Mineral Grain Size Descriptors

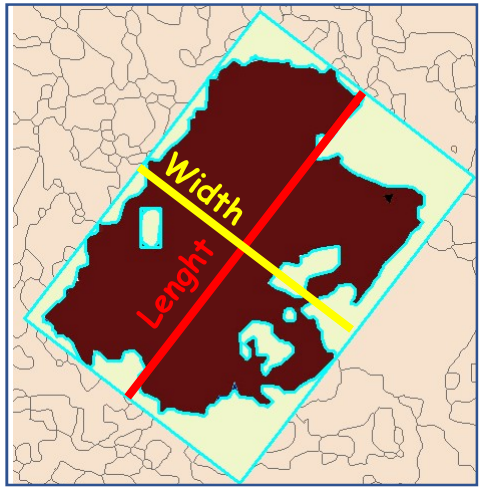
Basic Size Descriptors

Grain Area (A)
(Total number of pixel within polygon)

Grain Perimeter (P)
(Total number of pixel along grain boundary)

Grain Length (L)
(Total number of pixel along the long axis)

Grain Width (W)
(Total number of pixel along the short axis)



Conversion factors

(Xmm / Xpx) * (Ymm / Ypx) * Grain Area

(((Xmm / Xpx) + (Ymm / Ypx)) / 2) * Grain Perimeter

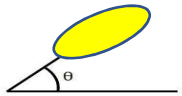
(((Xmm / Xpx) + (Ymm / Ypx)) / 2) * Grain Length

(((Xmm / Xpx) + (Ymm / Ypx)) / 2) * Grain Width

Mineral Grain Shape Factors

Derivative shape factors

Grain Orientation



Elongation (E)

$E = (\pi * L^2) / (4*A)$

Compactness (Cp)

$$Cp = \frac{P^2}{4\pi A}$$

EQPC Diameter

$$D_a = 2\sqrt{\frac{A}{\pi}}$$

Roundness (R)

$$R = \frac{4A}{\pi L^2}$$

Straightness (S)

$S = L / P$

Axial Ratio (AR)

$$AR = \frac{L}{W}$$

Circularity (C)

$$C = \frac{4A}{PL}$$

Grain Shape Factor (GSF)

$$\text{Grain shape factor } GSF = \left(L/W\right)^{0.318} \cdot \frac{P}{2\sqrt{A}}$$

Aspect Ratio (AsR) And Bretherton (B*) shape factor

$$AsR = \frac{1}{AR} = \frac{W}{L}$$

$$B^* = \left(M_x^2 - M_n^2\right) / \left(M_x^2 + M_n^2\right)$$

Ellipticity (El)

$$El = \frac{\pi L^2}{2A}$$

Grain Shape Index (GSI)

$$\text{Grain shape index } GSI = \frac{2\pi\sqrt{A/\pi}}{L}$$