

SURFACE ROUGHNESS TERMINOLOGY AND PARAMETERS

Terminology

Sampling Length, l , is the nominal wavelength used for separating roughness and waviness. Also known as Cutoff Length or Cutoff.

Evaluation Length, L , is the length over which the values of surface parameters are evaluated. It is recommended that the evaluation length consist of five sampling lengths although it may comprise any number of sampling lengths. Also known as Assessment Length.

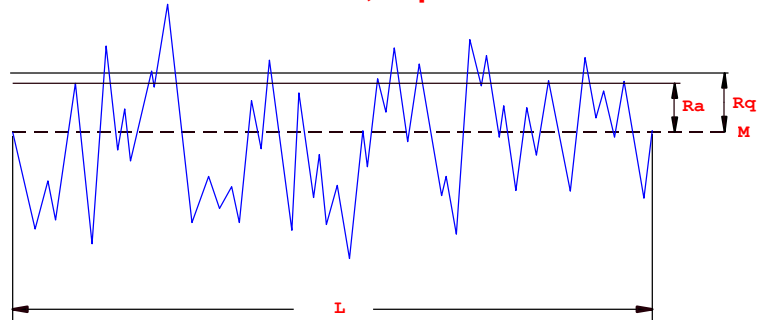
Mean Line, M , is the reference line about which the profile deviations are measured. The mean line of the roughness profile is usually established by analog or digital filters with the selected cutoff corresponding to the roughness sampling length.

Profile Peak is the point of maximum height on a portion of a profile that lies above the mean line and between two intersections of the profile with the mean line.

Profile Valley is the point of maximum depth on a portion of a profile that lies below the mean line and between two intersections of the profile with the mean line.

Profile Irregularity is a profile peak and the adjacent profile valley.

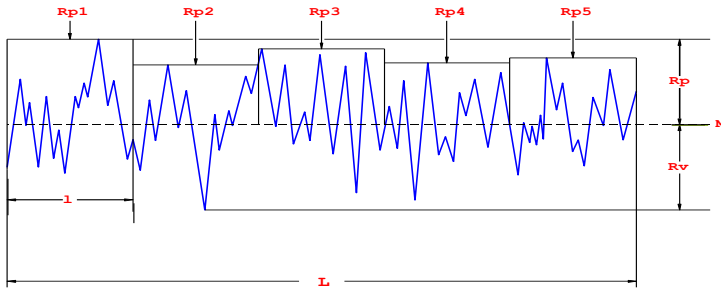
R_a, R_q



Roughness Average, R_a , is the arithmetic average of the absolute values of the profile heights over the evaluation length.

RMS Roughness, R_q , is the root mean square average of the profile heights over the evaluation length.

R_p, R_{pm}, R_v

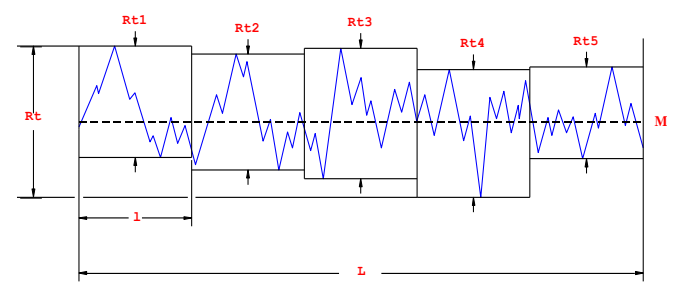


Maximum Profile Peak Height, R_p , the distance between the highest point of the profile and the mean line within the evaluation length.

Average Maximum Profile Peak Height, R_{pm} , is the average of the successive values of R_{pi} calculated over the evaluation length.

Maximum Profile Valley Depth, R_v , is the distance between the deepest valley of the profile and the mean line within the evaluation length.

$R_t, R_{ti}, R_z, R_z(DIN), R_{max}$



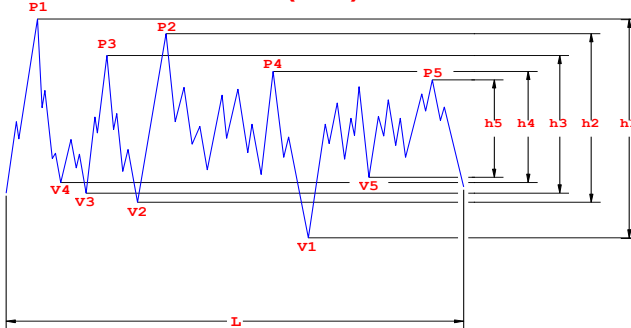
Maximum Height of the Profile, R_t , the vertical distance between the highest and lowest points of the profile within the evaluation length.

Maximum Heights within a Sampling Length, R_{ti} , the vertical distance between the highest and lowest points of the profile within a sampling length.

Average Maximum Height of the Profile, R_z , is the average of the successive values of R_{ti} calculated over the evaluation length. This parameter is the same as $R_z(DIN)$ when there are five sampling lengths within the evaluation length.

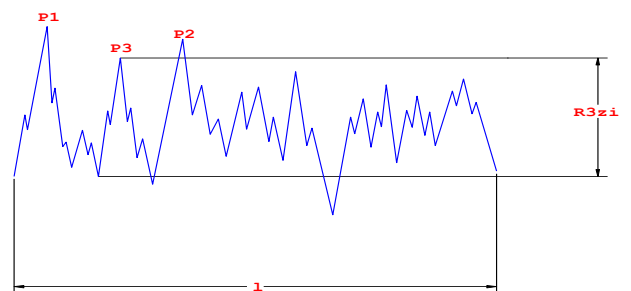
Maximum Roughness Depth, R_{max} , is the largest of the successive values of R_{ti} calculated over the evaluation length.

$R_z(ISO)$



Ten Point Height of Irregularities, $R_z(ISO)$, is the average value of the absolute values of the heights of five highest profile peaks and the depths of five deepest valleys within the evaluation length.

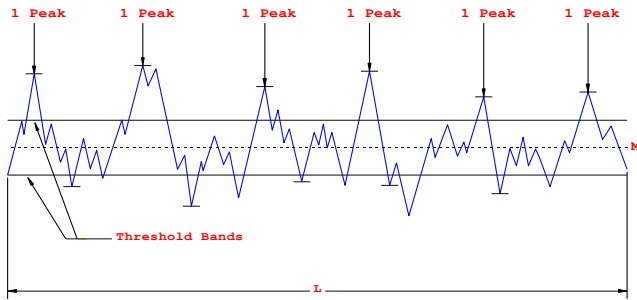
R_{3z}



Third Maximum Peak-to-Valley Height, R_{3z} , is the mean of the third maximum peak-to-valley heights in the evaluation length.

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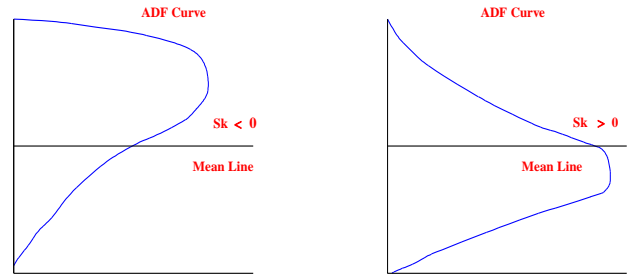
Pc



Peak Density, P_c , is the number of SAE peaks per unit length measured at a specified peak count level.

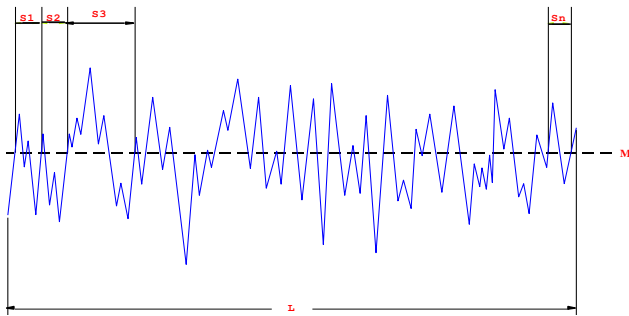
Note: An SAE peak (ANSI/ASME B46.1-1995) is a profile irregularity wherein the profile intersects consecutively a lower and upper boundary line.

Rsk



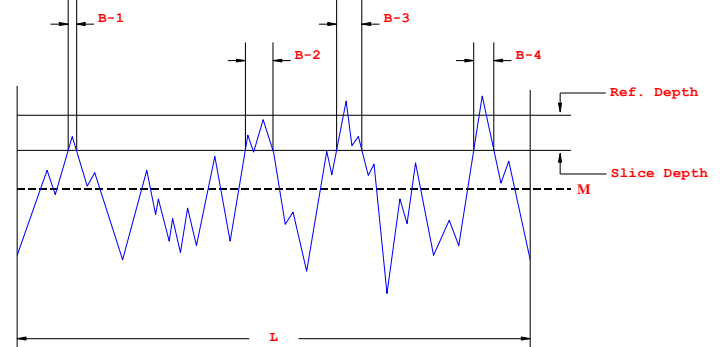
Skewness, R_{sk} , is a measure of the asymmetry of the profile about the mean line. A negative skewness indicates that a greater percentage of the profile is above the mean line and a positive value indicates that a greater percentage is below the mean line.

Sm



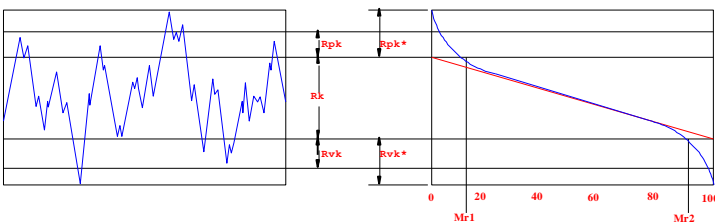
Mean Spacing of Profile Irregularities, S_m , is the mean value of the spacing between profile irregularities within the evaluation length.

tp



Profile Bearing Length Ratio, t_p , the ratio of the profile bearing length to the evaluation length at a specified level.

Rk, Rpk, Rvk, Mr1, Mr2, Rpk*, Rvk*, Vo



Core Roughness, R_k , is the core height of the profile along the Y-axis of the BAC curve generated by placing a 40% line on the curve at the minimum slope point and extending the lines to the 0% and 100% points.

Reduced Peak Height, R_{pk} , is the height on the Y-axis of a triangle with the same area as the BAC curve from the 0% point to the Mr_1 point.

Reduced Valley Depth, R_{vk} , is the height on the Y-axis of a triangle with the same area as the BAC curve from the Mr_2 point to the 100% point.

Peak Height, R_{pk}^* , is the distance between the highest profile peak and the intersection line of the surface ratio Mr_1 .

Valley Depth, R_{vk}^* , is the distance between the intersection line of the surface ratio Mr_2 and the deepest valley.

Retention Volume, V_o , is the area between the material ratio curve and the 100% material line below the core roughness.

Additional Parameters

Kurtosis, R_{ku} , is a measure of the peakedness of the profile about the mean line.

Average Absolute Slope, Δa , is the arithmetic average of the absolute value of the rate of change of the profile height calculated of the evaluation length.

RMS Slope, Δq , is the root mean square average of the rate of change of the profile height calculated over the evaluation length.

Average Wavelength, λa , is the average wavelength of the surface profile.

RMS Profile Wavelength, λq , is the RMS value of the profile wavelength.

Height Difference of Bearing Length Ratios, H_{tp} , is the height difference between two points on the bearing ratio curve set at specified levels of t_p , t_{p1} and t_{p2} .

Terminology and Parameter Definitions are based upon the American Standard ASME B46.1-1995 for Surface Texture and the German Standard DIN 4776 for the R_k group of parameters.