



## CERTIFICATE OF ANALYSIS

**A9950**  
**RESPIRABLE  $\alpha$ -QUARTZ POWDER**  
**REFERENCE MATERIAL**

Certification date: November 2014: reissued March 2022

Analyte	Number of data sets accepted	Certified Value <sup>[1]</sup>	Uncertainty <sup>[2]</sup>
	<i>n</i>	<i>% crystallinity</i>	
$\alpha$ -Quartz	4	89.3	$\pm 3.6$

[1] The reference value was determined through an inter laboratory comparison using X-ray diffraction (XRD) by comparing the slope of the area net intensities of the major XRD reflections of  $\alpha$ -quartz for A9950 with those of NIST SRM 1878a. The reference value is an average of all the values obtained by each participating laboratory for several X-ray diffraction reflections of  $\alpha$ -quartz, weighted towards the figures obtained by the more sensitive reflections.

[2] Uncertainty corresponding to a level of confidence of approximately 95 %.

**Signed**

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### Description of the sample

This is a sample of approximately 5 g of respirable sized pure  $\alpha$ -quartz powder supplied in a glass vial. The material (SIKRON F600, lot A9950) was sourced by the Health and Safety Executive (HSE) in 1980 from Quartzwerke (Frechen, Germany) and sized to the respirable range via a cyclonic sedimentation process.

### Analytical method used for certification

The reference value was determined through an international comparison of laboratories using X-ray diffraction (XRD) by comparing the slope of the area net intensities of the major XRD reflections of  $\alpha$ -quartz for A9950 with that of the certified reference material 1878a. The reference value is an average of all the values obtained by each participating laboratories for several X-ray diffraction reflections of  $\alpha$ -quartz, weighted towards the figures obtained by the more sensitive reflections. The certification process has been described in the following peer-reviewed publication [1].

### Traceability

This material is a secondary standard traceable through comparison to the National Institute of Standards and Technology (NIST) SRM 1878a *Respirable Alpha Quartz*.

### Other sample characteristics

#### Stability

HSE considers this reference material will remain stable if stored under the conditions defined below.

#### Safety Information

No hazardous effects are to be expected when this material is handled and used in a laboratory setting by analytical chemists trained in handling respirable sized crystalline silica with appropriate controls. It is recommended however that this material should be handled in a ventilated cupboard and disposed of in accordance with guidelines for handling laboratory reagents at the site of end use or disposal.

#### Storage

This reference material should be stored capped at ambient temperature (ca. 20°C) in a dry and clean atmosphere.

#### Intended use

This material is intended for calibration of the measurement of crystalline  $\alpha$ -quartz, in samples of respirable dust collected on filters, or in bulk material.

#### Instructions for use

The material should be used as supplied. Aerosols should only be generated in controlled conditions to prevent the exposure of people and workers.

#### Legal Notice

The Certified Value quoted in this certificate is determined by an international comparison, within the stated uncertainties, by application of the techniques and procedures described in the accompanying peer reviewed publication detailing the certification report [1]. HSE will inform purchasers of any updated information regarding the material or its Certified Value.

In no event shall HSE be liable for any damages (including, without limitation, lost profits, business interruption, or lost information) arising out of the use of or inability to use this HSE reference material, even if HSE has been advised of the possibility of such damages.



## Additional analytical Information

Infrared measurement, using the KBr disc method, on 30 samples taken systematically from different parts of the original batch of A9950 had coefficients of variations for the  $800\text{ cm}^{-1}$  and  $780\text{ cm}^{-1}$  absorption bands of 3.3% and 2.3% respectively. The intensity of the  $3.34\text{ \AA}$  quartz X-ray diffraction peak for the same 30 samples had a coefficient of variation of 1.9%. [2]

## Particle size of the powder

Parameter	Mean ( $\mu\text{m}$ )	Median ( $\mu\text{m}$ )
Volume spherical diameter (Horiba LA-390) [1]	4.85	4.2
Volume aerodynamic diameter (TSI Aerodynamic Particle Sizer) [1]	5.56	6.04
Number aerodynamic diameter (TSI Aerodynamic Particle Sizer) [1]	1.7	1.39

A9950 is not intended for use as a particle size measurement standard. These data are supplied to confirm the powder's relevance to the respirable fraction.

## References

[1] Stacey P, Kauffer E, Moulut JC, Dion C, Beauparlant M, Fernandez P, Key-Schwartz R, Friede B, Wake D, An International Comparison of the Crystallinity of Calibration Materials for the Analysis of Respirable  $\alpha$ -Quartz Using X-ray Diffraction and a Comparison with Results from the Infrared KBr Disc Method., *Ann. Occup. Hyg* Aug;53(6):639-49. 2009

[2] Chisholm J, Comparison of quartz standards for X-ray diffraction analysis: HSE A9950 (Sikron F600) and NIST SRM 1878. *Ann Occup Hyg*. Jun;49(4):351-8. 2005