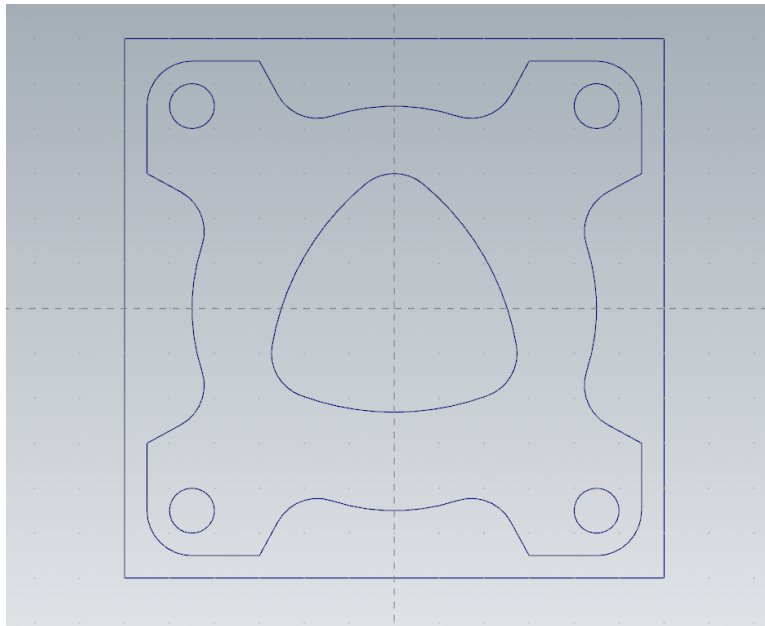
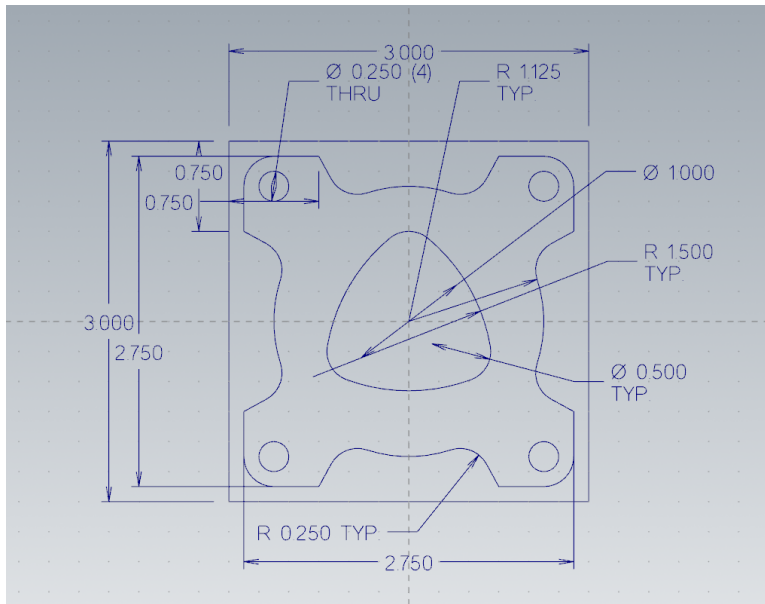


## Mill Lesson 5 Second Exercise

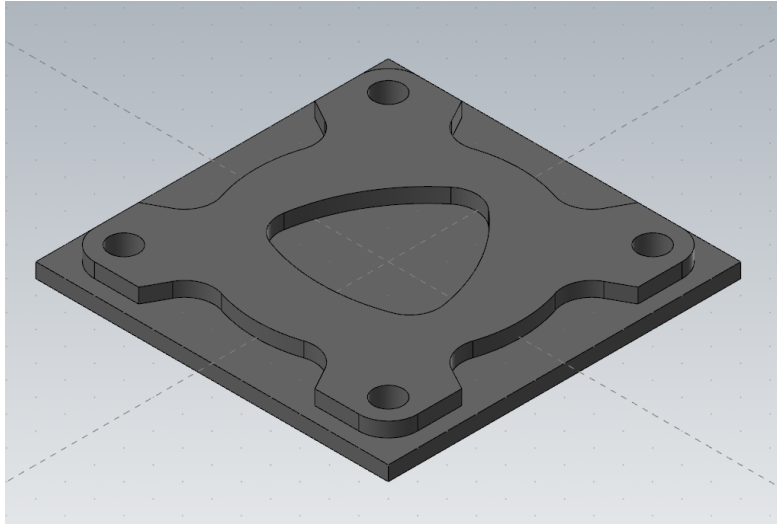
## I. Wireframe:



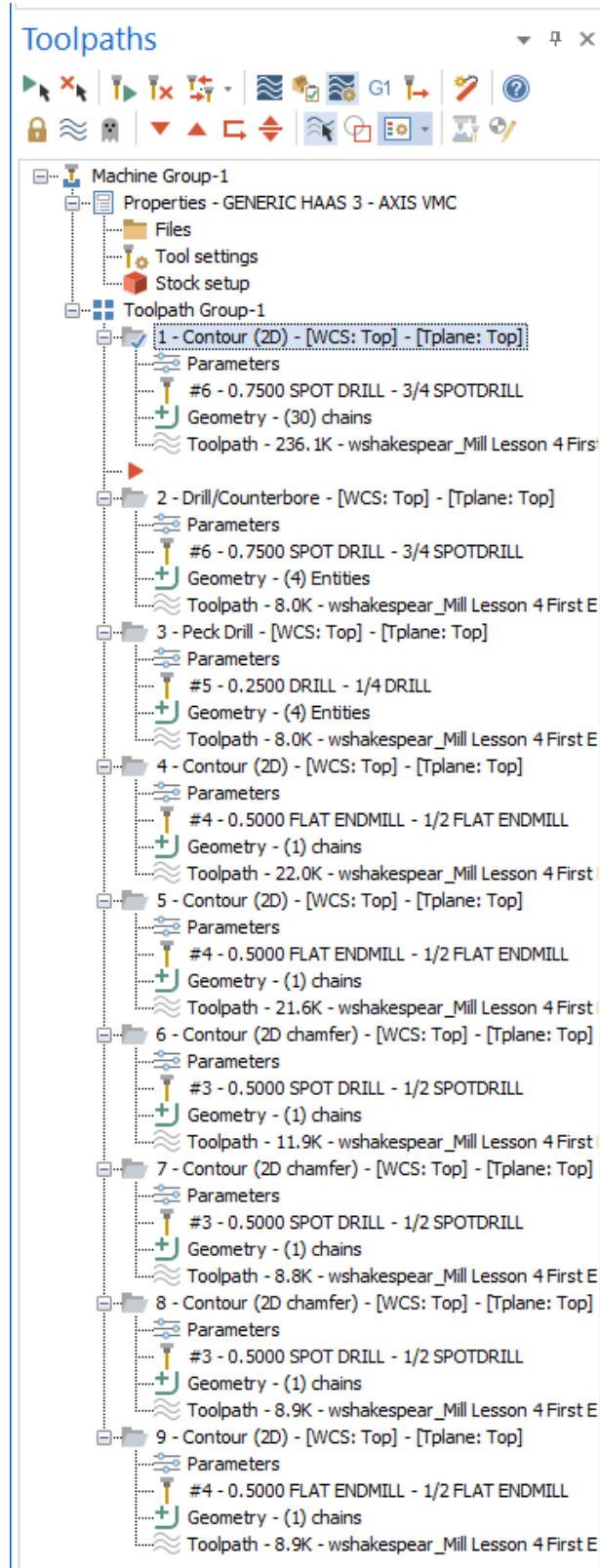
## II. Dimensions:



III. Solid:



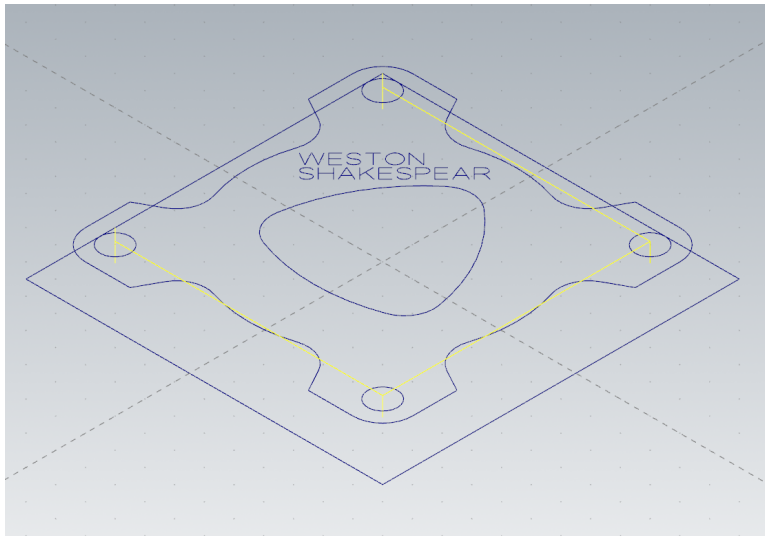
#### IV. Toolpaths:



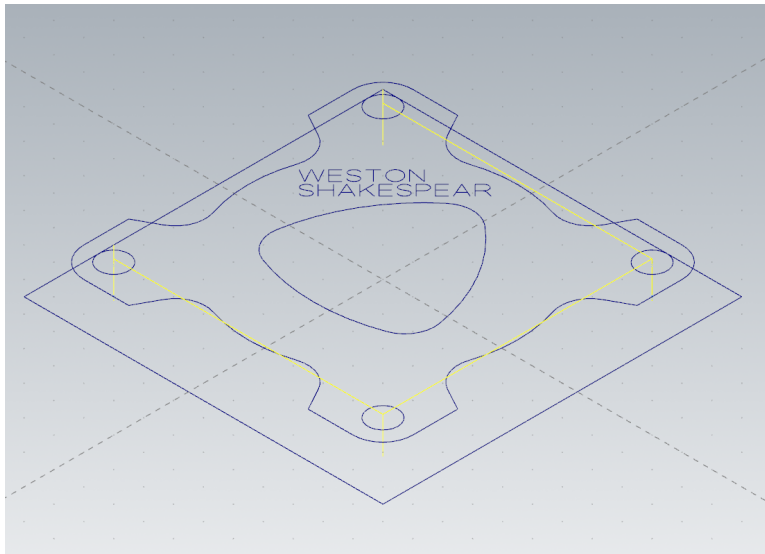
V. Name 2D Contour:



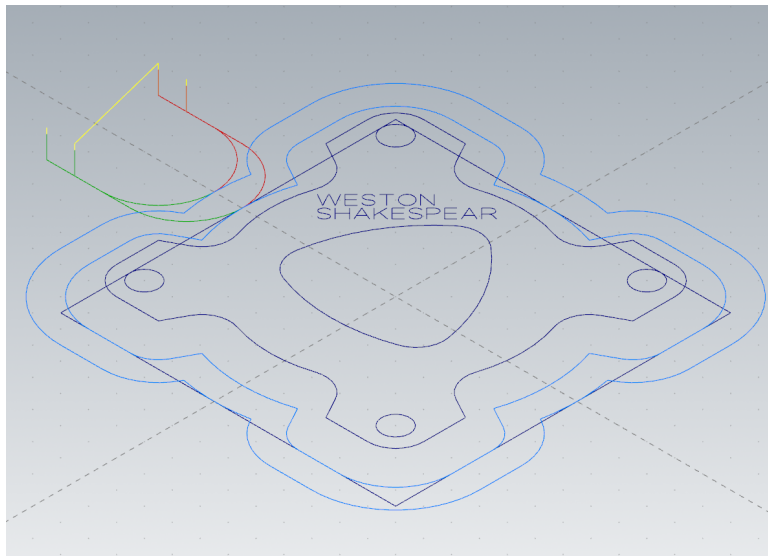
VI. Spot Drill:



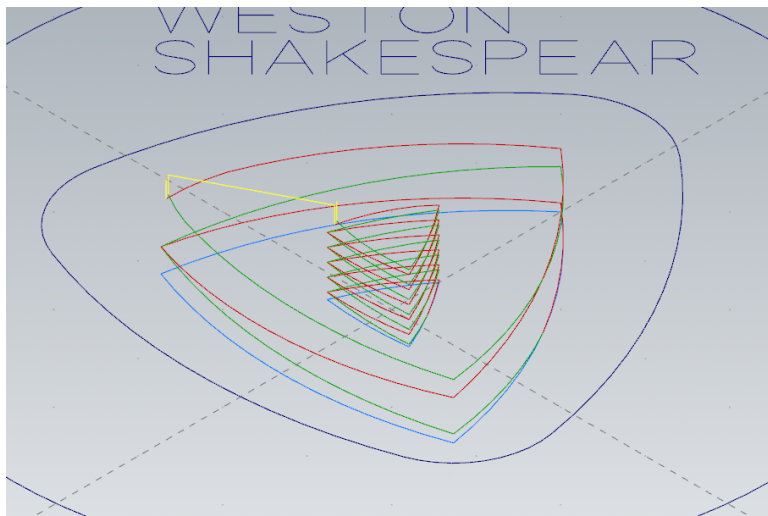
VII. Peck Drill:



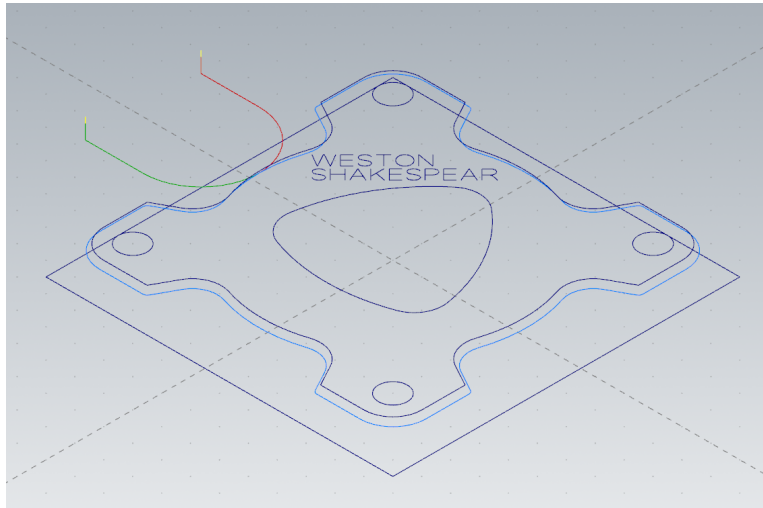
VIII. 2D Contour Outside:



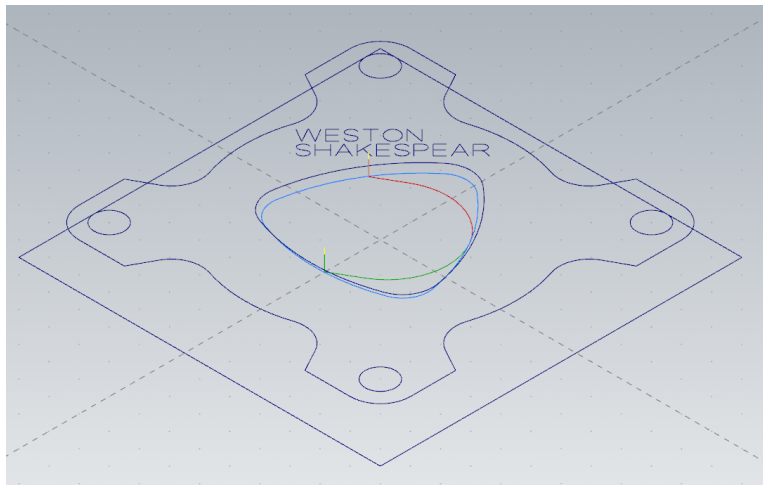
IX. 2D Contour Inside:



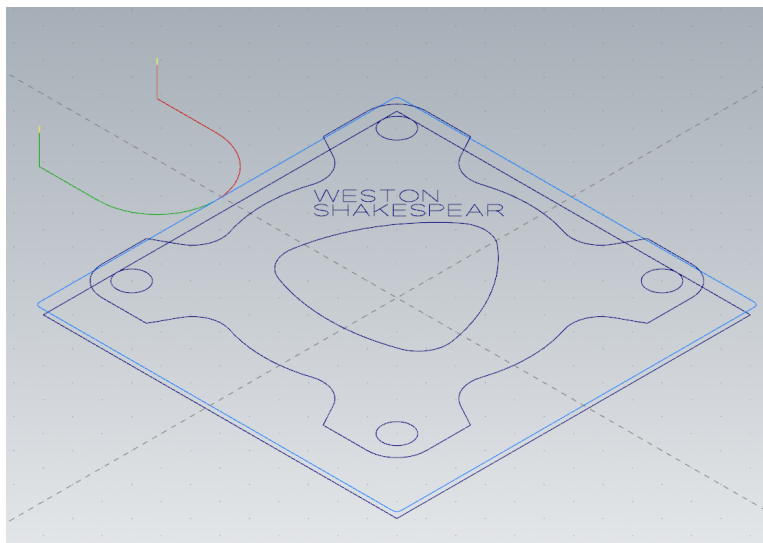
X. 2D Chamfer Contour Outside:



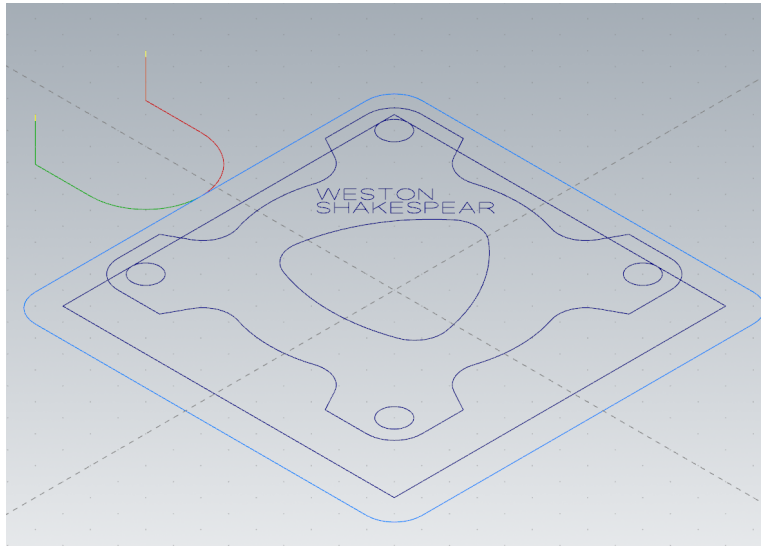
XI. 2D Chamfer Contour Inside:



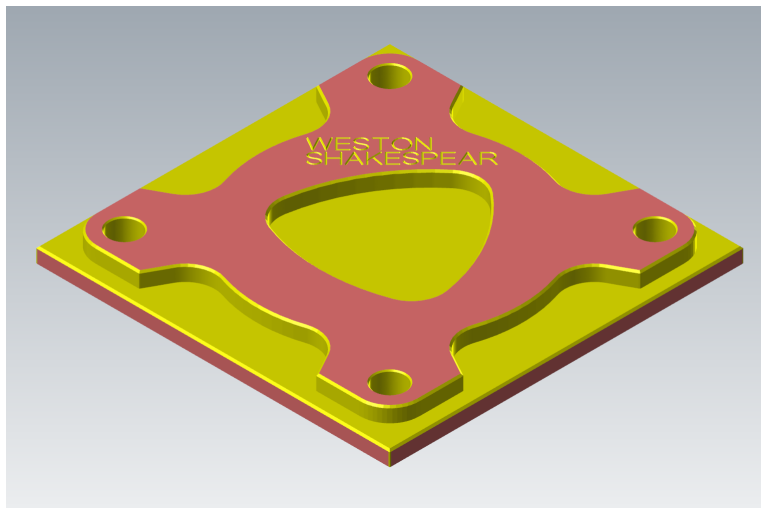
XII: 2D Chamfer Contour:



### XIII: 2D Contour:



### XIV. Final Solid:



### XV. Method:

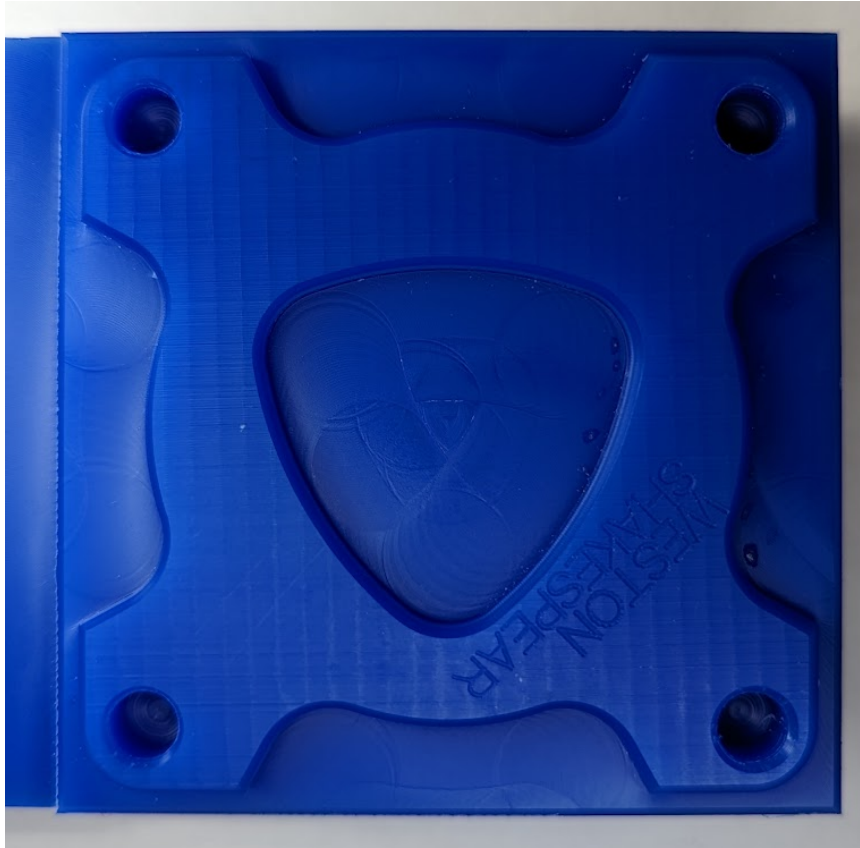
I just used a basic center anchored rectangle for the perimeter of the geometry. For the wireframe in the center I first created the inner circle then drew a line and manually assigned 30 degrees to the angle, this let me create the equidistant triangle in the center, from there I drew the 3 circles and then used the tangent 2 entities to complete the center.

Then I drew one copy of the radially symmetric portion and used a polar copy to finish the wireframe.

### XIV. GCode Changes

To modify my gcode to be compatible with the machine I first made sure the HAAS 3 axis post processor was selected when exporting the gcode. Then I removed the long lines at the beginning and edited the last G28 home command to not zero the x axis.

## XV. Finished Part



## XVI. Gcode:

%

O33005

(WSHAKESPEAR\_MILL LESSON 5B)

(DATE=DD-MM-YY - 03-02-23 TIME=HH:MM - 12:01)

(MCAM FILE - C:\USERS\WESTONSHAKESPEAR\DOWNLOADS\WSHAKESPEAR\_MILL LESSON  
5B.EMC)

(NC FILE - C:\USERS\WESTONSHAKESPEAR\DOWNLOADS\GCODE\WSHAKESPEAR\_MILL LESSON  
5B)

(MATERIAL - ALUMINUM INCH - 6061)

(T7|1/8 SPOTDRILL|H7|D7|TOOL DIA. - .125)

(T3|1/2 SPOTDRILL|H3|D3|TOOL DIA. - .5)

(T5|1/4 DRILL|H5|D5|TOOL DIA. - .25)

(T4|1/2 FLAT ENDMILL|H4|D4|TOOL DIA. - .5)

N100 G20

N110 G0 G17 G40 G49 G80 G90

N120 T7 M6

N130 G187 P3 E.001

N140 G0 G90 G54 X-1.0209 Y.32 S5000 M3



N150 G43 H7 Z.145  
N160 G1 Z.118 F6.4  
N170 X-.9097 Y.2562 F40.  
N180 X-.9707 Y.3703  
N190 X-.9674 Y.3735  
N200 X-.8533 Y.3125  
N210 X-.9172 Y.4237  
N220 Z.138 F6.4  
N230 G0 Z.145  
N240 X-.7552 Y.4131  
N250 G1 Z.118  
N260 X-.811 Y.3572 F40.  
N270 X-.8961 Y.4423  
N280 X-.8403 Y.4982  
N290 Z.138 F6.4  
N300 G0 Z.145  
N310 X-.8028 Y.4542  
N320 G1 Z.118  
N330 X-.8554 Y.4016 F40.  
N340 Z.138 F6.4  
N350 G0 Z.145  
N360 X-.746 Y.5595  
N370 G1 Z.118  
N380 X-.7572 Y.5627 F40.  
N390 X-.7691 Y.5617  
N400 X-.7806 Y.5566  
N410 X-.7909 Y.5482  
N420 X-.8005 Y.5356  
N430 X-.8053 Y.5224  
N440 X-.8052 Y.5098  
N450 X-.7998 Y.4998  
N460 X-.7873 Y.4929  
N470 X-.7854 Y.4926  
N480 X-.7702 Y.4943  
N490 X-.7644 Y.4964  
N500 X-.7339 Y.5136  
N510 X-.7185 Y.5188  
N520 X-.7127 Y.519  
N530 X-.7013 Y.5155  
N540 X-.6974 Y.5124  
N550 X-.6919 Y.5025  
N560 X-.6911 Y.4896

N570 X-.6955 Y.476  
N580 X-.7055 Y.4628  
N590 X-.7156 Y.4547  
N600 X-.7267 Y.4494  
N610 X-.7379 Y.4478  
N620 X-.7476 Y.4497  
N630 X-.7562 Y.4535  
N640 Z.138 F6.4  
N650 G0 Z.145  
N660 X-.7089 Y.6295  
N670 G1 Z.118  
N680 X-.6226 Y.5432 F40.  
N690 Z.138 F6.4  
N700 G0 Z.145  
N710 X-.7414 Y.5971  
N720 G1 Z.118  
N730 X-.6769 Y.6615 F40.  
N740 Z.138 F6.4  
N750 G0 Z.145  
N760 X-.6145 Y.6384  
N770 G1 Z.118  
N780 X-.6278 Y.6573 F40.  
N790 X-.6283 Y.6585  
N800 X-.6335 Y.6804  
N810 Y.6809  
N820 X-.6309 Y.7007  
N830 X-.6303 Y.7028  
N840 X-.6204 Y.7196  
N850 X-.6182 Y.7219  
N860 X-.6018 Y.7327  
N870 X-.5996 Y.7335  
N880 X-.5799 Y.7368  
N890 X-.5776  
N900 X-.5566 Y.7322  
N910 X-.5552 Y.7316  
N920 X-.5363 Y.7189  
N930 X-.5352 Y.7178  
N940 X-.522 Y.699  
N950 X-.5216 Y.698  
N960 X-.5164 Y.6757  
N970 Y.6756  
N980 X-.5194 Y.6543

N990 X-.5197 Y.6536  
N1000 X-.5301 Y.6365  
N1010 X-.5315 Y.6351  
N1020 X-.5463 Y.6246  
N1030 X-.5504 Y.6229  
N1040 X-.571 Y.6196  
N1050 X-.5723 Y.6197  
N1060 X-.5945 Y.6248  
N1070 X-.5947 Y.6249  
N1080 X-.6131 Y.637  
N1090 X-.6145 Y.6384  
N1100 Z.138 F6.4  
N1110 G0 Z.145  
N1120 X-.4716 Y.6942  
N1130 G1 Z.118  
N1140 X-.5592 Y.7817 F40.  
N1150 X-.41 Y.7558  
N1160 X-.4976 Y.8433  
N1170 Z.138 F6.4  
N1180 G0 Z.145  
N1190 X-.8266 Y.2088  
N1200 G1 Z.118  
N1210 X-.8571 Y.1916 F40.  
N1220 X-.8727 Y.1876  
N1230 X-.8781 Y.1877  
N1240 X-.8859 Y.1902  
N1250 X-.8925 Y.195  
N1260 X-.8979 Y.205  
N1270 X-.898 Y.2176  
N1280 X-.8932 Y.2308  
N1290 X-.8836 Y.2434  
N1300 X-.8733 Y.2518  
N1310 X-.8618 Y.2569  
N1320 X-.8499 Y.2579  
N1330 X-.8387 Y.2547  
N1340 Z.138 F6.4  
N1350 G0 Z.145  
N1360 X-.7901 Y.2076  
N1370 G1 Z.118  
N1380 X-.8019 Y.2137 F40.  
N1390 X-.8054 Y.2142  
N1400 X-.8154 Y.2132

N1410 X-.8266 Y.2088  
N1420 X-.8571 Y.1916  
N1430 X-.8727 Y.1876  
N1440 X-.8781 Y.1877  
N1450 X-.8859 Y.1902  
N1460 X-.8925 Y.195  
N1470 X-.8979 Y.205  
N1480 X-.898 Y.2176  
N1490 X-.8932 Y.2308  
N1500 X-.8836 Y.2434  
N1510 X-.8733 Y.2518  
N1520 X-.8618 Y.2569  
N1530 X-.8499 Y.2579  
N1540 X-.8387 Y.2547  
N1550 Z.138 F6.4  
N1560 G0 Z.145  
N1570 X-.7982 Y.158  
N1580 G1 Z.118  
N1590 X-.7882 Y.1712 F40.  
N1600 X-.7838 Y.1848  
N1610 X-.7846 Y.1977  
N1620 X-.7901 Y.2076  
N1630 X-.8019 Y.2137  
N1640 X-.8054 Y.2142  
N1650 X-.8154 Y.2132  
N1660 X-.8266 Y.2088  
N1670 X-.8571 Y.1916  
N1680 X-.8727 Y.1876  
N1690 X-.8781 Y.1877  
N1700 X-.8859 Y.1902  
N1710 X-.8925 Y.195  
N1720 X-.8979 Y.205  
N1730 X-.898 Y.2176  
N1740 X-.8932 Y.2308  
N1750 X-.8836 Y.2434  
N1760 X-.8733 Y.2518  
N1770 X-.8618 Y.2569  
N1780 X-.8499 Y.2579  
N1790 X-.8387 Y.2547  
N1800 Z.138 F6.4  
N1810 G0 Z.145  
N1820 X-.8489 Y.1487

N1830 G1 Z.118  
N1840 X-.8403 Y.1449 F40.  
N1850 X-.8306 Y.1429  
N1860 X-.8194 Y.1446  
N1870 X-.8082 Y.1499  
N1880 X-.7982 Y.158  
N1890 X-.7882 Y.1712  
N1900 X-.7838 Y.1848  
N1910 X-.7846 Y.1977  
N1920 X-.7901 Y.2076  
N1930 X-.8019 Y.2137  
N1940 X-.8054 Y.2142  
N1950 X-.8154 Y.2132  
N1960 X-.8266 Y.2088  
N1970 X-.8571 Y.1916  
N1980 X-.8727 Y.1876  
N1990 X-.8781 Y.1877  
N2000 X-.8859 Y.1902  
N2010 X-.8925 Y.195  
N2020 X-.8979 Y.205  
N2030 X-.898 Y.2176  
N2040 X-.8932 Y.2308  
N2050 X-.8836 Y.2434  
N2060 X-.8733 Y.2518  
N2070 X-.8618 Y.2569  
N2080 X-.8499 Y.2579  
N2090 X-.8387 Y.2547  
N2100 Z.138 F6.4  
N2110 G0 Z.145  
N2120 X-.7479 Y.2059  
N2130 G1 Z.118  
N2140 X-.8354 Y.2934 F40.  
N2150 Z.138 F6.4  
N2160 G0 Z.145  
N2170 X-.7293 Y.3156  
N2180 G1 Z.118  
N2190 X-.7935 Y.2515 F40.  
N2200 Z.138 F6.4  
N2210 G0 Z.145  
N2220 X-.6837 Y.27  
N2230 G1 Z.118  
N2240 X-.7713 Y.3575 F40.

N2250 Z.138 F6.4  
N2260 G0 Z.145  
N2270 X-.6638 Y.2899  
N2280 G1 Z.118  
N2290 X-.716 Y.4128 F40.  
N2300 X-.5931 Y.3606  
N2310 Z.138 F6.4  
N2320 G0 Z.145  
N2330 X-.6811 Y.3317  
N2340 G1 Z.118  
N2350 X-.6349 Y.3779 F40.  
N2360 Z.138 F6.4  
N2370 G0 Z.145  
N2380 X-.6606 Y.4682  
N2390 G1 Z.118  
N2400 X-.5731 Y.3806 F40.  
N2410 Z.138 F6.4  
N2420 G0 Z.145  
N2430 X-.6027 Y.5261  
N2440 G1 Z.118  
N2450 X-.6026 Y.4102 F40.  
N2460 Z.138 F6.4  
N2470 G0 Z.145  
N2480 X-.6027 Y.4575  
N2490 G1 Z.118  
N2500 X-.5123 Y.4414 F40.  
N2510 Z.138 F6.4  
N2520 G0 Z.145  
N2530 X-.4381 Y.5181  
N2540 G1 Z.118  
N2550 X-.494 Y.4622 F40.  
N2560 X-.579 Y.5473  
N2570 X-.5232 Y.6031  
N2580 Z.138 F6.4  
N2590 G0 Z.145  
N2600 X-.5384 Y.5066  
N2610 G1 Z.118  
N2620 X-.4857 Y.5592 F40.  
N2630 Z.138 F6.4  
N2640 G0 Z.145  
N2650 X-.4391 Y.5585  
N2660 G1 Z.118

N2670 X-.4305 Y.5547 F40.  
N2680 X-.4209 Y.5527  
N2690 X-.4096 Y.5544  
N2700 X-.3985 Y.5596  
N2710 X-.3884 Y.5678  
N2720 X-.3784 Y.5809  
N2730 X-.374 Y.5946  
N2740 X-.3748 Y.6074  
N2750 X-.3803 Y.6174  
N2760 X-.3921 Y.6235  
N2770 X-.3956 Y.624  
N2780 X-.4056 Y.6229  
N2790 X-.4169 Y.6185  
N2800 X-.4473 Y.6013  
N2810 X-.4629 Y.5973  
N2820 X-.4684 Y.5975  
N2830 X-.4762 Y.6  
N2840 X-.4828 Y.6048  
N2850 X-.4881 Y.6148  
N2860 X-.4882 Y.6274  
N2870 X-.4834 Y.6406  
N2880 X-.4738 Y.6532  
N2890 X-.4635 Y.6616  
N2900 X-.4521 Y.6667  
N2910 X-.4401 Y.6677  
N2920 X-.4289 Y.6645  
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N2940 G0 Z.145  
N2950 X-.3382 Y.6155  
N2960 G1 Z.118  
N2970 X-.4245 Y.7018 F40.  
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N2990 X-.38 Y.7433  
N3000 X-.3669 Y.7475  
N3010 X-.3533 Y.7465  
N3020 X-.3413 Y.7394  
N3030 X-.3342 Y.7274  
N3040 X-.3332 Y.7139  
N3050 X-.3374 Y.7007  
N3060 X-.3452 Y.6899  
N3070 X-.3789 Y.6562  
N3080 Z.138 F6.4

N3090 G0 Z.145  
N3100 X-.2031 Y.7531  
N3110 G1 Z.118  
N3120 X-.259 Y.6972 F40.  
N3130 X-.344 Y.7823  
N3140 X-.2882 Y.8381  
N3150 Z.138 F6.4  
N3160 G0 Z.145  
N3170 X-.2507 Y.7942  
N3180 G1 Z.118  
N3190 X-.3033 Y.7416 F40.  
N3200 Z.138 F6.4  
N3210 G0 Z.145  
N3220 X-.1825 Y.7713  
N3230 G1 Z.118  
N3240 X-.2346 Y.8942 F40.  
N3250 X-.1117 Y.842  
N3260 Z.138 F6.4  
N3270 G0 Z.145  
N3280 X-.1997 Y.8131  
N3290 G1 Z.118  
N3300 X-.1535 Y.8593 F40.  
N3310 Z.138 F6.4  
N3320 G0 Z.145  
N3330 X-.0917 Y.862  
N3340 G1 Z.118  
N3350 X-.1779 Y.9482 F40.  
N3360 X-.1389 Y.9873  
N3370 X-.128 Y.9946  
N3380 X-.1157 Y.9978  
N3390 X-.1032 Y.996  
N3400 X-.0918 Y.9887  
N3410 X-.0845 Y.9773  
N3420 X-.0825 Y.9647  
N3430 X-.0857 Y.9523  
N3440 X-.0933 Y.9417  
N3450 X-.1323 Y.9026  
N3460 Z.138 F6.4  
N3470 G0 Z.145  
N3480 X-.0983 Y.9366  
N3490 G1 Z.118  
N3500 X-.0835 Y.9407 F40.



N3510 X-.0682 Y.9397  
N3520 X-.0237 Y.93  
N3530 Z.138 F6.4  
N3540 G0 Z.145  
N3550 M5  
N3560 G91 G28 Z0.  
N3570 M01  
N3580 T3 M6  
N3590 G187 P3 E.001  
N3600 G0 G90 G54 X-1.125 Y1.125 S5000 M3  
N3610 G43 H3 Z.25  
N3620 M8  
N3630 Z.15  
N3640 G99 G81 Z-.01 R.15 F40.  
N3650 X1.125  
N3660 Y-1.125  
N3670 X-1.125  
N3680 G80  
N3690 Z.25  
N3700 M5  
N3710 G91 G28 Z0. M9  
N3720 M01  
N3730 T5 M6  
N3740 G187 P3 E.001  
N3750 G0 G90 G54 X-1.125 Y1.125 S5000 M3  
N3760 G43 H5 Z.25  
N3770 Z.15  
N3780 G99 G83 Z-.155 R.15 Q.075 F20.  
N3790 X1.125  
N3800 Y-1.125  
N3810 X-1.125  
N3820 G80  
N3830 Z.25  
N3840 M5  
N3850 G91 G28 Z0.  
N3860 M01  
N3870 T4 M6  
N3880 G187 P3 E.001  
N3890 G0 G90 G54 X-2.625 Y-.5 S5000 M3  
N3900 G43 H4 Z.25  
N3910 M8  
N3920 Z.2

N3930 G1 Z0. F6.4  
N3940 X-2.125 F40.  
N3950 G3 X-1.625 Y0. I0. J.5  
N3960 G2 X-1.5968 Y.3014 I1.625 J0.  
N3970 G1 X-1.6144 Y.3111  
N3980 G2 X-1.875 Y.75 I.2394 J.4389  
N3990 G1 Y1.125  
N4000 G2 X-1.125 Y1.875 I.75 J0.  
N4010 G1 X-.75  
N4020 G2 X-.3111 Y1.6144 I0. J-.5  
N4030 G1 X-.3014 Y1.5968  
N4040 G2 X0. Y1.625 I.3014 J-1.5968  
N4050 X.3014 Y1.5968 I0. J-1.625  
N4060 G1 X.3111 Y1.6144  
N4070 G2 X.75 Y1.875 I.4389 J-.2394  
N4080 G1 X1.125  
N4090 G2 X1.875 Y1.125 I0. J-.75  
N4100 G1 Y.75  
N4110 G2 X1.6144 Y.3111 I-.5 J0.  
N4120 G1 X1.5968 Y.3014  
N4130 G2 X1.625 Y0. I-1.5968 J-.3014  
N4140 X1.5968 Y-.3014 I-1.625 J0.  
N4150 G1 X1.6144 Y-.3111  
N4160 G2 X1.875 Y-.75 I-.2394 J-.4389  
N4170 G1 Y-1.125  
N4180 G2 X1.125 Y-1.875 I-.75 J0.  
N4190 G1 X.75  
N4200 G2 X.3111 Y-1.6144 I0. J.5  
N4210 G1 X.3014 Y-1.5968  
N4220 G2 X0. Y-1.625 I-.3014 J1.5968  
N4230 X-.3014 Y-1.5968 I0. J1.625  
N4240 G1 X-.3111 Y-1.6144  
N4250 G2 X-.75 Y-1.875 I-.4389 J.2394  
N4260 G1 X-1.125  
N4270 G2 X-1.875 Y-1.125 I0. J.75  
N4280 G1 Y-.75  
N4290 G2 X-1.6144 Y-.3111 I.5 J0.  
N4300 G1 X-1.5968 Y-.3014  
N4310 G2 X-1.625 Y0. I1.5968 J.3014  
N4320 G3 X-2.125 Y.5 I-.5 J0.  
N4330 G1 X-2.625  
N4340 Z.2 F6.4

N4350 G0 Z.25  
N4360 X-2.375 Y-.5  
N4370 Z.2  
N4380 G1 Z0.  
N4390 X-1.875 F40.  
N4400 G3 X-1.375 Y0. I0. J.5  
N4410 G2 X-1.3067 Y.428 I1.375 J0.  
N4420 G1 X-1.4947 Y.5305  
N4430 G2 X-1.625 Y.75 I.1197 J.2195  
N4440 G1 Y1.125  
N4450 G2 X-1.125 Y1.625 I.5 J0.  
N4460 G1 X-.75  
N4470 G2 X-.5305 Y1.4947 I0. J-.25  
N4480 G1 X-.428 Y1.3067  
N4490 G2 X0. Y1.375 I.428 J-1.3067  
N4500 X.428 Y1.3067 I0. J-1.375  
N4510 G1 X.5305 Y1.4947  
N4520 G2 X.75 Y1.625 I.2195 J-.1197  
N4530 G1 X1.125  
N4540 G2 X1.625 Y1.125 I0. J-.5  
N4550 G1 Y.75  
N4560 G2 X1.4947 Y.5305 I-.25 J0.  
N4570 G1 X1.3067 Y.428  
N4580 G2 X1.375 Y0. I-1.3067 J-.428  
N4590 X1.3067 Y-.428 I-1.375 J0.  
N4600 G1 X1.4947 Y-.5305  
N4610 G2 X1.625 Y-.75 I-.1197 J-.2195  
N4620 G1 Y-1.125  
N4630 G2 X1.125 Y-1.625 I-.5 J0.  
N4640 G1 X.75  
N4650 G2 X.5305 Y-1.4947 I0. J.25  
N4660 G1 X.428 Y-1.3067  
N4670 G2 X0. Y-1.375 I-.428 J1.3067  
N4680 X-.428 Y-1.3067 I0. J1.375  
N4690 G1 X-.5305 Y-1.4947  
N4700 G2 X-.75 Y-1.625 I-.2195 J.1197  
N4710 G1 X-1.125  
N4720 G2 X-1.625 Y-1.125 I0. J.5  
N4730 G1 Y-.75  
N4740 G2 X-1.4947 Y-.5305 I.25 J0.  
N4750 G1 X-1.3067 Y-.428  
N4760 G2 X-1.375 Y0. I1.3067 J.428

N4770 G3 X-1.875 Y.5 I-.5 J0.  
N4780 G1 X-2.375  
N4790 Z.2 F6.4  
N4800 G0 Z.25  
N4810 M9  
N4820 G187 P3 E.001  
N4830 X-.1089 Y-.0543  
N4840 Z.2  
N4850 G3 X.037 Y-.0761 I.1459 J.4783 F40.  
N4860 X.0739 Y-.0747 I0. J.5001  
N4870 G1 X.0976 Y-.0727 Z.1988  
N4880 X.1213 Y-.07 Z.1975  
N4890 X.1047 Y-.033 Z.1954  
N4900 X.0866 Y.0032 Z.1932  
N4910 X.067 Y.0387 Z.1911  
N4920 X.046 Y.0734 Z.189  
N4930 X.0237 Y.1071 Z.1869  
N4940 X0. Y.14 Z.1848  
N4950 X-.0283 Y.1005 Z.1822  
N4960 X-.0546 Y.0596 Z.1797  
N4970 X-.0789 Y.0175 Z.1771  
N4980 X-.1011 Y-.0258 Z.1746  
N4990 X-.1213 Y-.07 Z.172  
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N5010 X-.0405 Y-.0766 Z.1677  
N5020 X0. Y-.0774 Z.1656  
N5030 X.0405 Y-.0766 Z.1635  
N5040 X.081 Y-.0741 Z.1614  
N5050 X.1213 Y-.07 Z.1593  
N5060 X.1047 Y-.033 Z.1572  
N5070 X.0866 Y.0032 Z.155  
N5080 X.067 Y.0387 Z.1529  
N5090 X.046 Y.0734 Z.1508  
N5100 X.0237 Y.1071 Z.1486  
N5110 X0. Y.14 Z.1465  
N5120 X-.0283 Y.1005 Z.144  
N5130 X-.0546 Y.0596 Z.1414  
N5140 X-.0789 Y.0175 Z.1389  
N5150 X-.1011 Y-.0258 Z.1363  
N5160 X-.1213 Y-.07 Z.1338  
N5170 X-.081 Y-.0741 Z.1317  
N5180 X-.0405 Y-.0766 Z.1295

N5190 X0. Y-.0774 Z.1274  
N5200 X.0405 Y-.0766 Z.1253  
N5210 X.081 Y-.0741 Z.1232  
N5220 X.1213 Y-.07 Z.1211  
N5230 X.1047 Y-.033 Z.119  
N5240 X.0866 Y.0032 Z.1168  
N5250 X.067 Y.0387 Z.1147  
N5260 X.046 Y.0734 Z.1126  
N5270 X.0237 Y.1071 Z.1104  
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N5290 X-.0283 Y.1005 Z.1058  
N5300 X-.0546 Y.0596 Z.1032  
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N5320 X-.1011 Y-.0258 Z.0981  
N5330 X-.1213 Y-.07 Z.0956  
N5340 X-.081 Y-.0741 Z.0935  
N5350 X-.0405 Y-.0766 Z.0913  
N5360 X0. Y-.0774 Z.0892  
N5370 X.0405 Y-.0766 Z.0871  
N5380 X.081 Y-.0741 Z.0849  
N5390 X.1213 Y-.07 Z.0828  
N5400 X.1047 Y-.033 Z.0807  
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N5420 X.067 Y.0387 Z.0765  
N5430 X.046 Y.0734 Z.0744  
N5440 X.0237 Y.1071 Z.0722  
N5450 X0. Y.14 Z.0701  
N5460 X-.0283 Y.1005 Z.0675  
N5470 X-.0546 Y.0596 Z.065  
N5480 X-.0789 Y.0175 Z.0624  
N5490 X-.1011 Y-.0258 Z.0599  
N5500 X-.1213 Y-.07 Z.0573  
N5510 X-.081 Y-.0741 Z.0552  
N5520 X-.0405 Y-.0766 Z.053  
N5530 X0. Y-.0774 Z.0509  
N5540 X.0405 Y-.0766 Z.0488  
N5550 X.081 Y-.0741 Z.0467  
N5560 X.1213 Y-.07 Z.0446  
N5570 X.1047 Y-.033 Z.0425  
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N5600 X.046 Y.0734 Z.0361

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N5620 X0. Y.14 Z.0319  
N5630 X-.0283 Y.1005 Z.0293  
N5640 X-.0546 Y.0596 Z.0268  
N5650 X-.0789 Y.0175 Z.0242  
N5660 X-.1011 Y-.0258 Z.0217  
N5670 X-.1213 Y-.07 Z.0191  
N5680 X-.081 Y-.0741 Z.017  
N5690 X-.0405 Y-.0766 Z.0148  
N5700 X0. Y-.0774 Z.0127  
N5710 X.0405 Y-.0766 Z.0106  
N5720 X.081 Y-.0741 Z.0085  
N5730 X.1213 Y-.07 Z.0064  
N5740 X.1047 Y-.033 Z.0043  
N5750 X.0866 Y.0032 Z.0021  
N5760 X.067 Y.0387 Z0.  
N5770 G3 X0. Y.14 I-.866 J-.5  
N5780 X-.1213 Y-.07 I.799 J-.6013  
N5790 X0. Y-.0774 I.1213 J.9926  
N5800 X.1213 Y-.07 I0. J1.  
N5810 X.067 Y.0387 I-.9203 J-.3913  
N5820 G1 X.046 Y.0734 Z.0021  
N5830 X.0237 Y.1071 Z.0043  
N5840 X0. Y.14 Z.0064  
N5850 X-.0283 Y.1005 Z.0089  
N5860 X-.0546 Y.0596 Z.0115  
N5870 X-.0789 Y.0175 Z.014  
N5880 X-.1011 Y-.0258 Z.0166  
N5890 X-.1213 Y-.07 Z.0191  
N5900 X-.081 Y-.0741 Z.0212  
N5910 X-.0405 Y-.0766 Z.0234  
N5920 X0. Y-.0774 Z.0255  
N5930 X.0405 Y-.0766 Z.0276  
N5940 X.081 Y-.0741 Z.0298  
N5950 X.1213 Y-.07 Z.0319  
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N6040 X-.0789 Y.0175 Z.0522  
N6050 X-.1011 Y-.0258 Z.0548  
N6060 X-.1213 Y-.07 Z.0573  
N6070 X-.081 Y-.0741 Z.0594  
N6080 X-.0405 Y-.0766 Z.0616  
N6090 X0. Y-.0774 Z.0637  
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N6110 X.081 Y-.0741 Z.068  
N6120 X.1213 Y-.07 Z.0701  
N6130 X.1047 Y-.033 Z.0722  
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N6150 X.067 Y.0387 Z.0765  
N6160 X.046 Y.0734 Z.0786  
N6170 X.0237 Y.1071 Z.0807  
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N6220 X-.1011 Y-.0258 Z.093  
N6230 X-.1213 Y-.07 Z.0956  
N6240 X-.081 Y-.0741 Z.0977  
N6250 X-.0405 Y-.0766 Z.0999  
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N6280 X.081 Y-.0741 Z.1062  
N6290 X.1213 Y-.07 Z.1083  
N6300 X.1047 Y-.033 Z.1104  
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N6320 X.067 Y.0387 Z.1147  
N6330 X.046 Y.0734 Z.1168  
N6340 X.0237 Y.1071 Z.119  
N6350 X0. Y.14 Z.1211  
N6360 X-.0283 Y.1005 Z.1236  
N6370 X-.0546 Y.0596 Z.1262  
N6380 X-.0789 Y.0175 Z.1287  
N6390 X-.1011 Y-.0258 Z.1313  
N6400 X-.1213 Y-.07 Z.1338  
N6410 X-.081 Y-.0741 Z.1359  
N6420 X-.0405 Y-.0766 Z.1381  
N6430 X0. Y-.0774 Z.1402  
N6440 X.0405 Y-.0766 Z.1423

N6450 X.081 Y-.0741 Z.1444  
N6460 X.1213 Y-.07 Z.1465  
N6470 X.1047 Y-.033 Z.1486  
N6480 X.0866 Y.0032 Z.1508  
N6490 X.067 Y.0387 Z.1529  
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N6540 X-.0546 Y.0596 Z.1644  
N6550 X-.0789 Y.0175 Z.1669  
N6560 X-.1011 Y-.0258 Z.1695  
N6570 X-.1213 Y-.07 Z.172  
N6580 X-.081 Y-.0741 Z.1741  
N6590 X-.0405 Y-.0766 Z.1763  
N6600 X0. Y-.0774 Z.1784  
N6610 X.0405 Y-.0766 Z.1805  
N6620 X.081 Y-.0741 Z.1827  
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N6680 X.0237 Y.1071 Z.1954  
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N6700 X-.0141 Y.1209 Z.1988  
N6710 X-.0277 Y.1014 Z.2  
N6720 G3 X-.1015 Y-.0672 I.4134 J-.2814  
N6730 G0 Z.25  
N6740 X-.4255 Y-.2362  
N6750 Z.2  
N6760 G3 X-.2765 Y-.2964 I.2596 J.4274  
N6770 G1 X-.2219 Y-.3075 Z.1971  
N6780 X-.1668 Y-.3162 Z.1942  
N6790 X-.1114 Y-.3224 Z.1912  
N6800 X-.0557 Y-.3261 Z.1883  
N6810 X0. Y-.3274 Z.1854  
N6820 X.0631 Y-.3258 Z.1821  
N6830 X.1261 Y-.321 Z.1788  
N6840 X.1888 Y-.313 Z.1755  
N6850 X.2509 Y-.3019 Z.1721  
N6860 X.3125 Y-.2877 Z.1688



N6870 X.3732 Y-.2703 Z.1655  
N6880 X.433 Y-.25 Z.1622  
N6890 X.4208 Y-.188 Z.1589  
N6900 X.4054 Y-.1268 Z.1556  
N6910 X.387 Y-.0664 Z.1523  
N6920 X.3655 Y-.007 Z.1489  
N6930 X.3411 Y.0513 Z.1456  
N6940 X.3137 Y.1082 Z.1423  
N6950 X.2835 Y.1637 Z.139  
N6960 X.2505 Y.2176 Z.1357  
N6970 X.2149 Y.2697 Z.1324  
N6980 X.1767 Y.32 Z.1291  
N6990 X.136 Y.3683 Z.1258  
N7000 X.0929 Y.4145 Z.1225  
N7010 X.0475 Y.4584 Z.1192  
N7020 X0. Y.5 Z.1159  
N7030 X-.0511 Y.4551 Z.1123  
N7040 X-.0997 Y.4075 Z.1088  
N7050 X-.1456 Y.3573 Z.1052  
N7060 X-.1888 Y.3048 Z.1016  
N7070 X-.229 Y.2499 Z.0981  
N7080 X-.2661 Y.1929 Z.0945  
N7090 X-.3001 Y.134 Z.0909  
N7100 X-.3309 Y.0733 Z.0873  
N7110 X-.3583 Y.0111 Z.0838  
N7120 X-.3823 Y-.0526 Z.0802  
N7130 X-.4028 Y-.1174 Z.0766  
N7140 X-.4197 Y-.1833 Z.0731  
N7150 X-.433 Y-.25 Z.0695  
N7160 X-.3732 Y-.2704 Z.0662  
N7170 X-.3125 Y-.2877 Z.0629  
N7180 X-.2509 Y-.3019 Z.0596  
N7190 X-.1888 Y-.3131 Z.0563  
N7200 X-.1261 Y-.321 Z.053  
N7210 X-.0631 Y-.3258 Z.0497  
N7220 X0. Y-.3274 Z.0464  
N7230 X.0631 Y-.3258 Z.0431  
N7240 X.1261 Y-.321 Z.0398  
N7250 X.1888 Y-.3131 Z.0365  
N7260 X.2509 Y-.3019 Z.0331  
N7270 X.3125 Y-.2877 Z.0298  
N7280 X.3732 Y-.2704 Z.0265

N7290 X.433 Y-.25 Z.0232  
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N7310 X.4054 Y-.1268 Z.0166  
N7320 X.387 Y-.0664 Z.0133  
N7330 X.3655 Y-.007 Z.0099  
N7340 X.3411 Y.0513 Z.0066  
N7350 X.3137 Y.1082 Z.0033  
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N7380 X-.433 Y-.25 I.799 J-.9613  
N7390 X0. Y-.3274 I.433 J1.1726  
N7400 X.433 Y-.25 I0. J1.25  
N7410 X.2835 Y.1637 I-1.232 J-.2113  
N7420 G1 X.2505 Y.2176 Z.0033  
N7430 X.2149 Y.2697 Z.0066  
N7440 X.1767 Y.32 Z.0099  
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N7460 X.0929 Y.4145 Z.0166  
N7470 X.0475 Y.4584 Z.0199  
N7480 X0. Y.5 Z.0232  
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N7510 X-.1456 Y.3573 Z.0339  
N7520 X-.1888 Y.3048 Z.0374  
N7530 X-.229 Y.2499 Z.041  
N7540 X-.2661 Y.1929 Z.0446  
N7550 X-.3001 Y.134 Z.0481  
N7560 X-.3309 Y.0733 Z.0517  
N7570 X-.3583 Y.0111 Z.0553  
N7580 X-.3823 Y-.0526 Z.0588  
N7590 X-.4028 Y-.1174 Z.0624  
N7600 X-.4197 Y-.1833 Z.0659  
N7610 X-.433 Y-.25 Z.0695  
N7620 X-.3732 Y-.2704 Z.0728  
N7630 X-.3125 Y-.2877 Z.0761  
N7640 X-.2509 Y-.3019 Z.0794  
N7650 X-.1888 Y-.3131 Z.0828  
N7660 X-.1261 Y-.321 Z.0861  
N7670 X-.0631 Y-.3258 Z.0894  
N7680 X0. Y-.3274 Z.0927  
N7690 X.0631 Y-.3258 Z.096  
N7700 X.1261 Y-.321 Z.0993

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N7720 X.2509 Y-.3019 Z.106  
N7730 X.3125 Y-.2877 Z.1093  
N7740 X.3732 Y-.2704 Z.1126  
N7750 X.433 Y-.25 Z.1159  
N7760 X.4208 Y-.188 Z.1192  
N7770 X.4054 Y-.1268 Z.1225  
N7780 X.387 Y-.0664 Z.1258  
N7790 X.3655 Y-.007 Z.1291  
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N7810 X.3137 Y.1082 Z.1357  
N7820 X.2835 Y.1637 Z.139  
N7830 X.2505 Y.2176 Z.1423  
N7840 X.2149 Y.2697 Z.1456  
N7850 X.1767 Y.32 Z.1489  
N7860 X.136 Y.3683 Z.1523  
N7870 X.0929 Y.4145 Z.1556  
N7880 X.0475 Y.4584 Z.1589  
N7890 X0. Y.5 Z.1622  
N7900 X-.0493 Y.4568 Z.1656  
N7910 X-.0962 Y.4111 Z.1691  
N7920 X-.1407 Y.363 Z.1725  
N7930 X-.1826 Y.3126 Z.1759  
N7940 X-.2218 Y.2601 Z.1794  
N7950 X-.2582 Y.2056 Z.1828  
N7960 X-.2917 Y.1493 Z.1863  
N7970 X-.3222 Y.0913 Z.1897  
N7980 X-.3497 Y.0317 Z.1931  
N7990 X-.3739 Y-.0291 Z.1966  
N8000 X-.395 Y-.0912 Z.2  
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N8020 X-.4173 Y-.2504 I.5 J0.  
N8030 G0 Z.25  
N8040 M5  
N8050 G91 G28 Z0.  
N8060 M01  
N8070 T3 M6  
N8080 G187 P3 E.001  
N8090 G0 G90 G54 X-2.16 Y-.5 S5000 M3  
N8100 G43 H3 Z.25  
N8110 Z.2  
N8120 G1 Z.075 F6.4

N8130 X-1.66 F40.  
N8140 G3 X-1.16 Y0. I0. J.5  
N8150 G2 X-1.1024 Y.3611 I1.16 J0.  
N8160 G3 X-1.0917 Y.428 I-.2043 J.0669  
N8170 X-1.2037 Y.6167 I-.215 J0.  
N8180 G1 X-1.3918 Y.7193  
N8190 G2 X-1.41 Y.75 I.0168 J.0307  
N8200 G1 Y1.125  
N8210 G2 X-1.125 Y1.41 I.285 J0.  
N8220 G1 X-.75  
N8230 G2 X-.7193 Y1.3918 I0. J-.035  
N8240 G1 X-.6167 Y1.2037  
N8250 G3 X-.428 Y1.0917 I.1887 J.103  
N8260 X-.3611 Y1.1024 I0. J.215  
N8270 G2 X0. Y1.16 I.3611 J-1.1024  
N8280 X.3611 Y1.1024 I0. J-1.16  
N8290 G3 X.428 Y1.0917 I.0669 J.2043  
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N8310 G1 X.7193 Y1.3918  
N8320 G2 X.75 Y1.41 I.0307 J-.0168  
N8330 G1 X1.125  
N8340 G2 X1.41 Y1.125 I0. J-.285  
N8350 G1 Y.75  
N8360 G2 X1.3918 Y.7193 I-.035 J0.  
N8370 G1 X1.2037 Y.6167  
N8380 G3 X1.0917 Y.428 I.103 J-.1887  
N8390 X1.1024 Y.3611 I.215 J0.  
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N8410 X1.1024 Y-.3611 I-1.16 J0.  
N8420 G3 X1.0917 Y-.428 I.2043 J-.0669  
N8430 X1.2037 Y-.6167 I.215 J0.  
N8440 G1 X1.3918 Y-.7193  
N8450 G2 X1.41 Y-.75 I-.0168 J-.0307  
N8460 G1 Y-1.125  
N8470 G2 X1.125 Y-1.41 I-.285 J0.  
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N8490 G2 X.7193 Y-1.3918 I0. J.035  
N8500 G1 X.6167 Y-1.2037  
N8510 G3 X.428 Y-1.0917 I-.1887 J-.103  
N8520 X.3611 Y-1.1024 I0. J-.215  
N8530 G2 X0. Y-1.16 I-.3611 J1.1024  
N8540 X-.3611 Y-1.1024 I0. J1.16

N8550 G3 X-.428 Y-1.0917 I-.0669 J-.2043  
N8560 X-.6167 Y-1.2037 I0. J-.215  
N8570 G1 X-.7193 Y-1.3918  
N8580 G2 X-.75 Y-1.41 I-.0307 J.0168  
N8590 G1 X-1.125  
N8600 G2 X-1.41 Y-1.125 I0. J.285  
N8610 G1 Y-.75  
N8620 G2 X-1.3918 Y-.7193 I.035 J0.  
N8630 G1 X-1.2037 Y-.6167  
N8640 G3 X-1.0917 Y-.428 I-.103 J.1887  
N8650 X-1.1024 Y-.3611 I-.215 J0.  
N8660 G2 X-1.16 Y0. I1.1024 J.3611  
N8670 G3 X-1.66 Y.5 I-.5 J0.  
N8680 G1 X-2.16  
N8690 Z.2 F6.4  
N8700 G0 Z.25  
N8710 S4966 M3  
N8720 G187 P3 E.001  
N8730 X.0723 Y-.5356  
N8740 Z.2  
N8750 G1 Z.075  
N8760 X.2867 Y-.4118 F39.7  
N8770 G3 X.5367 Y.0212 I-.25 J.433  
N8780 X.4697 Y.2712 I-.5 J0.  
N8790 X.1374 Y.6653 I-1.2687 J-.7325  
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N8810 X-.1374 Y.6653 I0. J-.2149  
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N8830 X-.648 Y-.25 I.2119 J-.0363  
N8840 X-.5075 Y-.4517 I.215 J0.  
N8850 X0. Y-.5424 I.5075 J1.3743  
N8860 X.5075 Y-.4517 I0. J1.465  
N8870 X.648 Y-.25 I-.0745 J.2017  
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N8910 X-.2133 Y.4542 I0. J-.5  
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N8930 Z.2 F6.4  
N8940 G0 Z.25  
N8950 S5000 M3  
N8960 G187 P3 E.001

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N8980 Z.2  
N8990 G1 Z-.05  
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N9010 G3 X-1.535 Y0. I0. J.5  
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N9030 G2 X-1.5 Y1.535 I.035 J0.  
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N9050 G2 X1.535 Y1.5 I0. J-.035  
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N9070 G2 X1.5 Y-1.535 I-.035 J0.  
N9080 G1 X-1.5  
N9090 G2 X-1.535 Y-1.5 I0. J.035  
N9100 G1 Y0.  
N9110 G3 X-2.035 Y.5 I-.5 J0.  
N9120 G1 X-2.535  
N9130 Z.2 F6.4  
N9140 G0 Z.25  
N9150 M5  
N9160 G91 G28 Z0.  
N9170 M01  
N9180 T4 M6  
N9190 G187 P3 E.001  
N9200 G0 G90 G54 X-2.75 Y-.5 S5000 M3  
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N9220 Z.2  
N9230 G1 Z-.14 F6.4  
N9240 X-2.25 F40.  
N9250 G3 X-1.75 Y0. I0. J.5  
N9260 G1 Y1.5  
N9270 G2 X-1.5 Y1.75 I.25 J0.  
N9280 G1 X1.5  
N9290 G2 X1.75 Y1.5 I0. J-.25  
N9300 G1 Y-1.5  
N9310 G2 X1.5 Y-1.75 I-.25 J0.  
N9320 G1 X-1.5  
N9330 G2 X-1.75 Y-1.5 I0. J.25  
N9340 G1 Y0.  
N9350 G3 X-2.25 Y.5 I-.5 J0.  
N9360 G1 X-2.75  
N9370 Z.2 F6.4  
N9380 G0 Z.25

N9390 M5

N9400 G91 G28 Z0.

N9410 G28 X0. Y0.

N9420 M30

%