including changing date of manufacturing to date of dispatch); Addition of new terms and conditions; Updated document structure, Addition of individual Pellet characteristics
3.0	24.06.2022	New official letterhead
4.0	04.04.2023	Updated link to terms and conditions; Adaptation to automatically fill in the date and individual pellet characteristics

### References

Bundesanstalt für Materialforschung- und prüfung, Verein Deutscher Eisenhüttenleute (VDEh). Zertifiziertes Referenzmaterial, Reinstoff Nr.3, Calciumcarbonat CaCO<sub>3</sub>. Berlin 1994, available online at [www.bam.de](http://www.bam.de).

### Legal notice

Our order, sales and delivery conditions apply. The valid version of our general terms and conditions (status 01.09.2019) - can be found on our website: <https://www.my-standards.com/terms-and-conditions/>. They are also available on request.