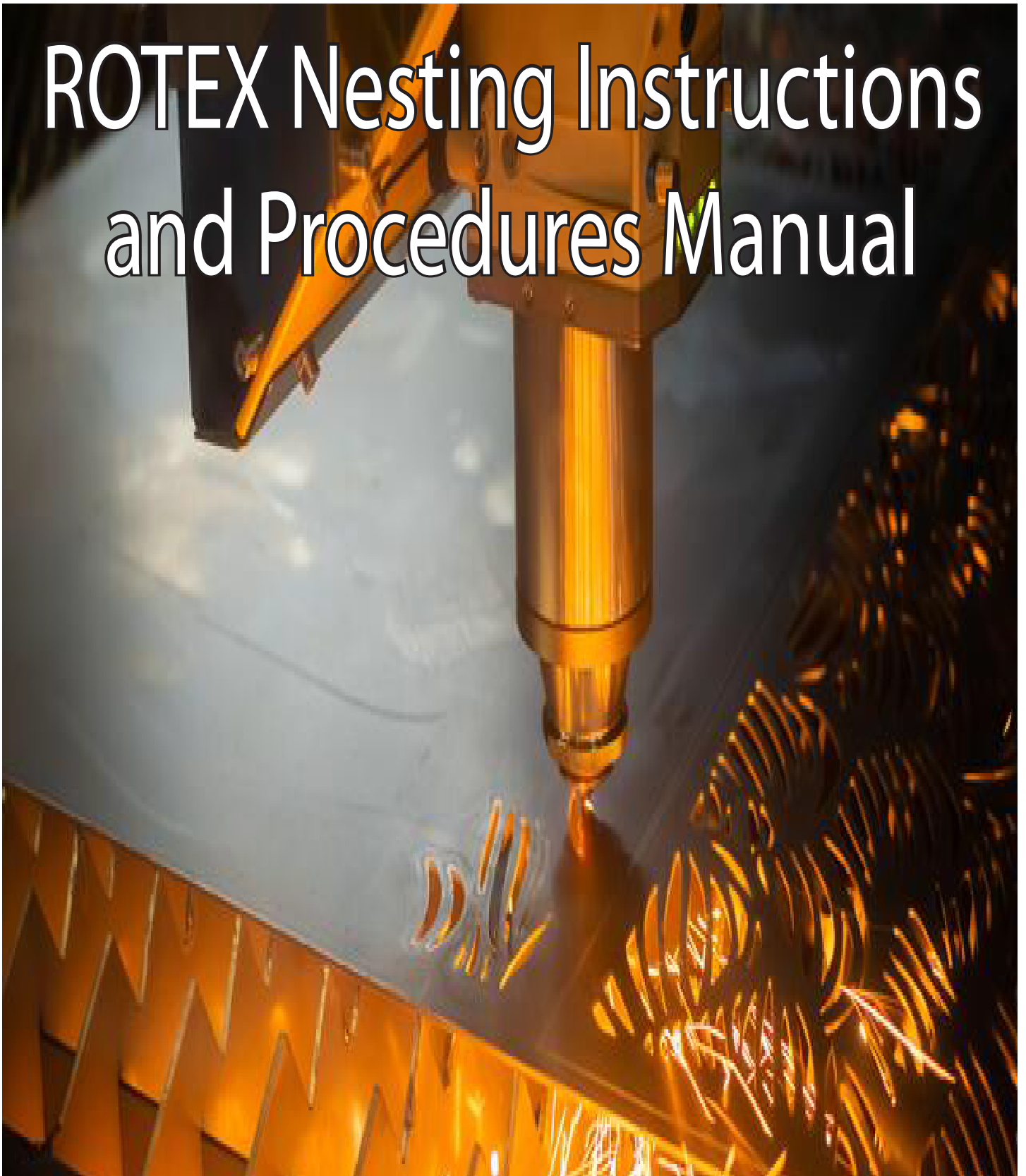


# ROTEX Nesting Instructions and Procedures Manual



**N E S T I N G**

Rotex Global, LLC



**ROTEX** 17/3  
HIGH PERFORMANCE SCREENS

Rev-1 9-22-22

# Laser Nesting Using C.I. LaserNest Software

## \* Basic Steps and Processes for Conformity in Laser Programming:

This section is to show some basic steps that we need to hold when programming in so that we can be sure that we capture all the information needed, and, which will also create a self check system when programming to ensure we have not missed anything and ensure that we get what we need before taking the nest(s) to the floor.

If the programmer nests using the same steps every time, it will become habit. So if we get into using these basic steps in the order that they are designed to be used, then every time a nest is made, they will all end up with the results we are needing, and giving us habitual "save" opportunities, numbering and naming processes that need to be done each time, and just by habit of doing it the same way every day.

Following are these basic steps that explain what is needed and why when nesting using Cincinnati Incorporated Laser Programming software. These are really easy, and if followed will make your nesting much easier in the long run especially when saving, printing and ending up with the documents and information we will need for material issuing and in other areas.

One of the first things you will be using is the "Project List" sheet in which you will be writing the SO#, MO#, Material size (if needed), Gauge or Thickness of the material, Type of material, Qty (if needed), the Nest No#, and the date you nested that particular nest. This information has proved invaluable when checking on jobs thru shop and to help answer a lot of questions regarding the nests if any issues arise.

Below is a sample of the sheet and an example of how to fill it out shown in Fig.1.

SO#'s	MO#'s	Mat'l Size	Gauge	Type	QTY.	Nest No#	Date
82475	83571_72_73, 82335, 82889		14ga.	HRS		131505	1-19-15
82825	83313, 83312		16ga.	304ss		130012	
82825	83313, 83312		10ga.	AR200		148590	

Fig.1

All detailed information about the nests are entered on the sheet for possible future use. SO#'s, MO#'s and material sheet sizes (optional) are entered as shown and can include any additional little notes or abbreviations if needed for your use. This makes it easy to find a nest and see if certain parts were on it or not or...

It is not required to fill out the "Mat'l Size" section or the "QTY" section if you don't want to. They're just there in case you want to utilize them.

## ~ CREATING A NEST ~

- 1) First open a nest file as usual, by opening the program by selecting a “New Nest File” button as shown below in Fig.2 and a new nest file window will open for you to begin as shown below in Fig.3.

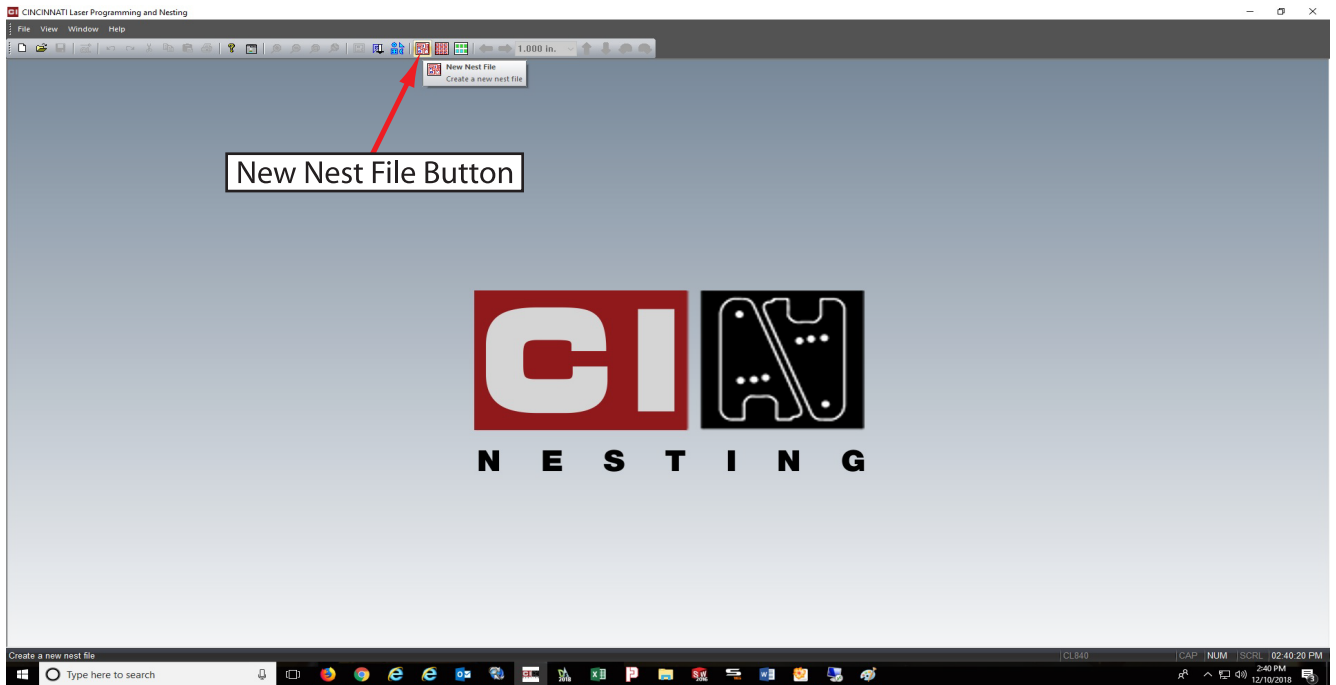


Fig.2

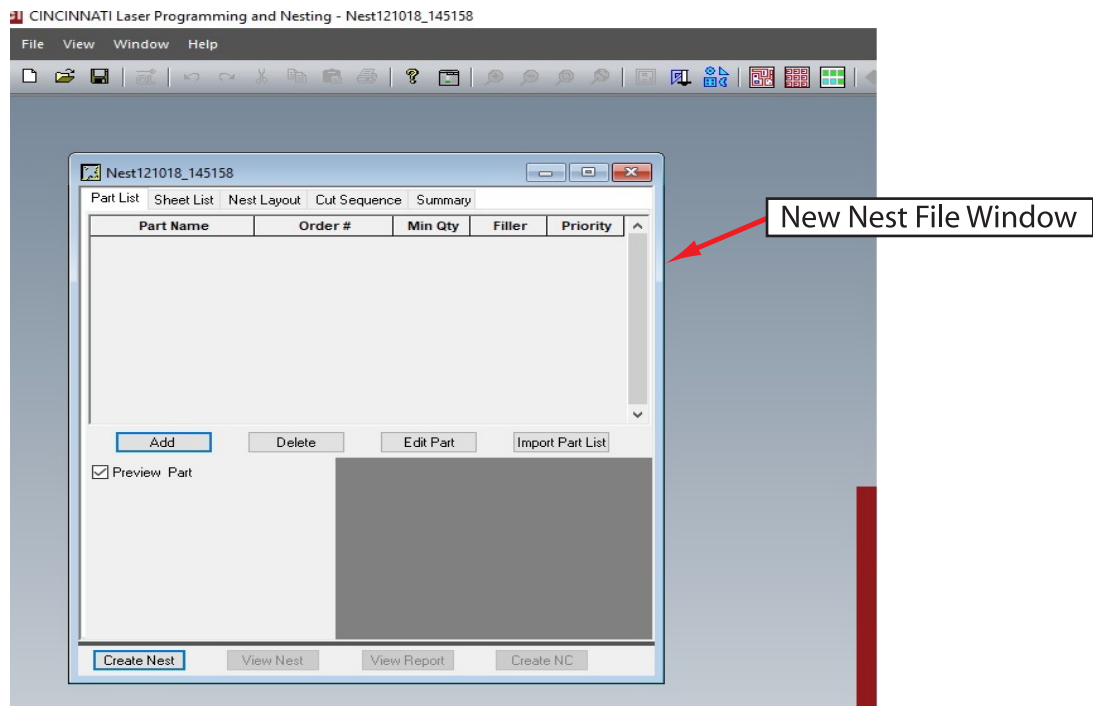


Fig.3

- 2) Now go back and fill out all the info needed on the “PROJECT LIST” sheet as shown on the previous page.  
*(Remember to follow these steps as shown, in this order, so you won't forget anything and will have what you need as you progress through the programming process.)*

## ~ Adding Sheet Material ~

- 3) Next add the sheet(s) of material you wish to use by clicking on the “**SHEET LIST**” tab, the 2nd tab from the left on the upper tab bar shown below in Fig.4. As a default, make sure you check the “Unlimited Sheet Quantities” box so you will have enough sheets to cover your nest in case more than one is needed. If more are needed and you only have one sheet available, there will be parts left off of the nest due to no more sheets to put them on. So check this as a default. This setting will also stay in that selection unless you uncheck it for a different nest for special quantity or other. Just know that you will have to re-check the unlimited box when you’re done or it will stay in that selection as well.)

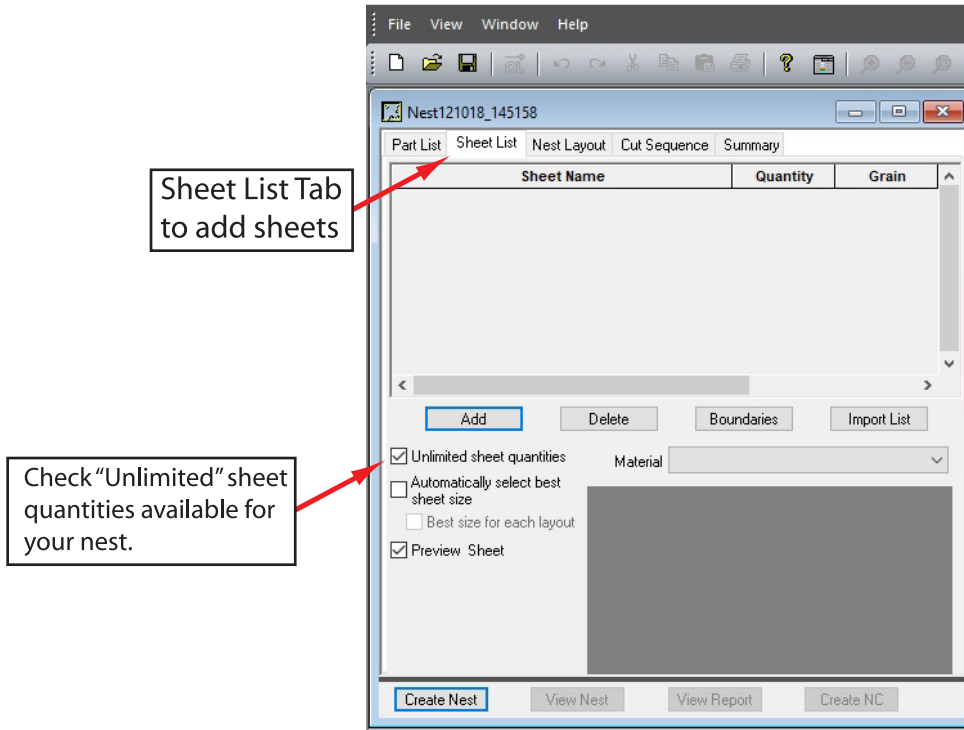


Fig.4

- 4) Now you will add the size of material you will need for the nest by selecting the “ADD” button, Fig.5. After selecting the ADD button, a drop-down window will appear in which you can input your Length and Width of the sheet you are going to use as shown in Fig.6 on the next page.

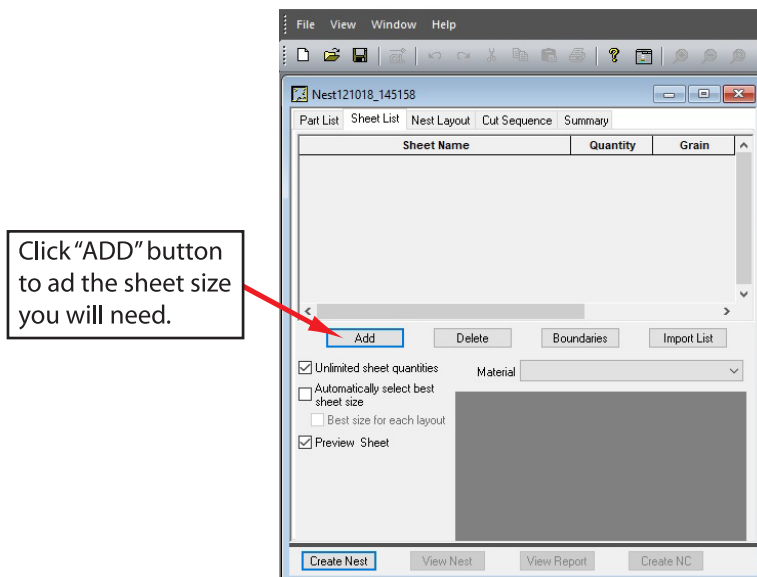


Fig.5

5) This is the window to input the sheet size you want to use for this nest, Fig. 6 below.

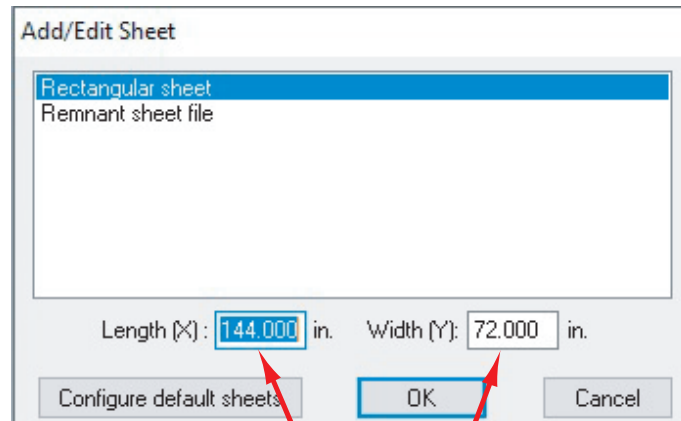


Fig.6

Type in Length and Width Sizes Here. Then click "OK"

## Selecting Sheet Material Type

6) Now you will add the "type" of material you will need for the nest by clicking the drop-down "Material" menu shown in Fig. 7. Choices for what material types you can select are in that drop-down which are created in the Configuration section of the software. These will include stock default materials as well as any new or special materials that you may have added to your configuration .

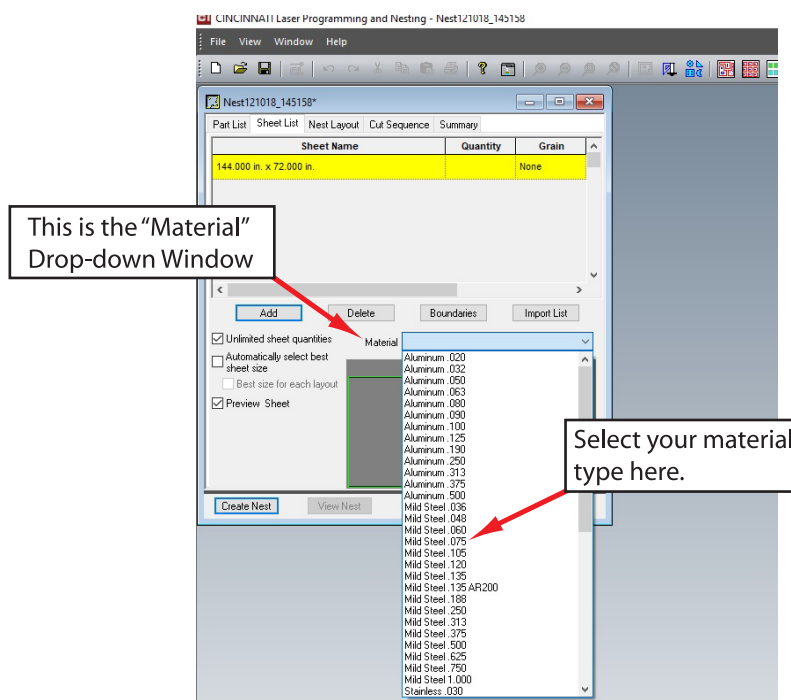


Fig.7

- 7) Now you **MUST SAVE** the nest in the “**Nest Back-up Folder**” at this time, which is located in the LASER DXF FILES folder. (This will keep you from having to browse and switch folders during the programming process each time you save your work) Do this now!

## ~ Adding Existing Part Files To The Nest ~

- 8) Next, add the parts you want by clicking on the “**PART LIST**” tab (1st. tab from the left on the upper tab bar), and then click the “**ADD**” tab on the far left of the window to open the search window to select the desired part folder, then click “**OK**” to place the part into the parts list shown in Fig.8. Repeat for each part needed.

**NOTE: All “Part” and “DXF” file Folders for all nesting parts are in the “Laser DXF Files” folder. See Fig.8 below.**

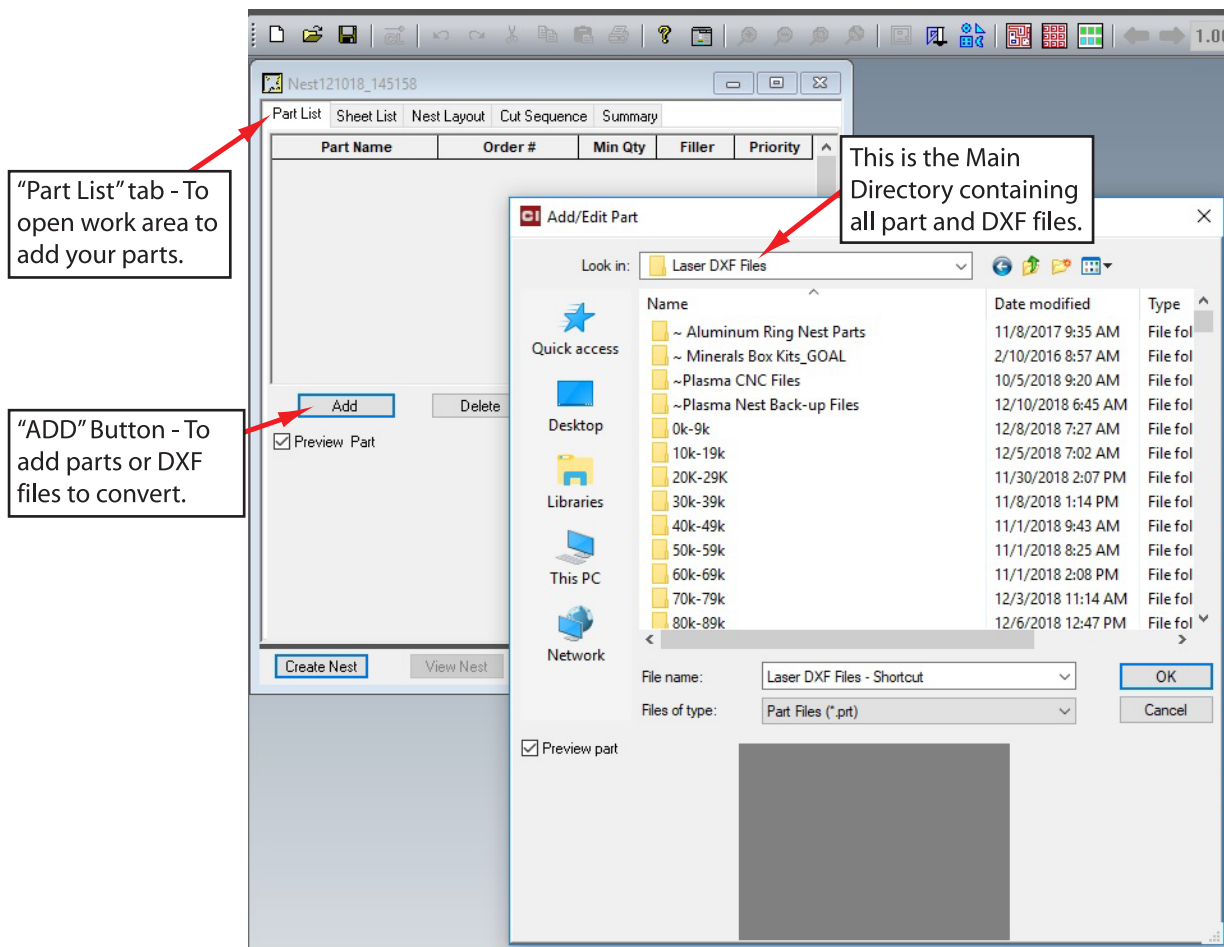


Fig.8

- 9) After you've placed your part in the parts list, you will need to verify a few things to make sure the part is the correct Material Type, Thickness, Lead-In and Lead-Outs are cutting the right side and direction, and a few other settings that need to be selected depending on the type of material you are using etc.
- 10) There is a pattern of selection that you will follow which will make sure you cover everything you need. Things that usually end up causing problems if not addressed. The next selection will show you what you need to check, and in a quick manner so you don't spend a lot of time going back for something you missed previously, and then having to go back and do it again.

- 11) To check the part, the first thing you do is to click on the “EDIT PART” tab in the lower section of the parts list window, as shown below in Fig. 9, and an editing window will pop up showing the part and information about it. (NOTE: This is editing the part only, and has nothing to do with the “nest” itself, only the characteristics of the individual part you are working with)
- Now notice there is a pop-up menu in the upper left corner of the window that will be displaying “General”. Click on the menu and it will drop-down showing all the things you can check within your part. We will only use a hand ful of these as not everything pertains to us and our use. See Fig.9 below.

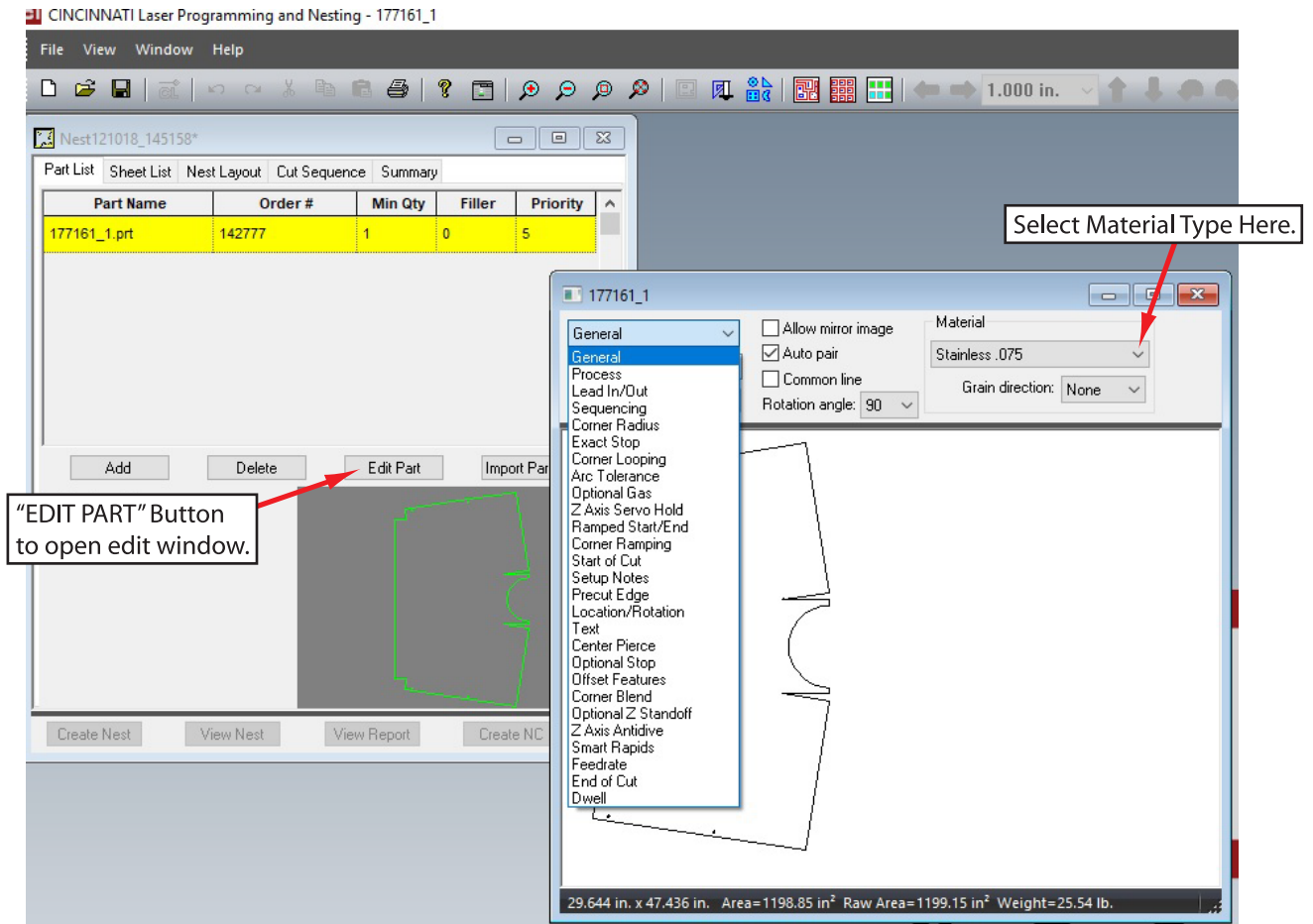


Fig.9

- 12) Before going through that drop-down list, you will first need to check the material of the part. You'll notice in the upper right of the editing window it mentions “Material”. In the beginning, you selected a sheet of material and associated it with a material type (HRS, 304ss etc.). Now you will need to select the SAME material type for your parts that you selected for your sheet in the beginning so they match. They MUST match or you will get errors and may not nest due to conflict of materials. So click on the drop-down and select the material type you will be using.

Your selection will now be displayed in the “Materials” box for that part as shown in Fig.10.

- 13) Now go back and click on the drop-down menu that says “General” and we will go through the items you'll need to check before moving onto the next part.

- 14) The first thing in the list you will check is the "Process" from the Process window. So scroll down the window to highlight and click on the "Process" selection. This indicates and or sets if you are cutting with Oxygen or Nitrogen or another function of the Process List that you want the laser to do while tracing the geometry. It will be the next item in line of the drop-down as shown in Fig.10 below for this illustration. Your menu line-up may be different, but the selection is the same.

NOTE: If cutting Mild Steel, you will select "CUT", and click on all the geometry that you want to cut in Mild Steel, and it will change the color to "BLACK". Next, in the Process Menu, select "ETCH O2". If the part number is on the part (usually is and we'll get to that in the next item), then click the part number to etch in Oxygen, and it will turn "RED". Now, if your part is Stainless Steel, then select "CLEAN CUT" from the menu for Stainless or Aluminum materials, and select the Geo for those items cutting in those types of materials, then select "ETCH N2" from the "Current Process" menu for Text etching in Stainless materials, but **DO NOT ETCH ALUMINUM!** Aluminum is too reflective and can shoot the beam back up into the laser and does very bad things. Very expensive and time consuming to fix, so No Aluminum Text Etching!

So as for a quick glance of any existing parts you want to add, you will see "Black and Red" for mild steel parts and "Brown and Lime Green" for stainless steel parts, which you will use to save you time as you get better at nesting.

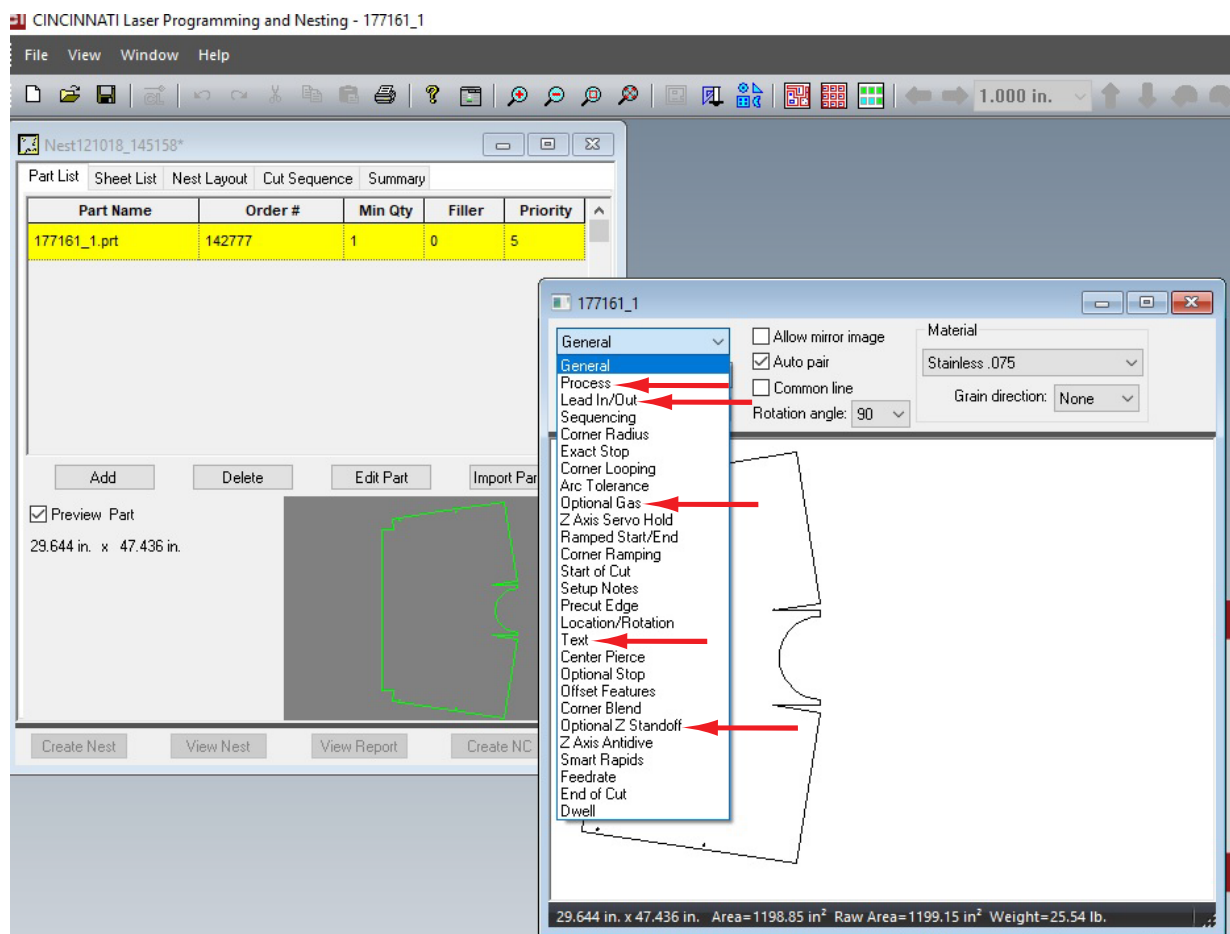


Fig.10

See the next figure, Fig.11, to see the color breakdown from the menu.



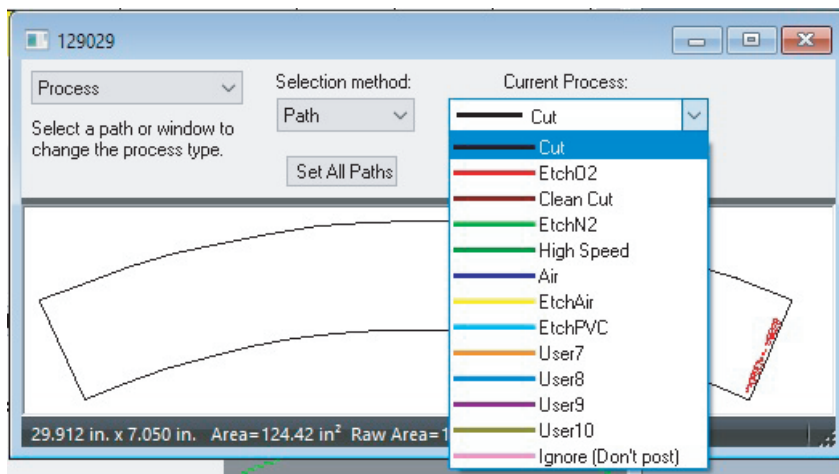


Fig.11

- 15) After you set your Processes to cut and Etch, now you will do a quick check through of a few more Process settings to make sure they show up before you move onto the next step. DON'T skip these few Process checks as they will cause the Laser problems during cutting. As shown in Fig.12 below, you can see the order in which you check the next few items. Check these in this order THE SAME WAY EVERY TIME so it becomes habit, and all your nests will have the same results before moving on.

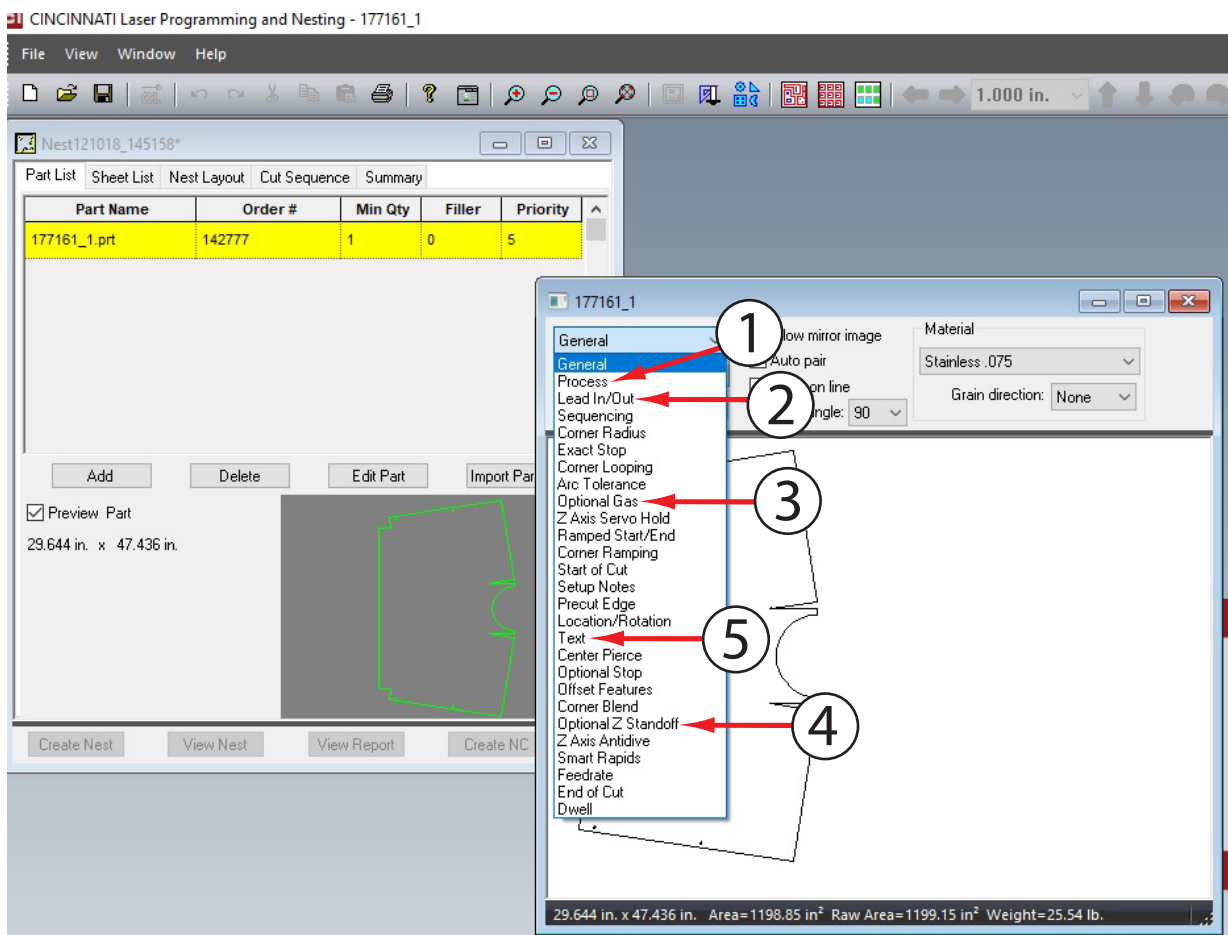


Fig.12

- 16) Since you've already checked the "Processes," next, find the "LEAD In/Out" selection, NO#2 (FIG.12), and it will highlight all the Lead-in pierce points, the path and order in which they will be cut (shown in blue) on that part. Make sure they are leading in on the correct side of the hole or outer perimeter of the part itself. If not, then change to suit the correct lead-in side or direction.

- 17) Next, check "Optional Gas," NO#3 (Fig.12). You will now see that every place a Lead-In is located, you will see a RED DOT indicating a lead in and that "Optional Gas" will be applied to that lead-in. If no Red Dots are seen, then select the "AFTER ALL LEAD-INS" button shown below in Fig.13, and it will apply the gas to all lead-ins on that part.

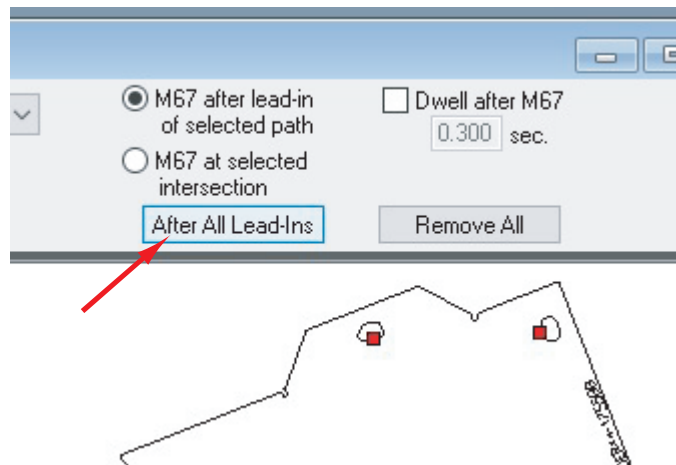


Fig.13

- 18) Next, check "Optional Z Standoff," NO#4 (FIG.12). The same thing should occur for this function as fit did or Optional Gas. You should see Red Dots at every lead-in location as well. If not, then again select the "After All Lead-Ins" button in that window to apply the Standoff function to all lead-ins. Do NOT skip 3 & 4 as they are essential for proper cutting!
- 19) The next thing to check is the "TEXT" option, or NO#5 (FIG.12). This is where you will add or edit the text that is needed so the the MO# and part number will be etched onto the parts, which HAS to be done for correct placement to the correct job. You then will be able to confirm the correct process (black and red or brown and lime green) for the correct cutting and etching gases mentioned previously. So pull down the menu and select the "TEXT" selection to open the text editing window and click on the "ADD TEXT" button which will open up the selection window as shown in Fig.14 below.

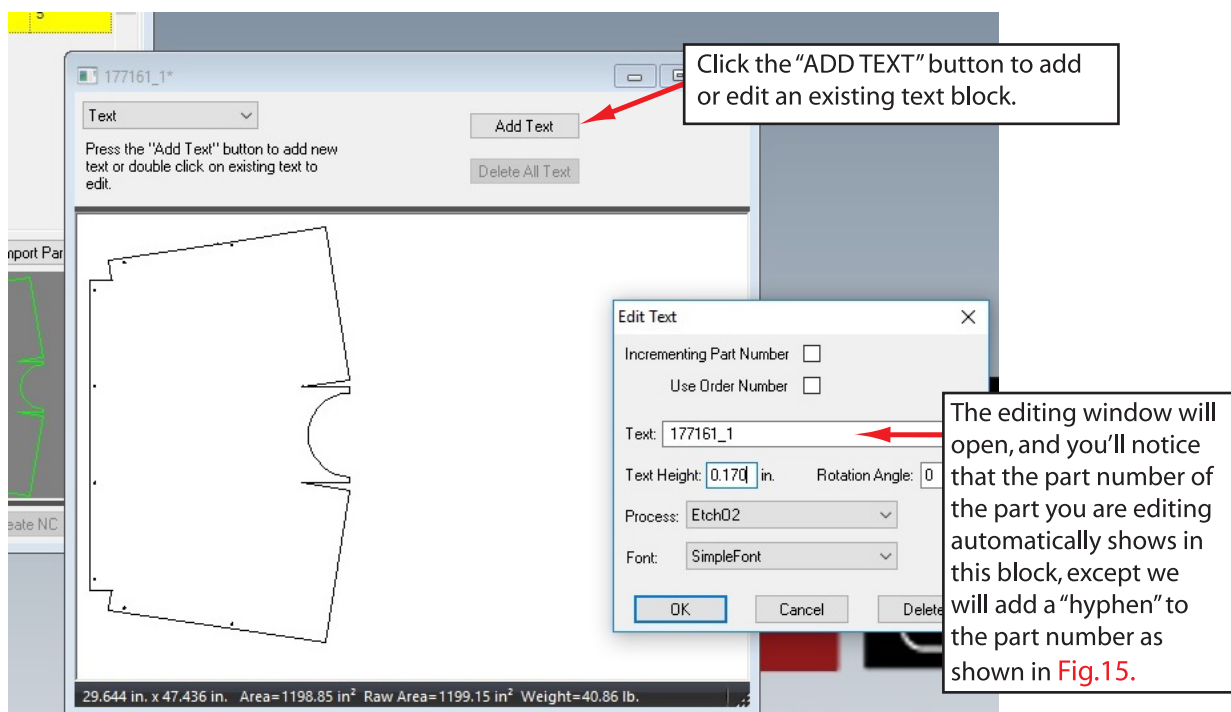


Fig.14

We will add this hyphen to the part number here as shown by typing it in, in front of the part number, so that it matches up with the MO# placed by clicking the "USE ORDER NUMBER" box in the upcoming steps. After you have typed in the hyphen, click OK to place the text onto the part.

NOTE: The "USE ORDER NUMBER" selection will automatically insert the MO# (that you entered in the parts list) in front of the part number when it etches so you don't have to go back each time to change or add the current MO# for the existing part you're nesting when you use it next time.

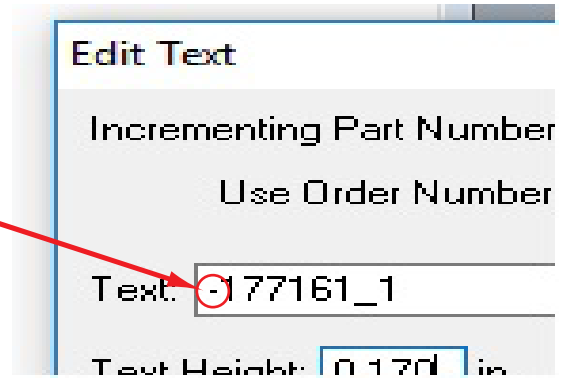


Fig.15

There are a couple other things you'll need to enter or select, see notes in Fig.16 below.

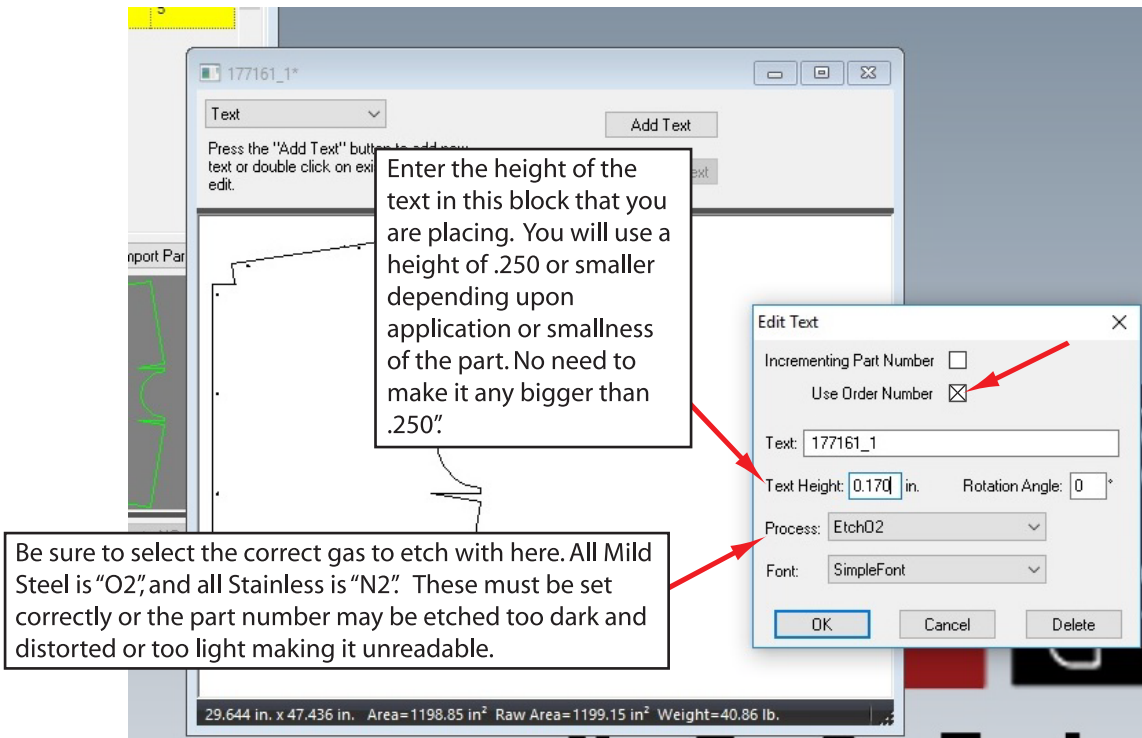


Fig.16

20) After all entries are made for this window, click "OK" and everything you entered will be applied to the part and will randomly place the text somewhere on the part. However, we will strategically place it in a specific area of the part to be consistent with all the other parts.

21) As mentioned, to be consistent with part labeling and also so those who handle the parts can find the numbers, we will ALWAYS place the text items along an edge of a part, preferably at a corner if possible, and **facing out** so that when someone picks a part up to look at, they can read the numbers facing them in the right direction. See Fig.17.

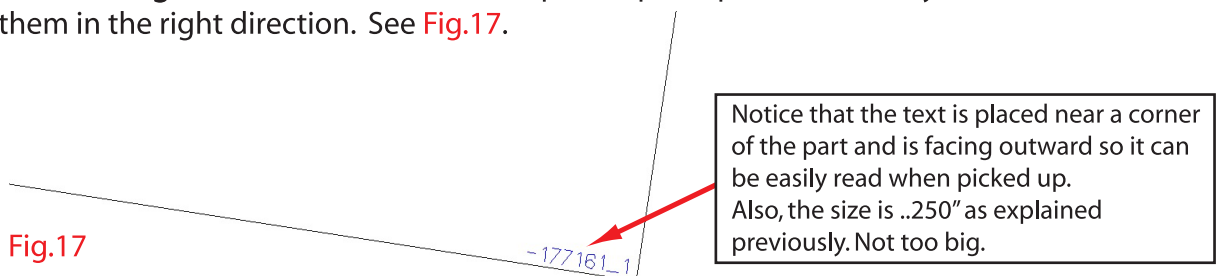


Fig.17

- 22) Now we need to add the "Order Number" to the text etching. To do this we will click the "ADD TEXT" button again, except this time you will click the "USE ORDER NUMBER" box ( shown in Fig.16) and then click "OK" to apply the extra added text. This will place the code word onto the part for the software to identify that it needs to insert the MO# you entered in place of the code word so it will be etched. The only other thing you need to do is place the "**\*\*ORDER\*\***" code word text in front of the part number on the part as shown in Fig.18.

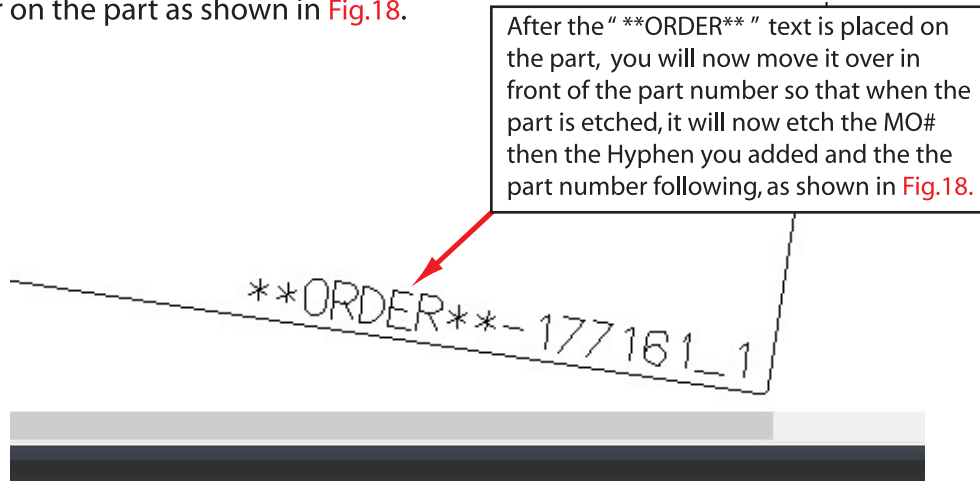


Fig.18

- 23) After all text is placed, now go back and check the "PROCESS" and see if the text process is the correct one for the type of steel you are cutting, as mentioned earlier, Mild Steel is "CUT" (black) and Etching is "O2" (Red), or Stainless "CLEAN CUT" (brown) and Etching "N2" (lime green). If the text is NOT the correct gas or selection, then simply pull down the processes menu, click on the one you want to change it too, and then click on the text you want to change. See Fig.16 for menu selection. Now **SAVE your work and close the part window.**
- 24) Next, be sure to type in the MO number of the job you are working on in the "Order#" block located in the nest window. This will be the number that will be etching on the parts as well as listed on the nest that is given to the laser so they know what job the parts go to. See Fig.19 below.

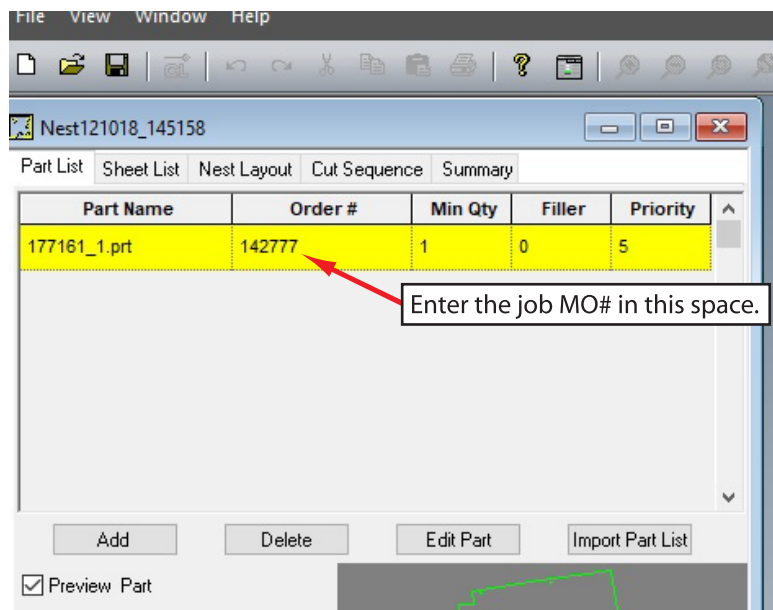


Fig.19

After typing in the MO# for that part, SAVE your work again. Now proceed to add another part if needed and repeat these instructions for each part. Do the process the same way everytime so that these processes become habit and almost second nature. This will help eliminate errors and lots of re-work on your part.

## ~ Adding A New Part From a New DXF File~ (Single Part Conversion)

When adding a new part from a DXF to add to your parts list, the “Conversion Process” of the DXF is the only difference between adding a new part from new geometry and adding an existing part file we just went over previously in these instructions. The following steps will show you how to convert a DXF CAD File to a part or “.prt” file to nest with. Once you have converted the geometry to a part file, then the rest is the same as we did previously when selecting an existing part.

- 25) The first thing you do is click on the “Import CAD File” button in the top icon bar to locate the file you want to convert as shown in Fig.20. A drop-down window will appear, and simply search the folders to locate the part DXF you want to convert to a usable part.

Part DXF Folders are located here: **Common Data S:\Engineering\Laser DXF Files.**

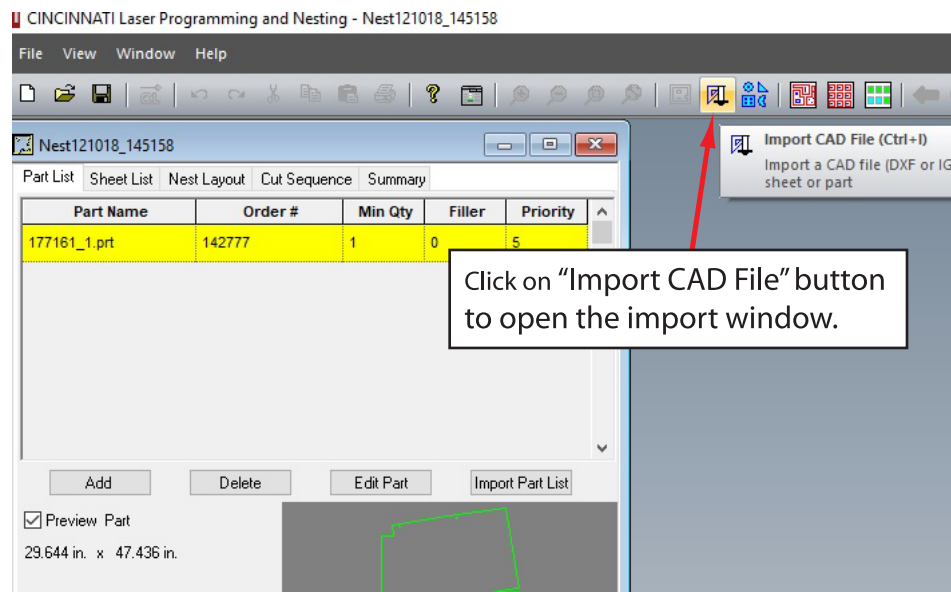


Fig.20

- 26) When you have located the DXF file you need, highlight it and click “OK” and it will pull in the file and display it in the conversion window with the greenish teal background, as shown in Fig.21. Now click the “Convert” button and the conversion window will open where you will select a few things there.

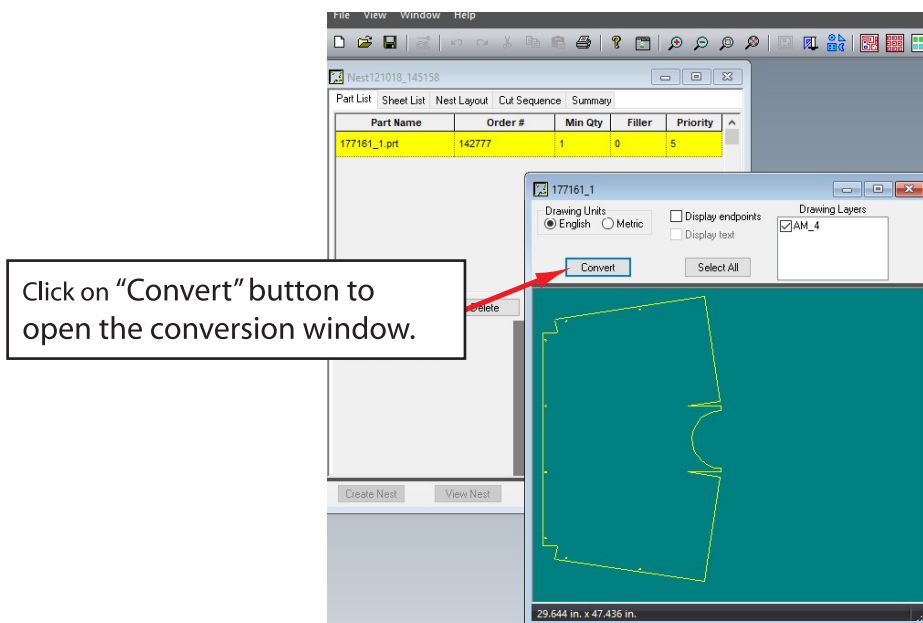


Fig.21

27) Once the window is opened, you will now need to set a few things so files go where they need to and processes are correct etc. So the first thing is to check the directory number you will be saving the part file into. Just highlight the folder number in the text line and type in the correct folder number. This will make sure the file goes in the correct location when you go to nest it.

Next, you'll notice a selection for the type of material you will be using for your part. Make sure this material matches the same material you chose for the sheet you are cutting the part out of so you don't get an error message that the two materials don't match.

The bottom section is where you will select the process by "layer". If there is more than one layer in your part, for example, one layer is cut and the other layer is etch, then you can select what process you want to happen with each layer. In our case, the part only has one layer as shown in Fig.22. This selection process is the same as you did when adding your sheet material in the previous sections.

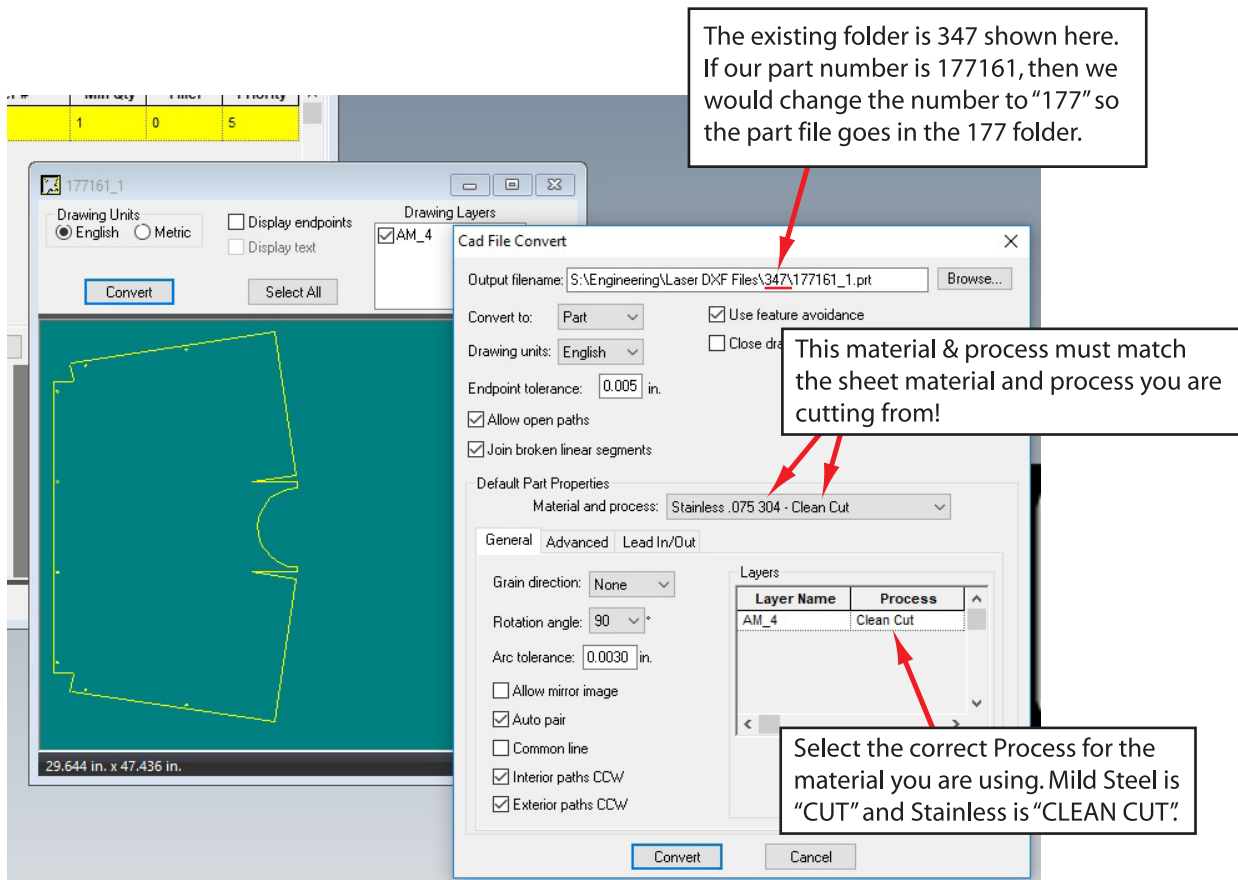


Fig.22

- 28) Next, select the “Lead In/Out” tab. Here you will select the length of the lead-in cut, the lead-in angle and feetrate. These items will remain selected with the numbers you put in until you physically change them again. No need to look at this everytime once you change them, as with all other settings in this window.

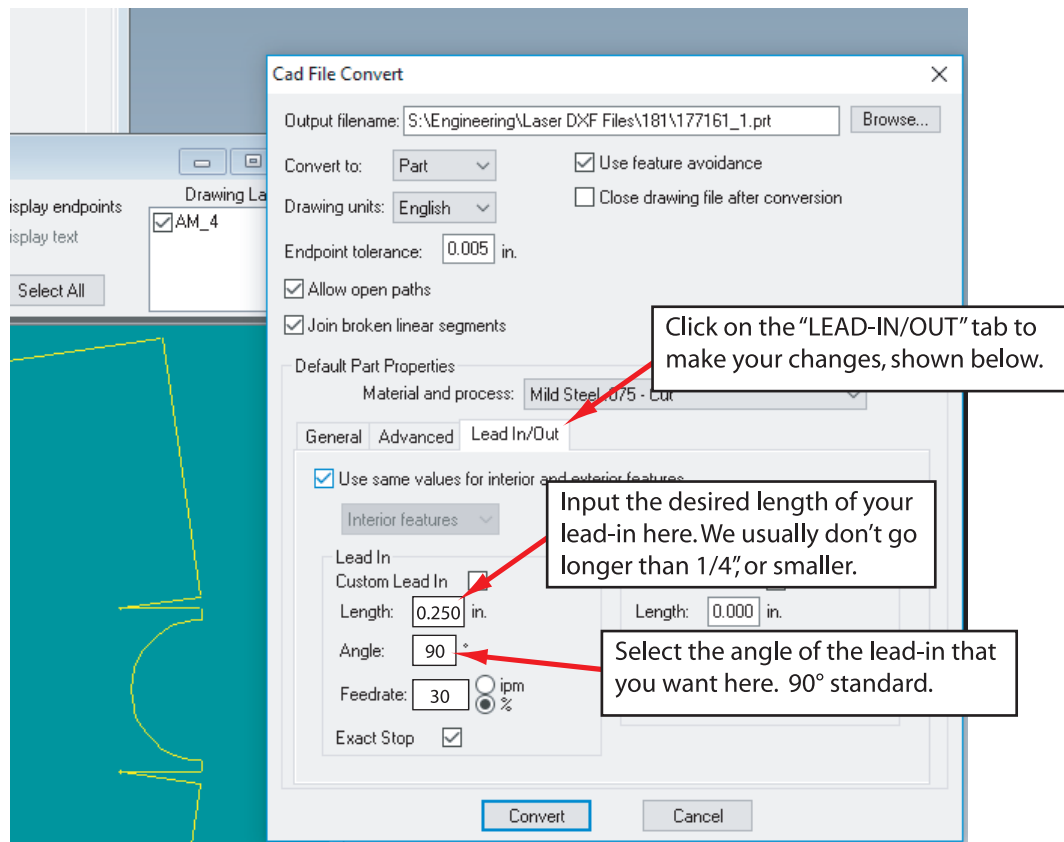


Fig.23

- 29) Now select the “Advanced” tab and set your settings to the same as shown in Fig.24 below.

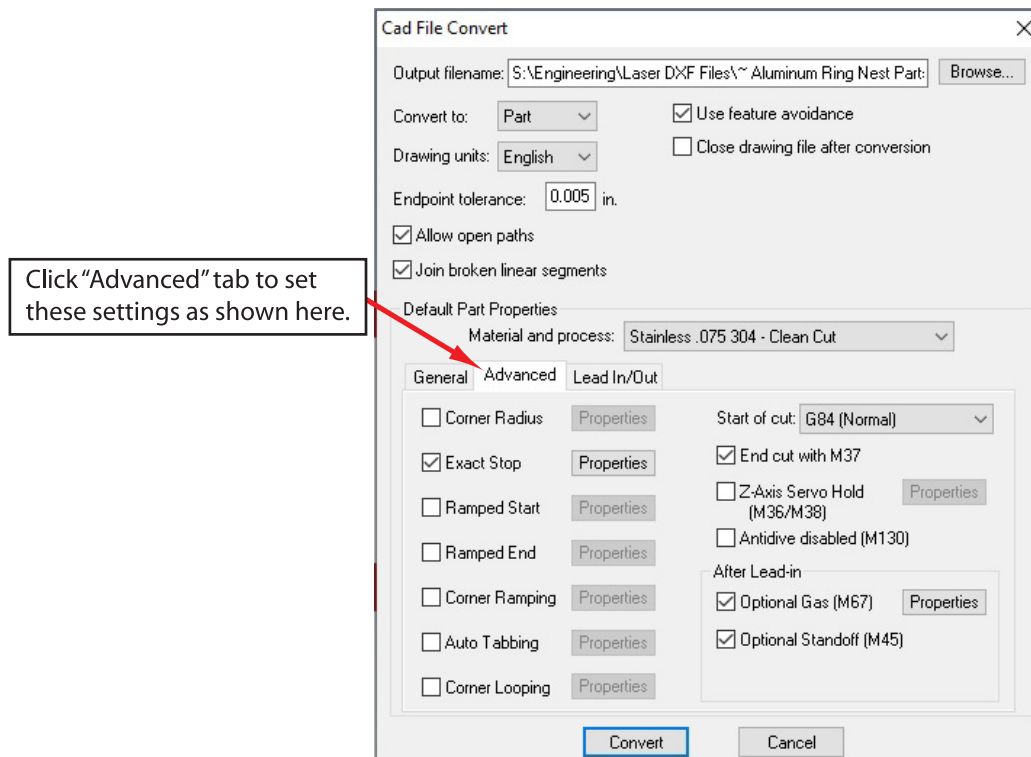


Fig.24

- 30) Last, select the “General” tab and make sure **your window has the same settings as shown below in Fig.25.**

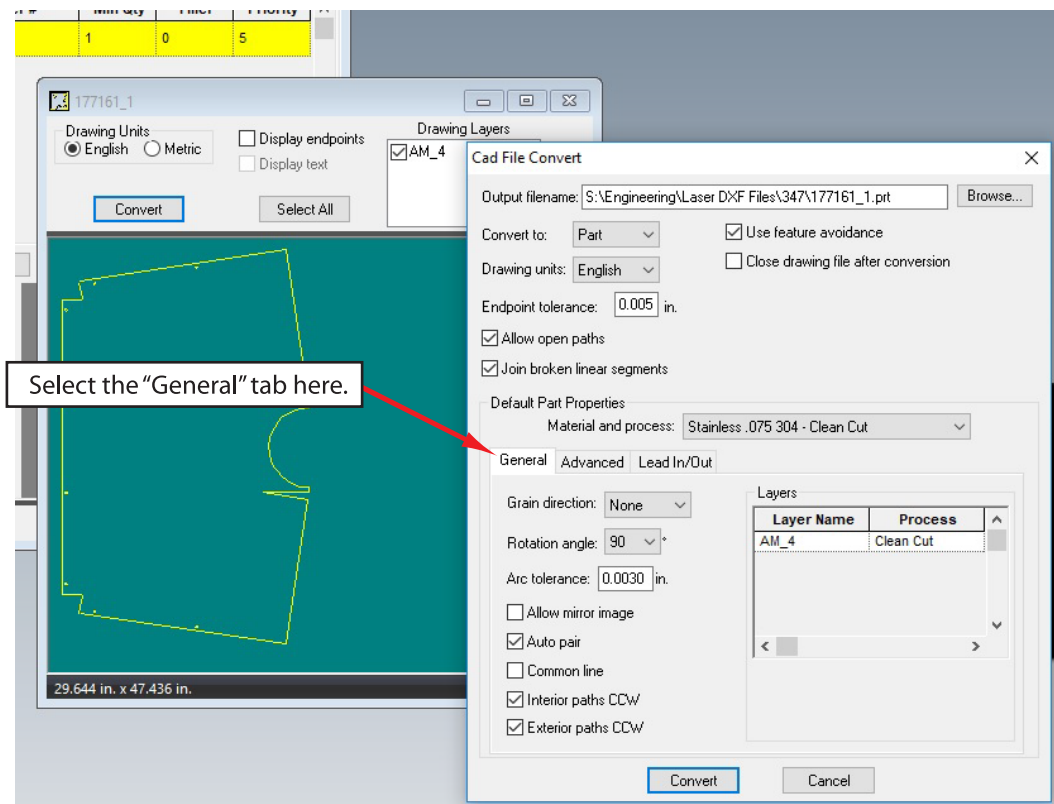


Fig.25

- 31) After you have completed setting up the conversion windows, click the “Covert” button at the bottom of the window and it will convert your part.
- 32) When your DXF has been converted to a part file, it will open it up in a sparate window next to the greenish window you converted it from. Now, go thru and check all settings to get the part ready to nest as you did in the “Adding Existing Part Files” section on page 5 checking the Processes, colors etc.

Now SAVE your work if you haven’t already, close both part windows and continue to add your new part to the nest the same way as an existing Part File explained earlier in these instructions.

**NOTE:** If you have more than one part you need to convert using the same material going in the same folder, you simply open the next DXF and hit “Convert” as all your settings will have remained the same from the first part you converted.



## ~ Creating The Nest ~

- 33) When your finished adding all the parts you need, select the “Nest Layout” tab as shown in Fig. 26 below, and a window will open showing more items you’ll need to select before posting your code. The left side of the window (Fig.27) offers different ways of nesting according to how you want to nest the items. Unless you are after a specific direction to nest or other, we will always just use the settings shown below in Fig.27 so that it runs through all 6 different nesting configurations for the most efficient use of material and placement of parts. The last box (lower right corner) is used to set the spacing between the parts in your nest.

Make sure your windows have the same items selected or checked as shown if Figs.26-28 below.

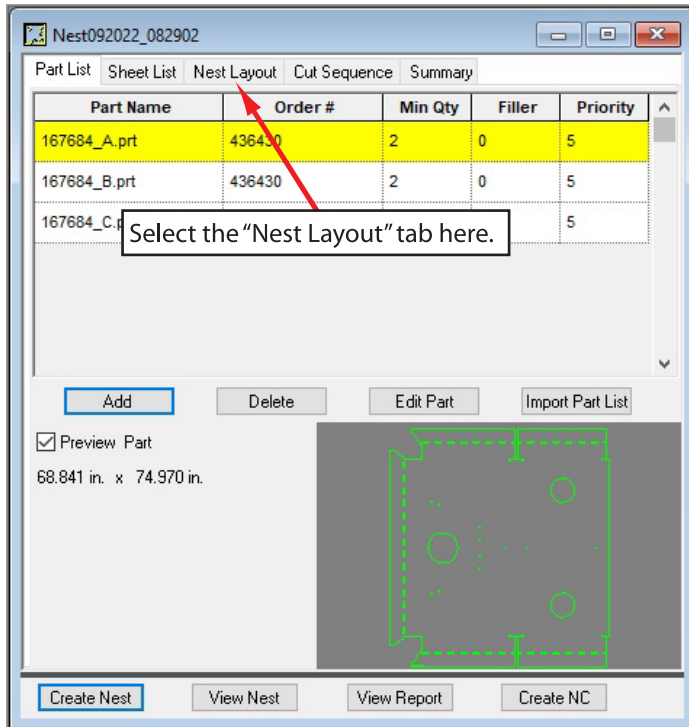


Fig.26

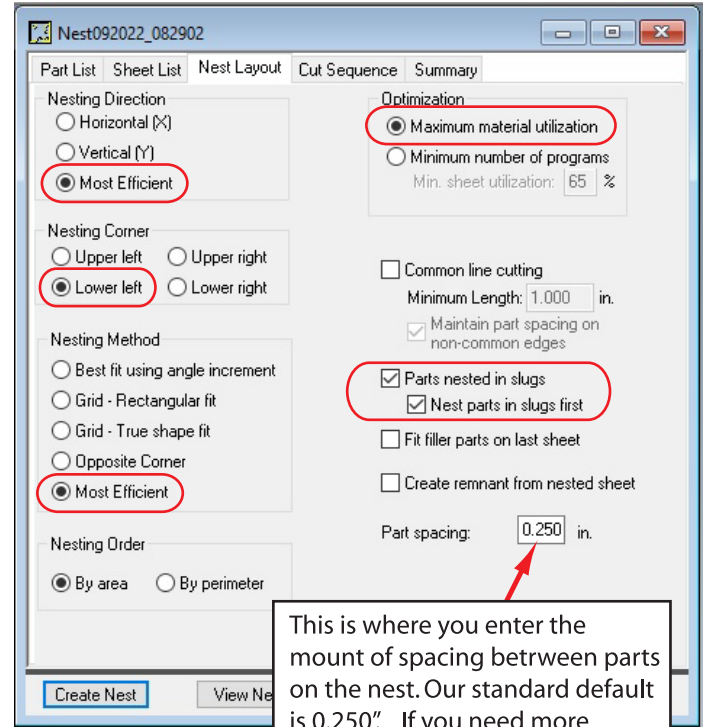


Fig.27

This is where you enter the mount of spacing between parts on the nest. Our standard default is 0.250". If you need more between the parts, just increase the amount and all parts will have that spacing between them.

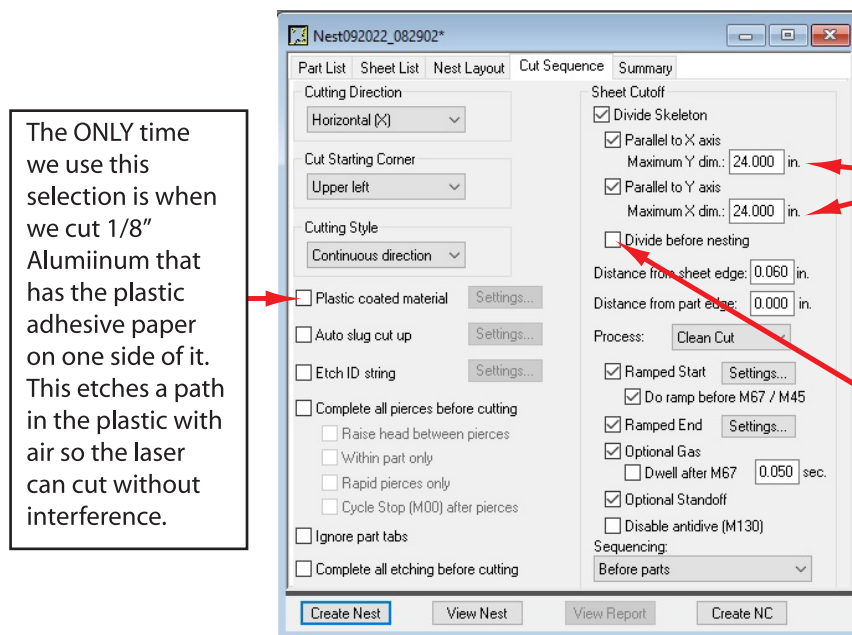


Fig.28

Do NOT Check this box. It will divide your sheet into pieces and try to nest your parts onto those pieces. Big Mess!

34) The “Summary” tab, which is the last tab, shown in Fig.29, shows you what actually got nested and what did not, after you run your nest. We will show this ahead. However, once you have all your settings selected or checked, you are now ready to create your nest by clicking the “Create Nest” button in the lower left corner as shown in Fig.29 below. It will run through the nesting options automatically and will stop to show you what it ended up with and how many sheets needed etc.

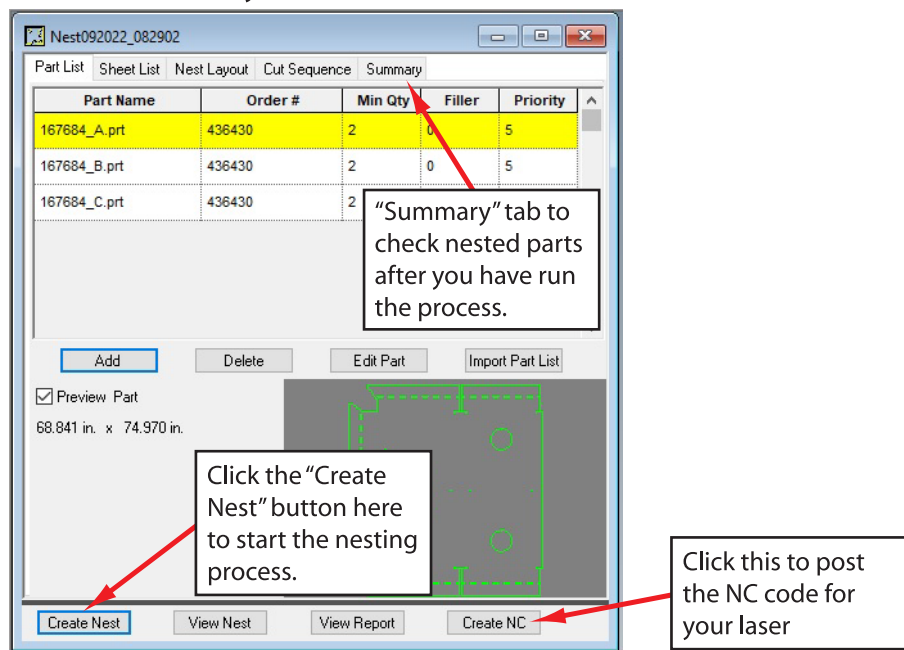


Fig.29

35) After you have run the nest, another window will open which is your work space. It will show you the nest including all sheets if multiples, and will show you all the skeleton cut-off lines of how the remaining scrap will be divided up to discard or save. Notice the Pink Grid Lines on the right side of the sheet below Fig.30, those are the scrap cut-off line of the remaining pieces to be scrapped if so desired. If you were wishing to save that half of sheet of material, you would just trim away the unwanted lines and create a new single cut-off line manually at a location you decide. See Fig.31.

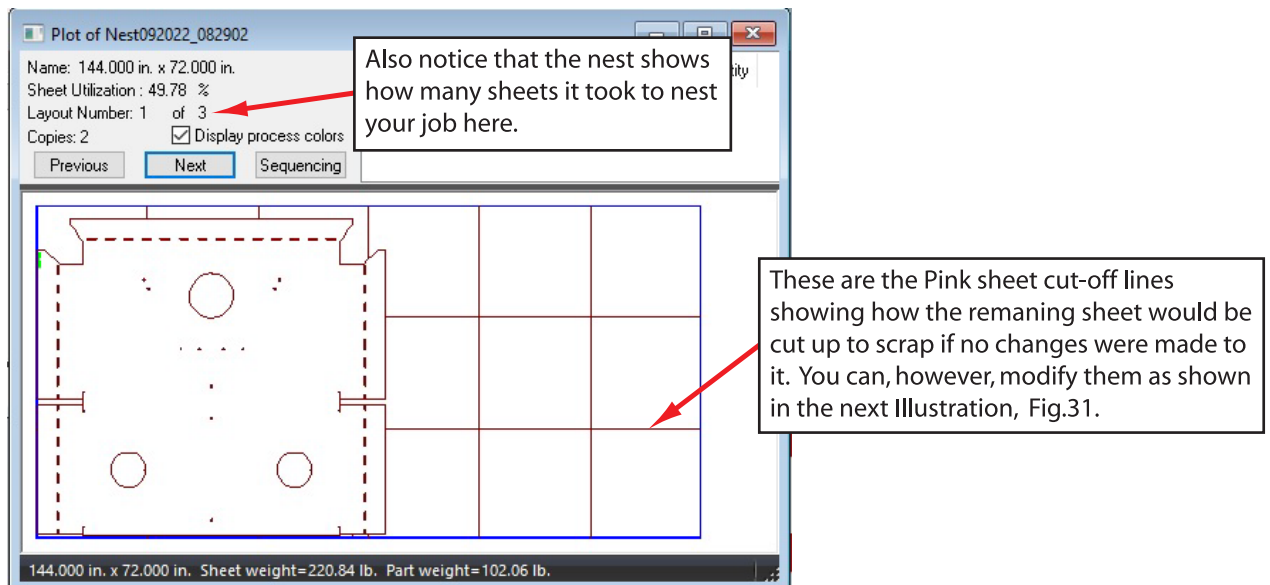


Fig.30

## ~ Checking For Nested Parts ~

- 36) Before you modify any cut-off lines or post your nest, you'll need to make sure that all of the parts you added did indeed make it on the nest and didn't get kicked out for some reason. So to do this, you will click on the Summary tab as mentioned earlier, and it will show you what parts actually made it onto the nest. These will be shown with the text in BLUE and will be listed in the "Actual" column of the Summary window. Ones that "Actually" made it. However, if a part does not make it on the nest or was too big for the sheet or something, it will be listed in the "Diff" column and the text will be in RED with a Minus sign in front of the numbers showing the nest is short those parts.

Fig.31 below shows two of the parts are not nested, and only one part is. However, Fig.32 shows all parts that were added to the nest list did in fact get nested on the sheet/s.

Part Name	Order #	Req.	Actual	Diff.
167684_A.pt	436430	2	2	0
167684_B.pt	436430	2	0	-2
167684_C.pt	436430	2	0	-2

Sheet Name	Copies	Utilization
144.000 in. x 72.000 in.	2	49.78%

Fig.31

Part Name	Order #	Req.	Actual	Diff.
167684_A.pt	436430	2	2	0
167684_B.pt	436430	2	2	0
167684_C.pt	436430	2	2	0

Sheet Name	Copies	Utilization
144.000 in. x 72.000 in.	2	49.78%
144.000 in. x 72.000 in.	2	42.16%
144.000 in. x 72.000 in.	2	34.48%

Fig.32

- 37) After you have made sure all the parts you need are now nested on your nest and your nest is ready to modify the cut lines, as shown back on Fig.30, continue with any revisions you need to make. Don't forget to take notes from Fig.33 on the next page to make sure you include everything that will be needed for your job.

# Laser Nesting Using C.I. LaserNest Software

## \* Basic Steps and Processes for Conformity in Laser Programming:

This section is to show some basic steps that we need to hold when programming in so that we can be sure that we capture all the information needed, and, which will also create a self check system when programming to ensure we have not missed anything and ensure that we get what we need before taking the nest(s) to the floor.

If the programmer nests using the same steps every time, it will become habit. So if we get into using these basic steps in the order that they are designed to be used, then every time a nest is made, they will all end up with the results we are needing, and giving us habitual "save" opportunities, numbering and naming processes that need to be done each time, and just by habit of doing it the same way every day.

Following are these basic steps that explain what is needed and why when nesting using Cincinnati Incorporated Laser Programming software. These are really easy, and if followed will make your nesting much easier in the long run especially when saving, printing and ending up with the documents and information we will need for material issuing and in other areas.

One of the first things you will be using is the "Project List" sheet in which you will be writing the SO#, MO#, Material size (if needed), Gauge or Thickness of the material, Type of material, Qty (if needed), the Nest No#, and the date you nested that particular nest. This information has proved invaluable when checking on jobs thru shop and to help answer a lot of questions regarding the nests if any issues arise.

Below is a sample of the sheet and an example of how to fill it out shown in Fig.1.

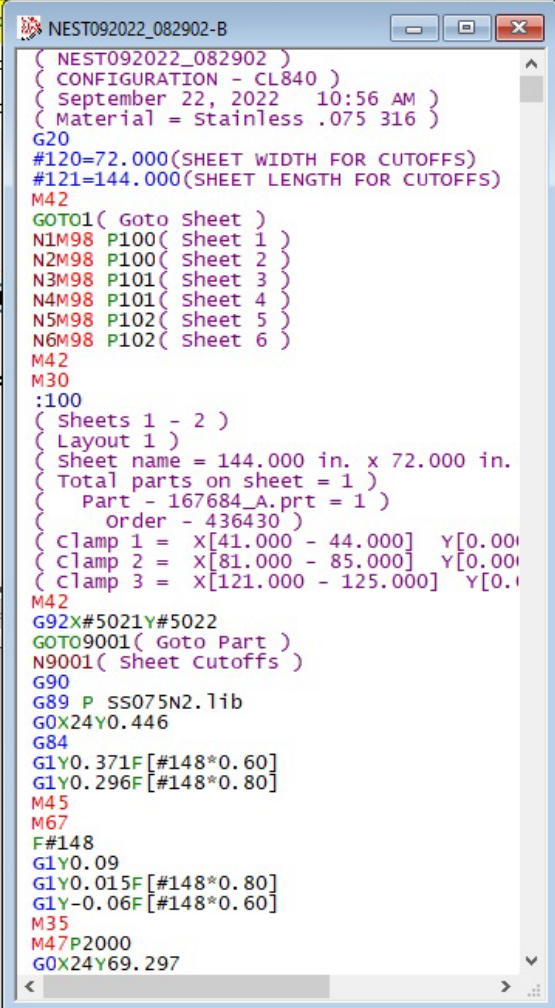
SO#'s	MO#'s	Mat'l Size	Gauge	Type	QTY.	Nest No#	Date
82475	83571_72_73, 82335, 82889		14ga.	HRS		131505	1-19-15
82825	83313, 83312		16ga.	304ss		130012	
82825	83313, 83312		10ga.	AR200		148590	

All detailed information about the nests are entered on the sheet for possible future use. SO#'s, MO#'s and material sheet sizes (optional) are entered as shown and can include any additional little notes or abbreviations if needed for your use. This makes it easy to find a nest and see if certain parts were on it or not or...

Fig.1

It is not required to fill out the "Mat'l Size" section or the "QTY" section if you don't want to. They're just there in case you want to utilize them.

- 39) Once you have made all revisions to your nest that you want to make, you are now ready to post the code for the laser to use. But first, Save Your Work once again so you don't lose the revisions you just made. Now click on the "Create NC" button (as shown back in Fig.29) and it will generate the code and open the window to show you the code that was generated, shown below in Fig.34.



```
( NEST092022_082902 )
( CONFIGURATION - CL840 )
( September 22, 2022 10:56 AM )
( Material = Stainless .075 316 )
G20
#120=72.000(SHEET WIDTH FOR CUTOFFS)
#121=144.000(SHEET LENGTH FOR CUTOFFS)
M42
GOTO1( Goto Sheet )
N1M98 P100( Sheet 1 )
N2M98 P100( Sheet 2 )
N3M98 P101( Sheet 3 )
N4M98 P101( Sheet 4 )
N5M98 P102( Sheet 5 )
N6M98 P102( Sheet 6 )
M42
M30
:100
( Sheets 1 - 2 )
( Layout 1 )
( Sheet name = 144.000 in. x 72.000 in. )
( Total parts on sheet = 1 )
( Part - 167684_A.prt = 1 )
( Order - 436430 )
( Clamp 1 = x[41.000 - 44.000] y[0.000] )
( Clamp 2 = x[81.000 - 85.000] y[0.000] )
( Clamp 3 = x[121.000 - 125.000] y[0.000] )
M42
G92X#5021Y#5022
GOTO9001( Goto Part )
N9001( Sheet cutoffs )
G90
G89 P SS075N2.1ib
G0X24Y0.446
G84
G1Y0.371F[#148*0.60]
G1Y0.296F[#148*0.80]
M45
M67
F#148
G1Y0.09
G1Y0.015F[#148*0.80]
G1Y-0.06F[#148*0.60]
M35
M47P2000
G0X24Y69.297
```

Fig.34

- 40) Now close that code window as the code is now in the folder to retrieve from the Laser, and Save Your Work again.
- 41) Next you will click on the "View Nest" button to open up the nest as before, and print out a copy of it. Now you can write down the cut-off line dimension onto the page as shown in Fig.33.

- 42) Next you will click on the “View Report” button and it will open a PDF nesting report showing the nest and all kinds of information (Fig.35 below). We will not use this report to go down to the floor as we will be taking the nest page/s you already printed out (and put the cut-off dimension on) for the Laser Operator to use. However, we WILL use one bit of info on the report. At the top section of the report there is a “Total Run Time” number on it that you will also need to write down on the nest, at the top of the nest, in the upper righthand corner area. See Fig.35 below.

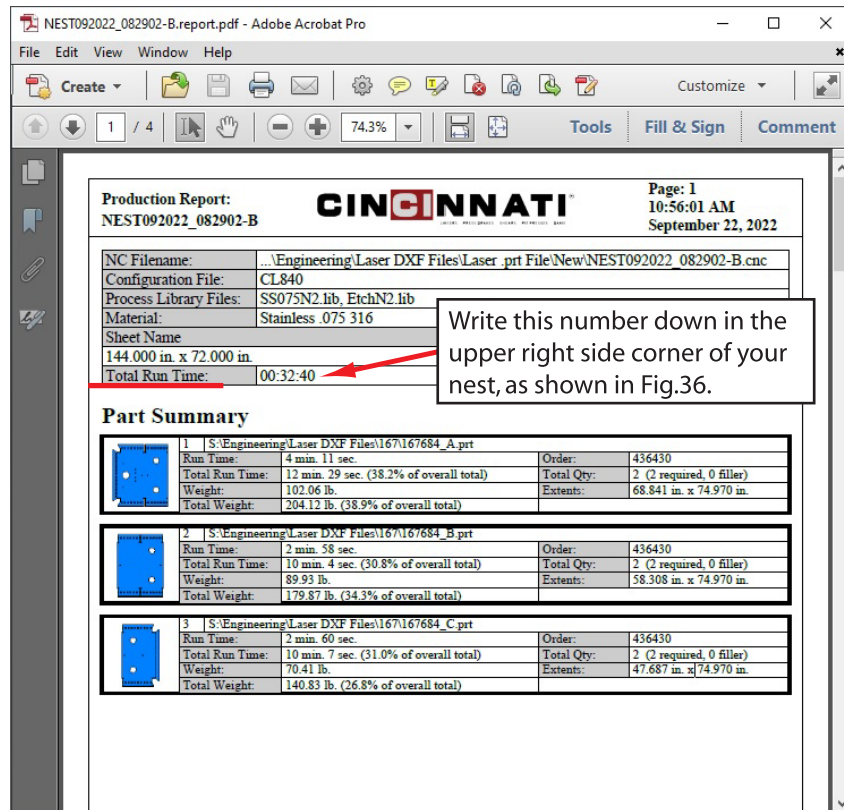


Fig.35

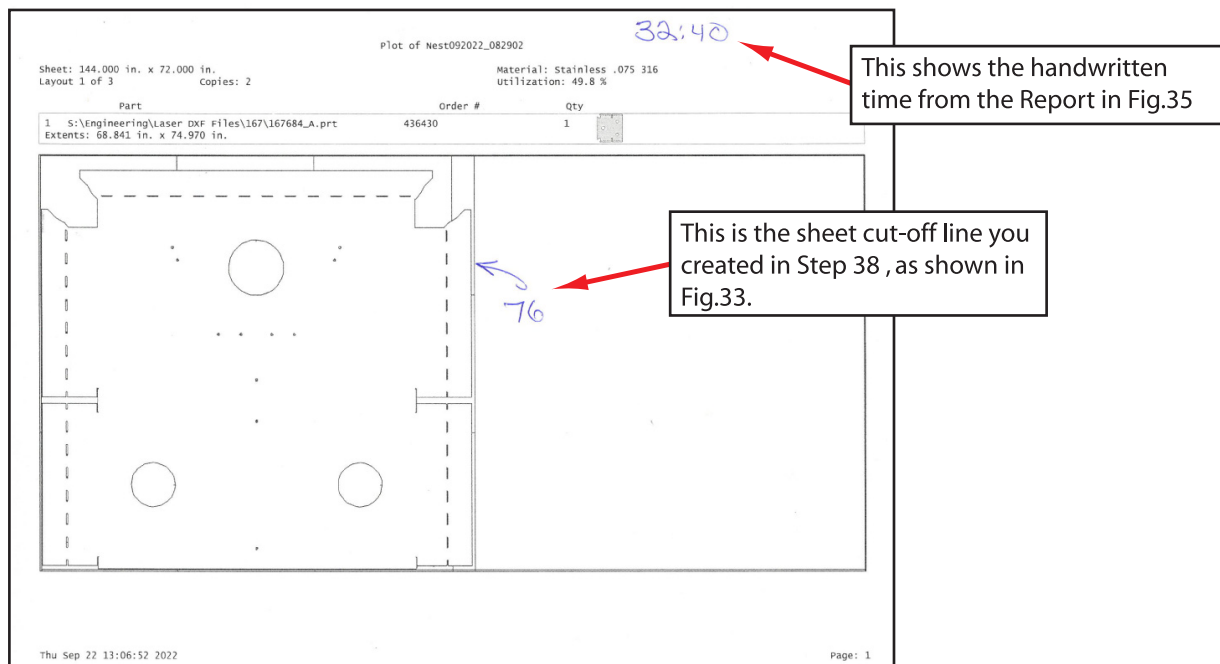


Fig.36

43) At this point, your nest is ready for the next step and is ready to be cut.

Repeat these steps for each new nest as instructed in this manual to maintain consistency and conformity throughout your nesting process.