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**Workplace air — Analysis of  
respirable crystalline silica by X-ray  
diffraction —**

**Part 2:  
Method by indirect analysis**

*Air des lieux de travail — Fraction alvéolaire de la silice cristalline  
par diffraction de rayons X —*

*Partie 2: Méthode indirecte d'analyse*



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 146, *Air quality*, Subcommittee SC 2, *Workplace atmospheres*.

ISO 16258 consists of the following parts, under the general title *Workplace Air — Analysis of respirable crystalline silica by X-ray diffraction*:

- *Part 1: Direct-on-filter method*
- *Part 2: Method by indirect analysis*

## Introduction

Respirable crystalline silica (RCS) is a hazard to the health of workers in many industries through exposure by inhalation. Industrial hygienists and other public health professionals need to determine the effectiveness of measures taken to control workers' exposure. The collection of samples of air during a work activity and then measuring the amount of respirable crystalline silica is often done to assess an individual's exposure, the effectiveness of controls or their respiratory protection. X-ray diffraction (XRD) analysis of crystalline silica in a sample of respirable dust collected on a filter is the principle technique employed in many countries to measure and estimate exposure to RCS. X-ray diffraction is able to clearly distinguish the polymorphs of crystalline silica.

This part of ISO 16258 specifies the analysis procedure for the measurement of RCS where the dust is recovered from the collection substrate and deposited onto a filter for analysis. Many different types of sampling apparatus are used to collect respirable dust, according to the occupational hygiene convention. This part of ISO 16258 is designed to accommodate the variety of samplers and collection substrates available to analysts. This part of ISO 16258 is to be used in conjunction with ISO 24095 which promotes best practice for these analyses.

# Workplace air — Analysis of respirable crystalline silica by X-ray diffraction —

## Part 2: Method by indirect analysis

### 1 Scope

This part of ISO 16258 specifies the analysis of RCS in samples of air collected on collection substrates (i.e. filters or foams) by X-ray diffraction, when using an analytical approach where dust from the sample collection substrate (i.e. filter or foam) is recovered, treated and deposited on another filter for analysis by the instrument. This part of ISO 16258 includes information on the instrumental parameters, sensitivity of different sampling apparatus, the use of different filters, sample treatment to remove interference and correction for absorption effects. In this part of ISO 16258, the expression respirable crystalline silica includes the most common polymorphs quartz and cristobalite. The less common polymorphs of crystalline silica, such as tridymite, are not included within the scope of this part of ISO 16258 because a standard reference material is not available. Under certain circumstances (i.e. low filter dust loads, low silica content), the analytical approach described in this method may not fulfil the expanded uncertainty requirements of EN 482[2]. Guidance for calculation of uncertainty for measurements of RCS is given in ISO 24095.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7708, *Air quality — Particle size fraction definitions for health-related sampling*

ISO 13137, *Workplace atmospheres — Pumps for personal sampling of chemical and biological agents — Requirements and test methods*

ISO 15767, *Workplace atmospheres — Controlling and characterizing uncertainty in weighing collected aerosols*

ISO 24095, *Workplace air — Guidance for the measurement of respirable crystalline silica*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1 General definitions

##### 3.1.1

##### **airborne particles**

fine matter, in solid or liquid form, dispersed in air

[SOURCE: EN 1540]

Note 1 to entry: Smoke, fume, mist and fog consist of airborne particles.