Technological Institute of Higher Studies of Monterrey

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Manufacturing Processes Laboratory

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05/13/2019

Summary

What is sought in this project is to make a functional press using the machines that were seen in class in order to demonstrate and apply the knowledge acquired in class. In creating this Press the following machines will be used to reach all the specifications of the parts, It will use milling cutter, lathe, welding machine, CNC machine, just like programs like MasterCam, Solidworks and NX 12. All parts, as well as in final assembly must have a tolerance not greater than 0.3mm.

Introduction

As a project within the career of Electrical Mechanical Engineering, students are expected to have Complete knowledge of the machines for the manufacture of parts as well as their operation. I know seeks that students are able to manufacture any type of object or part that is required using the machines seen in the workshop as well as being able to make these parts in the software that they were also taught throughout the semester.

How this is a subject which is within the last semesters of the degree, some of the Students already know how to work or have seen these machines work. It is important not only to know how to use them, but how they work and what are the important questions to take into account in each of the machines, as well as the revolutions of each one, the cutting speed, the bit size, among others things. These considerations have to be taken because what an engineer is looking for is to decrease the working times and make the resources at hand more efficient.

The goals to be met in this project are mentioned in this report, a description of each of the processes for the manufacture of each of the pieces that make up the press, images of the manufacture of the pieces, lists of materials that were used throughout the semester. Finally we will give our conclusions about the project, the creation of the press as well as some comments as a group. Here we will talk about meeting delivery dates, quality of pieces and the activities that were carried out throughout the semester, will seek to capture lessons learned in the development of this project as well as a product and its development.

Definition of the problem

What is sought with this project is the creation of a press which works correctly and is developed entirely with parts made in the mechanical laboratory, applying the knowledge acquired throughout the semester as well as experience gained in other semesters.

This product is developed with different materials which were machined with different machines. Steel, aluminum and brass were used to make the press. The aluminum parts were worked on the CNC machines, while the steel parts were worked on the milling machine, lathe and welding was also used. It is a product that measures an approximate length of 217 mm and 120 mm breadthways. The press has around 11 pieces without counting the pieces that are repeated in the press.

This product is a device that is used to compact or hold other objects while keeping them in their place. In this way you can work with the clamped piece without it moving and having more precision. This mechanical press has a flywheel which is given by means of a lever a force and pressure on the grip to hold the desired piece in place.

The press will feature the following pieces:

- Screw cap
- Push cap
- Stop caps
- Slider
- Jaw
- Brackets

- Sleeve
- Retention ring
- Base
- Plates

Parts Description

Base

For the manufacture of the base, a counter mold of the measurements specified in the plans was built. for foundry which was exceeded in all measures to later rectify, this counter mold was designed in NX11 and then exported in .DXF; this piece was laser cut in MDF 3mm which resulted in 7 different layers which were then bonded with white resistol; in the end it They put two screws at the bottom of the base to be able to remove it from the mold easily, the counter mold is shown in figure 1.

Then we proceeded to make the mold with sand by inserting the counter mold in the sand and kneading so that the sand will be completely compressed and thus avoid porosities in the piece final. Once the mold is ready, it was introduced into the foundry oven to dry it of any humidity that may have and avoid bubbling when pouring the molten aluminum after 12 hours the mold is removed from the oven and allowed to cool, then the oven was heated to a temperature of 1100 ° C, the 660 ° C aluminum melting point, this large temperature difference is used to have time to take out the crucible with the molten aluminum and be able to pour it into the mold without solidifying it, to This cast iron was used approximately 1kg of aluminum in pieces as shown in the figure 2 .; for which 2 crucibles were necessary which were poured at the same time with the help of two team members. The casting was allowed to cool for 48 hours and then removed from the mold, They took the necessary measurements of the final piece which is shown in figure 3.

Figure 1. Against mold

Figure 2. Aluminum parts

Figure 3. Final casting

To finish the base, an 80x80x155 mm aluminum block was purchased, which is shown in the figure

4, this aluminum block was inserted into the CNC and 3 of the faces were rectified in order to obtain a 0 piece and get the desired

measurements. In order to generate the codes in mastercam, the part was drawn in solidworks and later each of the faces was

exported in the .DXF format. For the part of CNC developed 4 different codes, the first one that was made was the part where the

20mm hole, to make that hole a drill procedure was created in Mastercam and to remove excess material at 45 ° angles a contour

was created by removing 1mm of material on each pass. The second code that was machined was that of the holes in the face of the

30 ° angle, After this, the code of the holes was machined both for the left face and for the right. Finally the code that was machined

was the one that removed the entire central part of the block for this The 0.3 " crown was used and was performed first with a contour

and then with a pocket. These codes They are shown in Annex 1. The final machining is shown in Figure 5.

Figure 4. Aluminum block
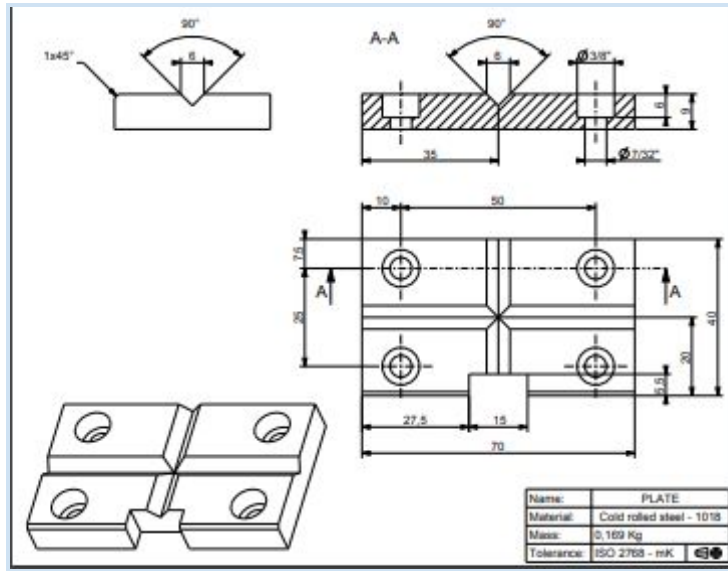

Figure 5. CNC machined end piece

Plate

Figure 6. Plate plane

Figure 7. Plate

To make this piece, plate, what was done was to take a 3 "steel bar, thus not we had to remove a lot of excess material. With the strawberry we use a ¼ "cutter of this way we gave it the square shape. To make the small square space what we did was put the piece vertically and for the same cutter until it gave the exact measurement.

Once these two parts were made, what was done was to give the angle to the head of the strawberry so that make the small channels, in this way by turning the piece the horizontal and vertical could be made.

As we finished this, a center bit was taken and marked at each of the locations for then pass the necessary bit. This piece was repeated twice.

$F = V \ / (N \ * \ n)$

$RR\ M = w * d * v$
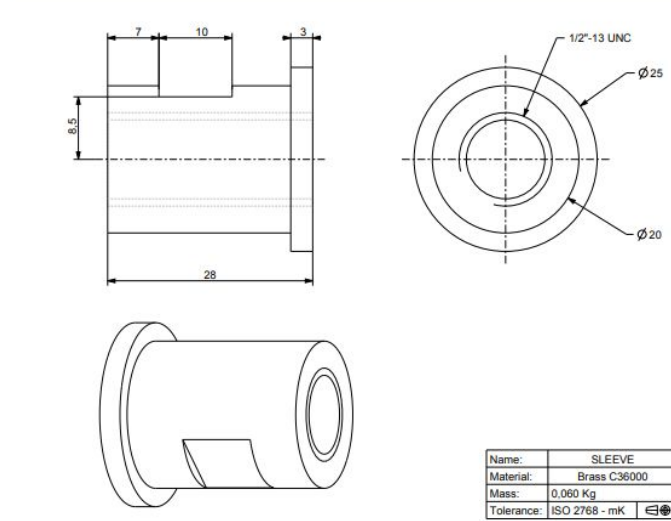
$t = (*w * d \quad) / MRR$

Sleeve

Figure 8. Sleeve Plan

Figure 9. Final sleeve

In order to make the sleeve, what was done was to get a 1 "brass bar. For this piece will be used once the lathe has been assembled, it had to be lowered 0.4mm in diameter to make it fit exact. Without moving the piece, the same process is done to further decrease the diameter as shown in the figure. Since the part with the diameters is listed, it is necessary to put the head to put the drill. She put a drill bit on her head and since it was well secured, she put the indicated distance slowly. Finally the cutter was assembled and the surplus brass material was cut. Once ready the piece just needs to make the small cut and this is done in the strawberry with a drill which allowed us make the difference.

$RR\ M = Potence\ /\ k$

$ol\ V = a * h$

$volume\ /\ MRR\ t = v$

Jaw

For the jaw the part was made in solidworks and 3 of its faces were exported in .DXF to be able to open it on mastercam. One of its faces does not require machining so no code was generated for this face. For the upper face with 2 holes and 45 ° angles, 2 contour processes were used, one

for the angles and another to be able to leave the slot where the holes go. For the holes a Peck cycle with 1 mm immersion after

lowering 2 mm with the center drill. Then stop the upper face was used a recto " straight cutter with a cut to the center and a contour

process was used, then the center drill was used to subsequently drill the measurement correspondent. In the end, the 4 holes in the

lower part of the piece were made first with a center and then with the corresponding bit. The final piece is shown in figure 10 and the

codes corresponding are shown in Annex 1.
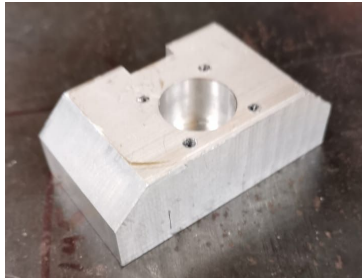
Figure 10. Jaw manufactured

Slider

The slider only required 2 codes, one to remove the excess material from the sides and another to make the holes. To remove the

excess material, a contour process was generated removing material from millimeter to millimeter and the ¾ " cutter was used. For

the holes a drill process called bore where a dwell of 4 seconds was defined, this to be able to leave the face with a good finish, in this

drill the 3/8 "cutter was used. To finish, the drill bit was used corresponding together with a peck process with a 1mm immersion. The

end result of the slider shown in figure 11 and the codes used are shown in annex 1.

Figure 11. Machined slider

Retention Ring
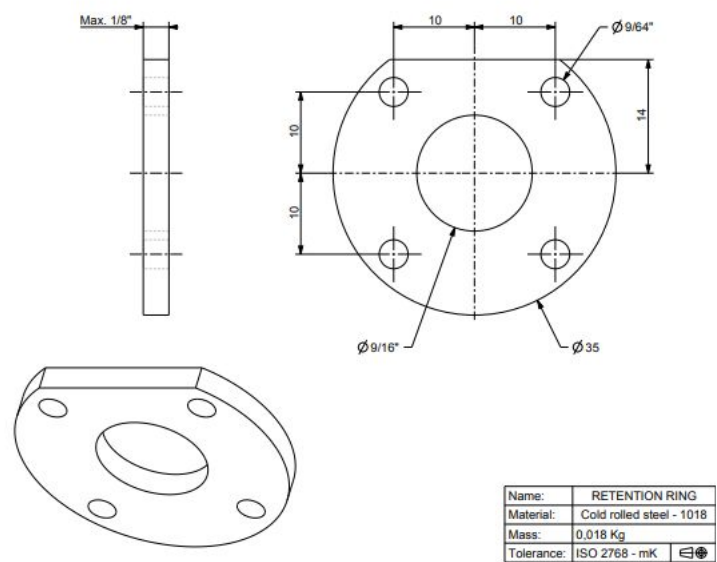
Figure 12. Retaining Ring Drawing

The Retention Ring was made with the lathe, for this a 1 "½ bar was used to reduce the diameter up to the desired 35mm. Once the diameter on the lathe was decreased to 650 RPM, He made a hole, measured the thickness of the piece and used the cut to have the final piece. Once cut what was made were the holes, first using a center drill so that it remains the auger instead. To finish, it was placed on the strawberry vertically to make the small notch.

$$N = (1000 * V c)/(pi * C)$$

$$RR * d \quad c M = V * f$$

Complete Screw
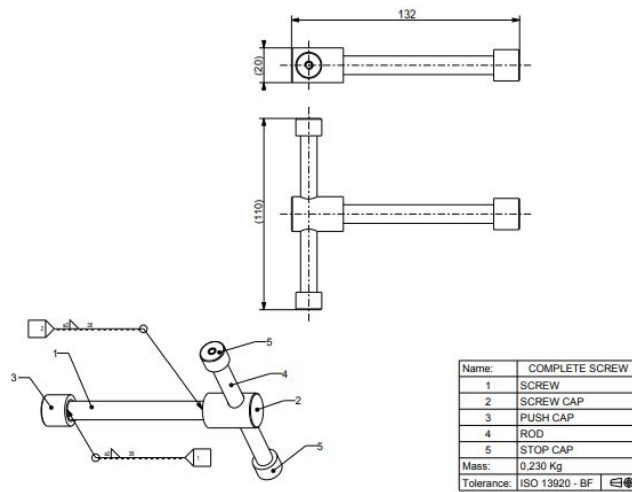
Figure 13. Plane of the complete screw

Name:	COMPLETE SCREW
1	SCREW
2	SCREW CAP
3	PUSH CAP
4	ROD
5	STOP CAP
Mass:	0,230 Kg
Tolerance:	ISO 13920 - BF

Figure 14. Screw finished

The lathe was used to make these pieces, the same steel bar was used for all of them. A bar was used ½ "which would be cut to different lengths to make these pieces. Once it was placed in the lathe was put 650RPM to be able to work with the piece. Since they were only bars, the method was used automatic on the lathe to facilitate the process and have a better finish. For the Push Cap what I know did was the same procedure, correctly measuring the necessary distance and once it was is the correct size that piece is taken and placed on the lathe with a drill bit as shown in the next picture.

Figure 15. Push cap machining

Bracket
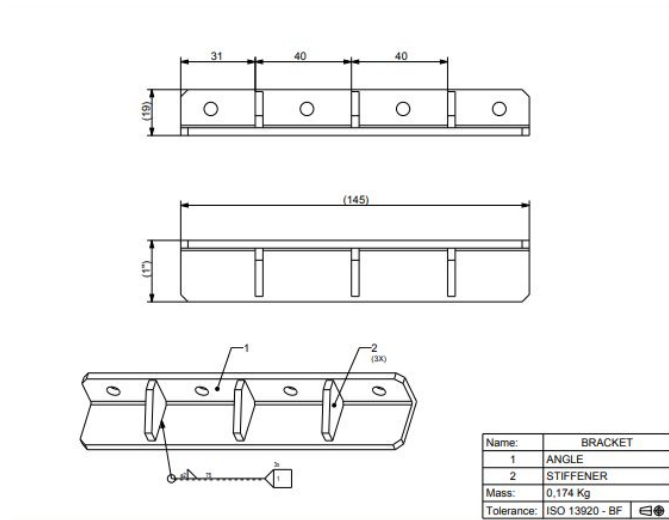
Figure 16. Bracket plan
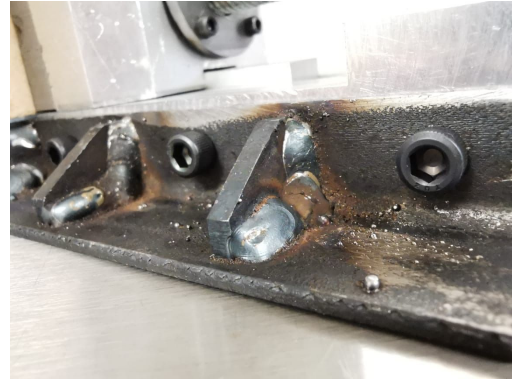
Figure 17. Brackets

To make the brackets, a 1 "L" piece was taken. In this way the holes have to be made with a bur with a 7/32 " bit. To make the triangles, a one-inch hearth was taken and used a hand grinding wheel to reach the desired measurements once the 20X12 measurement was only available the distance of 5 was marked and the angle was made.

CNC parameters

Herramienta	Pieza	Cara	RPM	Feed
Corona 3"	Base	Superior	2010	100
Broca centro	Base	Superior	3500	100
	Base	Lateral		
	Jaw	Superior		
	Jaw	Lateral		
Cortador 3/4"	Base	Lateral	2500	100
	Slider	Laterales		
	Jaw	Lateral		
Broca	Base	Superior	3500	90
	Base	Lateral		
	Jaw	Lateral		
	Jaw	Lateral		
	Slider	Inferior		
Cortador 3/8"	Base	Inferior	2800	200
	Slider	Inferior		

Table 1. Revolutions and feed used by tool

Quality

In order to keep our quality in the pieces constant, what was done was to use the metrology found in the mechanical laboratory. In this way we are sure that It is completely level and we can make sure that the measures we will take will be correct. In the same way we can see if some of our pieces were uneven and if necessary make possible corrections. In order to maintain a good quality in all our pieces they did not pass with a tolerance greater than 0.3mm, in this way we can ensure that the pieces could assemble correctly without difficulties. In order to make the measurements and make sure that the piece is within the correct measurements, what was done was to use the digital Vernier and the Vernier traditional to make measurements, in this way we can ensure that the uncertainty caused decreases by human.

Equipment and process requirements list

- Lathe: Universal Parallel Lathe LA-53, Taiwan

- Strawberry: X6325A Milling Machine
- Welding: Millermatic 350P
- CNC: HAAS VF-02
- Muffle: 1100 ° C LINDBERG 51894
- MasterCam
- NX 12
- Solidworks
- Mask
- Gloves
- Overalls
- Lenses

- Disc cutter
- Screws
- Screwdriver
- Press
- Butter
- Drill
- Aluminum
- Steel
- Vernier
- Taps
- Tarraja

List of manufacturing specifications

- Screw cap (Lathe)
- Push cap (Lathe)
- Stop caps (Lathe)
- Slider (CNC)
- Jaw (CNC)
- Brackets (Welding)
- Sleeve (Lathe)

- Retention ring (Lathe)
- Base (Casting and CNC)
- Plates (Strawberry)

Conclusions

The project was successfully completed. The delivery on the delivery date was what was raised and what was expected within the established measures. The quality of the results in our press It is satisfactory since all the pieces fit to size without the need to make some changes important. Respecting the tolerance of 0.3 mm in all the pieces allows us to have this quality in the Final product. It is a solid assembly which allows us to work with the press as it should. I know They can hold any type of part with enough force to keep it in place.

It is important to have well marked the pieces or holes to know how far they have to be do such machining, but you are not careful enough when doing this or you do not take account it is easy to have failures and the whole piece has to be repeated. It may happen that when you are doing The last holes in the part have an error and therefore everything has to be repeated.

To use the CNC machine, the code must be taken into account and reviewed in detail so there is no error in the programming of the part to be made up. It is important mention that the code that was done in class in the CNC Simulator software does not work correctly on the machine that is in the tec. That is why the one of the software that was seen in class and then modify it so that the machine runs correctly.

Although the press is a somewhat simple machine which is based on transforming the force rotary in linear, it takes more parts than one might think to make it work smoothly press correct. All the parts that were manufactured play an important role in the operation.

What was learned was the time it takes to make a press of this size, so that all pieces fall within the tolerance range and the final product remains with the determined measurements. Is by This is why it is very important to know the calculations and mathematics behind all the processes. Of this way knowing the part, the machine and the tools you can make the time in each one of the pieces.

Co-evaluation:

	Eduardo Ramirez	*Eduardo Frutos*	*Martin Jaramillo*
Eduardo Ramirez	*100*	*100*	*100*
Eduardo Frutos	*100*	*100*	*100*
Martin Jaramillo	*100*	*100*	*100*

Annex 1. G codes

JAW

%

O2621 (JAW)

N100 G21

N102 G0 G17 G40 G49 G80 G90

N104 T8 M6

N106 G0 G90 G54 X-9,525 Y-9,525
A0. S2500 M3

N108 G43 H8 Z50. M8

N110 Z10.

N112 G1 Z-1.5 F35.

N114 Y18.945 F70.

N116 X6.055 Y34.525

N118 X63.945

N120 X79.525 Y18.945

N122 Y-9,525

N124 X-9,525

N126 Z-3. F35.

N128 Y18.945 F70.

N130 X6.055 Y34.525

N132 X63.945

N134 X79.525 Y18.945

N136 Y-9,525

N138 X-9,525

N140 Z-4.5 F35.

N142 Y18.945 F70.

N144 X6.055 Y34.525

N146 X63.945

N148 X79.525 Y18.945

N150 Y-9,525

N152 X-9,525

N154 Z-6. F35.

N156 Y18.945 F70.

N158 X6.055 Y34.525

N160 X63.945

N162 X79.525 Y18.945

N164 Y-9,525

N166 X-9,525

N168 Z-7.5 F35.

N170 Y18.945 F70.

N172 X6.055 Y34.525

N174 X63.945

N176 X79.525 Y18.945

N178 Y-9,525

N180 X-9,525

N182 Z-9. F35.

N184 Y18.945 F70.

N186 X6.055 Y34.525

N188 X63.945

N190 X79.525 Y18.945

N192 Y-9,525

N194 X-9,525

N196 Z-10.5 F35.

N198 Y18.945 F70.

N200 X6.055 Y34.525

N202 X63.945

N204 X79.525 Y18.945

N206 Y-9,525

N208 X-9,525

N210 Z-12. F35.

N212 Y18.945 F70.

N214 X6.055 Y34.525

N216 X63.945

N218 X79.525 Y18.945

N220 Y-9,525

N222 X-9,525

N224 Z-13.5 F35.

N226 Y18.945 F70.

N228 X6.055 Y34.525

N230 X63.945

N232 X79.525 Y18.945

N234 Y-9,525

N236 X-9,525

N238 Z-15. F35.

N240 Y18.945 F70.

N242 X6.055 Y34.525

N244 X63.945

N246 X79.525 Y18.945

N248 Y-9,525

N250 X-9,525

N252 Z-16.5 F35.

N254 Y18.945 F70.

N256 X6.055 Y34.525

N258 X63.945

N260 X79.525 Y18.945

N262 Y-9,525

N264 X-9,525

N266 Z-18. F35.

N268 Y18.945 F70.

N270 X6.055 Y34.525

N272 X63.945

N274 X79.525 Y18.945

N276 Y-9,525

N278 X-9,525

N280 Z-19.5 F35.

N282 Y18.945 F70.

N284 X6.055 Y34.525

N286 X63.945

N288 X79.525 Y18.945

N290 Y-9,525

N292 X-9,525

N294 Z-21. F35.

N296 Y18.945 F70.

N298 X6.055 Y34.525

N300 X63.945

N302 X79.525 Y18.945

N304 Y-9,525

N306 X-9,525

N308 Z-22.5 F35.

N310 Y18.945 F70.

N312 X6.055 Y34.525

N314 X63.945

N316 X79.525 Y18.945

N318 Y-9,525

N320 X-9,525

N322 Z-24. F35.

N324 Y18.945 F70.

N326 X6.055 Y34.525

N328 X63.945

N330 X79.525 Y18.945

N332 Y-9,525

N334 X-9,525

N336 Z-25.5 F35.

N338 Y18.945 F70.

N340 X6.055 Y34.525

N342 X63.945

N344 X79.525 Y18.945

N346 Y-9,525

N348 X-9,525

N350 Z-27. F35.

N352 Y18.945 F70.

N354 X6.055 Y34.525

N356 X63.945

N358 X79.525 Y18.945

N360 Y-9,525

N362 X-9,525

N364 Z-28.5 F35.

N366 Y18.945 F70.

N368 X6.055 Y34.525

N370 X63.945

N372 X79.525 Y18.945

N374 Y-9,525

N376 X-9,525

N378 Z-30. F35.

N380 Y18.945 F70.

N382 X6.055 Y34.525

N384 X63.945

N386 X79.525 Y18.945

N388 Y-9,525

N390 X-9,525

N392 Z-31.5 F35.

N394 Y18.945 F70.

N396 X6.055 Y34.525

N398 X63.945

N400 X79.525 Y18.945

N402 Y-9,525

N404 X-9,525

N406 Z-33. F35.

N408 Y18.945 F70.

N410 X6.055 Y34.525

N412 X63.945

N414 X79.525 Y18.945

N416 Y-9,525

N418 X-9,525

N420 Z-34.5 F35.

N422 Y18.945 F70.

N424 X6.055 Y34.525

N426 X63.945

N428 X79.525 Y18.945

N430 Y-9,525

N432 X-9,525

N434 Z-36. F35.

N436 Y18.945 F70.

N438 X6.055 Y34.525

N440 X63.945

N442 X79.525 Y18.945

N444 Y-9,525

N446 X-9,525

N448 Z-37.5 F35.

N450 Y18.945 F70.

N452 X6.055 Y34.525

N454 X63.945

N456 X79.525 Y18.945

N458 Y-9,525

N460 X-9,525

N462 Z-39. F35.

N464 Y18.945 F70.

N466 X6.055 Y34.525

N468 X63.945

N470 X79.525 Y18.945

N472 Y-9,525

N474 X-9,525

N476 Z-40. F35.

N478 Y18.945 F70.

N480 X6.055 Y34.525

N482 X63.945

N484 X79.525 Y18.945

N486 Y-9,525

N488 X-9,525

N490 G0 Z50.

N492 M5

N494 G91 G28 Z0. M9

N496 A0.

N498 M01

N500 T6 M6

N502 G0 G90 G54 X37.587 Y0. A0.

S2500 M3

N504 G43 H6 Z50. M8

N506 Z10.

N508 G1 Z-1,333 F35.

N510 Y25. F70.

N512 G0 Z25.

N514 Y0.

N516 Z10.

N518 G1 Z-2,667 F35.

N520 Y25. F70.

N522 G0 Z25.

N524 Y0.

N526 Z10.

N528 G1 Z-4. F35.

N530 Y25. F70.

N532 G0 Z25.

N534 Y0.

N536 Z10.

N538 G1 Z-5. F35.

N540 Y25. F70.

N542 G0 Z50.

N544 S2122 M3

N546 X32.413 Y0.

N548 Z10.

N550 G1 Z-1,333 F212.2

N552 Y25. F424.4

N554 G0 Z25.

N556 Y0.

N558 Z10.

N560 G1 Z-2,667 F212.2

N562 Y25. F424.4

N564 G0 Z25.

N566 Y0.

N568 Z10.

N570 G1 Z-4. F212.2

N572 Y25. F424.4

N574 G0 Z25.

N576 Y0.

N578 Z10.

N580 G1 Z-5. F212.2

N582 Y25. F424.4

N584 G0 Z50.

N586 M5

N588 G91 G28 Z0. M9

N590 A0.

N592 M01

N594 T2 M6

N596 G0 G90 G54 X35. Y21. A0.

S3000 M3

N598 G43 H2 Z25. M8

N600 G99 G83 Z-7. R25. Q0. F70.

N602 Y6.

N604 G80

N606 M5

N608 G91 G28 Z0. M9

N610 G28 X0. Y0. A0.

N612 M30%

%

O2627 (JAW1)

N100 G21

N102 G0 G17 G40 G49 G80 G90

N104 T8 M6

N106 G0 G90 G54 X35. Y25. A0.

S2500 M3

N108 G43 H8 Z25. M8

N110 G99 G83 Z-16. R0. Q3. F50.

N112 G80

N114 M5

N116 G91 G28 Z0. M9

N118 A0.

N120 M01

N122 T6 M6

N124 G0 G90 G54 X40.237 Y25. A0. S2200 M3

N126 G43 H6 Z50. M8

N128 Z10.

N130 G1 Z-1.5 F35.

N132 G3 X35. Y30,237 I-5,237 J0. F70.

N134 X29.763 Y25. I0. J-5,237

N136 X35. Y19.763 I5.237 J0.

N138 X40.237 Y25. I0. J5.237

N140 G1 Z-3. F35.

N142 G3 X35. Y30,237 I-5,237 J0. F70.

N144 X29.763 Y25. I0. J-5,237

N146 X35. Y19.763 I5.237 J0.

N148 X40.237 Y25. I0. J5.237

N150 G1 Z-4.5 F35.

N152 G3 X35. Y30,237 I-5,237 J0. F70.

N154 X29.763 Y25. I0. J-5,237

N156 X35. Y19.763 I5.237 J0.

N158 X40.237 Y25. I0. J5.237

N160 G1 Z-6. F35.

N162 G3 X35. Y30,237 I-5,237 J0. F70.

N164 X29.763 Y25. I0. J-5,237

N166 X35. Y19.763 I5.237 J0.

N168 X40.237 Y25. I0. J5.237

N170 G1 Z-7.5 F35.

N172 G3 X35. Y30,237 I-5,237 J0. F70.

N174 X29.763 Y25. I0. J-5,237

N176 X35. Y19.763 I5.237 J0.

N178 X40.237 Y25. I0. J5.237

N180 G1 Z-9. F35.

N182 G3 X35. Y30,237 I-5,237 J0. F70.

N184 X29.763 Y25. I0. J-5,237

N186 X35. Y19.763 I5.237 J0.

N188 X40.237 Y25. I0. J5.237

N190 G1 Z-10.5 F35.

N192 G3 X35. Y30,237 I-5,237 J0. F70.

N194 X29.763 Y25. I0. J-5,237

N196 X35. Y19.763 I5.237 J0.

N198 X40.237 Y25. I0. J5.237

N200 G1 Z-12. F35.

N202 G3 X35. Y30,237 I-5,237 J0. F70.

N204 X29.763 Y25. I0. J-5,237

N206 X35. Y19.763 I5.237 J0.

N208 X40.237 Y25. I0. J5.237

N210 G1 Z-13.5 F35.

N212 G3 X35. Y30,237 I-5,237 J0. F70.

N214 X29.763 Y25. I0. J-5,237

N216 X35. Y19.763 I5.237 J0.

N218 X40.237 Y25. I0. J5.237

N220 G1 Z-15. F35.

N222 G3 X35.   Y30,237
I-5,237 J0. F70.

N224 X29.763 Y25.   I0.
J-5,237

N226 X35. Y19.763 I5.237 J0.

N228 X40.237 Y25. I0. J5.237

N230 G1 Z-16. F35.

N232 G3 X35.   Y30,237
I-5,237 J0. F70.

N234 X29.763 Y25.   I0.
J-5,237

N236 X35. Y19.763 I5.237 J0.

N238 X40.237 Y25. I0. J5.237

N240 G0 Z50.

N242 M5

N244 G91 G28 Z0. M9

N246 A0.

N248 M01

N250 T30 M6

N252 G0 G90 G54 X25. Y35. A0.
S2200 M3

N254 G43 H30 Z25. M8

N256 G99 G81 Z-2. R0 F70.

N258 X45.

N260 Y15.

N262 X25.

N264 G80

N266 M5

N268 G91 G28 Z0. M9

N270 G28 X0. Y0. A0.

N272 M30

%

Slider

%

O2345 (SLIDER)

(T2 | 15. CENTER DRILL | H2
)

(T10 | 5.5 DRILL | H10)

(T8 | 9.5 DRILL | H8)

N100 G21

N102 G0 G17 G40 G49 G80 G90

N104 T2 M6

N106 G0 G90 G54 X16. Y12. A0.
S2500 M3

N108 G43 H2 Z5. M8

N110 G99 G83 Z-2. R5. Q1. F100.

N112 X31.

N114 G80

N116 M5

N118 G91 G28 Z0. M9

N120 A0.

N122 M01

N124 T10 M6

N126 G0 G90 G54 X16. Y12. A0.
S2000 M3

N128 G43 H10 Z5. M8

N130 G99 G83 Z-25. R5. Q1. F70.

N132 X31.

N134 G80

N136 M5

N138 G91 G28 Z0. M9

N140 A0.

N142 M01

N144 T8 M6

N146 G0 G90 G54 X16. Y12. A0.
S2200 M3

N148 G43 H8 Z5. M8

N150 G99 G82 Z-7. R5. P4. F40.

N152 X31.

N154 G80

N156 M5

N158 G91 G28 Z0. M9

N160 G28 X0. Y0. A0.

N162 M30

%

Base

O2524 (R12)

N100 G21

N102 G0 G17 G40 G49 G80 G90

N104 T6 M6

N106 G0 G90 G54 X0. Y37,737 A0.
S2800 M3

N108 G43 H6 Z50. M8

N110 Z10.

N112 G1 Z-.98 F100.

N114 X145. F200.

N116 G0 Z25.

N118 X0.

N120 Z10.

N122 G1 Z-1.96 F100.

N124 X145. F200.

N126 G0 Z25.

N128 X0.

N130 Z10.

N132 G1 Z-2.94 F100.

N134 X145. F200.

N136 G0 Z25.

N138 X0.

N140 Z10.

N142 G1 Z-3.92 F100.

N144 X145. F200.

N146 G0 Z25.

N148 X0.

N150 Z10.

N152 G1 Z-4.9 F100.

N154 X145. F200.

N156 G0 Z25.

N158 X0.

N160 Z10.

N162 G1 Z-5.88 F100.

N164 X145. F200.

N166 G0 Z25.

N168 X0.

N170 Z10.

N172 G1 Z-6.86 F100.

N174 X145. F200.

N176 G0 Z25.

N178 X0.

N180 Z10.

N182 G1 Z-7.84 F100.

N184 X145. F200.

N186 G0 Z25.

N188 X0.

N190 Z10.

N192 G1 Z-8.82 F100.

N194 X145. F200.

N196 G0 Z25.

N198 X0.

N200 Z10.

N202 G1 Z-9.8 F100.

N204 X145. F200.

N206 G0 Z25.

N208 X0.

N210 Z10.

N212 G1 Z-10.78 F100.

N214 X145. F200.

N216 G0 Z25.

N218 X0.

N220 Z10.

N222 G1 Z-11.76 F100.

N224 X145. F200.

N226 G0 Z25.

N228 X0.

N230 Z10.

N232 G1 Z-12.74 F100.

N234 X145. F200.

N236 G0 Z25.

N238 X0.

N240 Z10.

N242 G1 Z-13.72 F100.

N244 X145. F200.

N246 G0 Z25.

N248 X0.

N250 Z10.

N252 G1 Z-14.7 F100.

N254 X145. F200.

N256 G0 Z25.

N258 X0.

N260 Z10.

N262 G1 Z-15.68 F100.

N264 X145. F200.

N266 G0 Z25.

N268 X0.

N270 Z10.

N272 G1 Z-16.66 F100.

N274 X145. F200.

N276 G0 Z25.

N278 X0.

N280 Z10.

N282 G1 Z-17.64 F100.

N284 X145. F200.

N286 G0 Z25.

N288 X0.

N290 Z10.

N292 G1 Z-18.62 F100.

N294 X145. F200.

N296 G0 Z25.

N298 X0.

N300 Z10.

N302 G1 Z-19.6 F100.

N304 X145. F200.

N306 G0 Z25.

N308 X0.

N310 Z10.

N312 G1 Z-20.58 F100.

N314 X145. F200.

N316 G0 Z25.

N318 X0.

N320 Z10.

N322 G1 Z-21.56 F100.

N324 X145. F200.

N326 G0 Z25.

N328 X0.

N330 Z10.

N332 G1 Z-22.54 F100.

N334 X145. F200.

N336 G0 Z25.

N338 X0.

N340 Z10.

N342 G1 Z-23.52 F100.

N344 X145. F200.

N346 G0 Z25.

N348 X0.

N350 Z10.

N352 G1 Z-24.5 F100.

N354 X145. F200.

N356 G0 Z25.

N358 X0.

N360 Z10.

N362 G1 Z-25.5 F100.

N364 X145. F200.

N366 G0 Z50.

N368 X0. Y32,263

N370 Z10.

N372 G1 Z-.98 F100.

N374 X145. F200.

N376 G0 Z25.

N378 X0.

N380 Z10.

N382 G1 Z-1.96 F100.

N384 X145. F200.

N386 G0 Z25.

N388 X0.

N390 Z10.

N392 G1 Z-2.94 F100.

N394 X145. F200.

N396 G0 Z25.

N398 X0.

N400 Z10.

N402 G1 Z-3.92 F100.

N404 X145. F200.

N406 G0 Z25.

N408 X0.

N410 Z10.

N412 G1 Z-4.9 F100.

N414 X145. F200.

N416 G0 Z25.

N418 X0.

N420 Z10.

N422 G1 Z-5.88 F100.

N424 X145. F200.

N426 G0 Z25.

N428 X0.

N430 Z10.

N432 G1 Z-6.86 F100.

N434 X145. F200.

N436 G0 Z25.

N438 X0.

N440 Z10.

N442 G1 Z-7.84 F100.

N444 X145. F200.

N446 G0 Z25.

N448 X0.

N450 Z10.

N452 G1 Z-8.82 F100.

N454 X145. F200.

N456 G0 Z25.

N458 X0.

N460 Z10.

N462 G1 Z-9.8 F100.

N464 X145. F200.

N466 G0 Z25.

N468 X0.

N470 Z10.

N472 G1 Z-10.78 F100.

N474 X145. F200.

N476 G0 Z25.

N478 X0.

N480 Z10.

N482 G1 Z-11.76 F100.

N484 X145. F200.

N486 G0 Z25.

N488 X0.

N490 Z10.

N492 G1 Z-12.74 F100.

N494 X145. F200.

N496 G0 Z25.

N498 X0.

N500 Z10.

N502 G1 Z-13.72 F100.

N504 X145. F200.

N506 G0 Z25.

N508 X0.

N510 Z10.

N512 G1 Z-14.7 F100.

N514 X145. F200.

N516 G0 Z25.

N518 X0.

N520 Z10.

N522 G1 Z-15.68 F100.

N524 X145. F200.

N526 G0 Z25.

N528 X0.

N530 Z10.

N532 G1 Z-16.66 F100.

N534 X145. F200.

N536 G0 Z25.

N538 X0.

N540 Z10.

N542 G1 Z-17.64 F100.

N544 X145. F200.

N546 G0 Z25.

N548 X0.

N550 Z10.

N552 G1 Z-18.62 F100.

N554 X145. F200.

N556 G0 Z25.

N558 X0.

N560 Z10.

N562 G1 Z-19.6 F100.

N564 X145. F200.

N566 G0 Z25.

N568 X0.

N570 Z10.

N572 G1 Z-20.58 F100.

N574 X145. F200.

N576 G0 Z25.

N578 X0.

N580 Z10.

N582 G1 Z-21.56 F100.

N584 X145. F200.

N586 G0 Z25.

N588 X0.

N590 Z10.

N592 G1 Z-22.54 F100.

N594 X145. F200.

N596 G0 Z25.

N598 X0.

N600 Z10.

N602 G1 Z-23.52 F100.

N604 X145. F200.

N606 G0 Z25.

N608 X0.

N610 Z10.

N612 G1 Z-24.5 F100.

N614 X145. F200.

N616 G0 Z25.

N618 X0.

N620 Z10.

N622 G1 Z-25.5 F100.

N624 X145. F200.

N626 G0 Z50.

N628 X0. Y42,737

N630 Z10.

N632 G1 Z-1. F100.

N634 X145. F200.

N636 G0 Z25.

N638 X0.

N640 Z10.

N642 G1 Z-2. F100.

N644 X145. F200.

N646 G0 Z25.

N648 X0.

N650 Z10.

N652 G1 Z-3. F100.

N654 X145. F200.

N656 G0 Z25.

N658 X0.

N660 Z10.

N662 G1 Z-4. F100.

N664 X145. F200.

N666 G0 Z25.

N668 X0.

N670 Z10.

N672 G1 Z-5. F100.

N674 X145. F200.

N676 G0 Z25.

N678 X0.

N680 Z10.

N682 G1 Z-6. F100.

N684 X145. F200.

N686 G0 Z25.

N688 X0.

N690 Z10.

N692 G1 Z-7. F100.

N694 X145. F200.

N696 G0 Z25.

N698 X0.

N700 Z10.

N702 G1 Z-8. F100.

N704 X145. F200.

N706 G0 Z25.

N708 X0.

N710 Z10.

N712 G1 Z-9. F100.

N714 X145. F200.

N716 G0 Z25.

N718 X0.

N720 Z10.

N722 G1 Z-10. F100.

N724 X145. F200.

N726 G0 Z50.

N728 S2122 M3

N730 X0. Y27,262

N732 Z10.

N734 G1 Z-1. F212.2

N736 X145. F424.4

N738 G0 Z25.

N740 X0.

N742 Z10.

N744 G1 Z-2. F212.2

N746 X145. F424.4

N748 G0 Z25.

N750 X0.

N752 Z10.

N754 G1 Z-3. F212.2

N756 X145. F424.4

N758 G0 Z25.

N760 X0.

N762 Z10.

N764 G1 Z-4. F212.2

N766 X145. F424.4

N768 G0 Z25.

N770 X0.

N772 Z10.

N774 G1 Z-5. F212.2

N776 X145. F424.4

N778 G0 Z25.

N780 X0.

N782 Z10.

N784 G1 Z-6. F212.2

N786 X145. F424.4

N788 G0 Z25.

N790 X0.

N792 Z10.

N794 G1 Z-7. F212.2

N796 X145. F424.4

N798 G0 Z25.

N800 X0.

N802 Z10.

N804 G1 Z-8. F212.2

N806 X145. F424.4

N808 G0 Z25.

N810 X0.

N812 Z10.

N814 G1 Z-9. F212.2

N816 X145. F424.4

N818 G0 Z25.

N820 X0.

N822 Z10.

N824 G1 Z-10. F212.2

N826 X145. F424.4

N828 G0 Z50.

N830 M5

N832 G91 G28 Z0. M9

N834 G28 X0. Y0. A0.

N836 M30

%

O2125 (CAJARANURA)

N100 G21

N102 G0 G17 G40 G49 G80 G90

N104 T8 M6

N106 G0 G90 G54 X29.525 Y70. A0. S2200 M3

N108 G43 H8 Z50. M8

N110 Z10.

N112 G1 Z-1,481 F50.

N114 Y0. F100.

N116 G0 Z25.

N118 Y70.

N120 Z10.

N122 G1 Z-2,963 F50.

N124 Y0. F100.

N126 G0 Z25.

N128 Y70.

N130 Z10.

N132 G1 Z-4,444 F50.

N134 Y0. F100.

N136 G0 Z25.

N138 Y70.

N140 Z10.

N142 G1 Z-5,926 F50.

N144 Y0. F100.

N146 G0 Z25.

N148 Y70.

N150 Z10.

N152 G1 Z-7,407 F50.

N154 Y0. F100.

N156 G0 Z25.

N158 Y70.

N160 Z10.

N162 G1 Z-8,889 F50.

N164 Y0. F100.

N166 G0 Z25.

N168 Y70.

N170 Z10.

N172 G1 Z-10.37 F50.

N174 Y0. F100.

N176 G0 Z25.

N178 Y70.

N180 Z10.

N182 G1 Z-11,852 F50.

N184 Y0. F100.

N186 G0 Z25.

N188 Y70.

N190 Z10.

N192 G1 Z-13,333 F50.

N194 Y0. F100.

N196 G0 Z25.

N198 Y70.

N200 Z10.

N202 G1 Z-14,815 F50.

N204 Y0. F100.

N206 G0 Z25.

N208 Y70.

N210 Z10.

N212 G1 Z-16.296 F50.

N214 Y0. F100.

N216 G0 Z25.

N218 Y70.

N220 Z10.

N222 G1 Z-17,778 F50.

N224 Y0. F100.

N226 G0 Z25.

N228 Y70.

N230 Z10.

N232 G1 Z-19,259 F50.

N234 Y0. F100.

N236 G0 Z25.

N238 Y70.

N240 Z10.

N242 G1 Z-20,741 F50.

N244 Y0. F100.

N246 G0 Z25.

N248 Y70.

N250 Z10.

N252 G1 Z-22,222 F50.

N254 Y0. F100.

N256 G0 Z25.

N258 Y70.

N260 Z10.

N262 G1 Z-23.704 F50.

N264 Y0. F100.

N266 G0 Z25.

N268 Y70.

N270 Z10.

N272 G1 Z-25.185 F50.

N274 Y0. F100.

N276 G0 Z25.

N278 Y70.

N280 Z10.

N282 G1 Z-26,667 F50.

N284 Y0. F100.

N286 G0 Z25.

N288 Y70.

N290 Z10.

N292 G1 Z-28.148 F50.

N294 Y0. F100.

N296 G0 Z25.

N298 Y70.

N300 Z10.

N302 G1 Z-29.63 F50.

N304 Y0. F100.

N306 G0 Z25.

N308 Y70.

N310 Z10.

N312 G1 Z-31.111 F50.

N314 Y0. F100.

N316 G0 Z25.

N318 Y70.

N320 Z10.

N322 G1 Z-32.593 F50.

N324 Y0. F100.

N326 G0 Z25.

N328 Y70.

N330 Z10.

N332 G1 Z-34.074 F50.

N334 Y0. F100.

N336 G0 Z25.

N338 Y70.

N340 Z10.

N342 G1 Z-35,556 F50.

N344 Y0. F100.

N346 G0 Z25.

N348 Y70.

N350 Z10.

N352 G1 Z-37.037 F50.

N354 Y0. F100.

N356 G0 Z25.

N358 Y70.

N360 Z10.

N362 G1 Z-38,519 F50.

N364 Y0. F100.

N366 G0 Z25.

N368 Y70.

N370 Z10.

N372 G1 Z-40. F50.

N374 Y0. F100.

N376 G0 Z25.

N378 Y70.

N380 Z10.

N382 G1 Z-40. F50.

N384 Y0. F100.

N386 G0 Z50.

N388 X110.475

N390 Z10.

N392 G1 Z-1,481 F50.

N394 Y70. F100.

N396 G0 Z25.

N398 Y0.

N400 Z10.

N402 G1 Z-2,963 F50.

N404 Y70. F100.

N406 G0 Z25.

N408 Y0.

N410 Z10.

N412 G1 Z-4,444 F50.

N414 Y70. F100.

N416 G0 Z25.

N418 Y0.

N420 Z10.

N422 G1 Z-5,926 F50.

N424 Y70. F100.

N426 G0 Z25.

N428 Y0.

N430 Z10.

N432 G1 Z-7,407 F50.

N434 Y70. F100.

N436 G0 Z25.

N438 Y0.

N440 Z10.

N442 G1 Z-8,889 F50.

N444 Y70. F100.

N446 G0 Z25.

N448 Y0.

N450 Z10.

N452 G1 Z-10.37 F50.

N454 Y70. F100.

N456 G0 Z25.

N458 Y0.

N460 Z10.

N462 G1 Z-11,852 F50.

N464 Y70. F100.

N466 G0 Z25.

N468 Y0.

N470 Z10.

N472 G1 Z-13,333 F50.

N474 Y70. F100.

N476 G0 Z25.

N478 Y0.

N480 Z10.

N482 G1 Z-14,815 F50.

N484 Y70. F100.

N486 G0 Z25.

N488 Y0.

N490 Z10.

N492 G1 Z-16.296 F50.

N494 Y70. F100.

N496 G0 Z25.

N498 Y0.

N500 Z10.

N502 G1 Z-17,778 F50.

N504 Y70. F100.

N506 G0 Z25.

N508 Y0.

N510 Z10.

N512 G1 Z-19,259 F50.

N514 Y70. F100.

N516 G0 Z25.

N518 Y0.

N520 Z10.

N522 G1 Z-20,741 F50.

N524 Y70. F100.

N526 G0 Z25.

N528 Y0.

N530 Z10.

N532 G1 Z-22,222 F50.

N534 Y70. F100.

N536 G0 Z25.

N538 Y0.

N540 Z10.

N542 G1 Z-23.704 F50.

N544 Y70. F100.

N546 G0 Z25.

N548 Y0.

N550 Z10.

N552 G1 Z-25.185 F50.

N554 Y70. F100.

N556 G0 Z25.

N558 Y0.

N560 Z10.

N562 G1 Z-26,667 F50.

N564 Y70. F100.

N566 G0 Z25.

N568 Y0.

N570 Z10.

N572 G1 Z-28.148 F50.

N574 Y70. F100.

N576 G0 Z25.

N578 Y0.

N580 Z10.

N582 G1 Z-29.63 F50.

N584 Y70. F100.

N586 G0 Z25.

N588 Y0.

N590 Z10.

N592 G1 Z-31.111 F50.

N594 Y70. F100.

N596 G0 Z25.

N598 Y0.

N600 Z10.

N602 G1 Z-32.593 F50.

N604 Y70. F100.

N606 G0 Z25.

N608 Y0.

N610 Z10.

N612 G1 Z-34.074 F50.

N614 Y70. F100.

N616 G0 Z25.

N618 Y0.

N620 Z10.

N622 G1 Z-35,556 F50.

N624 Y70. F100.

N626 G0 Z25.

N628 Y0.

N630 Z10.

N632 G1 Z-37.037 F50.

N634 Y70. F100.

N636 G0 Z25.

N638 Y0.

N640 Z10.

N642 G1 Z-38,519 F50.

N644 Y70. F100.

N646 G0 Z25.

N648 Y0.

N650 Z10.

N652 G1 Z-40. F50.

N654 Y70. F100.

N656 G0 Z25.

N658 Y0.

N660 Z10.

N662 G1 Z-40. F50.

N664 Y70. F100.

N666 G0 Z50.

N668 S2010 M3

N670 X83.779 Y34.528 Z25.

N672 Z10.

N674 G1 Z-1,481 F402.

N676 X83.68 F804.

N678 X70.333

N680 X69.618

N682 X56.271

N684 X41.009 Y21.431

N686 X98.991

N688 X97.378 Y25.003

N690 Y42.862

N692 X98.991 Y47.625

N694 X41.009

N696 X42.622 Y42.862

N698 Y28.575

N700 X41.009 Y21.431

N702 X29.525 Y9.525

N704 X110.475

N706 Y60.475

N708 X29.525

N710 Y9.525

N712 G0 Z23.519

N714 X83.779 Y34.528

N716 Z8.519

N718 G1 Z-2,963 F402.

N720 X83.68 F804.

N722 X70.333

N724 X69.618

N726 X56.271

N728 X41.009 Y21.431

N730 X98.991

N732 X97.378 Y25.003

N734 Y42.862

N736 X98.991 Y47.625

N738 X41.009

N740 X42.622 Y42.862

N742 Y28.575

N744 X41.009 Y21.431

N746 X29.525 Y9.525

N748 X110.475

N750 Y60.475

N752 X29.525

N754 Y9.525

N756 G0 Z22.037

N758 X83.779 Y34.528

N760 Z7.037

N762 G1 Z-4,444 F402.

N764 X83.68 F804.

N766 X70.333

N768 X69.618

N770 X56.271

N772 X41.009 Y21.431

N774 X98.991

N776 X97.378 Y25.003

N778 Y42.862

N780 X98.991 Y47.625

N782 X41.009

N784 X42.622 Y42.862

N786 Y28.575

N788 X41.009 Y21.431

N790 X29.525 Y9.525

N792 X110.475

N794 Y60.475

N796 X29.525

N798 Y9.525

N800 G0 Z20.556

N802 X83.779 Y34.528

N804 Z5.556

N806 G1 Z-5,926 F402.

N808 X83.68 F804.

N810 X70.333

N812 X69.618

N814 X56.271

N816 X41.009 Y21.431

N818 X98.991

N820 X97.378 Y25.003

N822 Y42.862

N824 X98.991 Y47.625

N826 X41.009

N828 X42.622 Y42.862

N830 Y28.575

N832 X41.009 Y21.431

N834 X29.525 Y9.525

N836 X110.475

N838 Y60.475

N840 X29.525

N842 Y9.525

N844 G0 Z19.074

N846 X83.779 Y34.528

N848 Z4.074

N850 G1 Z-7,407 F402.

N852 X83.68 F804.

N854 X70.333

N856 X69.618

N858 X56.271

N860 X41.009 Y21.431

N862 X98.991

N864 X97.378 Y25.003

N866 Y42.862

N868 X98.991 Y47.625

N870 X41.009

N872 X42.622 Y42.862

N874 Y28.575

N876 X41.009 Y21.431

N878 X29.525 Y9.525

N880 X110.475

N882 Y60.475

N884 X29.525

N886 Y9.525

N888 G0 Z17.593

N890 X83.779 Y34.528

N892 Z2.593

N894 G1 Z-8,889 F402.

N896 X83.68 F804.

N898 X70.333

N900 X69.618

N902 X56.271

N904 X41.009 Y21.431

N906 X98.991

N908 X97.378 Y25.003

N910 Y42.862

N912 X98.991 Y47.625

N914 X41.009

N916 X42.622 Y42.862

N918 Y28.575

N920 X41.009 Y21.431

N922 X29.525 Y9.525

N924 X110.475

N926 Y60.475

N928 X29.525

N930 Y9.525

N932 G0 Z16.111

N934 X83.779 Y34.528

N936 Z1.111

N938 G1 Z-10.37 F402.

N940 X83.68 F804.

N942 X70.333

N944 X69.618

N946 X56.271

N948 X41.009 Y21.431

N950 X98.991

N952 X97.378 Y25.003

N954 Y42.862

N956 X98.991 Y47.625

N958 X41.009

N960 X42.622 Y42.862

N962 Y28.575

N964 X41.009 Y21.431

N966 X29.525 Y9.525

N968 X110.475

N970 Y60.475

N972 X29.525

N974 Y9.525

N976 G0 Z14.63

N978 X83.779 Y34.528

N980 Z-.37

N982 G1 Z-11,852 F402.

N984 X83.68 F804.

N986 X70.333

N988 X69.618

N990 X56.271

N992 X41.009 Y21.431

N994 X98.991

N996 X97.378 Y25.003

N998 Y42.862

N1000 X98.991 Y47.625

N1002 X41.009

N1004 X42.622 Y42.862

N1006 Y28.575

N1008 X41.009 Y21.431

N1010 X29.525 Y9.525

N1012 X110.475

N1014 Y60.475

N1016 X29.525

N1018 Y9.525

N1020 G0 Z13.148

N1022 X83.779 Y34.528

N1024 Z-1,852

N1026 G1 Z-13.333 F402.

N1028 X83.68 F804.

N1030 X70.333

N1032 X69.618

N1034 X56.271

N1036 X41.009 Y21.431

N1038 X98.991

N1040 X97.378 Y25.003

N1042 Y42.862

N1044 X98.991 Y47.625

N1046 X41.009

N1048 X42.622 Y42.862

N1050 Y28.575

N1052 X41.009 Y21.431

N1054 X29.525 Y9.525

N1056 X110.475

N1058 Y60.475

N1060 X29.525

N1062 Y9.525

N1064 G0 Z11.667

N1066 X83.779 Y34.528

N1068 Z-3,333

N1070 G1 Z-14,815 F402.

N1072 X83.68 F804.

N1074 X70.333

N1076 X69.618

N1078 X56.271

N1080 X41.009 Y21.431

N1082 X98.991

N1084 X97.378 Y25.003

N1086 Y42.862

N1088 X98.991 Y47.625

N1090 X41.009

N1092 X42.622 Y42.862

N1094 Y28.575

N1096 X41.009 Y21.431

N1098 X29.525 Y9.525

N1100 X110.475

N1102 Y60.475

N1104 X29.525

N1106 Y9.525

N1108 G0 Z10.185

N1110 X83.779 Y34.528

N1112 Z-4.815

N1114 G1 Z-16.296 F402.

N1116 X83.68 F804.

N1118 X70.333

N1120 X69.618

N1122 X56.271

N1124 X41.009 Y21.431

N1126 X98.991

N1128 X97.378 Y25.003

N1130 Y42.862

N1132 X98.991 Y47.625

N1134 X41.009

N1136 X42.622 Y42.862

N1138 Y28.575

N1140 X41.009 Y21.431

N1142 X29.525 Y9.525

N1144 X110.475

N1146 Y60.475

N1148 X29.525

N1150 Y9.525

N1152 G0 Z8.704

N1154 X83.779 Y34.528

N1156 Z-6,296

N1158 G1 Z-17,778 F402.

N1160 X83.68 F804.

N1162 X70.333

N1164 X69.618

N1166 X56.271

N1168 X41.009 Y21.431

N1170 X98.991

N1172 X97.378 Y25.003

N1174 Y42.862

N1176 X98.991 Y47.625

N1178 X41.009

N1180 X42.622 Y42.862

N1182 Y28.575

N1184 X41.009 Y21.431

N1186 X29.525 Y9.525

N1188 X110.475

N1190 Y60.475

N1192 X29.525

N1194 Y9.525

N1196 G0 Z7.222

N1198 X83.779 Y34.528

N1200 Z-7,778

N1202 G1 Z-19.259 F402.

N1204 X83.68 F804.

N1206 X70.333

N1208 X69.618

N1210 X56.271

N1212 X41.009 Y21.431

N1214 X98.991

N1216 X97.378 Y25.003

N1218 Y42.862

N1220 X98.991 Y47.625

N1222 X41.009

N1224 X42.622 Y42.862

N1226 Y28.575

N1228 X41.009 Y21.431

N1230 X29.525 Y9.525

N1232 X110.475

N1234 Y60.475

N1236 X29.525

N1238 Y9.525

N1240 G0 Z5.741

N1242 X83.779 Y34.528

N1244 Z-9,259

N1246 G1 Z-20,741 F402.

N1248 X83.68 F804.

N1250 X70.333

N1252 X69.618

N1254 X56.271

N1256 X41.009 Y21.431

N1258 X98.991

N1260 X97.378 Y25.003

N1262 Y42.862

N1264 X98.991 Y47.625

N1266 X41.009

N1268 X42.622 Y42.862

N1270 Y28.575

N1272 X41.009 Y21.431

N1274 X29.525 Y9.525

N1276 X110.475

N1278 Y60.475

N1280 X29.525

N1282 Y9.525

N1284 G0 Z4.259

N1286 X83.779 Y34.528

N1288 Z-10,741

N1290 G1 Z-22.222 F402.

N1292 X83.68 F804.

N1294 X70.333

N1296 X69.618

N1298 X56.271

N1300 X41.009 Y21.431

N1302 X98.991

N1304 X97.378 Y25.003

N1306 Y42.862

N1308 X98.991 Y47.625

N1310 X41.009

N1312 X42.622 Y42.862

N1314 Y28.575

N1316 X41.009 Y21.431

N1318 X29.525 Y9.525

N1320 X110.475

N1322 Y60.475

N1324 X29.525

N1326 Y9.525

N1328 G0 Z2.778

N1330 X83.779 Y34.528

N1332 Z-12.222

N1334 G1 Z-23.704 F402.

N1336 X83.68 F804.

N1338 X70.333

N1340 X69.618

N1342 X56.271

N1344 X41.009 Y21.431

N1346 X98.991

N1348 X97.378 Y25.003

N1350 Y42.862

N1352 X98.991 Y47.625

N1354 X41.009

N1356 X42.622 Y42.862

N1358 Y28.575

N1360 X41.009 Y21.431

N1362 X29.525 Y9.525

N1364 X110.475

N1366 Y60.475

N1368 X29.525

N1370 Y9.525

N1372 G0 Z1.296

N1374 X83.779 Y34.528

N1376 Z-13,704

N1378 G1 Z-25.185 F402.

N1380 X83.68 F804.

N1382 X70.333

N1384 X69.618

N1386 X56.271

N1388 X41.009 Y21.431

N1390 X98.991

N1392 X97.378 Y25.003

N1394 Y42.862

N1396 X98.991 Y47.625

N1398 X41.009

N1400 X42.622 Y42.862

N1402 Y28.575

N1404 X41.009 Y21.431

N1406 X29.525 Y9.525

N1408 X110.475

N1410 Y60.475

N1412 X29.525

N1414 Y9.525

N1416 G0 Z-.185

N1418 X83.779 Y34.528

N1420 Z-15.185

N1422 G1 Z-26.667 F402.

N1424 X83.68 F804.

N1426 X70.333

N1428 X69.618

N1430 X56.271

N1432 X41.009 Y21.431

N1434 X98.991

N1436 X97.378 Y25.003

N1438 Y42.862

N1440 X98.991 Y47.625

N1442 X41.009

N1444 X42.622 Y42.862

N1446 Y28.575

N1448 X41.009 Y21.431

N1450 X29.525 Y9.525

N1452 X110.475

N1454 Y60.475

N1456 X29.525

N1458 Y9.525

N1460 G0 Z-1,667

N1462 X83.779 Y34.528

N1464 Z-16,667

N1466 G1 Z-28.148 F402.

N1468 X83.68 F804.

N1470 X70.333

N1472 X69.618

N1474 X56.271

N1476 X41.009 Y21.431

N1478 X98.991

N1480 X97.378 Y25.003

N1482 Y42.862

N1484 X98.991 Y47.625

N1486 X41.009

N1488 X42.622 Y42.862

N1490 Y28.575

N1492 X41.009 Y21.431

N1494 X29.525 Y9.525

N1496 X110.475

N1498 Y60.475

N1500 X29.525

N1502 Y9.525

N1504 G0 Z-3,148

N1506 X83.779 Y34.528

N1508 Z-18.148

N1510 G1 Z-29.63 F402.

N1512 X83.68 F804.

N1514 X70.333

N1516 X69.618

N1518 X56.271

N1520 X41.009 Y21.431

N1522 X98.991

N1524 X97.378 Y25.003

N1526 Y42.862

N1528 X98.991 Y47.625

N1530 X41.009

N1532 X42.622 Y42.862

N1534 Y28.575

N1536 X41.009 Y21.431

N1538 X29.525 Y9.525

N1540 X110.475

N1542 Y60.475

N1544 X29.525

N1546 Y9.525

N1548 G0 Z-4.63

N1550 X83.779 Y34.528

N1552 Z-19.63

N1554 G1 Z-31.111 F402.

N1556 X83.68 F804.

N1558 X70.333

N1560 X69.618

N1562 X56.271

N1564 X41.009 Y21.431

N1566 X98.991

N1568 X97.378 Y25.003

N1570 Y42.862

N1572 X98.991 Y47.625

N1574 X41.009

N1576 X42.622 Y42.862

N1578 Y28.575

N1580 X41.009 Y21.431

N1582 X29.525 Y9.525

N1584 X110.475

N1586 Y60.475

N1588 X29.525

N1590 Y9.525

N1592 G0 Z-6.111

N1594 X83.779 Y34.528

N1596 Z-21.111

N1598 G1 Z-32.593 F402.

N1600 X83.68 F804.

N1602 X70.333

N1604 X69.618

N1606 X56.271

N1608 X41.009 Y21.431

N1610 X98.991

N1612 X97.378 Y25.003

N1614 Y42.862

N1616 X98.991 Y47.625

N1618 X41.009

N1620 X42.622 Y42.862

N1622 Y28.575

N1624 X41.009 Y21.431

N1626 X29.525 Y9.525

N1628 X110.475

N1630 Y60.475

N1632 X29.525

N1634 Y9.525

N1636 G0 Z-7,593

N1638 X83.779 Y34.528

N1640 Z-22.593

N1642 G1 Z-34.074 F402.

N1644 X83.68 F804.

N1646 X70.333

N1648 X69.618

N1650 X56.271

N1652 X41.009 Y21.431

N1654 X98.991

N1656 X97.378 Y25.003

N1658 Y42.862

N1660 X98.991 Y47.625

N1662 X41.009

N1664 X42.622 Y42.862

N1666 Y28.575

N1668 X41.009 Y21.431

N1670 X29.525 Y9.525

N1672 X110.475

N1674 Y60.475

N1676 X29.525

N1678 Y9.525

N1680 G0 Z-9,074

N1682 X83.779 Y34.528

N1684 Z-24.074

N1686 G1 Z-35,556 F402.

N1688 X83.68 F804.

N1690 X70.333

N1692 X69.618

N1694 X56.271

N1696 X41.009 Y21.431

N1698 X98.991

N1700 X97.378 Y25.003

N1702 Y42.862

N1704 X98.991 Y47.625

N1706 X41.009

N1708 X42.622 Y42.862

N1710 Y28.575

N1712 X41.009 Y21.431

N1714 X29.525 Y9.525

N1716 X110.475

N1718 Y60.475

N1720 X29.525

N1722 Y9.525

N1724 G0 Z-10.556

N1726 X83.779 Y34.528

N1728 Z-25,556

N1730 G1 Z-37.037 F402.

N1732 X83.68 F804.

N1734 X70.333

N1736 X69.618

N1738 X56.271

N1740 X41.009 Y21.431

N1742 X98.991

N1744 X97.378 Y25.003

N1746 Y42.862

N1748 X98.991 Y47.625

N1750 X41.009

N1752 X42.622 Y42.862

N1754 Y28.575

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N1758 X29.525 Y9.525

N1760 X110.475

N1762 Y60.475

N1764 X29.525

N1766 Y9.525

N1768 G0 Z-12.037

N1770 X83.779 Y34.528

N1772 Z-27.037

N1774 G1 Z-38.519 F402.

N1776 X83.68 F804.

N1778 X70.333

N1780 X69.618

N1782 X56.271

N1784 X41.009 Y21.431

N1786 X98.991

N1788 X97.378 Y25.003

N1790 Y42.862

N1792 X98.991 Y47.625

N1794 X41.009

N1796 X42.622 Y42.862

N1798 Y28.575

N1800 X41.009 Y21.431

N1802 X29.525 Y9.525

N1804 X110.475

N1806 Y60.475

N1808 X29.525

N1810 Y9.525

N1812 G0 Z-13,519

N1814 X83.779 Y34.528

N1816 Z-28.519

N1818 G1 Z-40. F402.

N1820 X83.68 F804.

N1822 X70.333

N1824 X69.618

N1826 X56.271

N1828 X41.009 Y21.431

N1830 X98.991

N1832 X97.378 Y25.003

N1834 Y42.862

N1836 X98.991 Y47.625

N1838 X41.009

N1840 X42.622 Y42.862

N1842 Y28.575

N1844 X41.009 Y21.431

N1846 X29.525 Y9.525

N1848 X110.475

N1850 Y60.475

N1852 X29.525

N1854 Y9.525

N1856 G0 Z25.

N1858 M5

N1860 G91 G28 Z0. M9

N1862 A0.

N1864 M01

N1866 T2 M6

N1868 G0 G90 G54 X133. Y35. A0.

S3000 M3

N1870 G43 H2 Z25. M8

N1872 G99 G83 Z-2. R25. Q2. F150.

N1874 G80

N1876 M5

N1878 G91 G28 Z0. M9

N1880 A0.

N1882 M01

N1884 T3 M6

N1886 G0 G90 G54 X133. Y35. A0.

S3500 M3

N1888 G43 H3 Z25. M8

N1890 G99 G83 Z-10. R25. Q2. F90.

N1892 G80

N1894 M5

N1896 G91 G28 Z0. M9

N1898 G28 X0. Y0. A0.

N1900 M30

%

O2334

N100 G21

N102 G0 G17 G40 G49 G80 G90

N104 T2 M6

N106 G0 G90 G54 X12.5 Y11. A0.

S3200 M3

N108 G43 H2 Z25. M8

N110 G99 G83 Z-2. R25. Q2. F150.

N112 X52.5

N114 X92.5

N116 X132.5

N118 G80

N120 M5

N122 G91 G28 Z0. M9

N124 A0.

N126 M01

N128 T7 M6

N130 G0 G90 G54 X12.5 Y11. A0.

S3500 M3

N132 G43 H7 Z25. M8

N134 G99 G83 Z-20. R25. Q2. F100.

N136 X52.5

N138 X92.5

N140 X132.5

N142 G80

N144 M5

N146 G91 G28 Z0. M9

N148 G28 X0. Y0. A0.

N150 M30

%

O2111

N100 G21

N102 G0 G17 G40 G49 G80 G90

N104 T2 M6

N106 G0 G90 G54 X10. Y52.5 A0.
S1145 M3

N108 G43 H2 Z25. M8

N110 G99 G83 Z-9. R25. Q2. F114.5

N112 X60.

N114 G80

N116 S3500 M3

N118 X10. Y27.5

N120 G99 G83 Z-2. R25. Q2. F150.

N122 X60.

N124 G80

N126 M5

N128 G91 G28 Z0. M9

N130 A0.

N132 M01

N134 T7 M6

N136 G0 G90 G54 X10. Y52.5 A0.
S3500 M3

N138 G43 H7 Z25. M8

N140 G99 G83 Z-23. R25. Q2. F170.

N142 X60.

N144 Y27.5

N146 X10.

N148 G80

N150 M5

N152 G91 G28 Z0. M9

N154 G28 X0. Y0. A0.

N156 M30

%