

Supplementary material for

Image-based Fracture Surface Defect Characterization Methods for Additively Manufactured Ti-6Al-4V Tested in Fatigue

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Table S-I. Distribution of defects on a LOF (PV7) specimen.

Lack of Fusion Distribution					
Features	Test Statistic	GEV	GUM	GPD	Decision
FeretX	AIC	6012.874	6100.406	6004.333	GPD
FeretX	BIC	6027.193	6109.952	6013.879	
FeretY	AIC	6019.238	6064.560	6047.224	GEV
FeretY	BIC	6033.557	6074.107	6056.770	
Area	AIC	8624.074	8850.823	8602.140	GPD
Area	BIC	8638.393	8860.369	8611.686	
X	AIC	6268.006	6360.519	6270.646	
X	BIC	6282.325	6370.065	6280.192	
Y	AIC	6263.331	6305.959	6255.861	GPD
Y	BIC	6277.650	6315.506	6265.407	
Perimeter	AIC	6050.612	6153.750	6121.503	GEV
Perimeter	BIC	6064.931	6163.296	6131.049	
Circularity	AIC	-194.819	-139.212	-24.041	GEV
Circularity	BIC	-180.500	-129.666	-14.495	
Feret Length	AIC	4993.546	5029.654	5074.317	GEV
Feret Length	BIC	5007.865	5039.201	5083.863	
Feret Angle	AIC	4646.517	4673.498	4508.837	GPD
Feret Angle	BIC	4660.836	4683.044	4518.383	
MinFeret	AIC	4477.372	4512.718	4561.897	GEV
MinFeret	BIC	4491.691	4522.265	4571.443	
Aspect Ratio	AIC	843.033	878.059	869.479	GEV
Aspect Ratio	BIC	857.352	887.605	879.025	
Roundness	AIC	-281.375	-245.340	-133.781	GEV
Roundness	BIC	-267.056	-235.794	-124.235	
Solidity	AIC	-686.252	-366.782	-276.513	GEV
Solidity	BIC	-671.933	-357.236	-266.967	

Table S-II. Distribution of defects on a Keyhole (PV2) specimen.

Keyhole Distribution					
Features	Test Statistics	GEV	GUM	GPD	Decision
FeretX	AIC	5074.319	5115.615	5075.953	
FeretX	BIC	5088.118	5124.814	5085.152	
FeretY	AIC	5075.473	5129.816	5046.158	GPD
FeretY	BIC	5089.273	5139.016	5055.358	
Area	AIC	6049.443	6213.204	6033.786	GPD
Area	BIC	6063.242	6222.404	6042.986	
X	AIC	5294.533	5335.651	5288.794	GPD
X	BIC	5308.332	5344.851	5297.993	
Y	AIC	5296.711	5351.519	5261.512	GPD
Y	BIC	5310.511	5360.719	5270.712	
Perimeter	AIC	4075.008	4095.754	4135.158	GEV
Perimeter	BIC	4088.808	4104.954	4144.357	
Circularity	AIC	-649.696	-215.343	-261.316	GEV
Circularity	BIC	-635.897	-206.143	-252.117	
Feret Length	AIC	3271.716	3289.008	3337.753	GEV
Feret Length	BIC	3285.516	3298.207	3346.952	
Feret Angle	AIC	3859.771	3998.024	3753.534	GPD
Feret Angle	BIC	3873.571	4007.224	3762.734	
MinFeret	AIC	3044.572	3049.316	3062.948	GEV
MinFeret	BIC	3058.372	3058.515	3072.148	
Aspect Ratio	AIC	-16.706	22.670	24.662	GEV
Aspect Ratio	BIC	-2.907	31.870	33.862	
Roundness	AIC	-474.983	-315.662	-256.794	GEV
Roundness	BIC	-461.183	-306.462	-247.594	
Solidity	AIC	-1347.978	-320.154	-658.621	GEV
Solidity	BIC	-1334.178	-310.954	-649.421	

Table S-III. Distribution of defects on a Process Window (PV6) specimen.

Process Window Distribution					
Features	Test Statistics	GEV	GUM	GPD	Decision
FeretX	AIC	2653.660	2683.797	2621.882	GPD
FeretX	BIC	2665.488	2691.683	2629.767	
FeretY	AIC	2645.121	2670.362	2611.428	GPD
FeretY	BIC	2656.949	2678.248	2619.314	
Area	AIC	2987.271	3024.427	2968.211	GPD
Area	BIC	2999.100	3032.313	2976.097	
X	AIC	2768.227	2799.234	2736.049	GPD
X	BIC	2780.056	2807.119	2743.934	
Y	AIC	2760.600	2785.024	2724.434	GPD
Y	BIC	2772.429	2792.909	2732.320	
Perimeter	AIC	2052.500	2057.079	2075.848	GEV
Perimeter	BIC	2064.329	2064.965	2083.734	
Circularity	AIC	-197.942	-102.311	-128.658	GEV
Circularity	BIC	-186.114	-94.426	-120.772	
Feret Length	AIC	1698.315	1701.797	1723.637	
Feret Length	BIC	1710.143	1709.683	1731.522	
Feret Angle	AIC	2051.559	2083.533	1962.554	GPD
Feret Angle	BIC	2063.387	2091.418	1970.440	
MinFeret	AIC	1453.261	1451.535	1486.503	GUM
MinFeret	BIC	1465.090	1459.421	1494.389	
Aspect Ratio	AIC	405.438	436.546	408.035	
Aspect Ratio	BIC	417.266	444.432	415.921	
Roundness	AIC	-96.551	-76.408	-54.725	GEV
Roundness	BIC	-84.723	-68.523	-46.839	
Solidity	AIC	-549.354	-277.361	-406.027	GEV
Solidity	BIC	-537.526	-269.476	-398.142	