

Consistently measured, AI-driven digital grain size, shape and sorting data for input into empirical permeability equations

Permeability from cuttings

200x | 650 particles | 63 – 250 μm



High-resolution white light image of very fine to fine size fraction sands

200x | 99% segmented particles | 63 – 250 μm



AI segmentation of the same image achieved 99% pixel-wise accuracy in identifying particles

$\sigma_1 = 0.59$	Sorting = Moderately well sorted
$Sk_1 = -0.09$	Skewness = Symmetrical
$Kg = 0.92$	Kurtosis = Mesokurtic
$\Phi_{50} = 3.75$	Very Coarse Silt - Very Fine Sand
k	1085mD

k is permeability (mD)

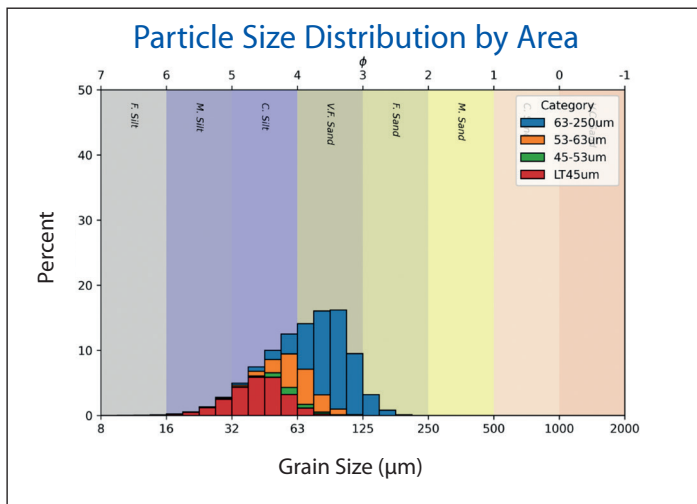
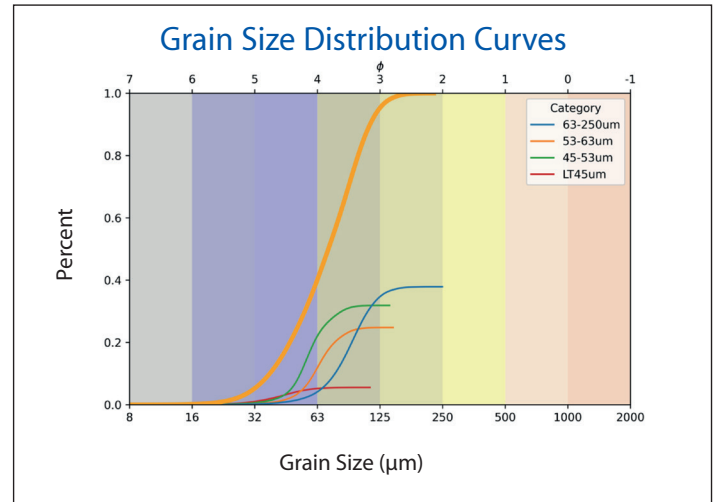
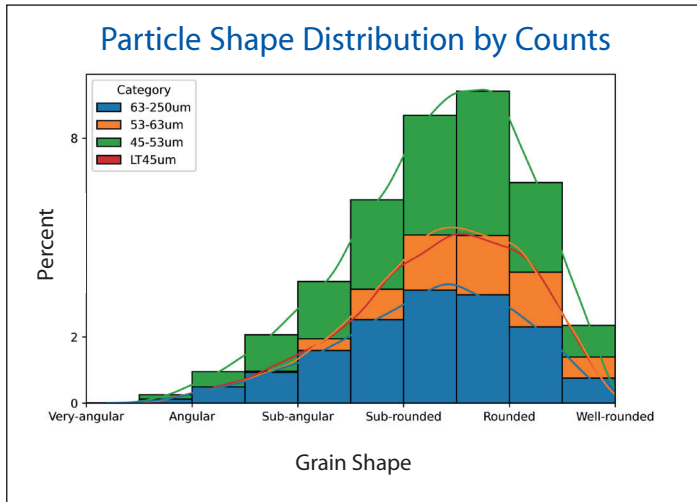
d_g is the geometric mean **grain diameter** (mm)

σ_D is a measure of the standard deviation or **sorting** of grain sizes.

$$k = 760 d_g^2 \exp \left(1 - \frac{1.31}{\sigma_D} \right)$$

Krumbein & Monk (1942)

Accurate Quantitative Results



Why accurately measure the texture of detrital grains?

To provide quantitative data input for empirical equations for permeability estimation:

- Using a high-resolution image analysis and AI-approach, quantify key textural parameters of the original detrital grain component of a sample

- Quantify detrital **grain size** from granule to clay fractions
- Quantify detrital **grain shape** from well rounded to angular
- Quantify overall **sorting** of the sample (sorting coefficient)