Size and Shape Parameter in DiaTest-ASM and DiaInspect software

the citation of ISO refers to E DIN ISO 9276-6:2010-02

Abbreviation in DiaInspect 2010	Vers. 1.9	DIN - ISO descriptor	also allowed	also used	old DiaInspect	description	Value range	formula
		Size parameters for the normalization of shape descriptors						
A	X	**A**			**A**	**projection area**	**0 ...**	A
xA	X	**xA**	**dA**	**ECD**	**dCirc**	**equivalent circle diameter**	**0 ...**	$xA = \sqrt{\frac{4 * A}{\pi}}$
P	X	**P**				**Perimeter**	**0 ...**	
xP	X	**xP**	**dP**			**Diameter of circle with same perimeter**	**0 ...**	$xP = \frac{P}{\pi}$
		Shape descriptors -> macro descriptors -> geometrical descriptors						
xLmax	X	**xLmax**	**dLmax**			**Axis and axis ratio of the Legendre-ellipse which has the same geometricals moments as the original particle area**	**0 ...**	
xLmin	X	**xLmin**	**dLmin**				**0 ...**	
xFmax	X	**xFmax**	**dFmax**		**dmin**	**Feret max diameter**	**0 ...**	
xFmin	X	**xFmin**	**dFmin**		**dmax**	**Feret min diamater**	**0 ...**	
xLF	X	**xLF**	**dLF**			**Feret diameter 90° to min. Feret Diameter**	**0 ...**	
		Shape descriptors -> macro descriptors -> proportion descriptor						
Er	X	**Ellipse ratio**					**0...1**	$Er = \frac{xLmin}{xLmax}$
Ellipticity	X	**elliptical shape factor**			**Ellipticity**		**1...**	$Ellipticity = \frac{xLmax}{xLmin}$
Xr	X	**Aspect ratio**	**Chunkiness**	**elongation**			**0...1**	$Xr = \frac{xFmin}{xFmax}$
F-elong	X				**F-elong**		**1...**	$F - elong = \frac{xFmax}{xFmin}$

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		DIN - ISO descriptor	also allowed	also used	old DiaInspect	description	Value range	formula
Co	X	**Compactness**				**to which degree is the particle similar to a circle**	**0...1**	$Co = \frac{\sqrt{\frac{4*A}{\pi}}}{xFmax} = \frac{xA}{xFmax}$
Ro	X			**Roundness**		**related to area and max. Diameter**	**0...1**	$Ro = \frac{4*A}{\pi * xFmax^2} = \left(\frac{xA}{xFmax}\right)^2$
Comp	X				**Compactness**	**related to true perimeter and area**	**1...**	$Comp = \frac{P^2}{4*\pi*A}$
Coutl	X				**convex Outline**	**related to convex perimeter and area**	**1...**	$cOutl = \frac{Pc^2}{4*\pi*A}$
Ex	X	**Extent**					**0...1**	$Ex = \frac{A}{xFmax * xFmin}$
Br	X	**Boxratio Br**				**ratio of the projected surface to the feret box**	**0...1**	$Br = \frac{A}{xFmin * xLF}$
DiaInspect 2010		**Shape descriptors -> meso descriptors**						
C	X	**Circularity C**			**1/Compactness^1/2**	**to which degree is the particle similar to a circle, considering the smotthness of the perimeter**	**0...1**	$c = \sqrt{\frac{4*\pi*A}{P^2}} = \frac{xA}{xP}$
S	X	**Solidity**				**overall convexity of an object, using area of convex hull and area**	**0...1**	$S = \frac{A}{A_c}$
CI	X	**global surface concavity index**						$CI = \frac{Ac - A}{A}$
Cc	X			**Concavity**			**0...1**	$Cc = \frac{Ac - A}{Ac}$
Cv	X	**Convexity**			**1/Roughness**	**Perimeter convex / Perimeter**		$Cv = \frac{Pc}{P}$

	DIN - ISO descriptor	also allowed	also used	old DiaInspect	description	Value range	formula
Rb -	**Particle robustness**	**Ω1**			**defined by the number of erosions (omega2) necessary to let the particle disappear**		$\Omega_1 = \frac{2 * \omega_2}{\sqrt{A}}$
	Shape descriptors Roughness descriptor						
DF -	**Fractal Dimensions DF**				**The relation between the length of perimeter P(lambda) and the length lambda of the steps is liinear on log-log plot, known as Richardson plot. The data are first normalized by the maximum feret diameter. The upper border for the step size is lambda= 0.3* xFmax. The equation of the straight line;**		$\log(P(\lambda)) = (1 - D_F) * \log(\lambda) + \log(b)$

Greyscale and color parameters in DiaInspect 2010

avail. in Vers. 1.9 DiaInspect 2010	DIN - ISO descriptor	also allowed	also used	old DiaInspect	description	Value range	formula
	Size parameters for the normalization of shape descriptors						
Atr x					**transparent area related to the total area**	**0...1**	Atransparent / Atotal
AtrLum x					**brightness of the transparent area related to the maximum possible brightness**	**0...1**	Brightness / maxBrightness
CIEL x					**L*-Value of the particle in the CIELab color coordinate system**	**0 ...100**	
CIEa x				**CIEa**	**a*-Value of the particle in the CIELab color coordinate system**	**-100...+100**	
CIEb x				**CIEb**	**b*-Value of the particle in the CIELab color coordinate system**	**-100...+100**	

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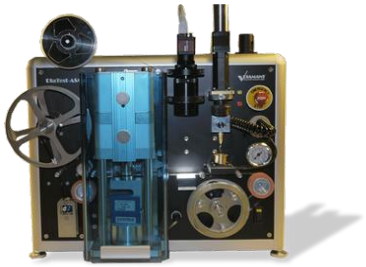

	DIN - ISO descriptor	also allowed	also used	old DiaInspect	description	Value range	formula
DiaTest-ASM	***Fracture and 3D parameters***						
CFFFt					**CFF calculated from the F(t) plot**	**N**	
CFF1st					**CFF of the first fracture calculated from the F(d) plot (Force vs. anvil displacement)**	**N**	
CFFmp					**CFF of the most prominent fracture calculated from the F(d) plot (Force vs. anvil displacement), is connected to the largest anvil displacement**	**N**	
Nob					**Number of breakings for this particle**	**1 …**	
CFF1 … CFF10					**CFF of the observed breakings #1 to #10**	**N**	
dH1 … dH10					**anvil displacement related to the breaking**		
CFSFtd					**CFFFt divided by Pi/4*xFmin^2**	**N/mm^2**	
CFSFtA					**CFFFt divided by A**	**N/mm^2**	
CFS1std					**CFF1st divided by Pi/4*xFmin^2**	**N/mm^2**	
CFS1stA					**CFF1st divided by A**	**N/mm^2**	
CFSmpd					**CFFmp divided by Pi/4*xFmin^2**	**N/mm^2**	
CFSmpA					**CFFmp divided by A**	**N/mm^2**	
xH					**particle height**	**mm**	
Hr					**ratio between xH and xFmin**	**0 …**	