3D Printed Dowel Pin Holes

The hole diameters in our dowel pin holes differed from the dimensions specified in our SolidWorks model. The interface dimensions for the diameters were measured using the ANSI Fits Calculator (http://www.amesweb.info/FitTolerance/FitToleranceImperial.aspx) going from a looser RC fit to a tighter FN fit.

Table 1. Dimensional report of dowel pin holes

		Ideal (in)	Measured (in)
1/8 in Dowel Pin		0.125	0.1245
	RC1	0.1253	0.125
	LC1	0.1253	0.125
	LT1	0.1256	0.1245
	LN1	0.1253	0.123
	FN1	0.1256	0.1225
	STDev	0.000164	0.001173

		Ideal (in)	Measured (in)
1/4 in Dowel Pin		0.25	0.249
	RC1	0.2503	0.26
	LC1	0.2504	0.259
	LT1	0.2506	0.2575
	LN1	0.2504	0.2565
	FN1	0.2504	0.254
	STDev	0.000110	0.002329

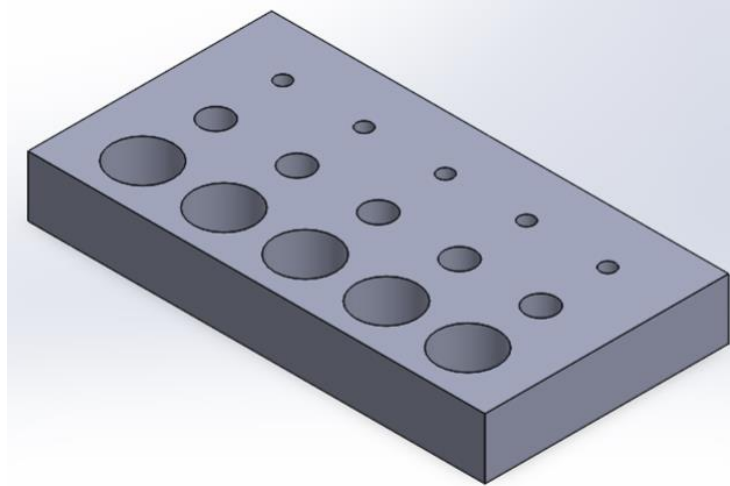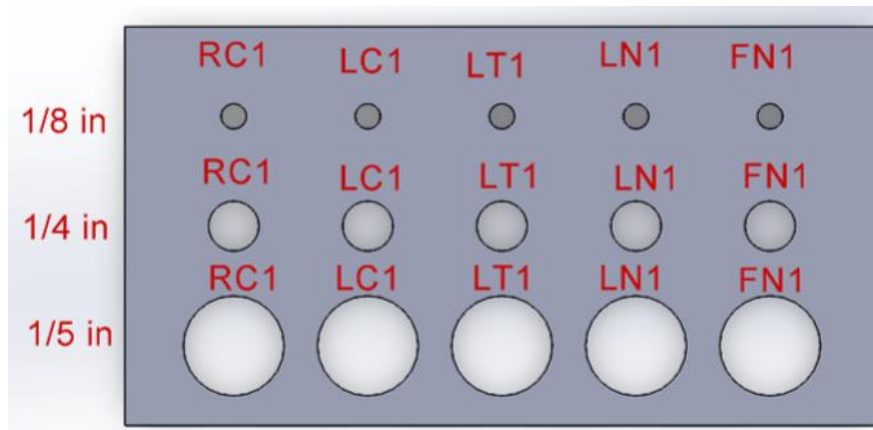|		Ideal (in)	Measured (in)
1/2 in Dowel Pin		0.5	0.4995
	RC1	0.5003	0.518
	LC1	0.5004	0.517
	LT1	0.5007	0.5155
	LN1	0.5004	0.513
	FN1	0.5004	0.512
	STDev	0.000152	0.002559

Figure 1. 3D Model of dowel pin holes

Figure 2. 3D Model of dowel pin holes with interfaces

Based upon the measurements of hole diameters and overall dimensions of the part printed, there are various amounts of discrepancy between the as-printed printed vs the as-designed part. With these discrepancies, we can observe thermal contraction may have occurred during the 3D printing process. Another contributing factor to the imperfections of our model may have been caused by the resolution of the 3D printer having too tight of dimensions. Using 3D printer filament material also made it difficult to measure precise measurements since the calipers were able to dig into the material a little.