

PRESENTED BY :

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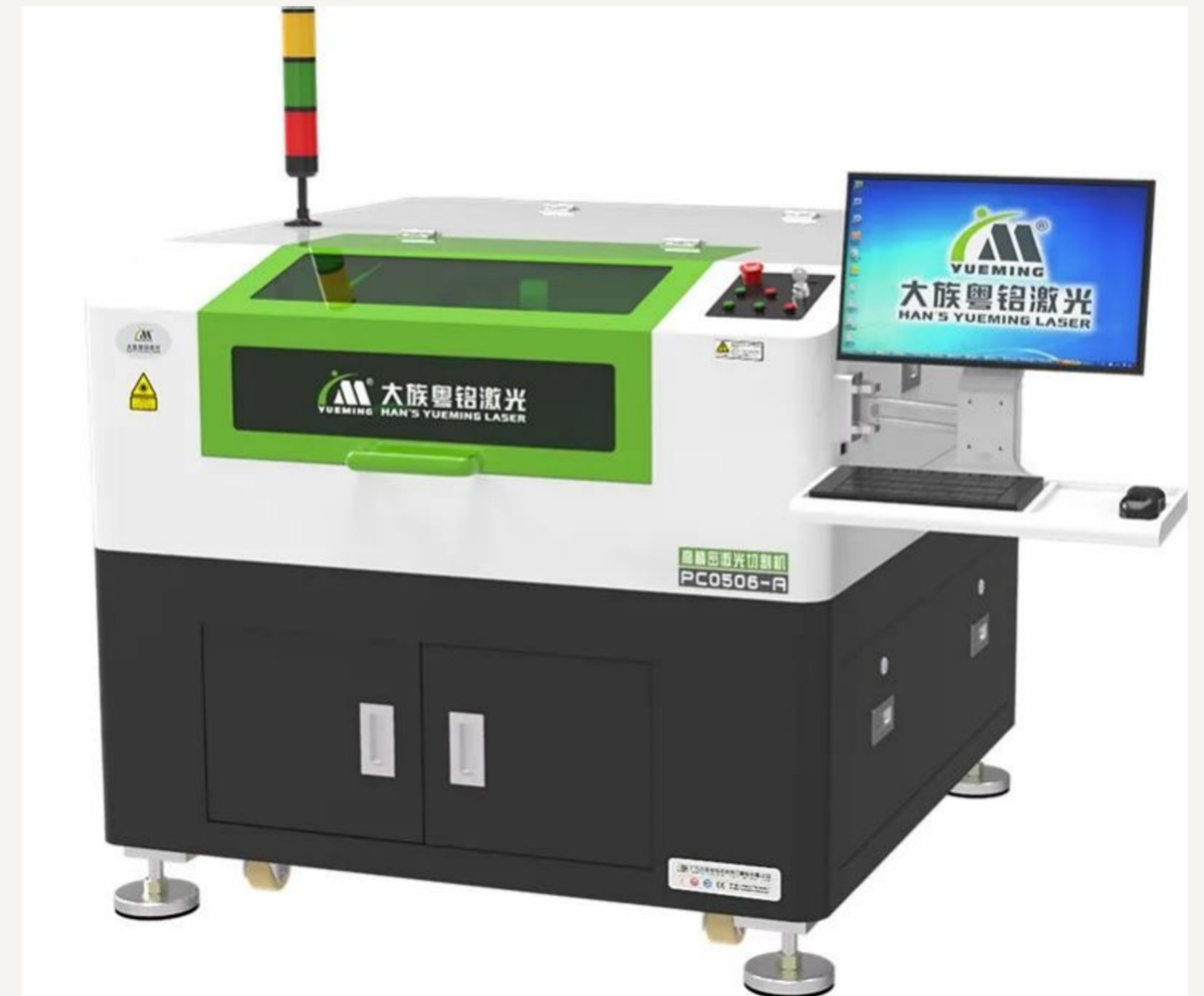
ISDN 2400: Physical Prototyping 24-25 Spring
Additive Manufacturing Lab I

SUBTRACTIVE MANUFACTURING LASER CUT

LAB OBJECTIVE

In this lab, you will learn some knowledge about:

- Subtractive manufacture
- How to operate the laser cutter

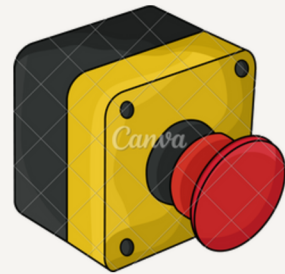


HEADS UP !!!!!



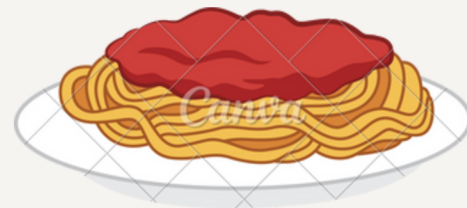
NO UNSURE ACTION

Do not perform any actions if you are unsure. If you have any doubts, contact the TAs or Staffs FIRST.



FIND THE EMERGENCY STOP

Before use any machine, always know how to turn it off in case of emergency.



DAMAGE? INFORM!

It is normal to damage a machine, if this happened, please inform the relevant Person In Charge. DO NOT HIDE the problem!



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SUBTRACTIVE MANUFACTURING



Subtractive manufacturing involves material removal with turning, milling, drilling, grinding, cutting, and boring. The material is typically metals or plastics, and the end product has a smooth finish with tight dimensional tolerances.



REVISION SM TECHNOLOGY

CATALOG BY WAY OF SUBTRACTION

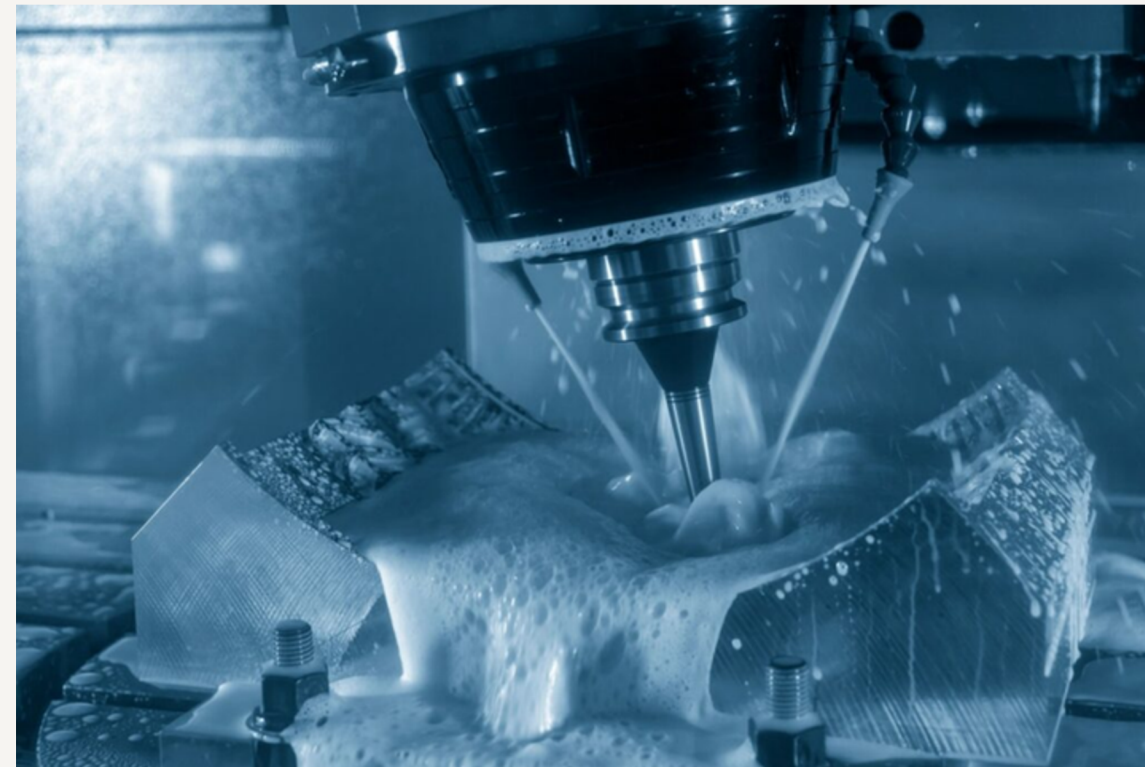
Subtractive manufacture can be divided into the following categories according to the cutting method:

- Force: Physical force to cut the part
- Thermal: Use heat to melt or sublimation
- Chemical: Chemical reaction to remove the material



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FORCE SUBTRACTIVE



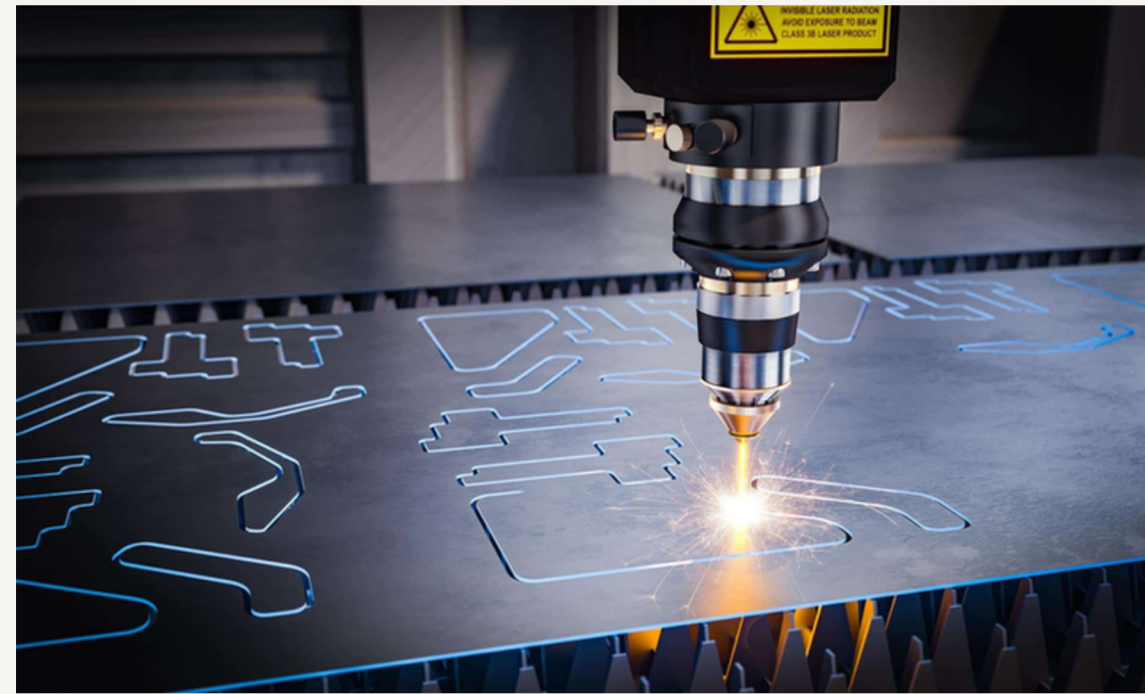
Knife cutting: milling, drilling



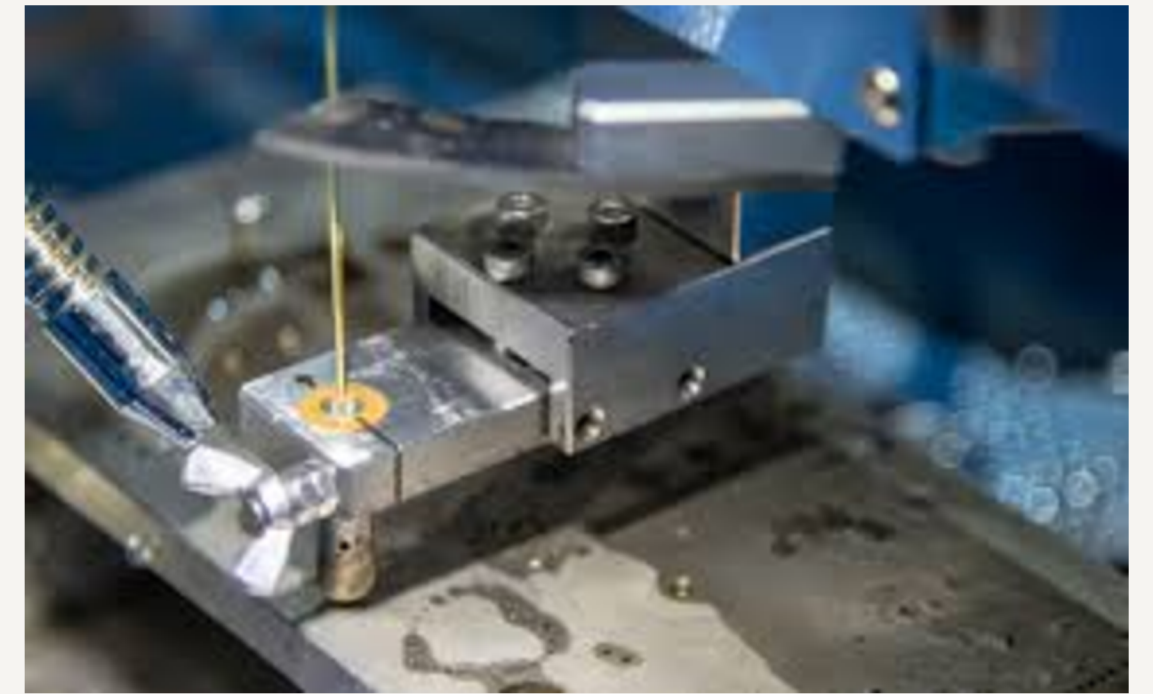
Water jet: Abrasive water jet,
water jet

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THERMAL SUBTRACTIVE



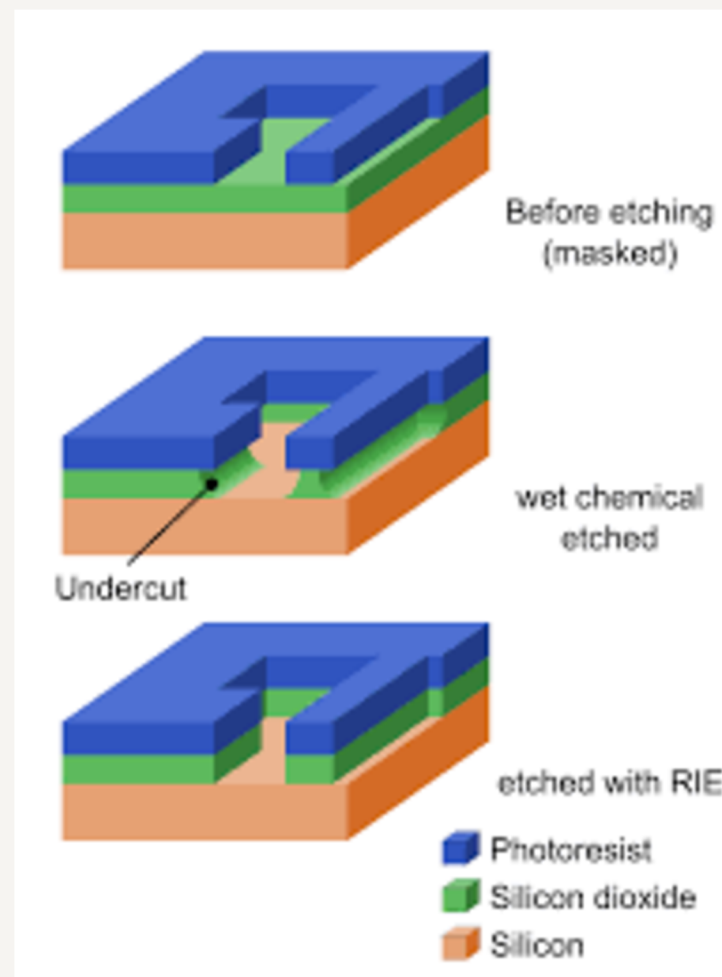
Particle ejecting: Laser cut, plasma cut, oxy-fuel cutting



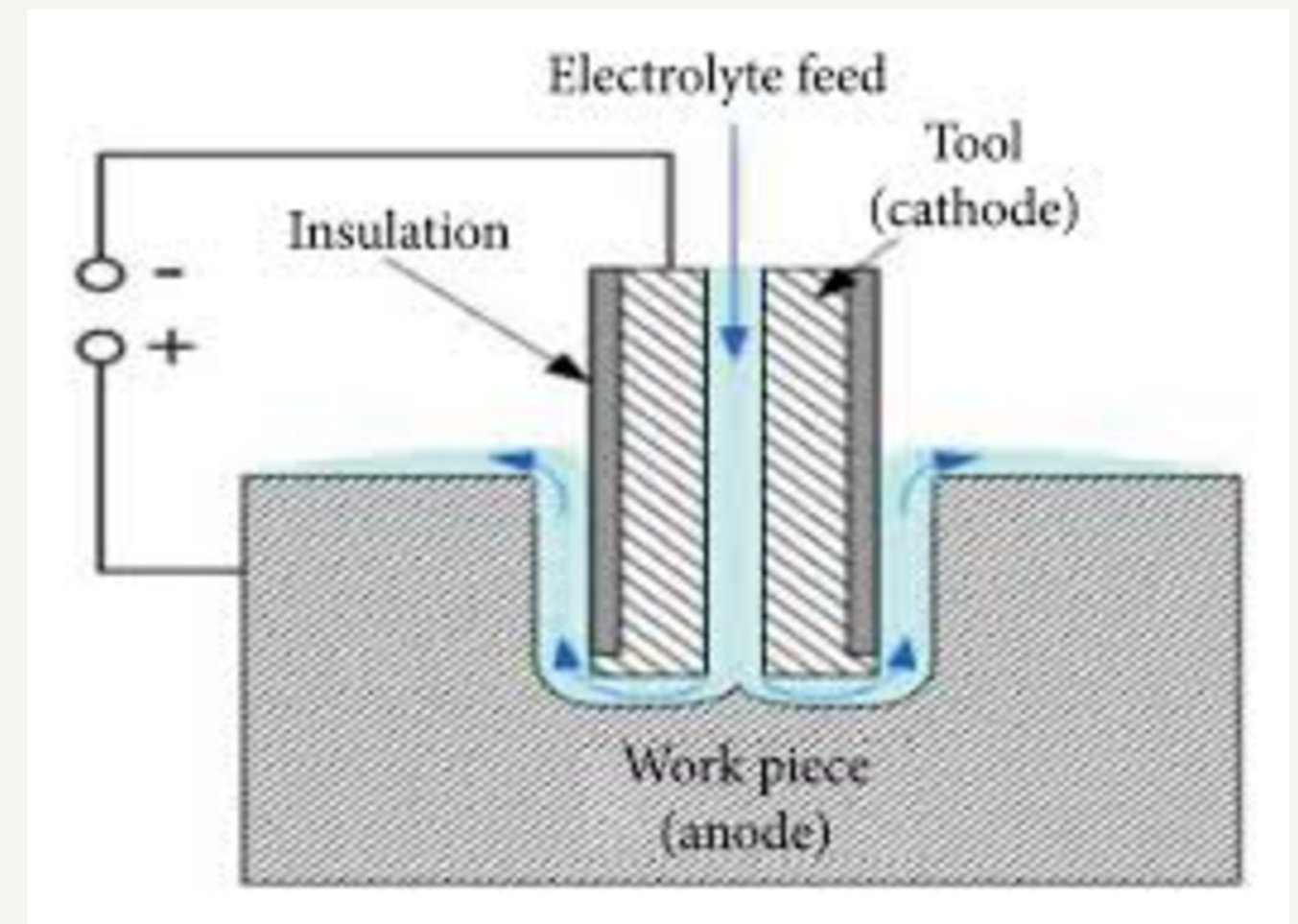
Electrical discharge: EDM, wire EDM

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CHEMICAL SUBTRACTIVE



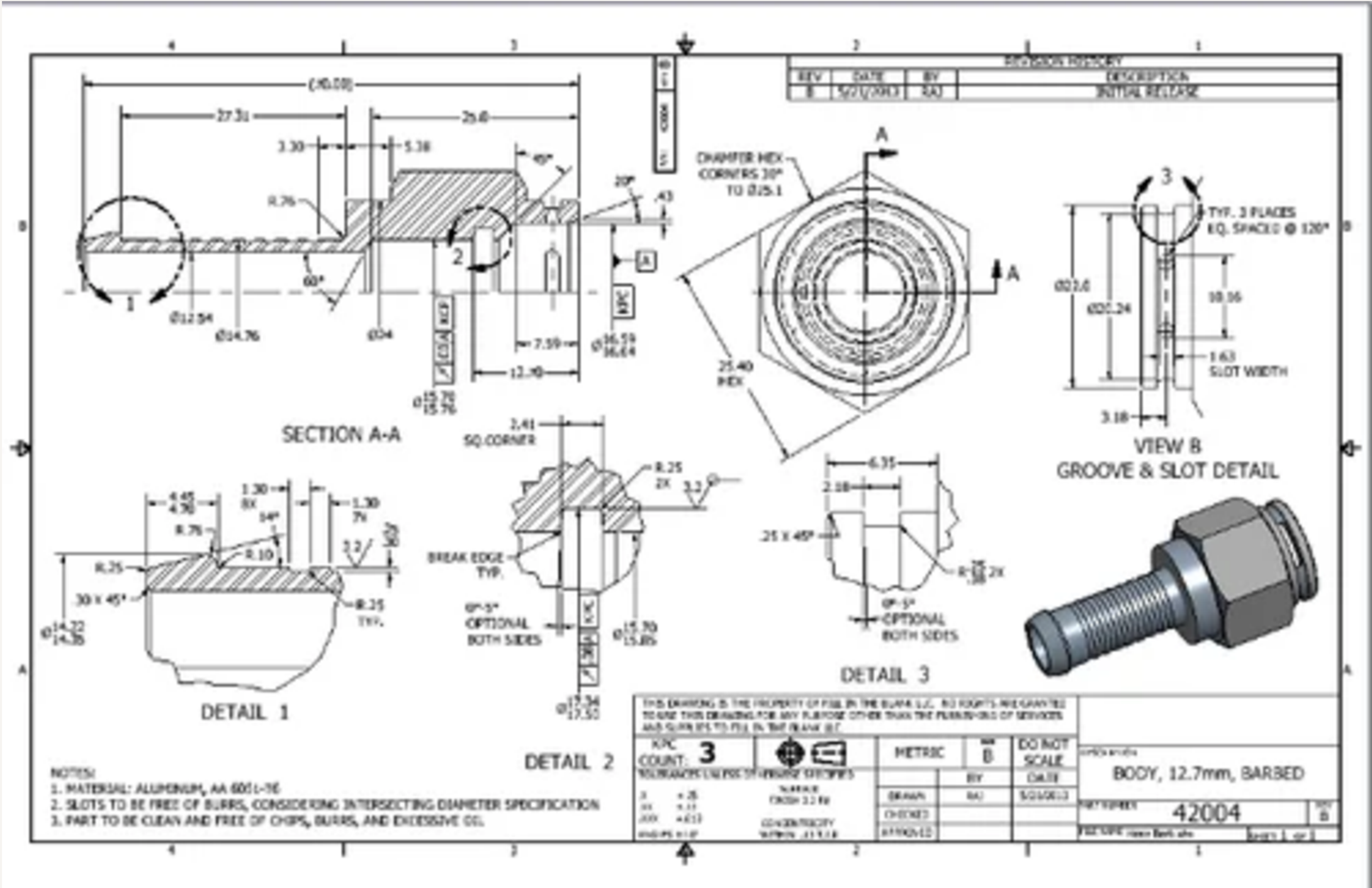
Etching



Electrochemical

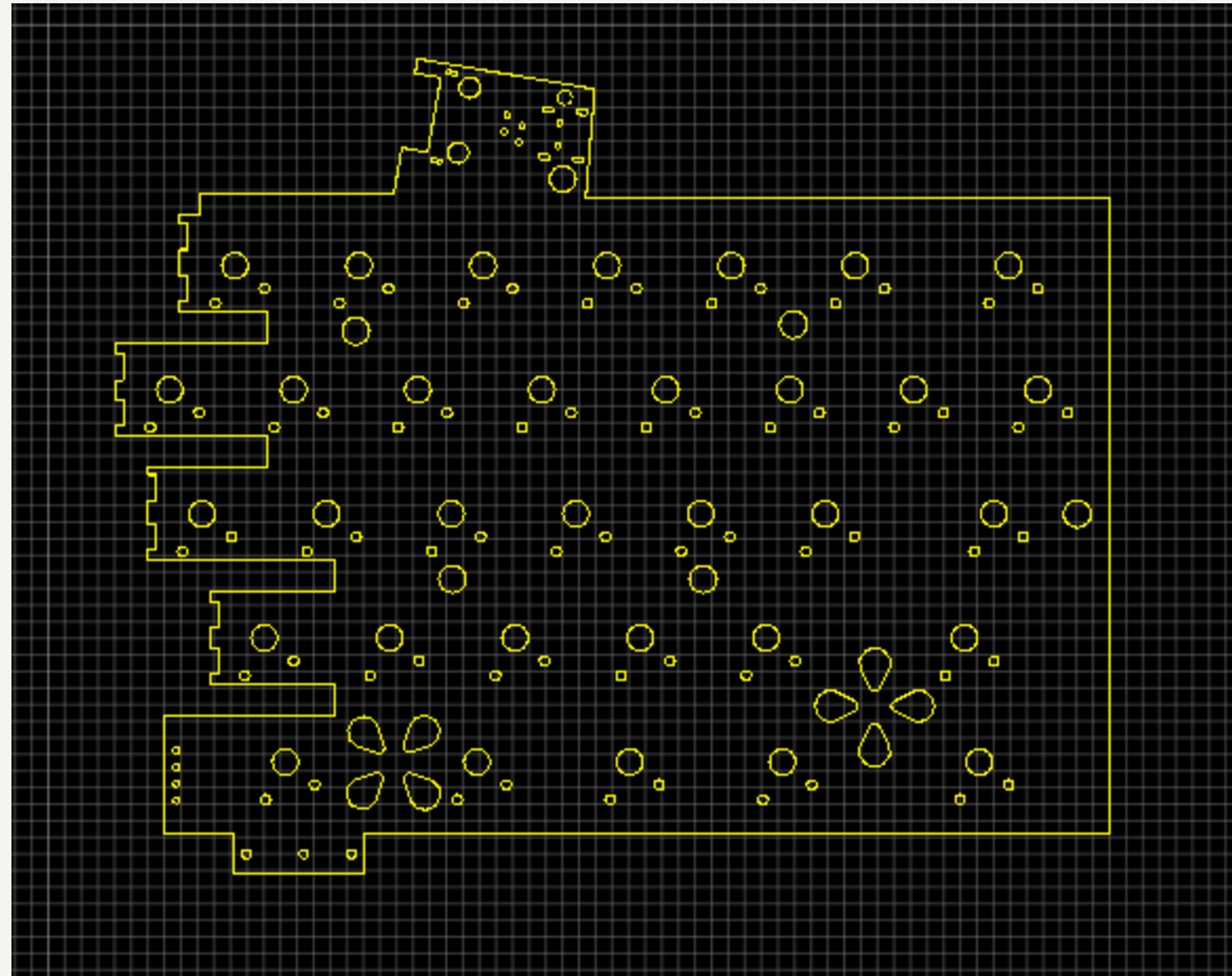
CAD FILE FOR 3D SM TECHNOLOGY

STEP & ENGINEER DRAFT (PDF)



CAD FILE FOR 2D SM TECHNOLOGY

DXF (DRAWING EXCHANGE FORMAT)



CAM FILE FORMATS G-CODE

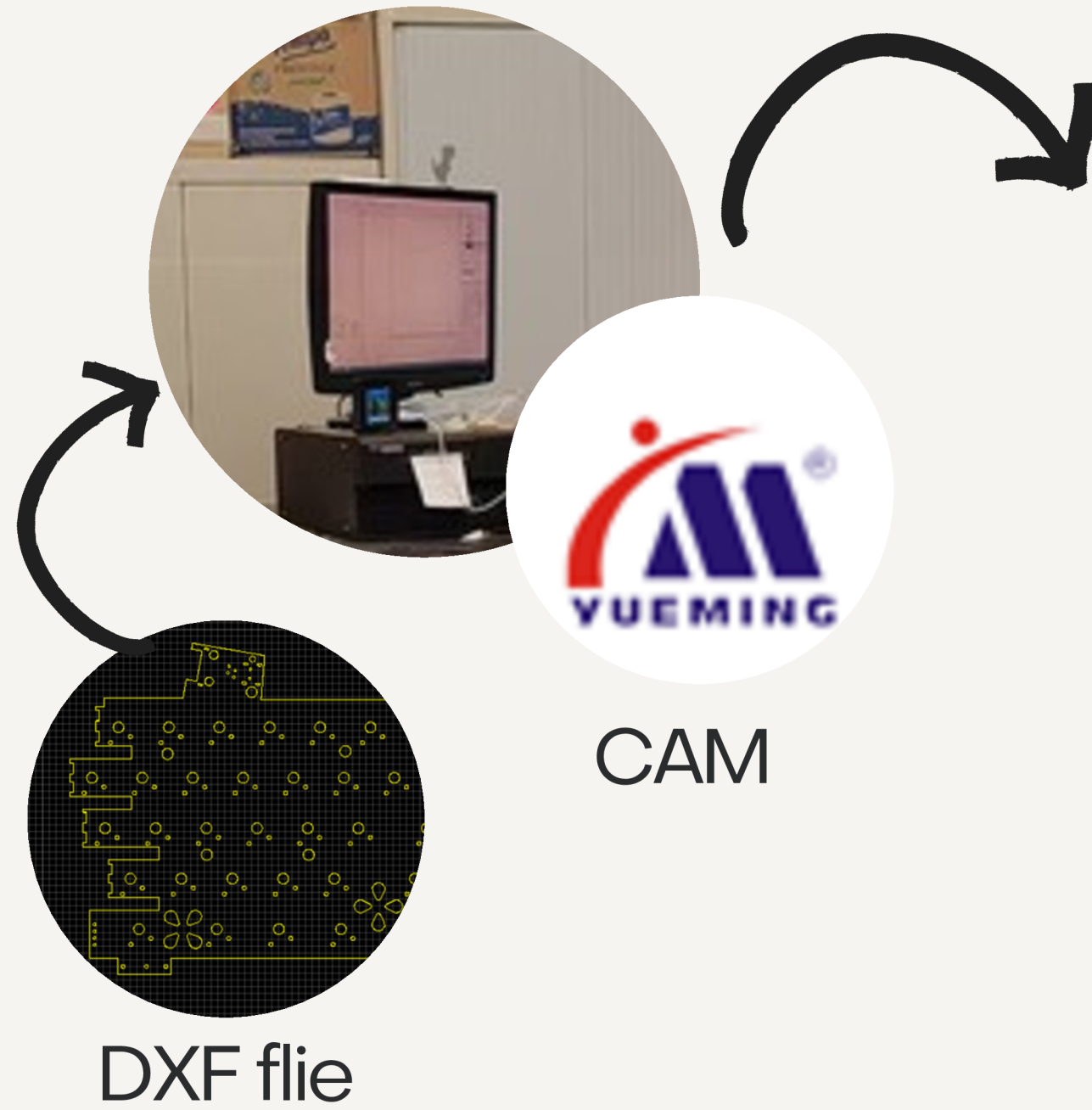


Fan speed setting
Nozzle travel speed (without extrusion)
Nozzle printing speed (with extrusion)
X, Y Coordinates

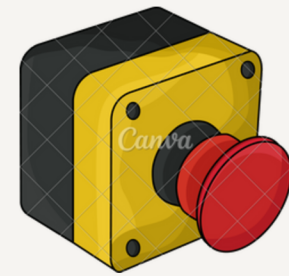
```
;Layer count: 25  
;LAYER:0  
M107  
G0 F9000 X52.235 Y55.800 Z0.300  
;TYPE:SKIRT  
G1 F2340 X56.093 Y55.800 E0.18815  
G1 X56.346 Y55.605 E0.20373  
G1 X57.299 Y55.078 E0.25684  
G1 X58.540 Y54.758 E0.31934  
G1 X59.404 Y54.719 E0.36152  
G1 X60.320 Y53.688 E0.42878
```

Layer height
Extrusion length

LACER CUTTER IN LAB RM 4223



SLICER BAMBU STUDIO



FIND THE EMERGENCY STOP

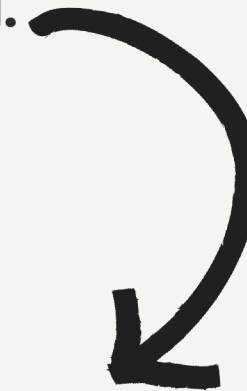


LASER CUT COMMON MATERIALS

WOOD BOARD, ACRYLIC BOARD, CLOTH

Important material data:

- Material type
- Thickness



Layer Parameter	
Name	3
Processing Media	Laser
Work Parameter	
Max. Power(%)	20.00
Min. Power(%)	20.00
Work Speed(mm/s)	300.000

DEMO FOR LASER CUT

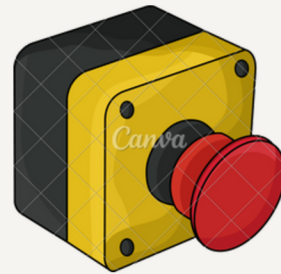


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LASER CUTTING ASSIGNMENT

LAB ASSIGNMENT (**DDL: 3RD MAR 23:59**)

- This is a group assignment. You will cut the fish's backbone with PETG, which will be used to create the fish's tail.
- Cut the fish backbone Part #18 +(one piece) and Part #13 with the laser cutter. [File shared in the Canvas →lab→Lab 3 Subtractive Manufacture →Laser cutting assignment]
- $P_{max} = 55$ $P_{min} = 50$ $v = 12$ (Just a reference)
- Feel free to modify the part if you want.
- Submission file:
 - A photograph showing your laser cutting part with your group number

THANK YOU!