



SWeRF Analysis

Determining the Size-Weighted Respirable Fraction of Bulk Materials

SWeRF analysis is relevant in the context of general material characterisation used to support regulatory compliance dossiers for bulk powders. In particular, SWeRF analysis is essential for manufacturers of mineral products containing respirable crystalline silica (RCS) to inform whether a hazard classification (STOT RE category) is needed under the European Regulation EC No 1272/2008 on classification, labelling and packaging of substances (CLP) regulation.

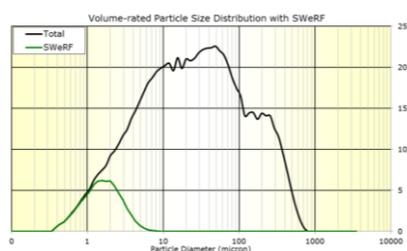


We are a leading provider of health and safety solutions to industry, commerce, public sector and professional bodies. We have a wealth of expertise and experience, enabling us to provide practical solutions to a broad spectrum of workplace health needs.

SWeRF Analysis

The size weighted respirable fraction - SWeRF is a concept that contributes to the understanding of the potential respirability of materials. The SWeRF figure is typically used to help determine the quantity of material within the bulk product that may penetrate the deep lung and present a respiratory inhalation risk.

The principle behind SWeRF combines the particle size distribution analysis (determined by laser diffraction in accordance with ISO 13320:2009) and the lung deposition probability function given in EN 481 to provide the SWeRF expressed as a percentage of the bulk, as exemplified below:



SWeRF and Risk Assessment

SWeRF can be used within the broad spectrum of complimentary material characterisation methods available to inform risk assessment.

SWeRF can be used to indicate the potential health hazard of a bulk material by quantifying the fraction of respirable particles. This information is relevant in the context of any applicable Workplace Exposure Limits (WEL) for the respirable fraction, informing the potential for inhalation risk and highlighting the potential need for suitable control measures.

¹SWeRF – A Method for Estimating the Relevant Fine Particle Fraction in Bulk Materials for Classification and Labelling Purposes, *Ann. Occup. Hyg.*, 2013, 1–11.

SWeRF and Crystalline Silica

In order to classify a product containing a fine fraction of crystalline silica (CS) under CLP regulations (EC No 1272/2008), it is necessary for manufacturers to quantify the relevant fine fraction of CS.

Our SWeRF analysis service is based on the methodology¹ developed and recommended by IMA-Europe (Industrial Minerals Association) to quantify levels of respirable crystalline silica within bulk materials.

Additional analysis required includes the measurement of absolute density and crystalline silica content. IOM provides these analyses within our SWeRF analysis service using helium pycnometry and X-ray diffraction.

Compliance-driven Analysis

Materials characterisation is an important aspect in understanding the potential hazards presented by bulk powders and nanomaterials, as well as a requirement for regulatory compliance. IOM has extensive experience in providing data for substance characterisation to support these needs.

To obtain a SWeRF analysis of materials, contact us to discuss your requirements and receive a quote.

OUR ANALYSIS TECHNIQUES

Particle Characterisation

- Dustiness testing of bulk powders to EN15051-2
- Particle Size Distribution (PSD) of dry powders and wet dispersions by laser diffraction to ISO 13320:2009 and ISO 14487:2000, and dynamic light scattering to ISO 22412:2008
- Size Weighted Respirable Fraction (SweRF) analysis by laser diffraction to ISO 13320:2009
- Zeta-potential and molecular weight analysis to ISO 13099-2:2012
- Microscopy and elemental analysis by SEM/EDXS
- Absolute density by helium pycnometry
- Nanoparticle characterisation as per the EC recommended definition 2011/696/EU
- Other specialist characterisation (e.g. TEM, BET)
- Aerosolisation and size-fractionation for the analysis of respirable particles based on aerodynamic size

Morphology & Chemical Analysis

- Elemental analysis, including trace metal content by ICP-AES and SEM/EDXS
- Organics & VOCs analysis by GC-FID, GC-MS and HPLC
- Acids anions by IC
- Crystalline silica analysis by XRD
- Elemental Carbon determination (NIOSH 5040) for carbon-based nanomaterials
- Bio-durability assessment
- Other specialist characterisation (e.g. FT-IR, XPS, SIMS, NMR, UV-vis, Raman)

OUR COMPANY

The Institute of Occupational Medicine (IOM) is one of the leading providers of workplace health research, consulting and services. Our expertise extends across a very wide range of disciplines.

We have a reputation for high quality, authoritative and independent measurement, surveys and reporting, which we undertake for hundreds of clients – large and small – each year.

Today, IOM is one of a select few internationally recognised authorities on workplace health around the world.

CONTACT

William Brown
Tel: +44(0)131 449 8072
william.brown@iom-world.org

IOM Edinburgh
Research Avenue North
Riccarton, Edinburgh EH14 4AP

Tel: 0131 449 8000
Fax: 0131 449 8084
Email: iom@iom-world.org

IOM Singapore
30 Raffles Place, #17-06 Chevron House,
Singapore, 048622

Tel: +65 6809 6245
Fax: +65 6809 6201
Email: info@iom-world.org