

T-Model Fingerprint Calculator v. 9.9

Legend

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

* Values for CRU and Pore tentative pending close-match testing. ** Value omitted from calculator due to extreme rarity.

RIDGE FEATURE REDUCTION FACTORS

<u>Ridge Feature Clarity and Reliability (Analysis)</u>							<u>Ridge Feature Quality of Agreement (Comparison)</u>			
Grade	DISTORTION LEVEL					Reduction Factor	Grade	Ridge Type and Path Agrees	Spatial Relationship To Nearest Neighbor Agrees	Reduction Factor
	None	Low	Moderate	High	Very High					
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				

<u>GUIDELINES</u>	
No Distortion	Ridge feature appears visually clear and reliable.
Low Distortion	Ridge feature appears visually unclear or unreliable.
Moderate Distortion	Ridge feature appears visually unclear and unreliable.
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.

<u>GUIDELINES</u>	
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.
Ridge Path:	Ridge path, i.e., 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.
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.

T-MODEL FORMULAE

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