

Appendix-I

Table 7 ANOVA for SN ratios of strength at break

Source	DF	Seq SS	Adj SS	Adj MS	F	P	%c
Infill density	2	209.3	209.3	104.67	2.00	0.333	22.0
Perimeter	2	175.0	175.0	87.49	1.67	0.374	19.0
Pattern	2	428.3	428.3	214.15	4.09	0.196	46.6
Residual Error	2	104.6	104.6	52.30			11.4
Total	8	917.2					

Table 8 Response table for SN ratios of strength at break (Larger is better)

Level	Infill density	Perimeter	Pattern
1	6.195	8.381	4.187
2	17.989	9.184	10.562
3	11.493	18.111	20.927
Delta	11.793	9.729	16.740
Rank	2	3	1

Table 9 ANOVA for SN ratios of peak elongation

Source	DF	Seq SS	Adj SS	Adj MS	F	P	%c
Infill density	2	101.3	101.3	50.66	0.72	0.582	17.4
Perimeter	2	102.6	102.6	51.31	0.73	0.579	17.6
Pattern	2	236.3	236.3	118.16	1.67	0.374	40.6
Residual Error	2	141.3	141.3	70.65			24.0
Total	8	581.6					

Table 10 Response table for SN ratios of peak elongation (Larger is better)

Level	Infill density	Perimeter	Pattern
1	3.302	4.096	4.900
2	11.383	6.975	3.450
3	8.638	12.251	14.972
Delta	8.082	8.155	11.522
Rank	3	2	1

Table 11 ANOVA for SN ratios of break elongation

Source	DoF	SS	Adj SS	Adj MS	F	P	%C
Infill density	2	86.31	86.31	43.16	0.69	0.593	17.0
Perimeter	2	89.94	89.94	44.97	0.72	0.583	18.0
Pattern	2	195.51	195.51	97.75	1.56	0.391	39.3
Residual Error	2	125.62	125.62	62.81			25.0
Total	8	497.38					

Table 12 Response Table for SN ratios of break elongation (Larger is better)

Level	Infill density	Perimeter	Pattern
1	4.475	5.000	7.159
2	11.689	8.544	4.023
3	10.115	12.735	15.097
Delta	7.213	7.734	11.075
Rank	3	2	1

Table 13 ANOVA for SN ratios of percentage peak elongation

Source	DoF	SS	Adj SS	Adj MS	F	P	%C
Infill density	2	96.88	96.88	48.44	0.68	0.595	17.5
Perimeter	2	96.35	96.35	48.17	0.68	0.596	17.0
Pattern	2	229.31	229.31	114.65	1.61	0.383	40.0

Residual Error	2	142.36	142.36	71.18			25.0
Total	8	564.89					

Table 14 Response Table for SN ratios of percentage peak elongation (Larger is better)

Level	Infill density	Perimeter	Pattern
1	8.815	9.648	9.847
2	16.790	12.130	9.201
3	13.661	17.488	20.217
Delta	7.975	7.841	11.016
Rank	2	3	1

Table 15 ANOVA for SN ratios of percentage break elongation

Source	DoF	SS	Adj SS	Adj MS	F	P	%C
Infill density	2	111.1	111.1	55.57	0.84	0.544	19.6
Perimeter	2	101.3	101.3	50.66	0.77	0.566	17.9
Pattern	2	204.1	204.1	102.07	1.54	0.393	36.0
Residual Error	2	132.4	132.4	66.20			23.0
Total	8	549.0					

Table 16 Response table for SN ratios of percentage break elongation (Larger is better)

Level	Infill density	Perimeter	Pattern
1	8.815	9.648	11.384
2	17.152	13.304	9.201
3	14.835	17.851	20.217
Delta	8.338	8.203	11.016
Rank	2	3	1

Table 17 ANOVA for SN ratios of Young's modulus

Source	DoF	SS	Adj SS	Adj MS	F	P	%C
Infill density	2	28.350	28.350	14.175	4.77	0.173	17.3
Perimeter	2	20.249	20.249	10.124	3.41	0.227	12.0
Pattern	2	108.599	108.599	54.300	18.27	0.052	66.0
Residual Error	2	5.943	5.943	2.972			3.6
Total	8	163.141					

Table 18 Response table for SN ratios of Young's modulus (Larger is better)

Level	Infill density	Perimeter	Pattern
1	39.31	40.71	35.70
2	43.08	38.67	43.58
3	39.32	42.34	42.43
Delta	3.77	3.67	7.87
Rank	2	3	1

Table 19 ANOVA for SN ratios of modulus of toughness

Source	DoF	SS	Adj SS	Adj MS	F	P	%C
Infill density	2	606.1	606.1	303.1	1.25	0.444	21.7
Perimeter	2	544.9	544.9	272.4	1.13	0.470	19.0
Pattern	2	1150.9	1150.9	575.5	2.38	0.296	41.0

Residual Error	2	484.1	484.1	242.0			17.0
Total	8	2786.0					

Table 20 Response Table for SN ratios of modulus of toughness (Larger is better)

Level	Infill density	Perimeter	Pattern
1	-31.951	-29.202	-31.411
2	-11.952	-24.139	-27.122
3	-20.198	-10.758	-5.567
Delta	19.999	18.444	25.844
Rank	2	3	1

Appendix-II

Table 21 ANOVA for linear model (for **Strength at peak**)

Source	SS	DoF	MS	F	P	
Model	326.46	2	163.23	9.06	0.0012	significant
A-Infill density	54.08	1	54.08	3.00	0.0960	
B-Perimeter	0.0000	0				
C-Pattern	272.38	1	272.38	15.12	0.0007	
Residual	432.41	24	18.02			
Lack of Fit	432.41	6	72.07			
Pure Error	0.0000	18	0.0000			
Cor Total	758.87	26				

Table 22 ANOVA for Linear model (for **Strength at break**)

Source	Ss	DoF	MS	F	P	
Model	264.00	2	132.00	9.05	0.0012	significant
A-Infill density	43.71	1	43.71	3.00	0.0963	
B-Perimeter	0.0000	0				
C-Pattern	220.29	1	220.29	15.10	0.0007	
Residual	350.21	24	14.59			
Lack of Fit	350.21	6	58.37			
Pure Error	0.0000	18	0.0000			
Cor Total	614.21	26				

Table 23 ANOVA for 2FI model (for **Peak elongation**)

Source	SS	DoF	MS	F	P	
Model	150.34	4	37.58	11.10	< 0.0001	significant
A-Infill density	13.16	1	13.16	3.89	0.0614	
B-Perimeter	0.0000	0				
C-Pattern	28.58	1	28.58	8.44	0.0082	
AB	4.52	1	4.52	1.34	0.2600	
AC	104.08	1	104.08	30.75	< 0.0001	
BC	0.0000	0				
Residual	74.47	22	3.38			
Lack of Fit	74.47	4	18.62			
Pure Error	0.0000	18	0.0000			
Cor Total	224.80	26				

Table 24 ANOVA for 2FI model (for **Break elongation**)

Source	SS	DoF	MS	F	P	
Model	158.15	4	39.54	10.78	< 0.0001	significant
A-Infill density	16.25	1	16.25	4.43	0.0470	
B-Perimeter	0.0000	0				
C-Pattern	20.16	1	20.16	5.50	0.0285	

AB	3.81	1	3.81	1.04	0.3193	
AC	117.94	1	117.94	32.16	< 0.0001	
BC	0.0000	0				
Residual	80.68	22	3.67			
Lack of Fit	80.68	4	20.17			
Pure Error	0.0000	18	0.0000			
Cor Total	238.84	26				

Table 25 ANOVA for 2FI model (for **Percentage peak elongation**)

Source	SS	df	MS	F	P	
Model	489.42	4	122.35	11.95	< 0.0001	significant
A-Infill density	40.50	1	40.50	3.96	0.0593	
B-Perimeter	0.0000	0				
C-Pattern	98.00	1	98.00	9.57	0.0053	
AB	20.17	1	20.17	1.97	0.1744	
AC	330.75	1	330.75	32.30	< 0.0001	
BC	0.0000	0				
Residual	225.25	22	10.24			
Lack of Fit	225.25	4	56.31			
Pure Error	0.0000	18	0.0000			
Cor Total	714.67	26				

Table 26 ANOVA for 2FI model (for **Percentage break elongation**)

Source	Sum of Squares	df	Mean Square	F-value	p-value	
Model	537.92	4	134.48	11.26	< 0.0001	significant
A-Infill density	60.50	1	60.50	5.07	0.0347	
B-Perimeter	0.0000	0				
C-Pattern	60.50	1	60.50	5.07	0.0347	
AB	20.17	1	20.17	1.69	0.2072	
AC	396.75	1	396.75	33.22	< 0.0001	
BC	0.0000	0				
Residual	262.75	22	11.94			
Lack of Fit	262.75	4	65.69			
Pure Error	0.0000	18	0.0000			
Cor Total	800.67	26				

Table 27 ANOVA for Linear model (for **Young's modulus**)

Source	SS	DoF	MS	F	P	
Model	22209.47	2	11104.73	4.53	0.0214	significant
A-Infill density	64.87	1	64.87	0.0265	0.8722	
B-Perimeter	0.0000	0				
C-Pattern	22144.60	1	22144.60	9.03	0.0061	
Residual	58853.19	24	2452.22			

Lack of Fit	58853.19	6	9808.87			
Pure Error	0.0000	18	0.0000			
Cor Total	81062.66	26				

Table 28 ANOVA for 2FI model (**for Modulus of toughness**)

Source	Sum of Squares	df	Mean Square	F-value	p-value	
Model	2.04	4	0.5097	8.69	0.0002	significant
A-Infill density	0.0882	1	0.0882	1.50	0.2331	
B-Perimeter	0.0000	0				
C-Pattern	0.3758	1	0.3758	6.41	0.0190	
AB	0.0580	1	0.0580	0.9887	0.3309	
AC	1.52	1	1.52	25.85	< 0.0001	
BC	0.0000	0				
Residual	1.29	22	0.0587			
Lack of Fit	1.29	4	0.3227			
Pure Error	0.0000	18	0.0000			
Cor Total	3.33	26				

Appendix-III

Table30: Initial Dimensions of specimens (10⁰C)

Length of specimens	Width of specimen	Thickness of specimen	Initial volume
19.3	7.64	2.81	414.3401
19.98	9.78	2.89	564.7187
19.67	11.23	2.58	569.9068
19.78	11.84	3.58	838.4188
19.83	11.95	3.86	914.6984
19.53	12.38	3.26	788.2074
19.57	12.41	3.65	886.4525
16.49	13.24	2.18	475.9542
19.08	12.11	2.54	586.8894

Table 31: Dimensions of specimens after 30 min immersion (10⁰C)

Length of specimens	Width of specimen	Thickness of specimen	Initial volume
18.84	7.77	2.76	404.0276
19.82	9.4	3.09	575.6917
19.7	11.24	2.63	582.3556
19.73	11.92	3.16	743.1739
19.54	12.16	3.53	838.7506
19.67	11.92	3.48	815.9431
19.75	12.65	3.7	924.3988
16.72	14.1	2.23	525.727
19.81	12.23	2.64	639.6094

Table 32: Dimensions of specimens after exposure of 30 min at atmospheric conditions (10⁰C)

Length of specimens	Width of specimen	Thickness of specimen	Initial volume
18.87	7.47	2.9	408.7808
20.08	9.72	2.62	511.3653
19.65	11.19	2.54	558.5041
19.69	11.81	2.98	692.9659
19.81	11.99	3.62	859.8293
19.54	12.32	3.27	787.1963
19.59	12.41	3.75	911.6696
15.93	13.26	2.2	464.71
19.49	12.18	2.62	621.9571

Table 33: Initial Dimensions of specimens (70⁰C)

Length of specimens	Width of specimen	Thickness of specimen	Initial volume
20.38	9.25	3.01	567.4302
19.67	11.68	3.44	790.3249
20.08	10.78	2.5	541.156
20.45	12.34	3.31	835.2884
19.96	11.5	3.3	757.482

19.55	11.66	3.21	731.7291
19.08	11.88	3.53	800.1465
19.72	13.87	2.46	672.8503
19.43	12.78	3.05	757.362

Table 34: Dimensions of specimens after 30 min immersion (70⁰C)

Length of specimens	Width of specimen	Thickness of specimen	Initial volume
19.23	9.1	3.04	531.9787
19.83	11.7	3.42	793.4776
20.06	10.49	2.62	551.325
20.06	12.21	3.15	771.5377
19.7	11.35	2.83	632.7739
19.5	12.04	3.32	779.4696
18.65	12.35	3.27	753.1709
19.59	13.89	2.53	688.4259
19.6	12.7	2.66	662.1272

Table 35: Dimensions of specimens after exposure of 30 min at atmospheric conditions(10⁰C)

Length of specimens	Width of specimen	Thickness of specimen	Initial volume
19.25	8.38	3.01	485.5582
19.89	9.96	3.74	740.9105
19.54	11.45	3.13	700.2843
20.03	10.25	2.7	554.3303
19.92	11.61	3.75	867.267
19.55	12	3	703.8
18.86	12.63	3.35	797.976
19.6	13.69	2.37	635.9279
19.24	12.81	2.28	561.9388

Appendix IV

Table 37: Weights of all the specimens at different conditions

Specimens	Under room temperature (10°C)			Under stimulated environment (70°C)		
	Initial Weight	Weight after 30 min immersion	Weight after 30 min exposure to room temperature	Initial Weight	Weight after 30 min immersion	Weight after 30 min exposure to room temperature
1	0.393	0.394	0.392	0.43	0.438	0.431
2	0.537	0.539	0.538	0.517	0.646	0.636
3	0.554	0.555	0.552	0.629	0.537	0.525
4	0.753	0.755	0.746	0.644	0.616	0.591
5	0.793	0.798	0.794	0.727	0.676	0.64
6	0.728	0.741	0.733	0.764	0.792	0.767
7	0.756	0.787	0.769	0.744	0.8	0.76
8	0.47	0.463	0.459	0.639	0.646	0.637
9	0.62	0.621	0.616	0.62	0.634	0.622