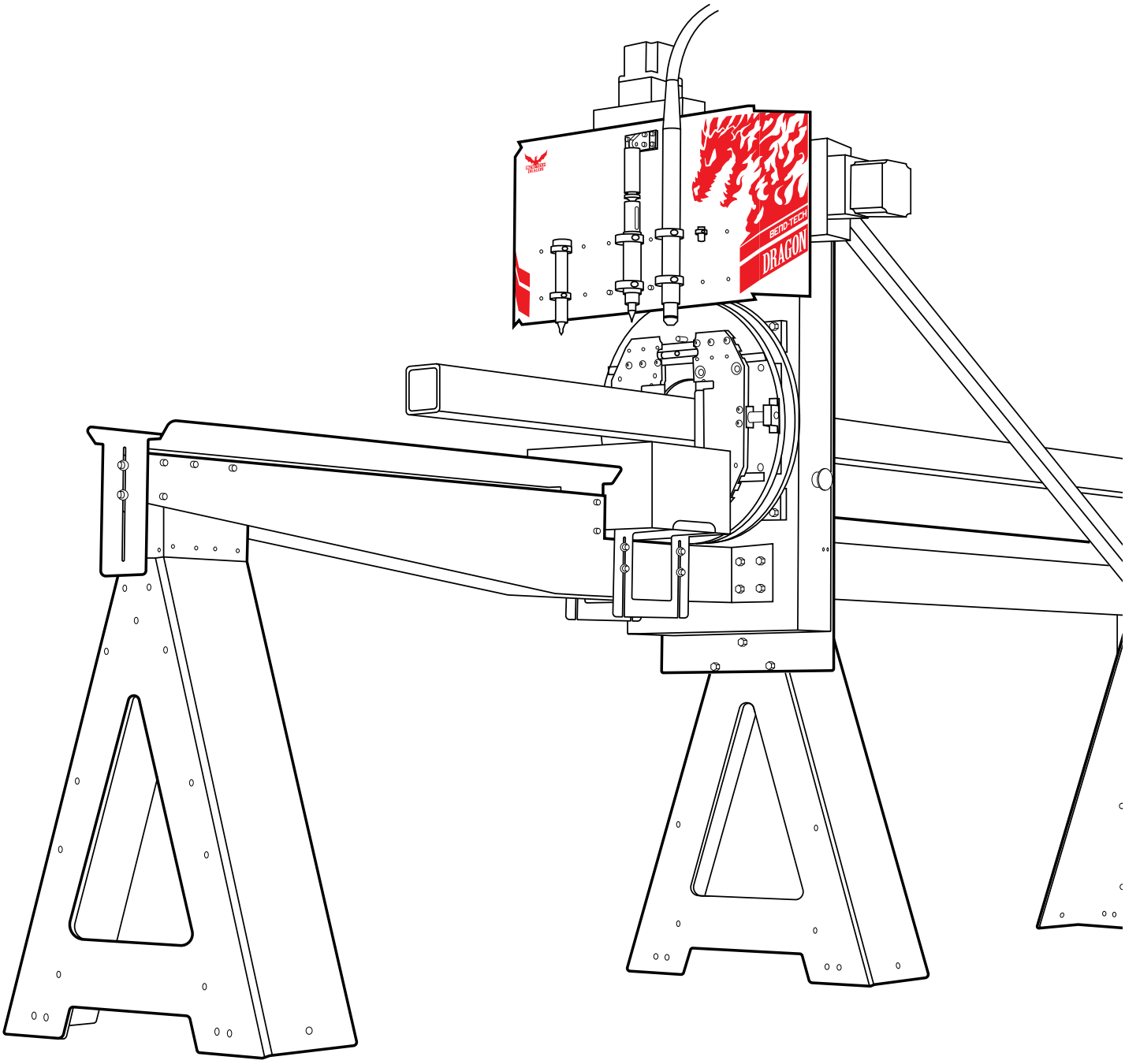
Part 3 of 4

BEND-TECH

DRAGON A400

Start-Up and Training Manual

Part 3: Torch Mount and Software Overview



Version 2.2 | English

Dragon A400

Start-Up and Training Manual
Version 2.2

English
Original Instructions

January 2020

Bend-Tech LLC
729 Prospect Ave.
Osceola, WI 54020 USA

(651) 257-8715
www.bend-tech.com
support@bend-tech.com

Contents

01 Torch Mount

1.1 Torch Mount Overview

Before the Dragon A400 can perform a cutting procedure, the Torch must be calibrated. The Torch calibration process requires the Operator to run the Torch Mount calibration feature found in the Machine Library. The Torch Mount procedure sets the Torch to the correct height and readies the Torch for the cutting process.

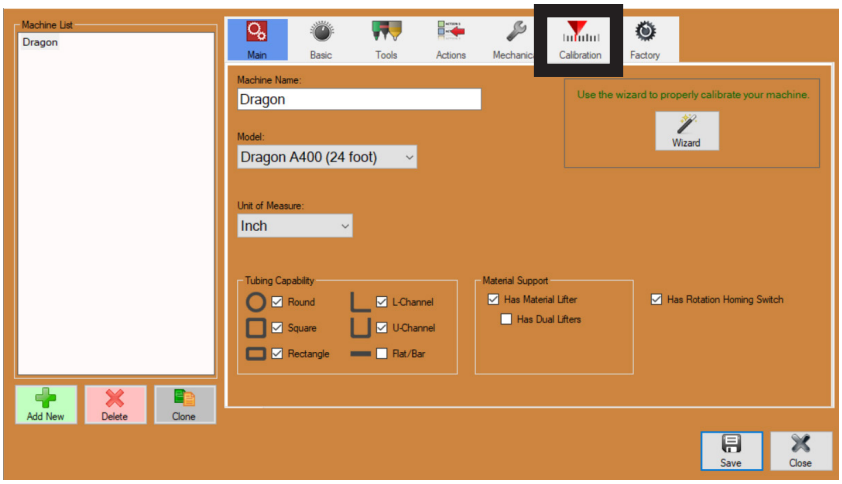
Before the Torch Mount procedure can begin the machine must be powered on and all Axes homed.

! Caution !

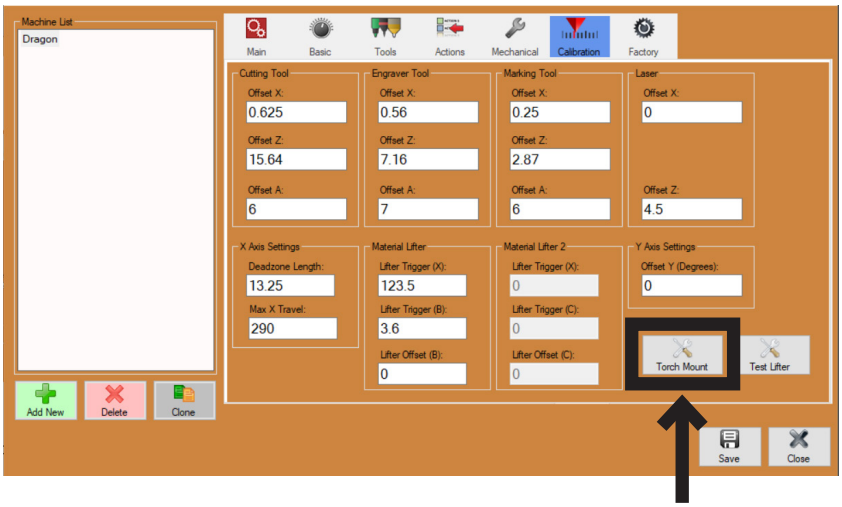
Ensure the Torch wand is not installed on the Toolhead or is mounted only in the top collar before starting the Torch Mount procedure.

1.1.1 Launch Torch Calibration Tool

To begin the Torch Mount procedure in Dragon CAM, go to Machine Library. The Machine Library will show any Dragon A400 machines integrated with the computer. This will likely only show one machine. The Operator should choose the machine that will be calibrated in this procedure.

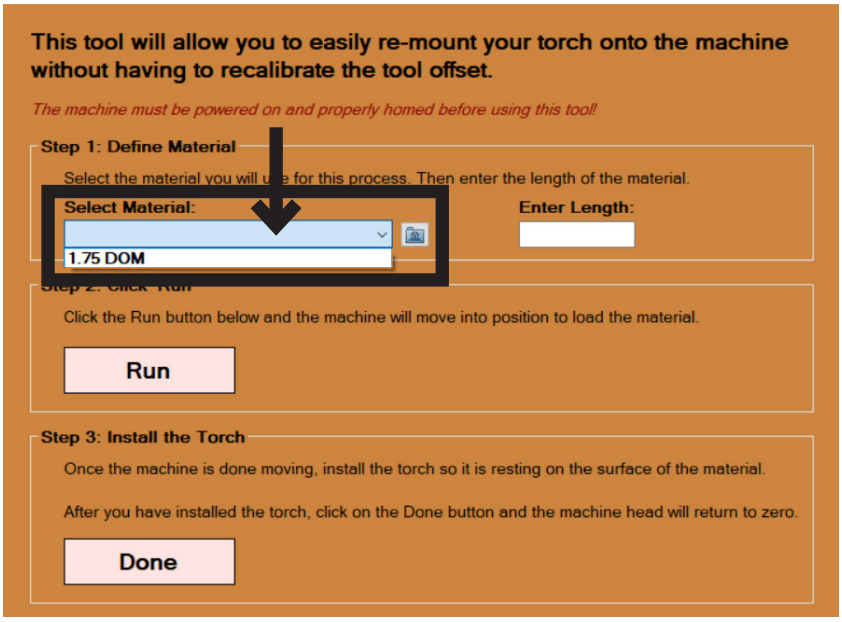


In the menu bar at the top of the interface click Calibration. This will open a new interface.

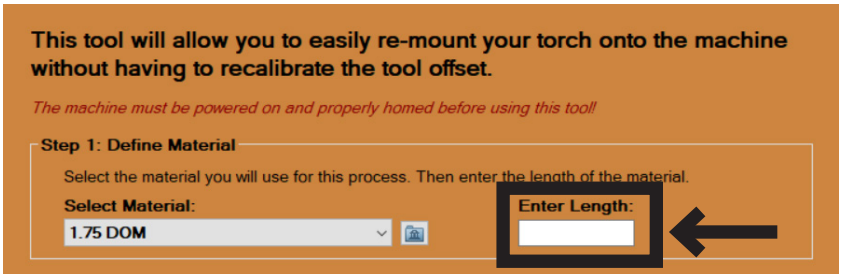


Click Torch Mount at the bottom right of the new interface. This will open the Torch Mounting Utility interface.

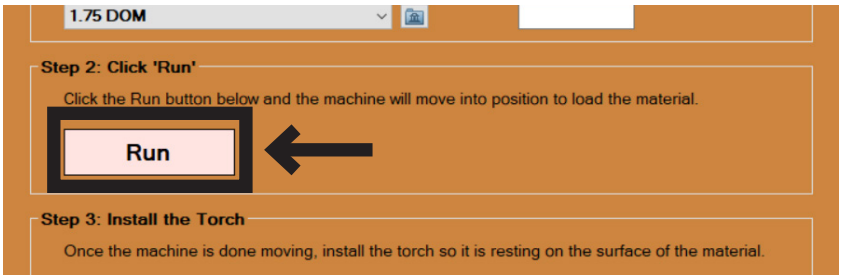
1.1.2 Torch Mount Utility



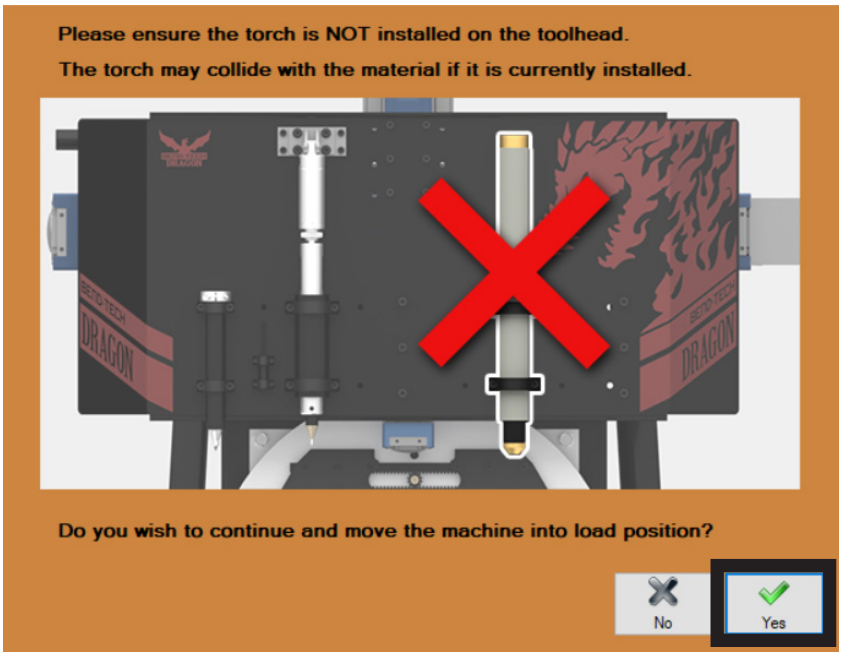
In the Torch Mount Utility interface click the Select Material drop down and select a material type that's been entered in the Tube and Pipe Library that will be used for the Torch Mounting process.



Enter the length of the material that will be loaded into the machine.



Click Run.



A Torch Collision Warning interface will appear. Check to confirm the Torch is raised enough that it will not contact the material before it can be adjusted. If the Torch is too low, adjust it so it is clear of the material.

Click Yes. At this point the Trolley will move into position based on the length of the material as entered in the Torch Mount Utility interface. The Toolhead will move into position based on the size of the material. The machine is now ready for material to be loaded.

It may be necessary to manually adjust the Torch in order to load the material.

1.1.3 Load The Material

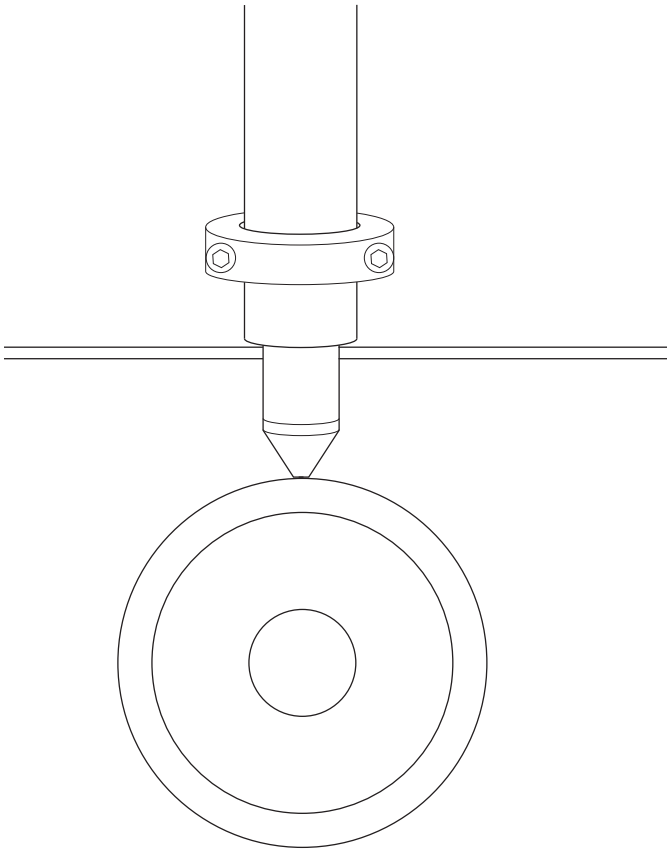
Using a ¼ **in. Allen wrench**, the Operator should adjust the Gate openings wide enough to accept the material using the front and rear Gate Lead Screws. Feed the material through the Gate, then adjust the front and rear Gate Lead Screws so they are finger tight with the material. When mounted in the Gate, the material should move freely forward and backward with no play side-to-side. Adjust the Chuck to accept the material using the Chuck Key. Feed the material into the Chuck and tighten the Chuck with the Chuck Key. The Torch is now ready to be adjusted in relation to the material.

At this point if the material is not in the correct position for Torch calibration the Operator can change the value in the material length to feed material forward or backward. After a new value is entered press "Run" and the Dragon A400 will adjust the position of the Trolley accordingly.

1.1.4 Setting The Torch

Manually lower the Torch so the tip is resting on the surface of the material. Tighten the Torch mounting collars using the appropriate hex wrench until they are snug.

The Torch is now set and ready to cut material.



1.1.5 When To Perform Future Torch Mount

Once the Torch is set into position it is ready to cut any material loaded into the machine without further adjustment. However, there are two exceptions:

1. If the Torch head is removed from its mounting clamps, the Operator will need to perform the Torch Mount Utility procedure to re-establish the Torch position.
2. Different Torch consumables such as fine cut consumables may require different Torch positioning.

At this point the Dragon A400 is ready for operation.

Tube and Pipe Library

2.1 Tube and Pipe Library Overview

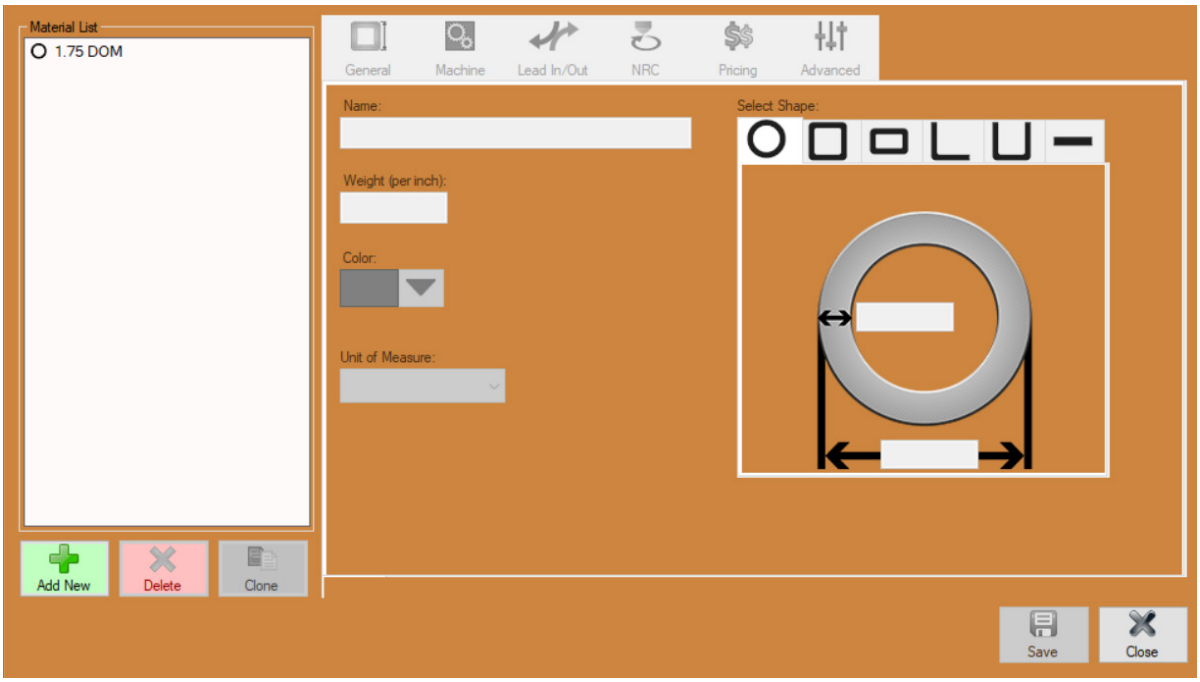
The Tube and Pipe Library is where the Operator sets up material, creating a material list that will be used in a given project. Before a project can be started, the type of material and specifications of the material must be entered into the Tube and Pipe Library.

2.1.1 Open The Tube and Pipe Library

Before performing any type of cutting procedure on the Dragon A400 the Operator must first add material(s) into the Tube and Pipe Library.

To begin this procedure, in the Bend-Tech Dragon CAM software, click Tube Library.

This will open the interface for logging material types and sizes into the Library.

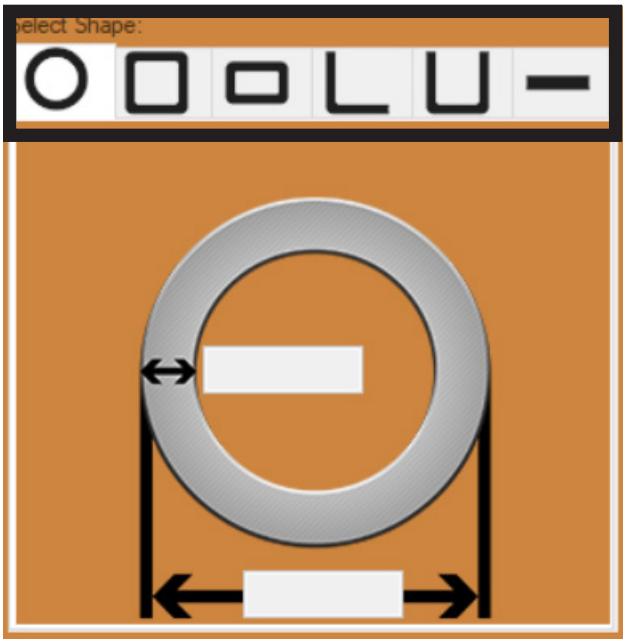


Once a material is entered into the Tube and Pipe Library, it allows the Operator to quickly choose a given material from the Library without having to re-enter the dimensions of the material.

2.1.2 Add New Material Into The Tube and Pipe Library

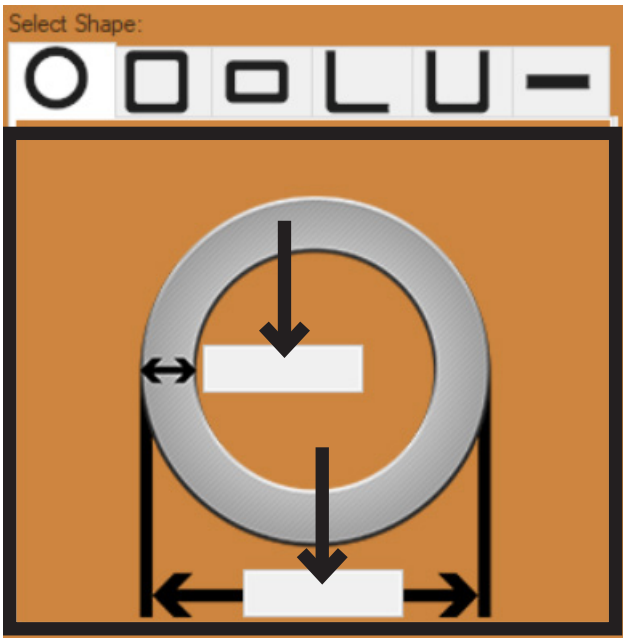
To enter a new material into the Tube and Pipe Library, click the green “Add New” icon in the bottom left hand corner of the screen.

2.1.3 Choose The Type Of Material



On the right hand side of the screen, choose the type of material that will be loaded into the machine by clicking the icon displaying the appropriate shape (round, square, etc.).

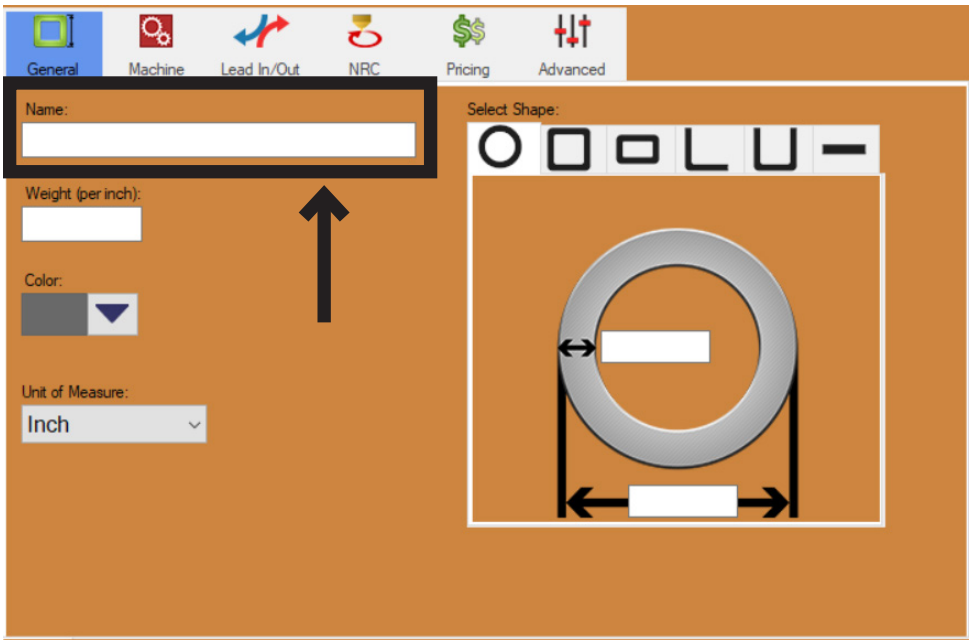
2.1.4 Dimensions



Depending on the type of material chosen, the Operator will need to enter dimensions for the material. Enter the dimensions of the material in the text boxes.

Entering accurate material dimensions is critical to achieving precise machine operation.

2.1.5 Naming the Material



The Operator will be required to choose a name for the material. The majority of Operators simply enter the material dimensions for this, but it can be named anything the Operator desires.

Click Save.

Click Close.

With material logged into the Tube and Pipe Library, the Dragon A400 is now ready to accept the material.

03 Dragon CAM

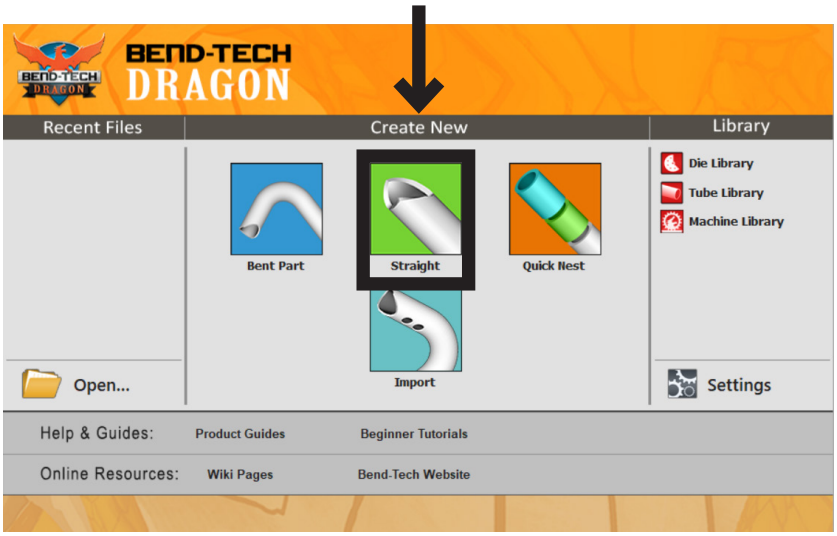
3.1 Dragon CAM

The Dragon CAM software allows the Operator to design and create new parts for production using the Dragon A400. Dragon CAM software is designed to be an easy-to-use interface that allows for one-off custom parts to be produced, or for complete project production. Parts can be easily designed and saved for immediate production as well as production at a later date.

This Chapter is set up as a procedural. Following these steps will walk the Operator through a basic part creation process and introduce the Operator to many of the basic controls found in the Bend-Tech Dragon software.

3.2 Create New Part

It is easiest to choose the material that was used in the Torch Mount procedure found in Chapter 1 of this section.



On the Bend-Tech Dragon software home interface, under Create New, choose the type of part you wish to design.

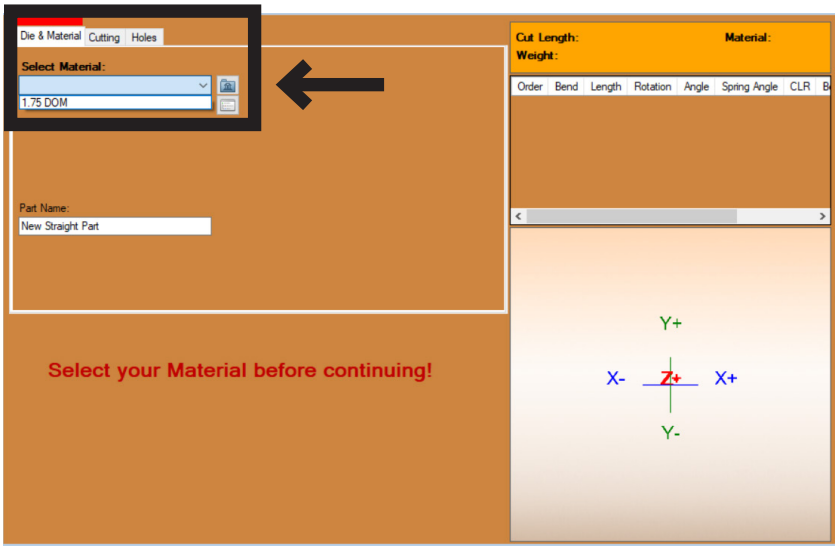
For this tutorial, under Create New, we will choose Straight to create a new straight part. This will open a new interface which will include a 3D, five axis design window in the bottom right.

This tutorial will feature an example using round tube.

3.2.1 Dragon CAM Preparation Checklist

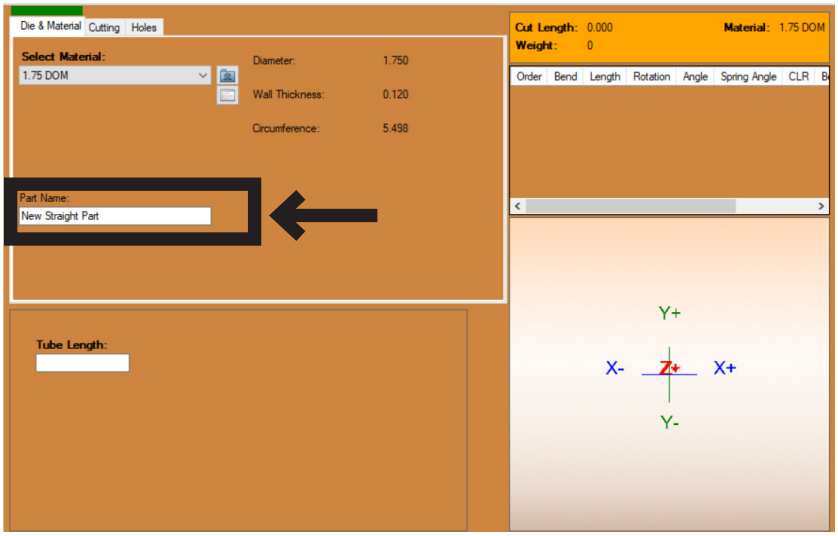
Dragon CAM Support Asset	Action
Tube and Pipe Library	Has material been entered and named in the Tube and Pipe Library as outlined in Chapter 2 of this section?
Torch Mount	Has the Torch been mounted and calibrated as outlined in Chapter 1 of this section?

3.2.2 Die And Material



Select the Die & Material tab near the top left of the interface. In the pull down menu choose the type of material you will be working with from the Tube and Pipe Library. Refer to Chapter 2 of this section to see how to enter material into the Tube and Pipe Library.

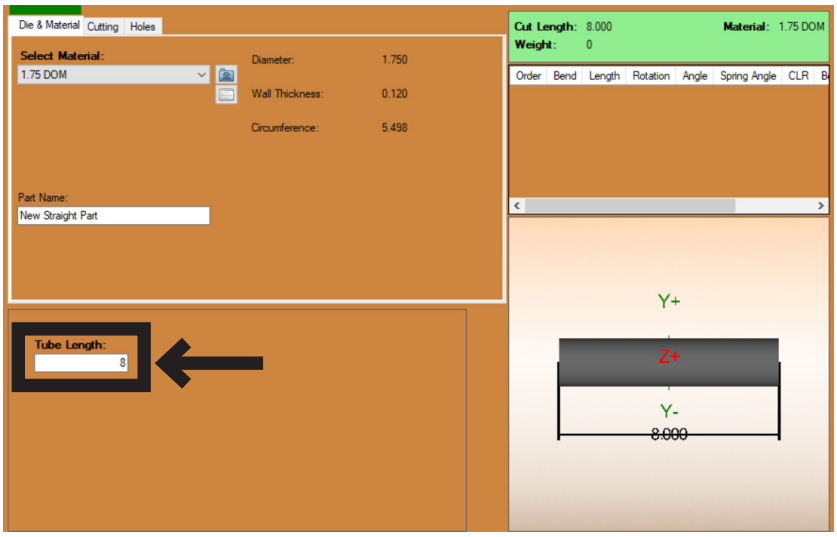
3.2.3 Part Name



Choose a name for the part and enter it in the text box under Part Name.

The Part Name will show up in Nest Part once the project is entered and saved in the Nest Part feature.

3.2.4 Part Length



Enter the length of the part you wish to create. The part will appear in the 3D, five axis design window.

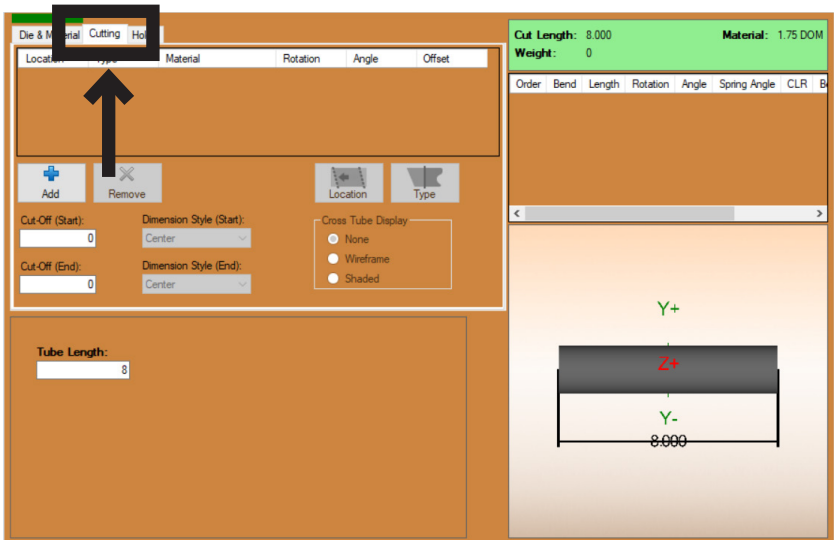
Part Length is not the material stock length.

3.2.5 3D Interface Control

Once the part is visible in the 3D design window the Operator can use the mouse to rotate the part, zoom in/zoom out, or drag the entire part by holding the scrolling wheel down.

3D Interface Control	
Zoom	Scroll in/out
Drag	Hold down scroll wheel, or click and hold both mouse buttons
Rotate	Hold down right button

3.3 Cutting



Click the Cutting tab. The Cutting interface allows the Operator to choose and set up a variety of cuts on the material.

3.3.1 Adding A Cut

Click Add to add a cut or notch to the part. The program will default to cope/notch. The program will default the cut location to the Start end of the material.

3.3.2 Changing The Cut Location

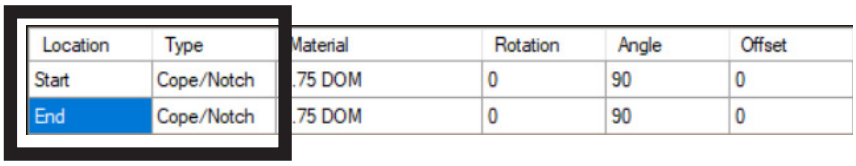
Under the Location tab, click Start. Clicking the Location tab will flip the cut to the other end of the part.

3.3.3 Changing The Type Of Cut

Clicking Type will switch the cut from Cope/Notch to Miter.

3.3.4 Additional Cuts

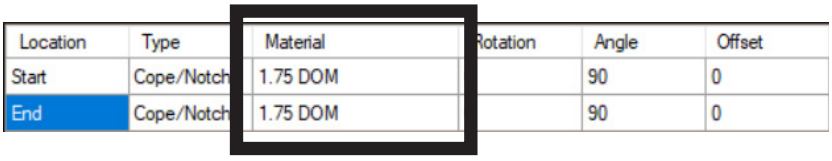
If the Operator Clicks Add a second time, the program will add a cope/notch to the other end of the part as the default cutting action.



Location	Type	Material	Rotation	Angle	Offset
Start	Cope/Notch	.75 DOM	0	90	0
End	Cope/Notch	.75 DOM	0	90	0

3.3.5 Material

The Material drop down menu allows the Operator to change the size of the material for which the cuts are being produced. Choosing the material determines the cutting profile of the cope/notch.



Location	Type	Material	Rotation	Angle	Offset
Start	Cope/Notch	1.75 DOM		90	0
End	Cope/Notch	1.75 DOM		90	0

The Material feature is only for cope/notch, it does not apply to miter cuts.

3.3.6 Rotation

Rotation allows the Operator to move the cut around the circumference of the material.

3.3.7 Angle

The Angle text box allows the Operator to change the angle of the cut.

Location	Type	Material	Rotation	Angle	Offset
Start	Cope/Notch	1.75 DOM	0	90	0
End	Cope/Notch	1.75 DOM	0	90	0

3.3.8 Offset

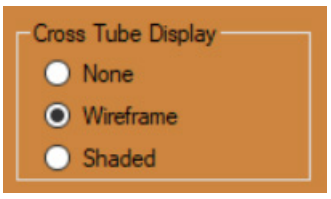
The Offset text box allows the Operator to change the offset of the cuts on the part in relation to the centerline of the part.

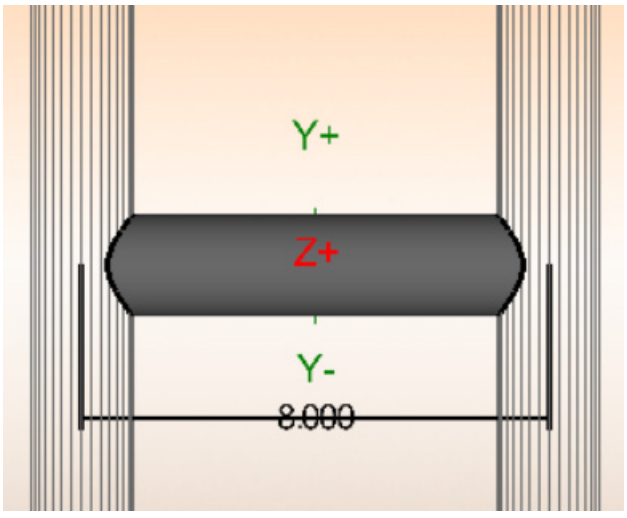
Location	Type	Material	Rotation	Angle	Offset
Start	Cope/Notch	1.75 DOM	0	90	0
End	Cope/Notch	1.75 DOM	0	90	0

The offset value must not be larger than the overall diameter of the material.

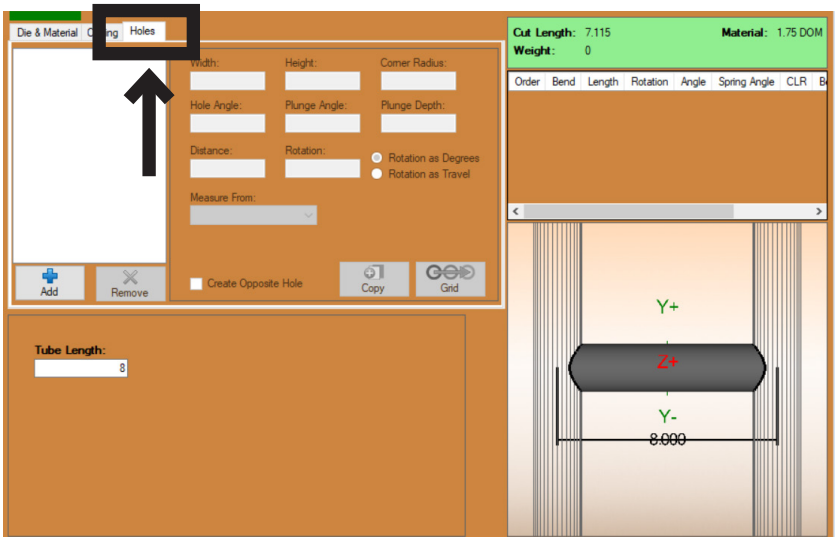
3.3.9 Cross Tube Display

The Operator can choose the Wire Frame display or the Shaded display to assist in visualizing how the part will interface with the overall project. Choose None for parts display only, with no visualization display.





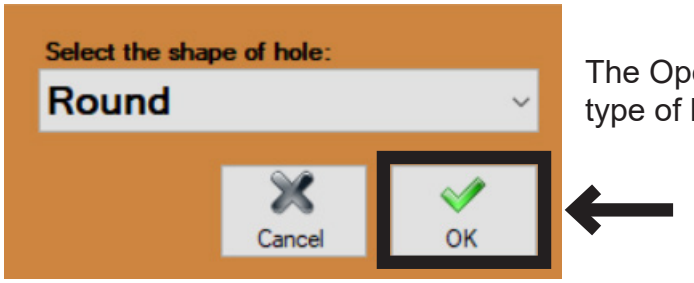
3.4 Holes



Click the Holes tab. The Holes interface allows the Operator to choose and set up a variety of holes that can be cut into the material.

3.4.1 Add A Hole

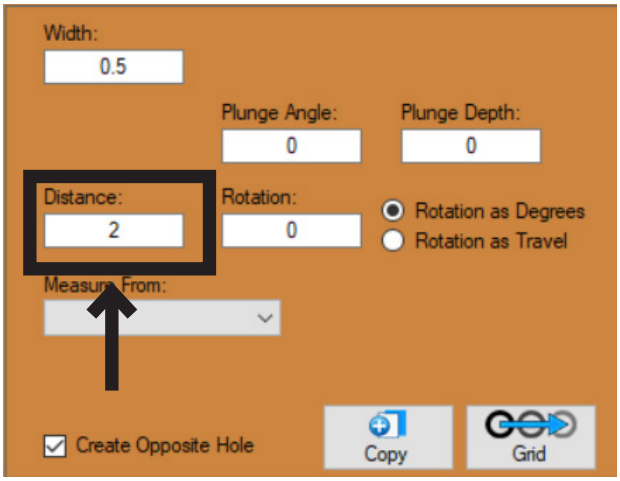
To add a hole to the part click Add. The Add New Hole window will appear.



The Operator can use the drop down menu to choose the type of hole needed for the part. Choose Round. Click OK.

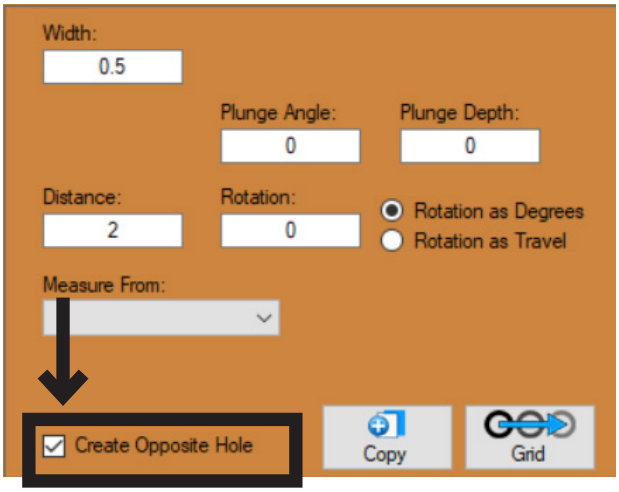
The program will choose a default location to place the hole on the material.

3.4.2 Hole Location



Change the Distance value to move the hole location along the length of the tube.

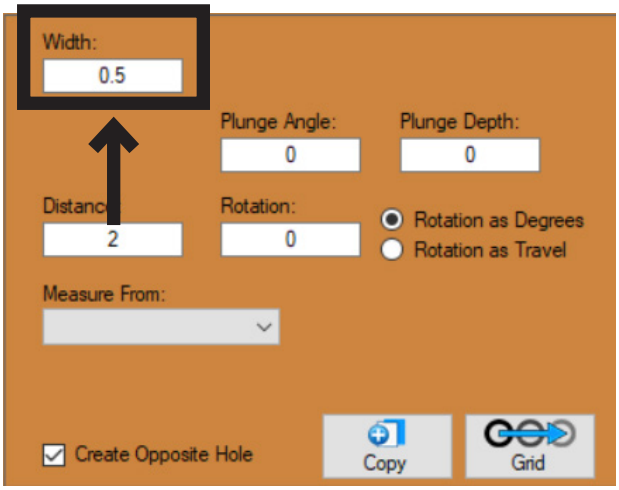
3.4.3 180-Degree Hole



For this tutorial we will use the interface to create a second hole 180-degrees from the original hole.

To do this, check Create Opposite Hole to create a hole on both sides of the part.

3.4.4 Hole Width



The program chooses a default size for the hole (½ in.). Change the Hole Width value to change the size of the hole.

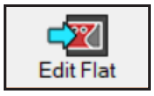
If the Operator chooses a hole that is too big for the material the program will shade all text boxes red until the hole size is corrected.

3.5 Edit Flat

In some cases it may be helpful to see a flat version of the part that the Operator has designed. This is performed easily in the Bend-Tech Dragon software. The Operator can also use this interface instead of the 3D interface to edit and create a part.

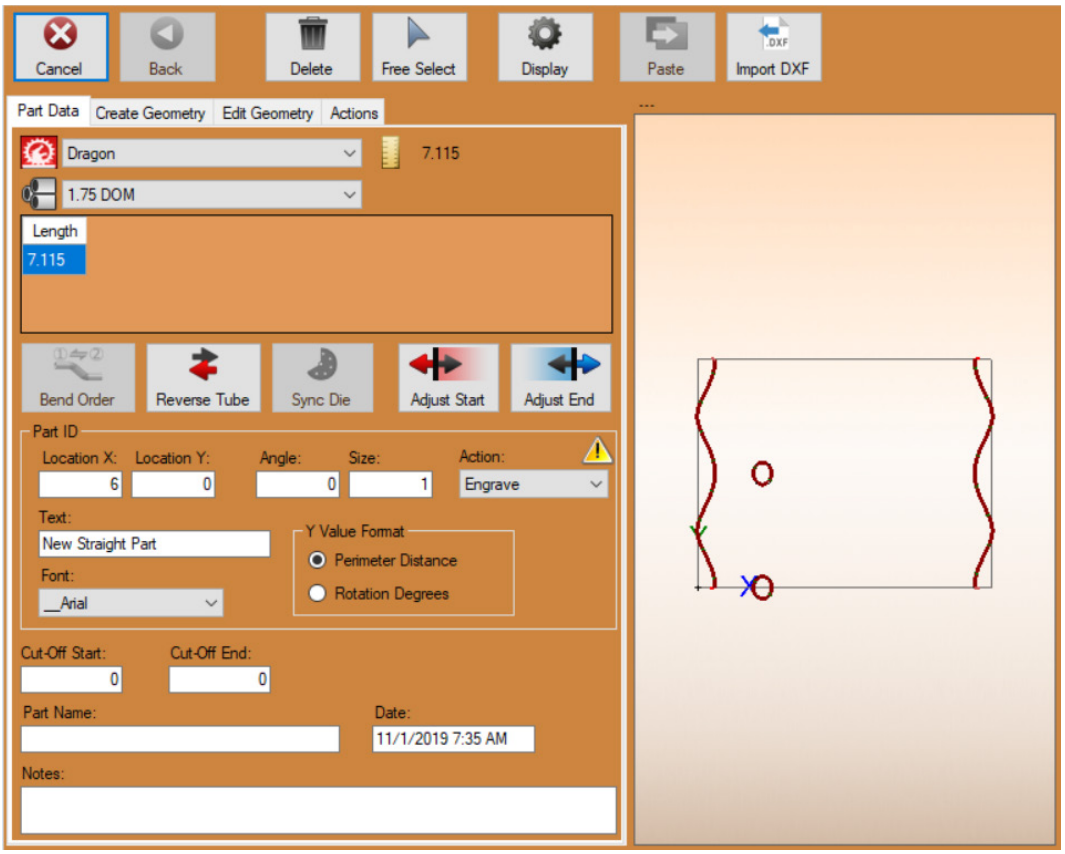
Edit Flat is typically used by the Operator to mark or engrave part IDs, or move lead-in locations.

3.5.1 Using Edit Flat



At the top of the screen click the Edit Flat icon.

A flat version of the cut will appear in the design window.

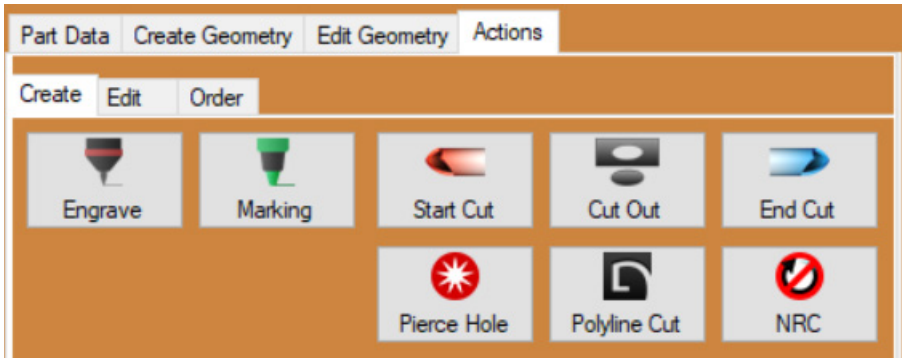


3.5.2 Create and Edit Geometry

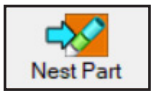
In Edit Flat, Click Create Geometry. An interface will open with tabs where the Operator can choose to create different geometry on the part. After geometry is added to the part, an action will be given to each specific geometry.

3.5.3 Actions

In Edit Flat, the Operator can click the Actions tab to change how the machine will perform the Geometry chosen (Start Cut, Engrave, Mark, Polyline Cut, Non-Rotational Cut (NRC),etc.).



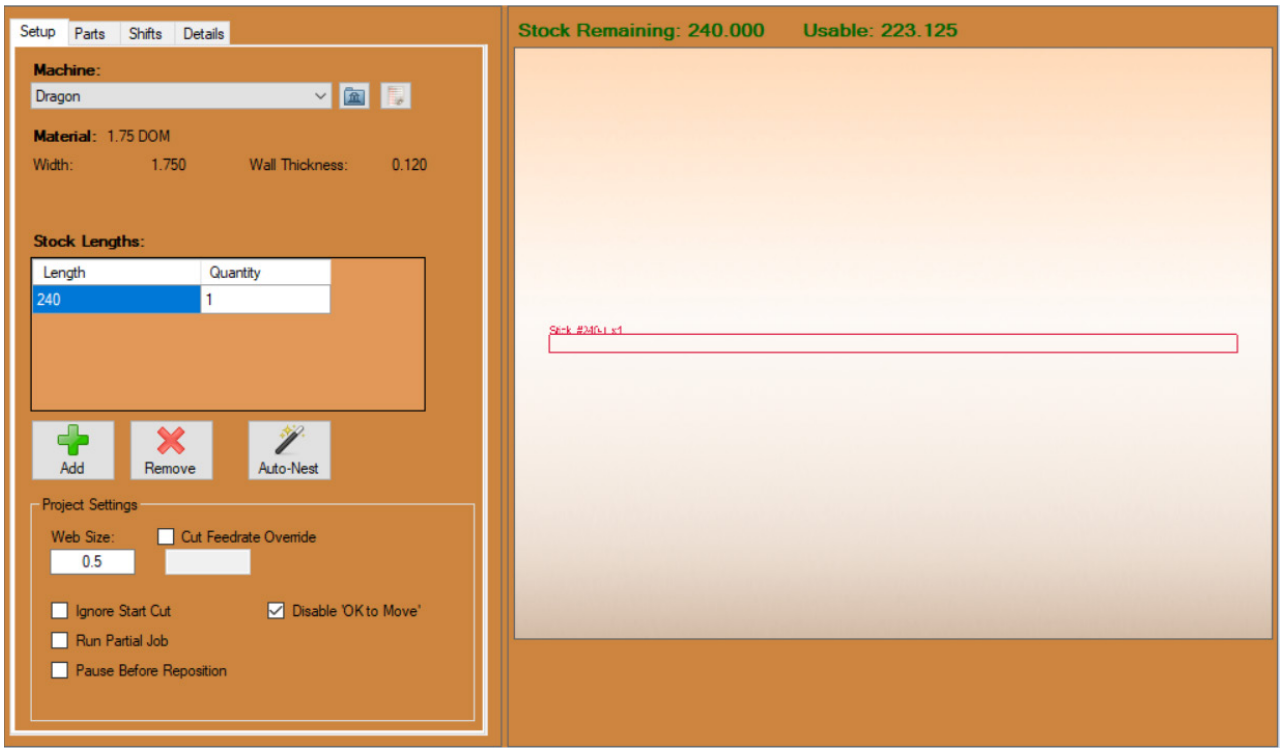
3.6 Nest Part

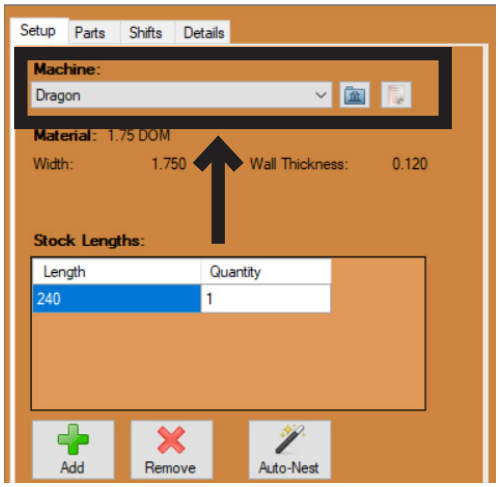


After the part has been designed, at the top of the screen, click Nest Part. Nest Part allows the designer to arrange the designed parts on a full material length for cutting. The parts can be arranged to optimize the given amount of material.

3.6.1 Nest Part Procedure

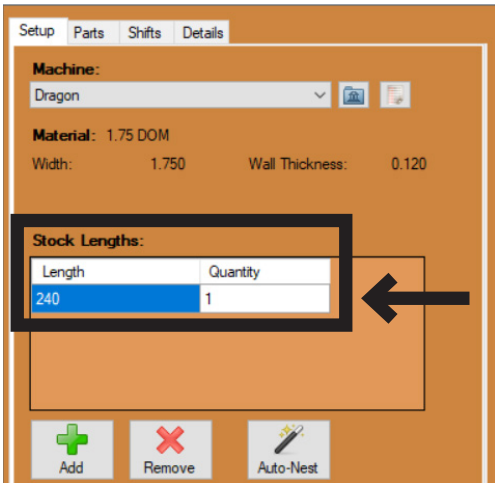
At the top of the interface click the Nest Part icon. This will open a new interface.





The Operator will choose a machine where the Nest Part project will be run. The Operator will have already chosen a name for the machine as outlined in Chapter 3 of the Start-Up and Training Manual Part 2. Most shops will only have one Dragon A400 machine logged into the computer, in which case it will default to that machine.

3.6.2 Stock Length

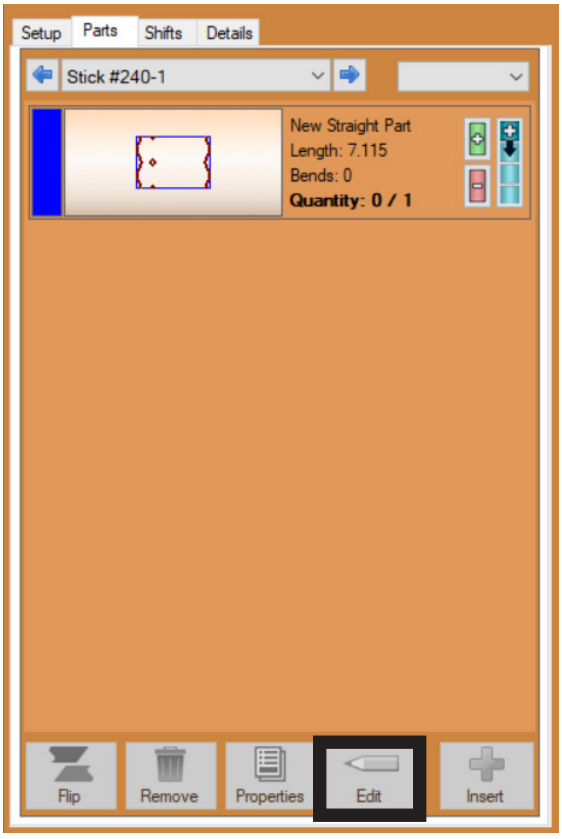


The Stock Length is the length of material that will be used when the Nest Part is produced. In the text box below the machine selection drop down menu, enter the length of the material.

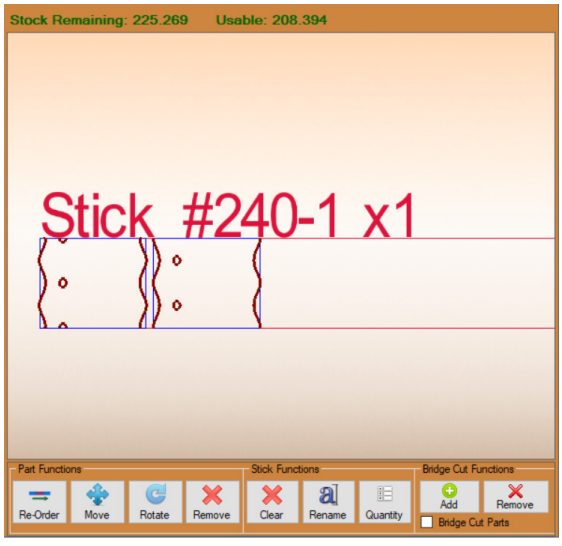
Enter how many pieces of material will be used to create the Nest Part(s). The Operator can choose a set material length or choose multiple different lengths based on what is available at the shop location.

The default length of the material can be set in the Tube and Pipe Library per material.

3.6.3 Parts



The Parts tab is used to arrange a desired quantity of a part onto a single piece of material. When editing nested part is enabled, the Operator is able to select parts in the list and choose Edit. This will bring the Operator back to Edit Flat. Multiple parts can be cut from one or more pieces of material in a nested project.



Next to the part display click the green + icon or red - icon to add or remove the number of parts, or click the blue + icon with the down arrow to apply the maximum number of parts that can be cut form the length of material entered.

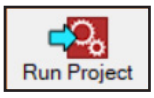
3.6.4 Shifts

The Shifts tab will display the order of operation the machine will use for its cutting path. The Operator can use the Shifts feature to rearrange cutting actions, unassign or remove actions from the list.

3.7 Run Project

With a part created and nested, the Operator can choose to Run Project to begin the cutting and production procedure.

3.7.1 Run Project Procedure



At the top of the interface, click Run Project. This will open the Machine Control screen. Click Start. In the Status window the Travel, Laser and Load icons will light up.

Clicking Run Project sends a G-code to the machine driving software (Mach3) readying the machine to perform an operation. It does not start the cutting process.

Clicking Start does not initiate the cutting process. It will initiate the entire project process, walking the Operator through each step.

3.7.2 Load Material

When the status light for Load appears, load material into the Gate, and then secure it into the Chuck as outlined in Chapter 1 of the Start-Up and Training Manual Part 3.

3.7.3 Pre-Run Checklist

By this point the Operator should have thoroughly readied the machine to perform cutting procedures. However, Bend-Tech, LLC recommends always ensuring the machine is ready to run before each job. Never assume the machine is ready without a pre-cutting check.

Pre-Run Checklist

- ☐ Is the laser on the material lined up with the centerline of the material?
- ☐ Is the Chuck tightened on the material?
- ☐ Are the Gate Lead Screws finger tight on the material?
- ☐ Are the Gate Lead Screws at 12 o'clock and 3 o'clock?
- ☐ If cutting round material on non-powered Gate machines, is the Gate locked?
- ☐ Is the Torch unit powered on?
- ☐ Is the compressed air connected to the machine and the Torch unit?
- ☐ Are there replacement Torch consumables on hand?

3.7.4 Start

Once material is loaded into the Dragon A400, click Start. The machine will begin the cutting procedure.

Import Project and Nest Part Process

4.1 Import Project and Nest Part Process Overview

The Dragon A400 is capable of producing single parts, multiples of a single part, or complete projects composed of multiple unique parts. Using the Import and Nest Part feature, the Operator can arrange and cut multiple unique parts from the same piece of material. This is especially effective when producing parts for such things as a handrail assembly, which may be composed of 20 parts or more.

Also, it is often the case that the parts drafter/designer is separate from the Operator. With the Nest Part feature the designer can set up an entire nesting project and pass it on to the Operator. The project can then be opened to the computer from an external drive such as a USB drive. The Bend-Tech software allows the Operator to import CAD designs from the computer and prepare them for production using the Nest Part feature.

When the Operator initiates the Nest Part feature the Bend-Tech software creates a Nesting Project. Once the Nesting Project is created the Operator can save the Nesting Project for use later.

4.2 Part Creation For Nesting Projects

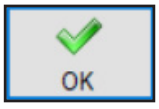
To create a Nesting Project, customers can design their own parts in CAM, parts can be imported into CAM, or they can be transferred from CAD.

4.3 Importing A Part To Dragon CAM

There are two ways to import a file into Dragon CAM. On the Dragon CAM task menu interface, under Create New, click Import.

The second method is to go to the menu bar at the top of the screen, click File and in the dropdown menu click Import.

Choose the type of file you're importing.



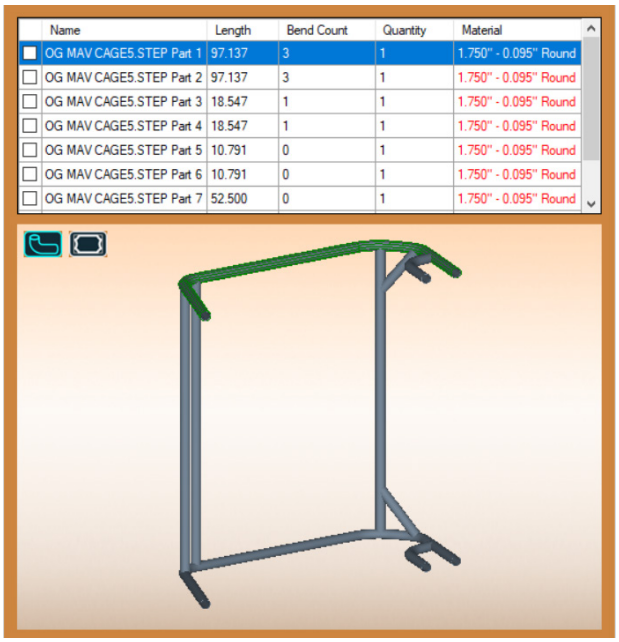
Click OK.

4.4 Opening A File In Dragon CAM

After clicking on the type of file the Operator is searching for, a browse menu will open. Search for the file needed to create the Nest Project. When the file is located, click Open. The file will open in Bend-Tech CAM

Depending on file size this could take up to 15 seconds.

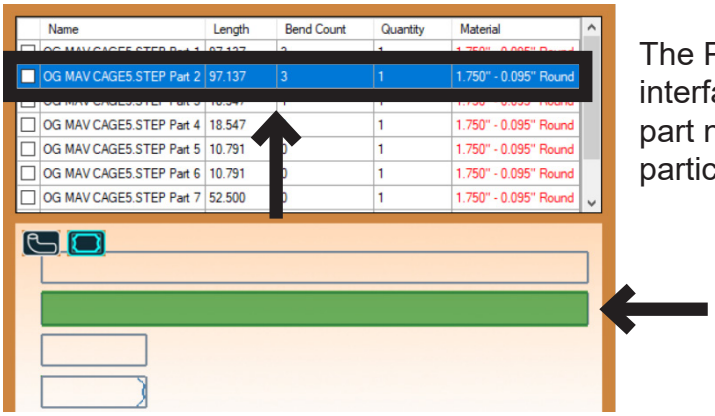
4.4.1 CAM Auto Import Interface



The Project Interface will feature a parts listing and a diagram of the assembly. The Operator can toggle between a diagram of the assembly and a flat layout by clicking the bent tube icon or the flat part icon in the top left corner.

Click the bent tube icon to show the assembly.

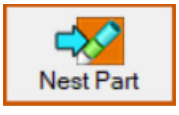
Click the flat icon in the upper left to show the individual parts.



The Part Listing interface above the part Display interface will show the arrangement of the parts by their part name. Clicking on one of these will highlight that particular part in the part interface.

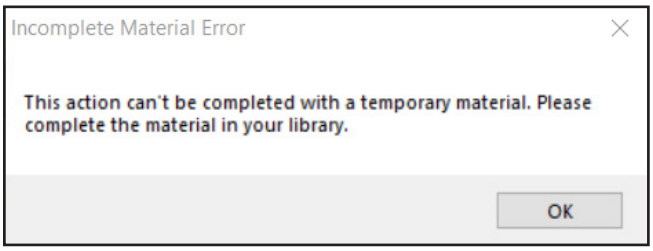
This example uses Auto Import. Other import processes may require additional steps.

4.4.2 Nest Part



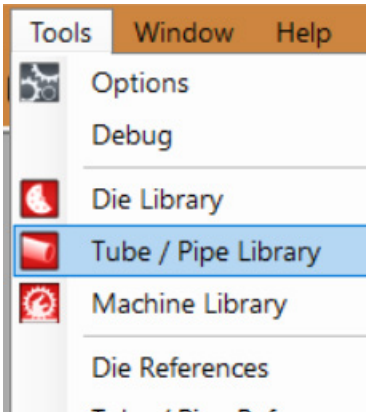
At the top of the interface, click the Nest Part icon. This will begin the process of arranging the parts on the given material for cutting. The Operator must select from the import list which parts will be nested. If the project has multiple material sizes, the Operator will need to create a Nesting Project for each material size.

4.4.3 Creating Temporary Materials

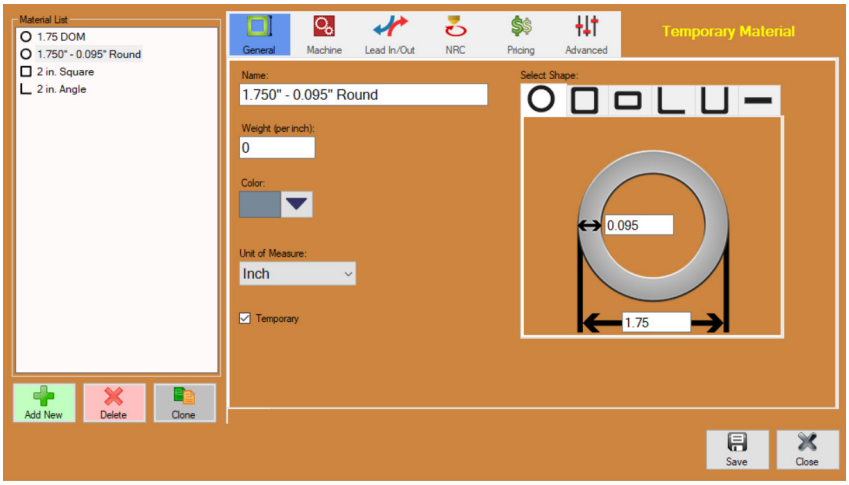


If all the material sizes are not entered in the Tube and Pipe Library a warning will appear that says, “The action cannot be completed with a temporary material. Please complete the material in your library.” Click OK. The software will automatically create a temporary material in the Tube and Pipe Library. Any parts with temporary material will appear in red type on the parts listing interface.

4.4.4 Complete Temporary Material



In order to process a temporary material, the Operator will need to complete the temporary material in the Tube and Pipe Library. Click the Tools dropdown, then click Tube and Pipe Library. This will open the Tube and Pipe Library.

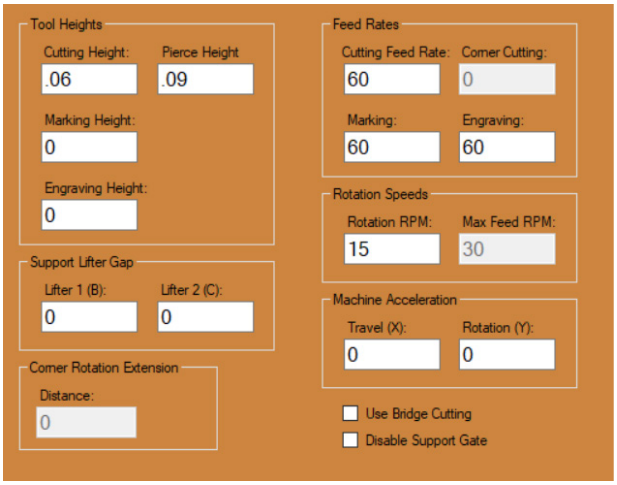


Search the Material List for the temporary material the software created. Click on the material. The interface will now say “Temporary Material” in the upper right.

The name of the material will be the name of the material in the import parts list.

4.4.5 Setting Cutting Parameters

Under the Machine icon, the Operator will need to fill in certain parameters in the text boxes as listed.



Cutting Feed Rate: 60
Marking: 60
Engraving: 60
Cutting Height: .06
Pierce Height: .09

Click Save.

4.4.6 Setting Lead In/Lead Out

The Operator can set the Lead In/Out for the material. Click Lead In/Out at the top of the interface.

In the End Cut Profiles box, under Lead-In Type, click the text box drop down menu, then click the type of lead-in needed for the material. Typically this is set to Perpendicular. Also within the End Cut Profiles box, enter **.125** in the Length/Distance text box for both the Lead-In Type and Lead-Out Type.

Click the text box under Lead-Out Type and choose the type of lead-out needed for the material. This is typically set to Perpendicular. Repeat this process in the Internal Cuts box, choosing “Same as End Cut.”

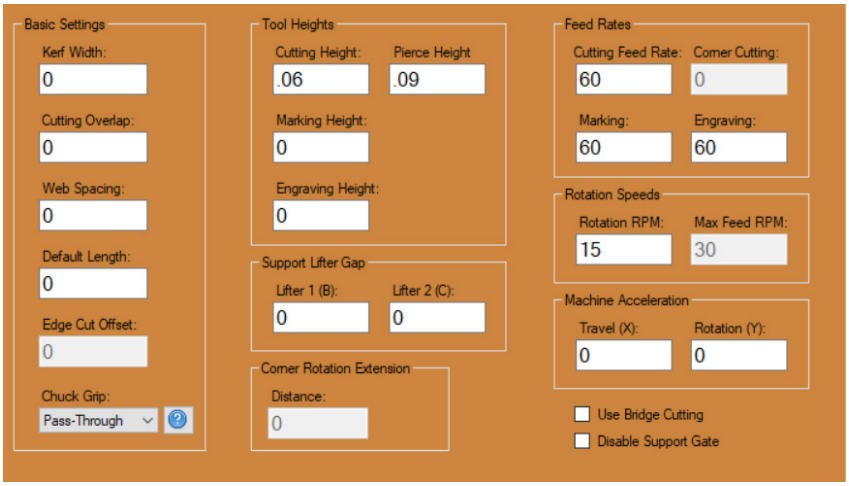
Click Save.

Angle and Channel material typically require different Lead-In settings.

The settings in sections 4.4.5 and 4.4.6 are general settings and may not be optimal for all materials.

4.4.7 Other Basic Settings

There are other basic settings the Operator should enter when setting up Temporary Material in the Nesting Project. Click Machine in the menu bar at the top of the interface.

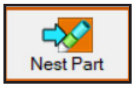


Enter the following values:

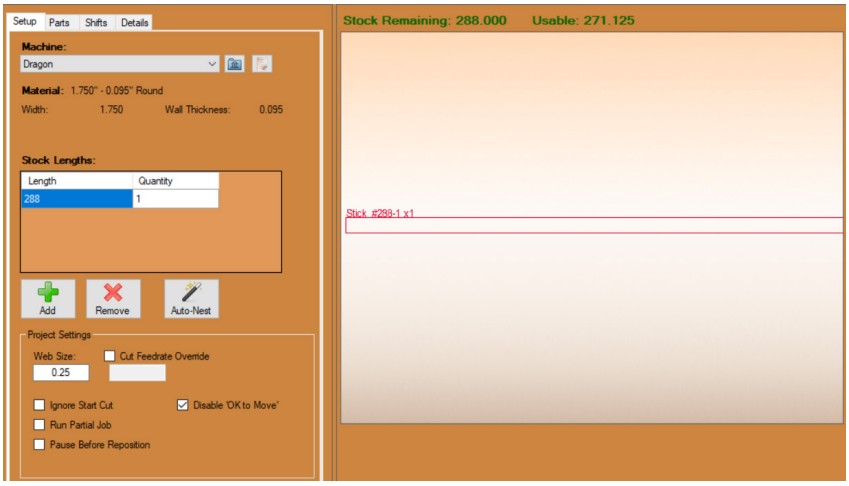
Kerf width: .06
Web spacing: .25
Default length: 288

Click Save.

Click Close.



Click Nest Part.



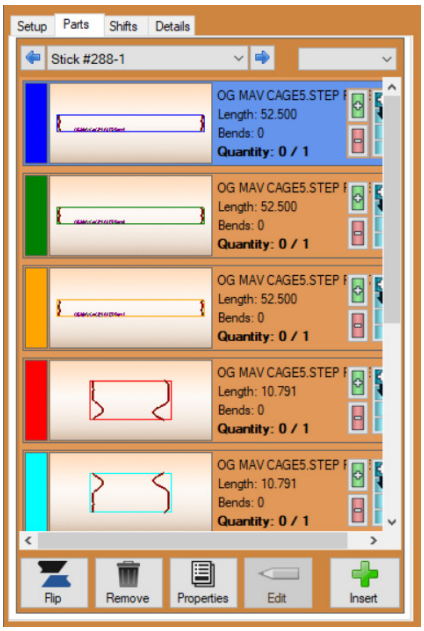
After clicking Nest Part, the software will open a Nesting Project interface for each size material used in the project. For example, if there are two different tube sizes, two separate interfaces will open, one for each size material. If there is only one size material, one interface will open.

At this point the project is Nested.

4.5 Running A Nesting Project

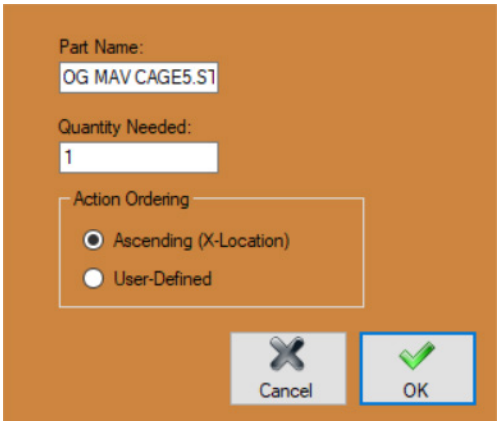
Once a Nesting Project is created, it can be saved and run at any time. The software will save the project until the Operator decides to delete it.

4.5.1 Preparing The Parts



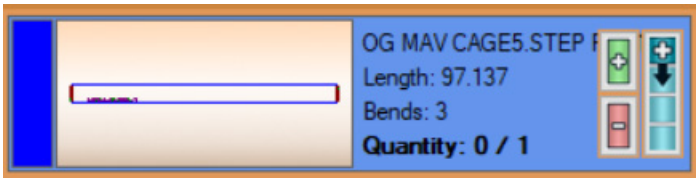
In the Nesting Project interface, the Operator can change the quantity of a part in the project. To do this, click the Parts tab. Click on an individual part in the parts listing.

Below the parts listing Click Properties.



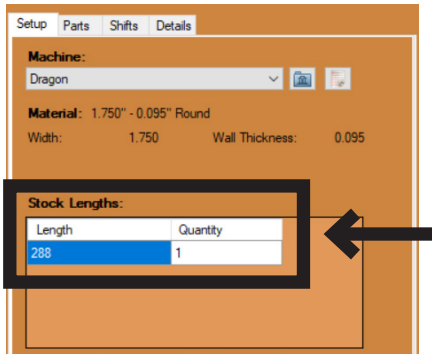
This will open an interface that will allow the Operator to enter or change a Part Name and a Quantity Needed. The Operator can also change the Action Ordering. Click OK. Repeat this process as needed for the parts listed.

It is advised the Operator choose Ascending unless highly experienced.

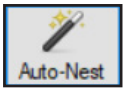


A second way to change the quantity of a part is to click the part in the list. This will highlight the entire part box to its designated color. The operator can now change the quantity by clicking the green +, the red - or the blue +, which will fill and entire piece of material with the same part.

4.5.2 Setup

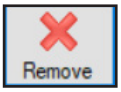


In the Nesting Project click the Setup tab. Ensure the length of the material used is correct in the Stock Lengths interface.



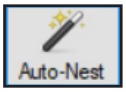
Near the center of the Setup interface, click Auto Nest. By clicking Auto Nest, the software calculates if the total number of parts can be produced on the material entered in the Stock Lengths interface. If there is not enough material the Operator will need to enter a larger number under Quantity.

4.5.3 Adding Material



In the Setup tab under the Stock Lengths interface, Click Remove.

Click Add. Enter the length of the material being used. Enter the quantity the software displayed as grayed-out material.

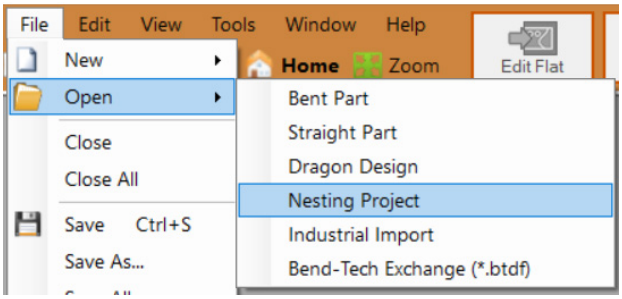


Click Auto Nest. The software will automatically change the Quantity to what is needed to run the project.

4.5.4 Saving

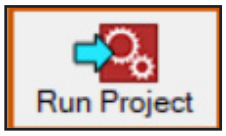
To save the Nested project, click File in the drop down menu at the top of the page, click Save As and enter a name and location where the project will be saved. The Operator can now X out of the interface. The project can be opened from its saved location for future production.

4.5.5 Opening a Saved Nesting Project



There are two ways to open a Nesting Project. The Operator can open a Nesting Project by clicking the File tab at the top of the Interface, mouse over Open, then click Nesting Project. This will open a complete list of saved Nesting Projects. With the Nesting Project interface already open, the Operator can also drag and drop a Nesting Project into the interface, which will open the file.

4.5.6 Running A Nested Project



To run a Nested Project on the Dragon A400, having completed all previous steps outlined in this chapter, and with the Nested Project open, click Run Project at the top of the interface. If not already open, Mach3 will open.

The Machine Control interface will open. Assure all Axes on the machine are homed. Click Start. When the Load icon lights up, load the material into the machine. Click Start.

Attention

Upon completion of Start-up and Training Manual Part 3, please proceed to Start-up and Training Manual Part 4.

Bend-Tech, LLC

729 Prospect Ave. Osceola, WI 54020
1-651-257-8715

sales@bend-tech.com
www.bend-tech.com