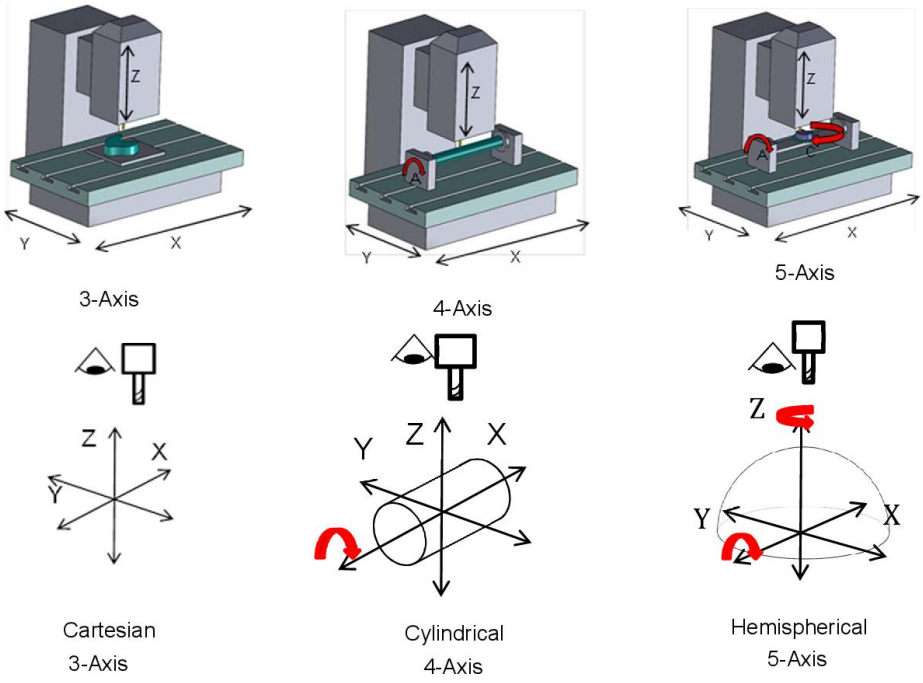
CNC Mill Standard Operating Procedure

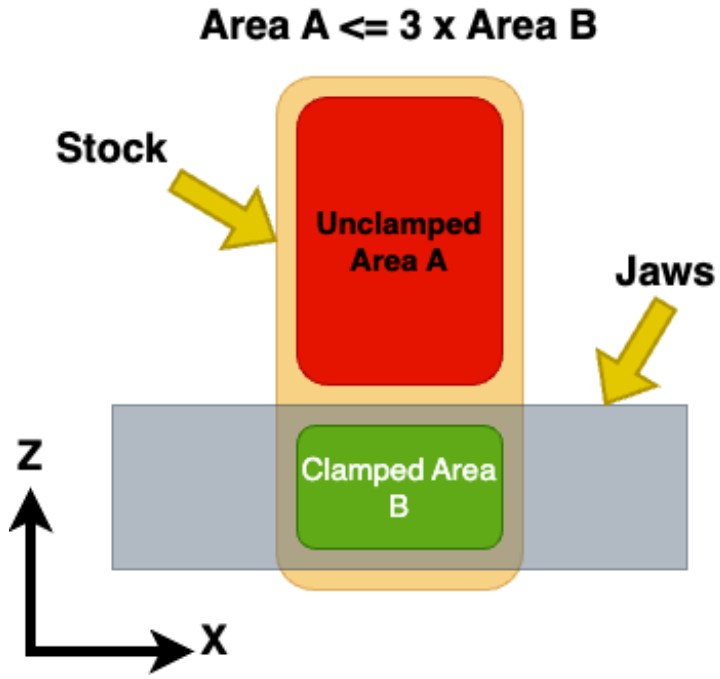
LIMITATIONS

- ❑ This checklist is only for 3-axis machining.

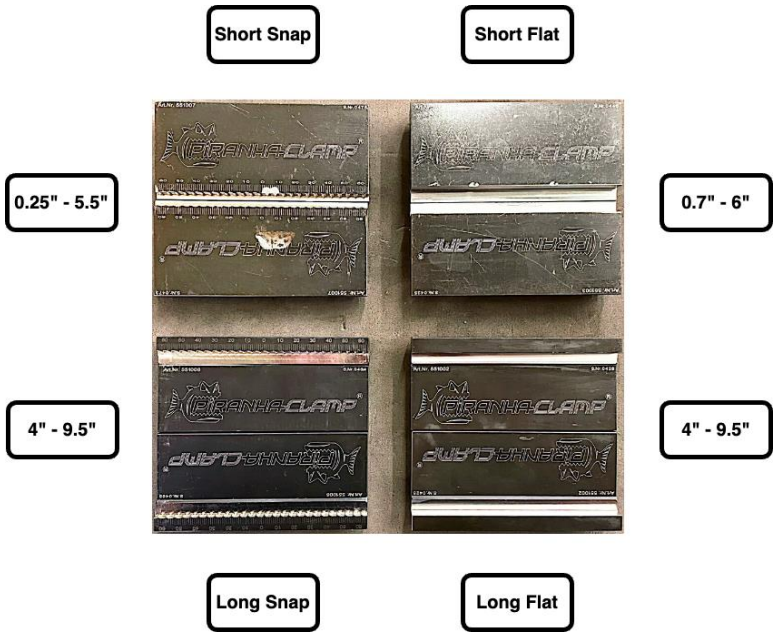


- ❑ The checklist is only meant for material ISO grade N, P, M. You can find the ISO grade of your material using the following link: https://www.purdue.edu/bidc/wp-content/uploads/2021/08/ISOGrade.pdf. ISO grade C or unknown materials are not allowed.

- ❑ Give the cross section of clamped stock below, the unclamped area B needs to be less than or equal to three times the clamped area A.



- ❑ This checklist only covers HydroForce assembly.
- ❑ This checklist only covers Gepard 300. Here are the limitations on the stock y-size:

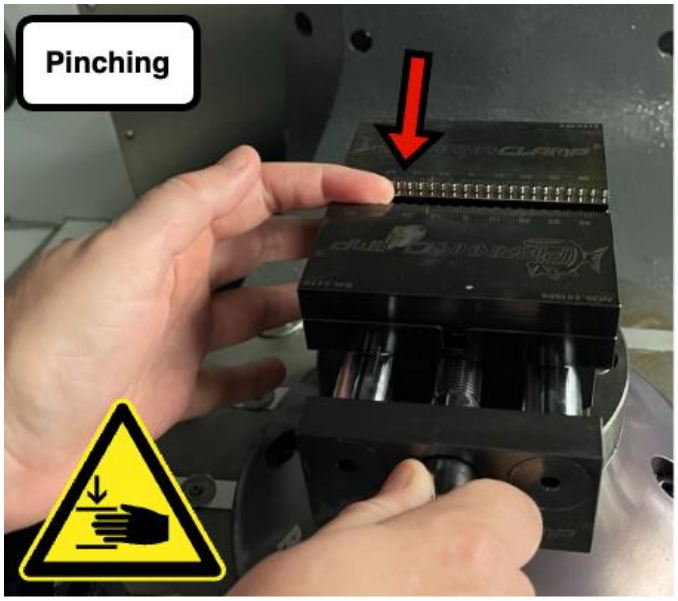


- ❑ Round stock, plate stock, organic stock, drill chuck, er collets, 4-axis machining, 5-axis machining, ISO K, S, H etc. require specialized one to one training.

MACHINE SPECIFIC HAZARDS

- ❑ Hands can be caught in the rotating spindle, rotating chip auger or moving chip belt.

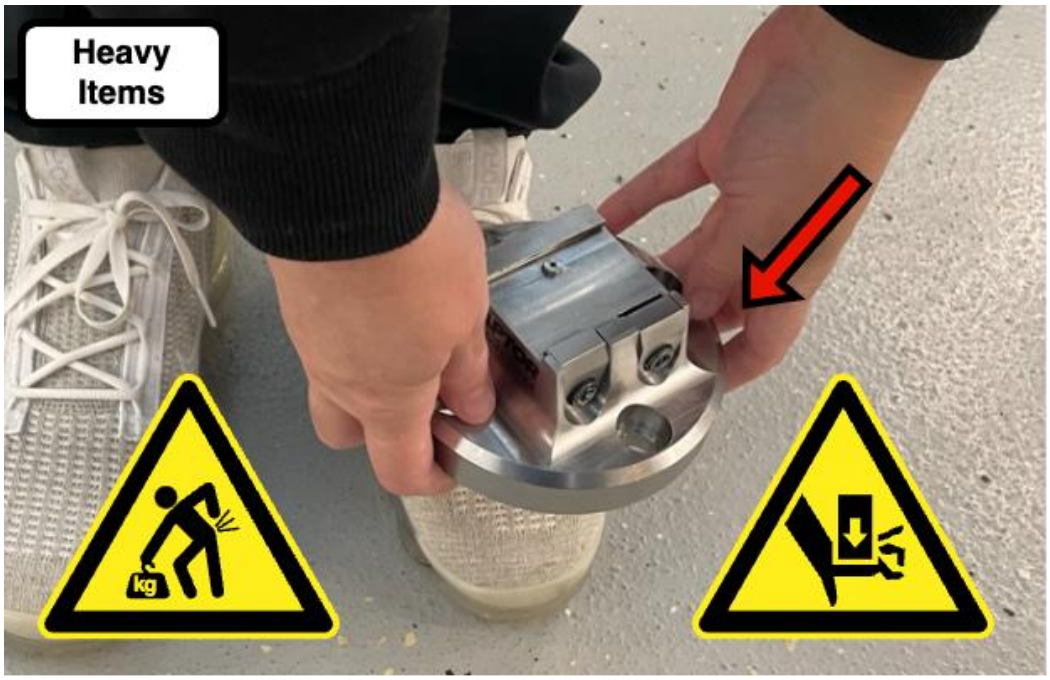
- ❑ Hands can get pinched on tool load and vice jaws.



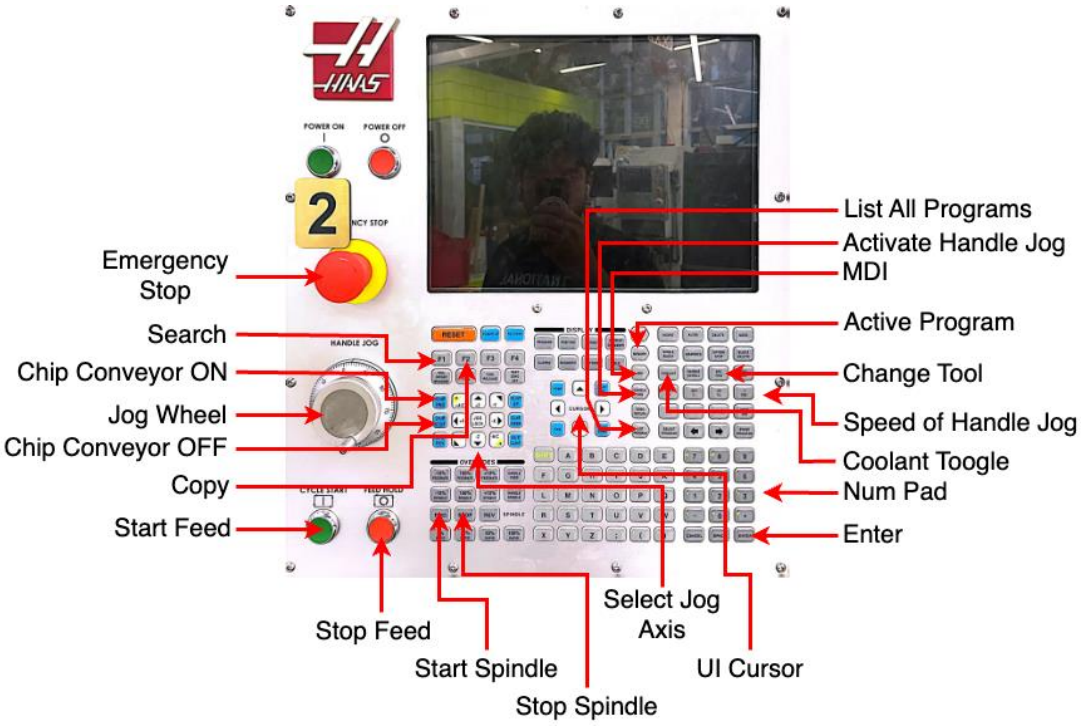
- ❑ The tools can cut your hands.

- ❑ Coolant can irritate your skin.

- ❑ Stock, tools and fixtures can be heavy.



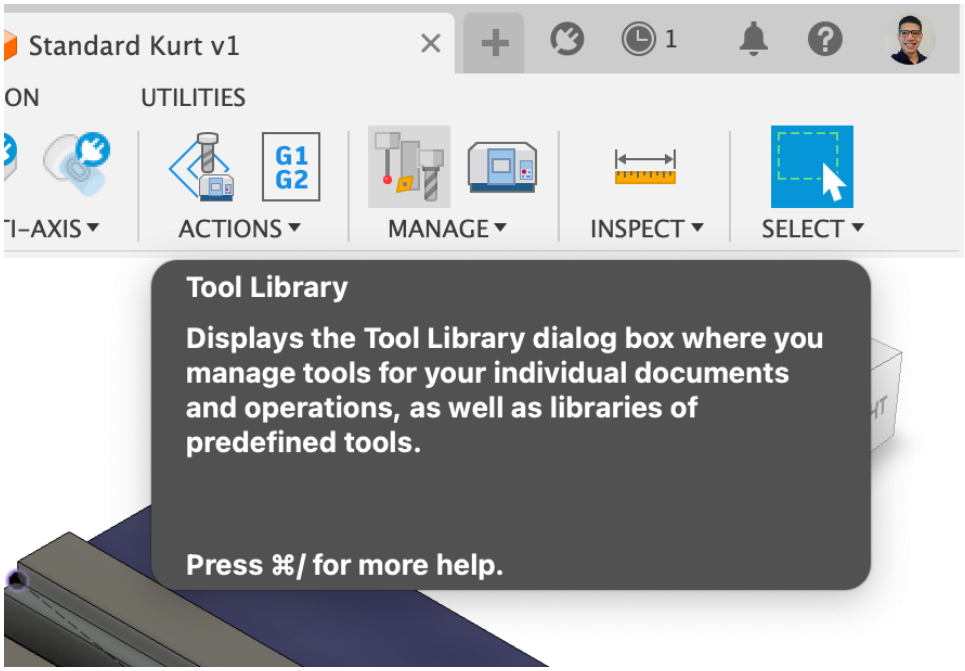
MACHINE CONTROLS



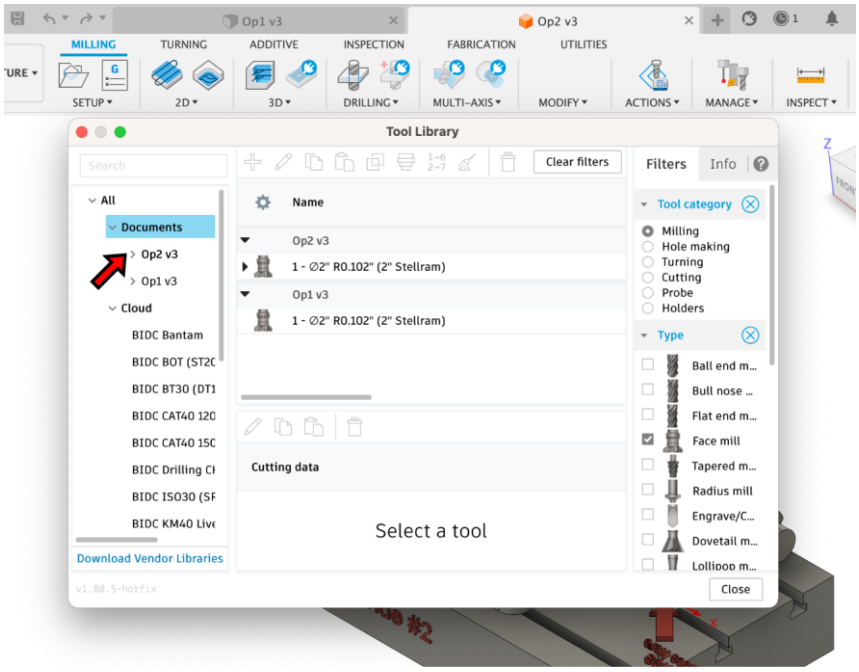
PRE-FLIGHT

<u>Tool Assembly</u>

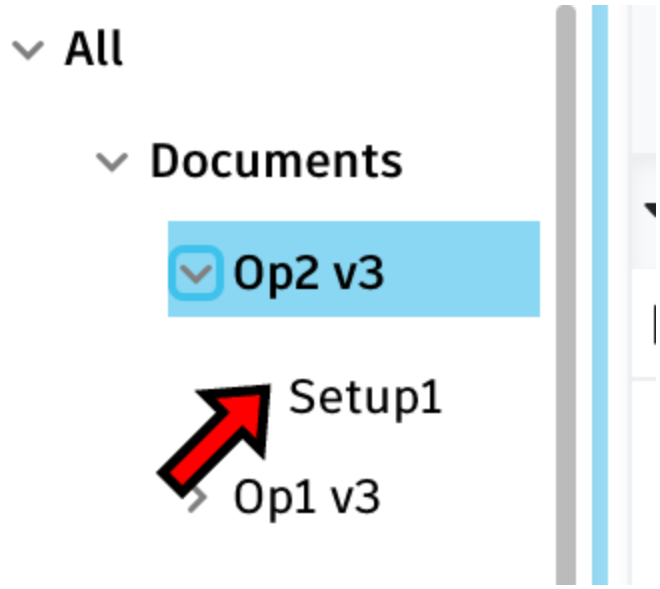
- ❑ Open **TOOL LIBRARY** in Fusion 360.



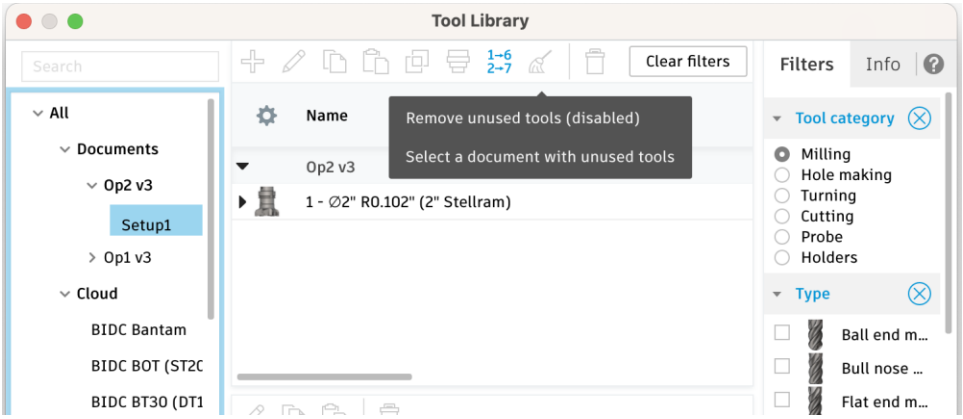
- ❑ Navigate to tools for current document.



- ❑ Navigate to the current setup.

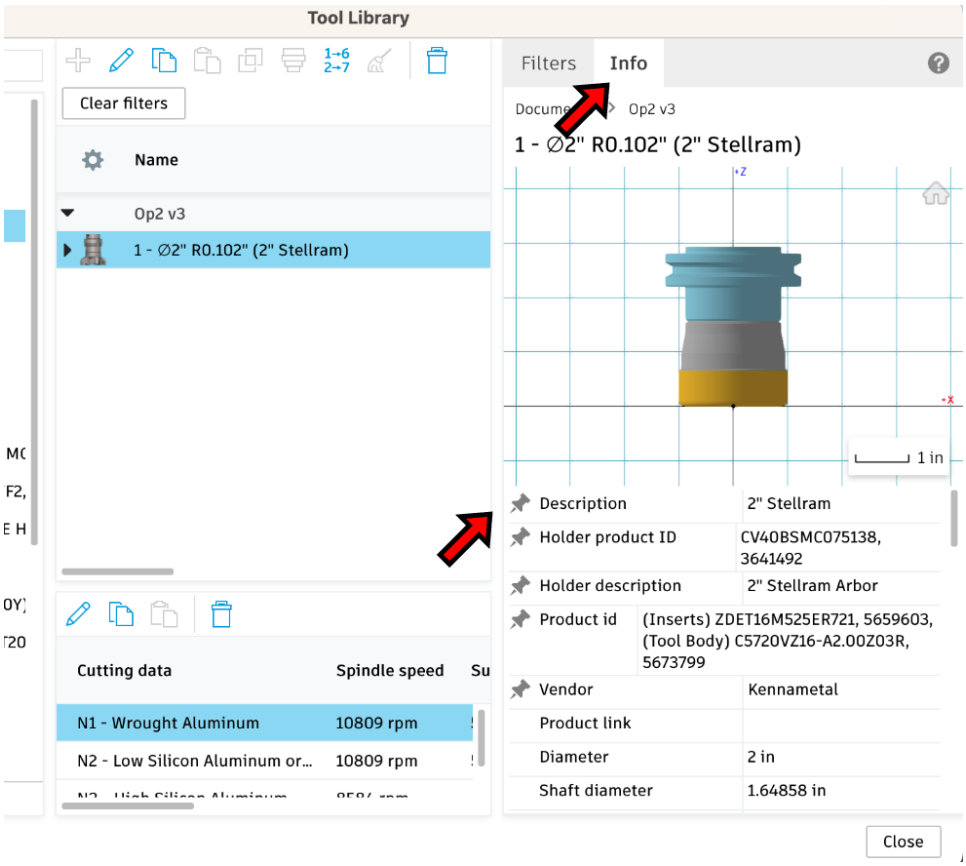


- ❑ Press **REMOVE UNUSED TOOLS** and accept the popup.

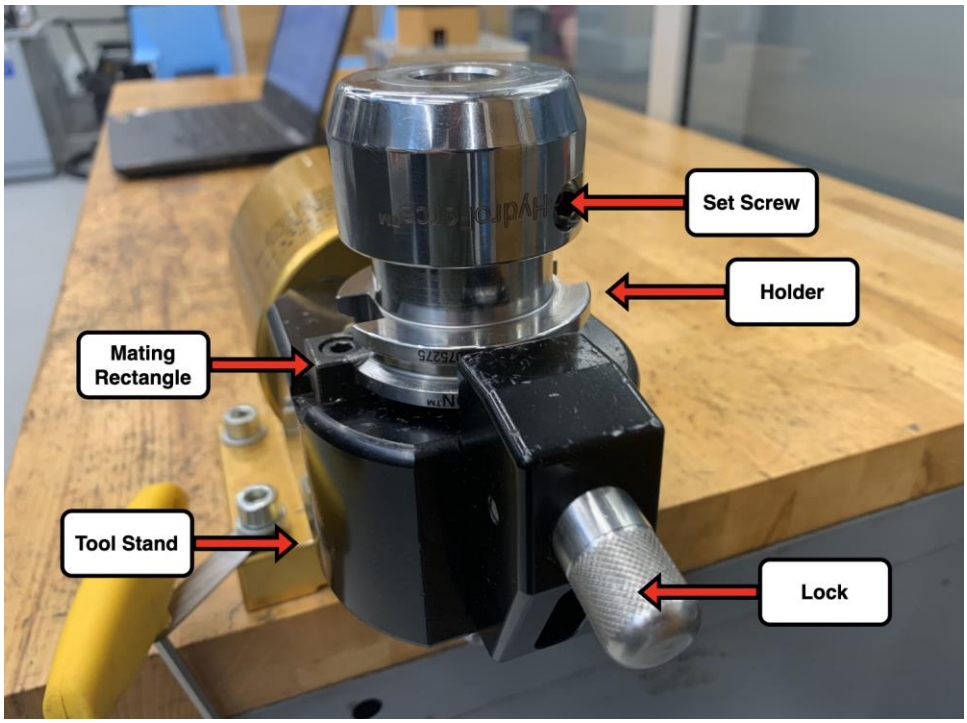


- ❑ Repeat the following procedures for the setup of each HydroForce tool:
    - Select tool in list so **INFO** bar on right populates with information.

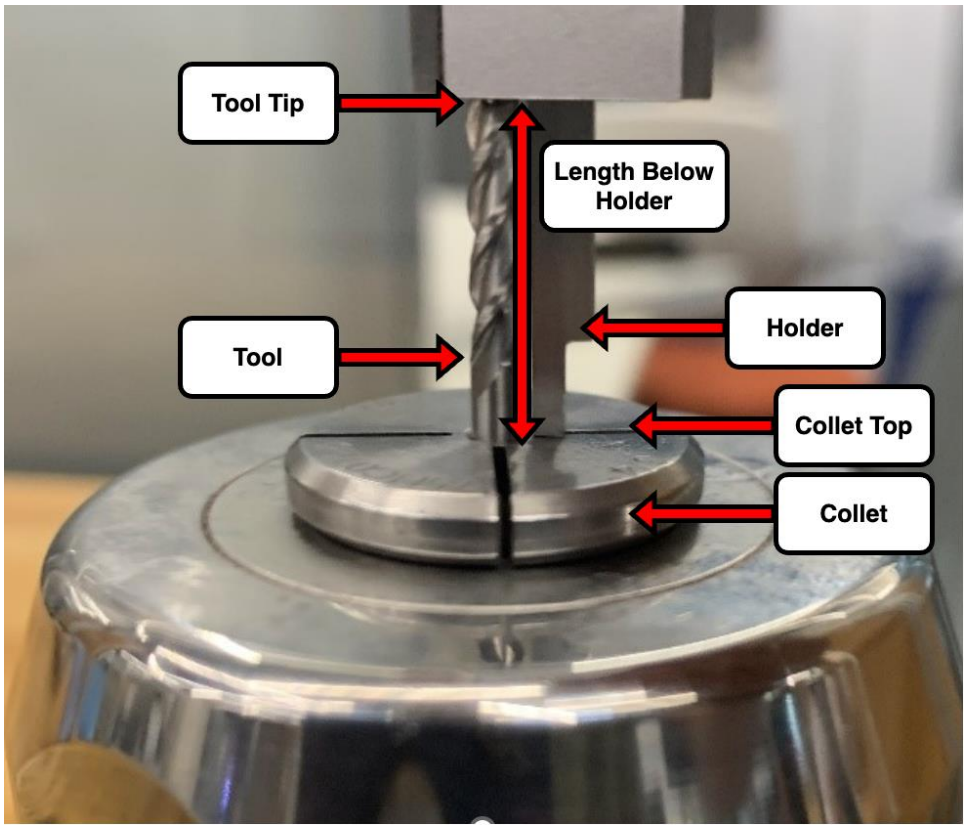
- Check holder type under **HOLDER DESCRIPTION** and **HOLDER PRODUCT ID.**
- Check tool under **DESCRIPTION** and **PRODUCT ID** if necessary.



- Retrieve **TOOL HOLDER**, tool, and collet with tool's shank diameter. You may use the IDs to guide you.
- Place **TOOL HOLDER** in **TOOL STAND** such that rectangular cutouts mates with the **MATING RECTANGLE** on **TOOL STAND** and the **LOCK** audibly clicks.
- Verify that **SET SCREW** faces away from **TOOL STAND**.



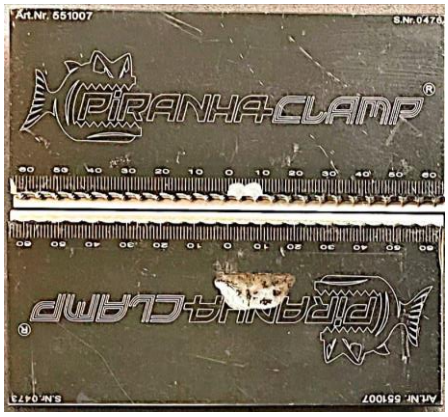
- Check **LENGTH BELOW HOLDER** in tool library where you identified tool and holder**.**
- Set calipers to **LENGTH BELOW HOLDER**, and lock with screw above the dial.
- Insert **COLLET** into **TOOL HOLDER** such that it is fully seated (if applicable).
- Insert **TOOL** into collet.
- Verify that distance between **TOOL TIP** and **COLLET TOP** face is **LENGTH BELOW HOLDER** using calipers.



- Hold **TOOL** to prevent slipping in **COLLET**.
- Tighten **SET SCREW** using hex key with yellow handles until screw no longer turns.
- Pull **LOCK** and remove **TOOL HOLDER** from **TOOL HOLDER STAND**.
- Place **TOOL HOLDER** in tool rack on machine.

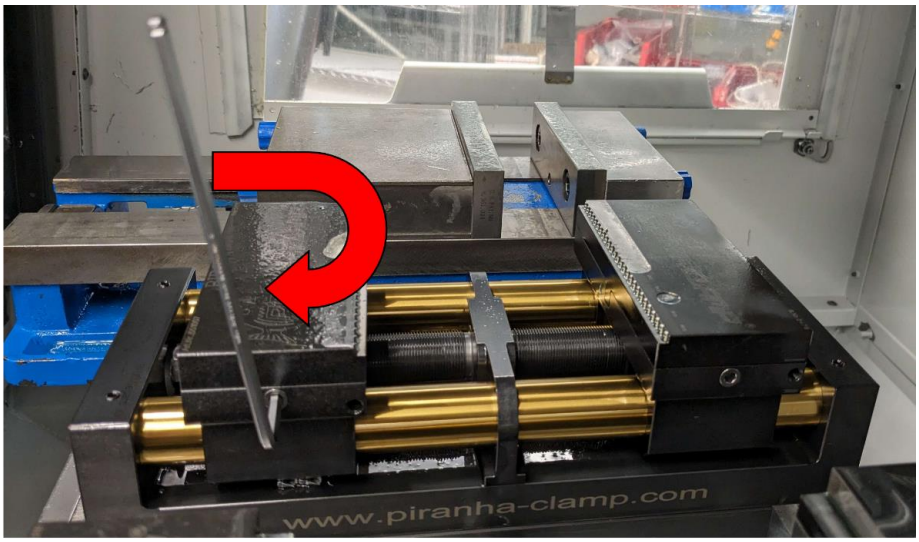
Stock Assembly

- ❑ Select the jaws for the Gepard 300.
    - **FLAT JAWS:** Use when stock has machined parallel flats to clamp on.

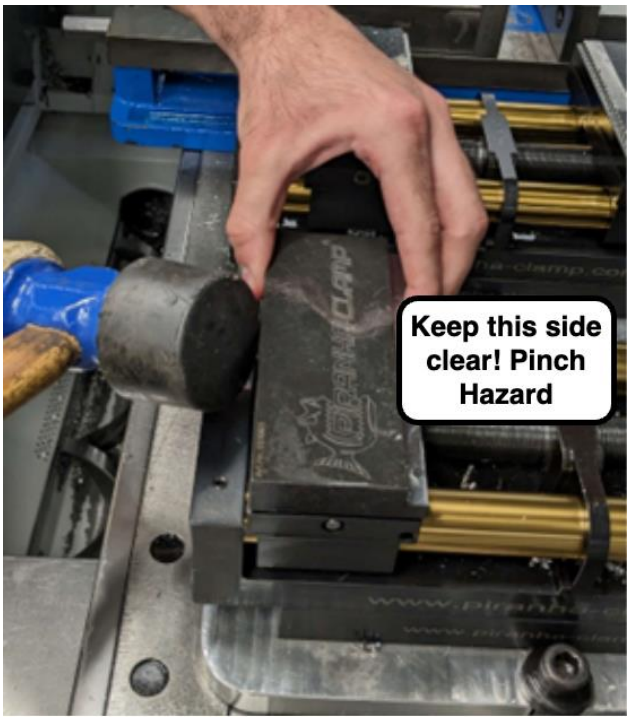


    - **SERRATED JAWS:** Use when stock has extruded sides to clamp on.

- ❑ Change jaws if needed.
    - Use a 4mm hex key to change the jaws.
    - Turn the hex key clockwise.



- Nudge with a mallet to loosen jaw. **Keep jaws open or else your hands will pinch against the other jaw.**

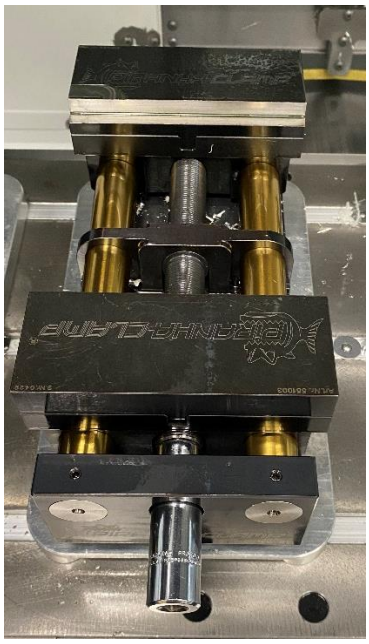


- Clean the bottom surfaces and replace jaws.

- Turn the hex key counterclockwise until you feel slight resistance to tighten jaw.

❑ Clamping the stock.

- Use 16mm socket to hand tighten.



- Set torque wrench to 60 ft.lb and tighten until you hear a click.

Program Load

- ❑ Upload CAM from PC to **NETSHARE** folder in Fusion Team.
- ❑ Press **LIST PROGRAM.**
- ❑ Navigate to **NETSHARE** using **CURSOR**.
- ❑ Type program code using **NUM PAD** and press **F1 / SEARCH**.
- ❑ Press **ENTER.**
- ❑ Press **F2 / COPY.**
- ❑ Press **ENTER** twice to copy into memory.
- ❑ PUT STUFF HERE
- ❑ Press **MEM** to view G-code.
- ❑ Ensure loaded program is accurate.

OPERATE

- ❑ Press **CYCLE START / START FEED.** Hover hand over **FEED HOLD / STOP FEED**.
- ❑ Load tools based on instructions from control and tool numbers from CAM.
- ❑ Tools will probe automatically, notify supervising Peer Mentor if the control throws an error.
- ❑ Validate WCS.
- ❑ Validate tool length.
- ❑ Check CAM for the current toolpath and **know the trajectory**.
- ❑ Press **FEED HOLD / STOP FEED** if machine operation deviates from expected (breakages, abnormal loud sounds, etc.)
- ❑ Check tool

POST-FLIGHT

- ❑ Hold tool
- ❑ Press black button to release tool
- ❑ Disassemble tool, return bits and holders to proper location

Stock Unloading

- ❑ Use breaker bar to break torque on workholding
- ❑ Remove any added fixturing

Cleanup

- ❑ Close coolant valve
- ❑ Press **Coolant** button
- ❑ Rinse chips off workholding and into chip auger
- ❑ Use air hose to wipe off coolant and any remaining stuck chips
- ❑ Press **Chip FWD** and use chip auger stick if necessary
- ❑ Press **Coolant** and **Chip STOP**

- ❑ Turn coolant valve back open

- ❑ Complete assigned 5-minute shop job at the end of your reservation.