

WHAT GRIT SIZES ARE AVAILABLE? The particles move either in free fall (in the case of free-flowing granules), in a liquid or in an air stream, which in the case of agglomerated powders ensures that the particles are separated.

Abrasive grits are manufactured and sold in accordance with the FEPA standard (see also: FEPA). This is to ensure that a consistent quality of the respective abrasive can be achieved across different manufacturers.

WHAT DOES THE SO-CALLED D50 VALUE FOR THE MICRO-GRAIN SIZES?

The d50 value, which is specified for micro grains, indicates the average particle size. d50 means that 50% of the particles are larger and 50% smaller than the specified value.

WHAT IS FEPA AND WHAT IS ITS PURPOSE?

FEPA is an association of European abrasives manufacturers whose mission is to develop and publish standards, documents and comprehensive safety information for the abrasives industry. For more information, visit <https://www.fepa-abrasives.com/>

BY MEANS OF WHICH MEASUREMENT METHODS ARE GRAIN SIZE DISTRIBUTIONS DETERMINED?

O Dynamic image analysis (DIA), primarily for macro grains.

In dynamic image analysis, a sample stream is generated which is captured and analyzed by a camera system. The particles are therefore in motion during the acquisition. In most cases, dynamic image

Image analysis, the particle stream is illuminated from one side with a light source and the particle images are recorded as shadow projections.

A particle measurement with dynamic image analysis usually takes 1-5 minutes and detects tens of thousands to many millions of particles in re- gel, depending on the sample. This method is characterized by high sample throughput, low error rate and excellent reproducibility. Source (25.07.2022):

<https://www.microtrac.de/de/produkte/particle-size-form-analysis/dynamic-image-analysis/>

O Sieve analysis for macro grains

The test sieves each consist of a sieve bottom and the sieve frame. In the case of sieving with a sieve tower, several test sieves (rarely also called test sieves) are arranged one above the other and clamped onto a sieving machine. The mesh sizes of the individual test sieves are descending from top to bottom. During sieve analysis, the sample to be analyzed is placed on the coarsest test sieve and subjected to a defined movement for a specified time. In so-called knocking sieving, a horizontal circular motion is mechanically superimposed on a vertical motion, the latter triggered by a knocking pulse.

The particle size distribution of the sample is then determined by weighing the residues on the individual test sieves. Sieving allows characterization of particle sizes with sizes ranging from 20 µm to several centimeters.

Source (07/25/2022):

<https://de.wikipedia.org/wiki/Siebanalyse#Trockensiebung>

O Static laser light scattering (SLS) for micro grains (d50).

Static light scattering is a phenomenon that occurs when light interacts with particles. It results in characteristic angle-dependent patterns in which light is preferentially scattered by the particles in certain directions:

Scattering angle and intensity depend on the size of the particles involved.

The characteristic scattered light patterns result from the interaction of laser light with particles by diffraction, refraction, reflection and absorption. For large particles (significantly larger than the wavelength of the light), diffraction, which occurs at the edge of the particle, is decisive. This is sufficiently described by the so-called Fraunhofer theory.

Source(25.07.2022):

<https://www.microtrac.de/de/wissen/static-light-scattering-laser-light-scattering/>

O Impedance method for micrograins (d50)

The principle of any impedance measurement is to indicate resistance differences. Here, such differences arise when particles pass through a measurement aperture. For this purpose, the current flow of the underlying electrolyte solution between two electrodes is measured. In this way, each particle is "measured" and at the same time all passing particles are counted, so that a particle size distribution can be determined from both sets of data. Source (07/27/2022):

*http://beckman.tentativ.de/beckman2_media/Life+Sciences/Products/Instruments/Flow CytometryCell+Analyser/Cell+Analyser/Multisizer+3/Apps/Single-particle-analysis-p-1262.pdf
O Sedimentation - Wird nicht von Wester Mineralien GmbH durchgeführt.*

COMPARISON OF THE AFOREMENTIONED ANALYSIS METHOD

Quelle (Juni 2019): Wester Mineralien GmbH

WHAT DOES THE SHAPE FACTOR SAY ABOUT THE GRAIN SHAPE?

The grain shape is usually described from "splintery" to "cubic" to "round". If the dimensionless shape factor, a kind of aspect ratio, has the value 1, the grain is circular. The smaller the shape factor becomes, the more pointed the grain is.

WHAT DOES THE BULK DENSITY SAY AND WHAT FACTORS HAVE AN INFLUENCE ON IT?

According to FEPA, the bulk density of an abrasive grit is the quotient of the mass and the volume of the vessel into which the grit is poured in a certain way. Bulk density, also called bulk weight, is expressed in the unit g/cm³, which is typical for density. The rounder the particles are with constant material density (see also: specific gravity) and with constant (open and closed) porosity (see also: porosity), the greater is the packing density. Accordingly, the mass of the material in the measuring volume is higher and thus also the bulk density.

WHAT IS THE SPECIFIC DENSITY (MATERIAL DENSITY)?

Specific gravity is the ratio between the mass of a body and its volume. It is determined by the material of the body and, as an intensive quantity, is independent of its shape and size. In the case of corundum, it is 3.94 g/cm³ under normal conditions.

WHAT IS THE SPECIFIC SURFACE AREA?

The specific surface area refers to the external surface area of a material, including all accessible pores, in relation to its mass. It can be determined using the Brunauer-Emmett-Teller (BET) method, i.e. via gas adsorption and comparison with experimental data.