

# T-Model Fingerprint Calculator

## RIDGE FEATURE VALUES

<u>Ridge Feature Shape</u>	<u>Value</u>	<u>Ridge Feature Position</u>	<u>Value</u>
Continuous Ridge Unit (.45mm x .45mm)* Pore	1.15 5	0-2 Intervening Ridges To Nearest Level II Neighbor	1
Ending Ridge Unit In Funnel	10	3 Intervening Ridges To Nearest Level II Neighbor	4
Ending Ridge Unit Not In Funnel	14.25	4 Intervening Ridges To Nearest Level II Neighbor	10
Ending/Bifurcating Ridge Unit In Funnel	14.375	5 Intervening Ridges To Nearest Level II Neighbor	62.5
Bifurcating Ridge Unit In Funnel	18.75	6 Intervening Ridges To Nearest Level II Neighbor	976
Ending/Bifurcating Ridge Unit Not In Funnel	20.5	7 Intervening Ridges To Nearest Level II Neighbor	38,125
Bifurcating Ridge Unit Not In Funnel	26.75	8 Intervening Ridges To Nearest Level II Neighbor	3,723,144
Dot (Nearest Level2 Neighbor in Same Furrow>1mm)	40	9 Intervening Ridges To Nearest Level II Neighbor	908,970,832
2 Dots In Furrow <1mm apart. Value Per Dot:	10	10 Intervening Ridge to Nearest Level II Neighbor	554,791,767,578
3 Dots In Furrow <1mm apart. Value Per Dot:	6		
4 Dots In Furrow <1mm apart. Value Per Dot:	4.5		
5 Dots In Furrow <1mm apart. Value Per Dot:	4		
6 Dots In Furrow <1mm apart. Value Per Dot:	3.75		
Core Area (1mm x 1mm)	209		
Delta Area (Y Shape) (1mm x1mm)	190		
Delta Area (Non-Y Shape) (1mm x 1mm)	570		

## RIDGE FEATURE REDUCTION FACTORS

<u>Ridge Feature Clarity and Reliability (Analysis)</u>							<u>Ridge Feature Quality of Agreement (Comparison)</u>			
DISTORTION LEVEL							Grade	Ridge Type and Path Agrees	Spatial Relationship To Nearest Neighbor Agrees	Reduction Factor
Grade	None	Low	Moderate	High	Very High	Reduction Factor	Grade			
A	Yes	No	No	No	No	1	A	Yes	Yes	1
B	No	Yes	No	No	No	0.75	C	No	Yes	0.5
C	No	No	Yes	No	No	0.5	F	Yes/No	No	No Value
D	No	No	No	Yes	No	0.25	A - Excellent C - Satisfactory F - Unsatisfactory			
F	No	No	No	No	Yes	No Value				
<b>GUIDELINES</b>							<b>GUIDELINES</b>			
No Distortion Ridge feature appears visually clear and reliable.							Ridge Feature Type: Ending Ridge, Bifurcation, etc. Example #1: Ridge feature in latent print is an ending ridge and the ridge feature in the exemplar print is an ending ridge. The ridge feature types agree. Example #2: Ridge feature in the latent print is an ending ridge and the ridge feature in the exemplar print is a bifurcation. The ridge feature types do not agree.			
Low Distortion Ridge feature appears visually unclear or unreliable.							Ridge Path: Ridge path, ie., an ending ridge unit slants to right, left, or not, or the ridge angle of separation, i.e., the angle of separation in a bifurcation, is large or small.			
Moderate Distortion Ridge feature appears visually unclear and unreliable.							Spatial Relationship To Nearest Neighbor: Difference in distal relationship is less than 20% and difference in angle of rotation relationship is less than 10 degrees.			
High Distortion Ridge feature appears obstructed, however the orientation and relative position are reliably predictable.										
Very High Distortion Ridge feature appears too distorted to analyze.										
Note: 1/P denotes neutralization of ridge feature value, e.g. value equals 1.										

## T-MODEL FORMULAE

<u>T-Value (Total Discriminating Value)</u>	<u>FINGERPRINT MATCH PROBABILITY</u>
T-Value = value 1 x value 2 x value 3 x value n...	Fingerprint Match Probability (FMP) = 1/T-Value
where,	If FMP < 1/Relevant Population (e.g., Number of People x 10 Fingers x Fingerprint Parts), then "Match"
value 1 = value for ridge feature no. 1 (shape x position x clarity x agreement)	Same as,
value 2 = value for ridge feature no. 2 (shape x position x clarity x agreement)	If T-Value > Relevant Population, then "Match"
value 3 = value for ridge feature no. 3 (shape x position x clarity x agreement)	
value n = value for ridge feature no. n (shape x position x clarity x agreement)	
<b><u>FINGERPRINT PARTS</u></b>	<b><u>ESTIMATED NUMBER OF FINGERPRINT LOOK-ALIKES</u></b>
(T) ^ (P) = 10 ^ 120	L = RP / T
P = Fingerprint Parts	where,
T = T-Value	L = Estimated Number of Look-alikes (conservative, upper-bound number)
Note: 10 ^ 120 = T-Value for Average Latent (Flat) Fingerprint	RP = Relevant Population (e.g., Number of People x 10 Fingers x Fingerprint Parts)
	T = T-Value