



Product Sheet XRD 49

Specimen Holders for the D2 PHASER sample changer

- 32 mm specimen holders and preparation tools

X-ray diffraction provides qualitative and quantitative phase analysis without the need for complex sample preparation. However, the best analytical results are obtained when the specimen preparation and the chosen holder are matched to the material's properties. All our specimen holders and mounting tools are designed to facilitate handling of various materials for XRD and to ensure reproducible specimen preparation. This product sheet gives an overview of our 32 mm diameter specimen holders available for the D2 PHASER with 6-position sample changer. In addition to the specimen holders shown here, dedicated solutions can be realized upon request.

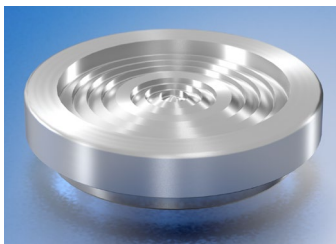
The D2 PHASER sample changer

- 6 positions sample changer, Ø 32 mm diameter holders
- Motorized and fully integrated in DIFFRAC.SUITE software
- Programmable sample rotation



Standard sample holders

Standard specimen holders for easy preparation of powder specimens, such as geological samples. Solid pieces, e.g. steel coins, are set to the correct sample height in deep holders, thus avoiding peak-shifts. Steel specimen holders with different sample reception depth for powder samples or solid specimens.



A26D332 (set of 6)
Sample reception:
Ø 25 mm, 1 mm depth



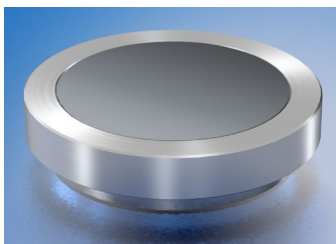
A26D330 (set of 6)
Sample reception:
Ø 28 mm, 3 mm depth

A26D333 (set of 6)
Sample reception:
Ø 28 mm, 4.5 mm depth

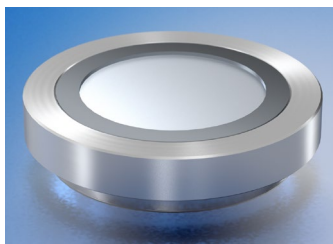
Low background sample holders

Pharmaceutical compounds and other weakly absorbing materials are best prepared on low-background silicon holders, thus minimizing sample related peak broadening.

Si low background holder for small specimen amounts, flat or with cavity.



A26B52 (1 piece)
With flat Si insert.
Sample reception:
Ø 25 mm, flat

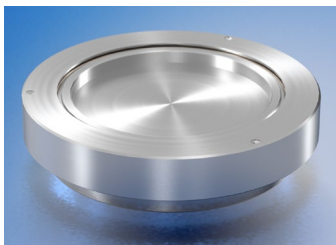


A26B60 (1 piece)
With Si insert with cavity.
Sample reception:
Ø 20 mm, 0.5 mm depth

Airtight sample holders

Air- and moisture sensitive samples can be protected in a range of airtight holders by covering them with e.g. a Kapton film. These holders also limit operator contact with hazardous chemicals.

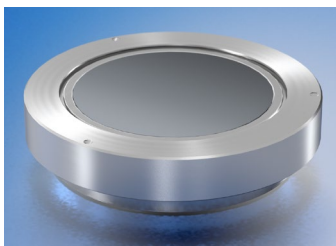
Available as standard holder or with Si low background insert. Separate mounting tool A26B54 required for sample preparation.



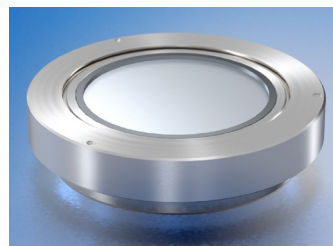
A26D339 (set of 6)
Sample reception:
Ø 21.5 mm, 1.5 mm depth



A26B54
Mounting tool for airtight sample holders. Required for A26D339, A26B53, A26B65



A26B53 (1 piece)
A26D337 (set of 6)
With flat Si insert.
Sample reception:
Ø 21.5 mm, flat



A26B65 (1 piece)
A26D338 (set of 6)
With Si insert with cavity.
Sample reception:
Ø 20 mm, 0.5 mm depth

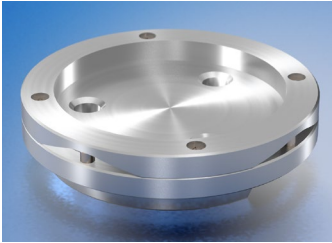
BRE-442

Roll of Kapton film to cover samples, 7.5 µm thickness

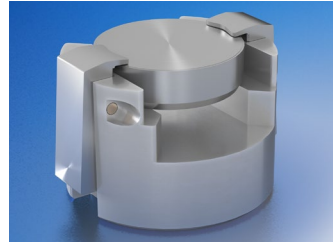
Backloading sample holders

Peak intensity variations arising from preferred orientation effects can be reduced with the backloading technique, which improves the random orientation of crystallites.

Steel specimen holders for backloading. Requires separate mounting tool A26B63 for sample preparation.



A26D334 (set of 6)
Sample reception:
Ø 25 mm, 2.5 mm depth

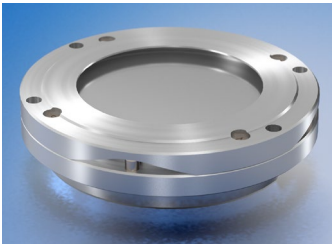


A26B63
Mounting tool for backloading sample holders. Required for A26D334.

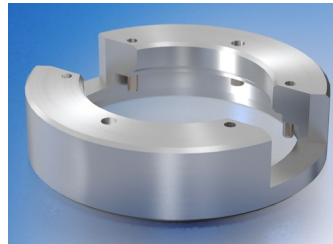
Filter paper sample holders

Dedicated sample holder to measure filter papers, e.g. for applications following NIOSH 7500 norm for respirable quartz. Includes Al-support plate that can be used for absorption correction.

Specimen holder fits Ø 25 mm filter papers. Requires separate mounting tool A26D336.



A26D335 (set of 6)
Sample reception:
Filter papers of Ø 25 mm

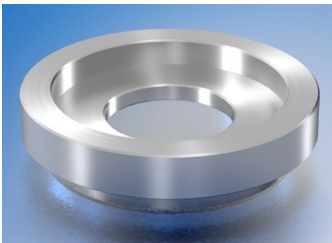


A26D336
Mounting tool for filter paper sample holders. Required for A26D335.

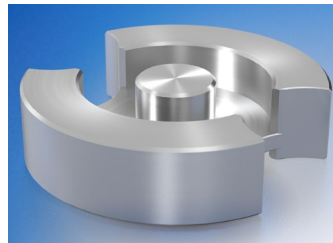
Clay sample holders

Proper for mounting of oriented clay specimen slides to the correct sample height minimizes peak-shift and facilitates phase-identification.

Dedicated steel specimen holders for oriented clay slides. Required mounting tool and 12 glass slides included in set A26B69.



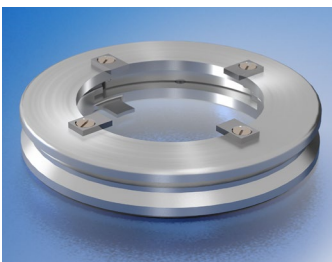
A26B69 (set of 6)
Sample reception:
Glass slide of Ø 25 mm.
12 glass slides included.



Mounting tool for clay sample holders. Included in A26B69.

Sample holder adapter ring

Adapter to run Ø 32 mm specimen holders in sample stages supporting in Ø 51.5 mm specimen holders.



A26D340 (1 piece)
Adapter ring for sample holders of Ø 32 mm.

Explore further

Our application and lab reports illustrate the use of different specimen holders for various sample types. Contact your local representative for more information.



Application Report XRD 8
D2 PHASER Desktop XRD: Silica Dust Analysis

The D2 PHASER is a portable desktop XRD instrument for research and quality control. It is easy to operate and independent of external media such as cooling or gas. Thanks to the LYNETE detector it is the fastest desktop XRD system on the market.

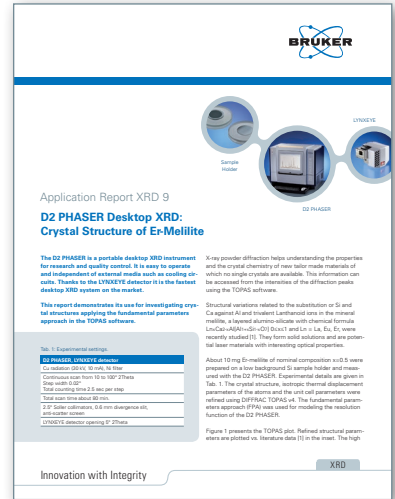
This report demonstrates its use for monitoring occupational exposure to respirable silica.

Tab. 1: Experimental settings
Characterization of SiO₂ in filter
Continuous scan from 2θ 1 to 2θ 37.5°
Scan rate: 1.5°/min
Step width: 0.02°
Step time: 2.0 s
2θ start: 1.00°
2θ end: 37.50°
2θ resolution: 0.10°
LYNETE detector opening: 2°

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Application Report XRD 8

Hazardous silica dust analysis, using filter paper sample holders. DOC-R88-EXS008 V2



Application Report XRD 9
D2 PHASER Desktop XRD: Crystal Structure of Er-Meliite

The D2 PHASER is a portable desktop XRD instrument for research and quality control. It is easy to operate and independent of external media such as cooling or gas. Thanks to the LYNETE detector it is the fastest desktop XRD system on the market.

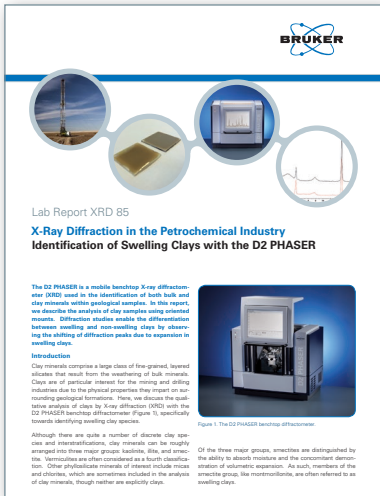
This report demonstrates its use for investigating crystal structures applying the fundamental parameters approach in the TOPAS software.

Tab. 1: Experimental settings
Characterization of Er-Meliite
Continuous scan from 2θ 10 to 2θ 37.5°
Scan rate: 1.5°/min
Step width: 0.02°
Step time: 2.0 s
2θ start: 10.00°
2θ end: 37.50°
2θ resolution: 0.10°
LYNETE detector opening: 2°

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Application Report XRD 9

Crystal structure of Er-Meliite, using low background Si holders. DOC-R88-EXS009 V2



Lab Report XRD 85
X-Ray Diffraction in the Petrochemical Industry: Identification of Swelling Clays with the D2 PHASER

The D2 PHASER is a mobile benchtop X-ray diffractometer (XRD) used in the identification of both bulk and clay mineral within petrochemical samples. In this report, we describe the analysis of clay samples using oriented mounts. Diffraction studies enable the differentiation between swelling and non-swelling clays by observing the shifting of diffraction peaks due to expansion in swelling clays.

Identification
Clay minerals comprise a large class of fine-grained, layered silicates that result from the weathering of bulk minerals. Clays are of particular interest for the mining and oilfield industries due to the physical properties they impart on surrounding geological formations. Here, we discuss the qualitative analysis of clays by X-ray diffraction (XRD) with the D2 PHASER benchtop diffractometer (Figure 1), specifically towards identifying swelling clay species.

Although there are quite a number of discrete clay species and interstratifications, clay minerals can be roughly arranged into three major groups: kaolinitic, illitic, and smectitic. Vermiculites are often considered as a fourth classification. Other phyllosilicate minerals of interest include mica and chlorites, which are sometimes included in the analysis of clay minerals, though neither are explicitly clays.

Of the three major groups, smectites are distinguished by the ability to absorb moisture and the concomitant demonstration of abnormally expansion. As such, members of the smectite group, like montmorillonite, are often referred to as swelling clays.

Figure 1: The D2 PHASER benchtop diffractometer.

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Lab Report XRD 85

Identification of swelling clays, using clay sample holders. DOC-L88-EXS085 V2



Lab Report XRD 76
X-Ray Diffraction Analysis in the Petroleum Industry: Scales and Corrosion Products

Summary
X-ray diffraction (XRD) is a powerful analytical tool that can be used to identify crystalline materials and quantify weight fractions in samples with multiple phases. In the petroleum industry, XRD finds use in a wide range of applications including mineralogy and whole rock analysis, speciation and quantification of clay fractions, sludged characterization, in-situ identification, and analysis of scales and corrosion products.

In this report, we will focus on the latter of these applications and demonstrate the use of desktop XRD technology for qualitative and quantitative analysis of mineralogical scales and corrosion materials.

Introduction
Scaling is the deposition of solid material from a solution or suspension. The conditions that determine scaling formation and buildup are complex and dependent on a number of variables, including the type and concentration of dissolved gases and ions, temperature, pressure, pH, and

activity. From a production standpoint, scaling and fouling present a significant challenge in the petroleum industry, as deposits can severely need to restrict flow rates, reduce tubing and valves as well as complete blockage of the wellbore. Examples of this can be seen in Figure 1, which illustrates the opening, thickness, and consequent reduction in pipe volume - of two sample scale deposits.

Figure 1: Test cells depicting the scale materials, removed from pipe segments for analysis and testing.

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Lab Report XRD 76

Analysis of scale and corrosion products in the petroleum industry, using backloading sample holders. DOC-L88-EXS076 V2

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