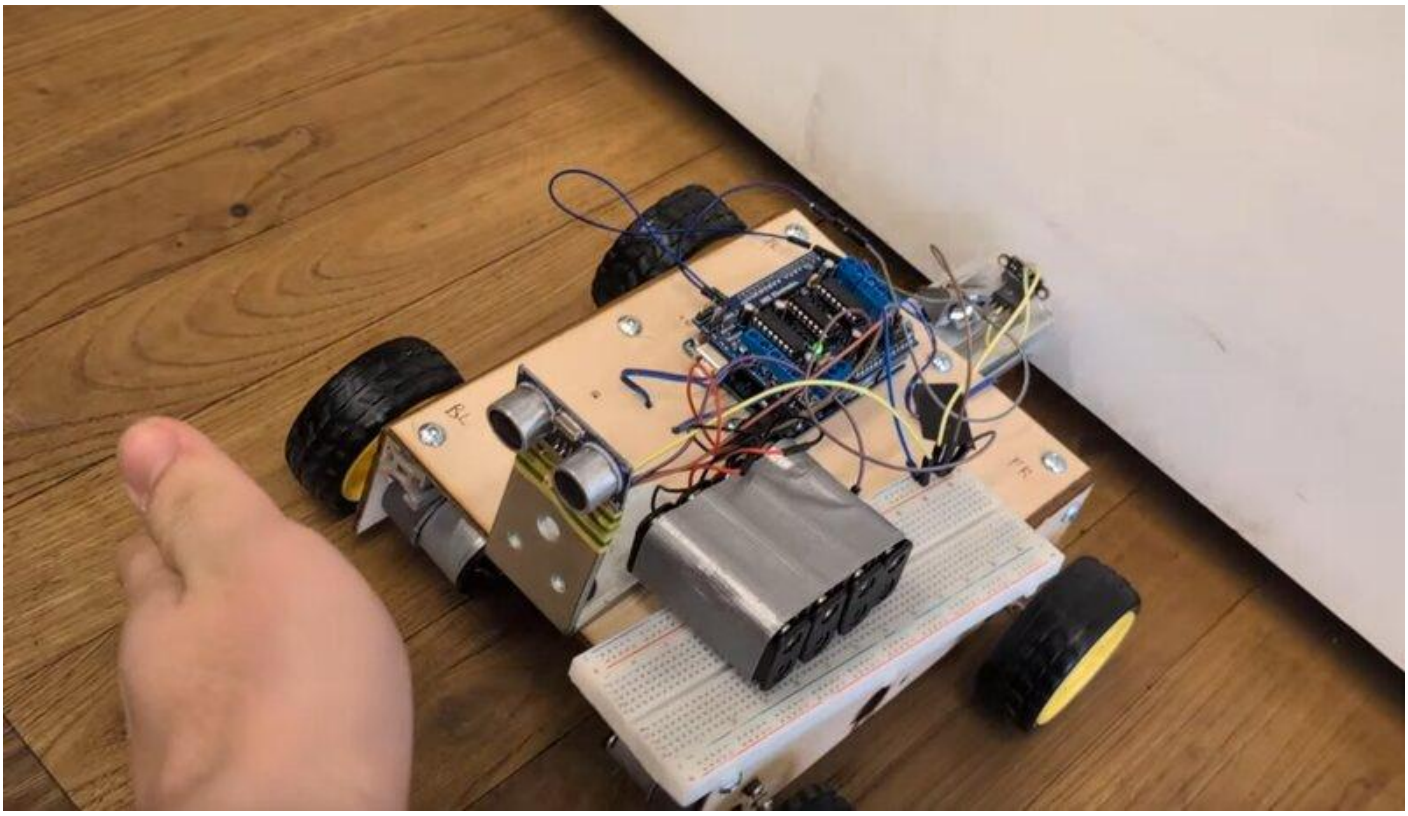
Week 13: Molding & Casting

- regional review
- machine presentations
- local class
- Materials
- Chocolate

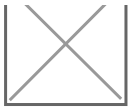
regional review

SAM



Forrest

Kirsjanis

https://gitlab.com/kriwkrow/pico-nc 

Patrick

machine presentations

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https://www.youtube.com/embed/sVUsoqN4CzQ?si=ci7gNEyZHg_7RYRV

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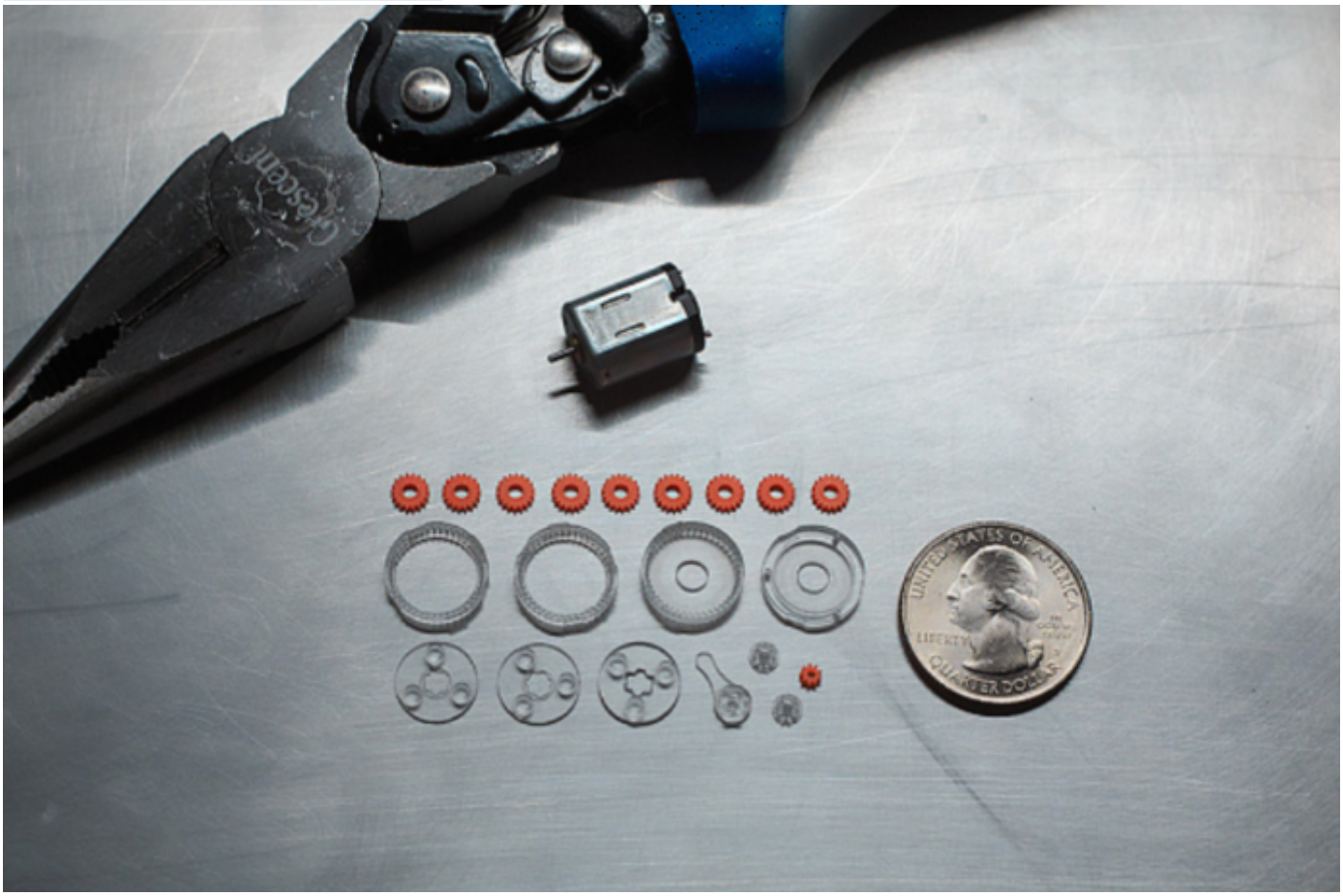
local class

guerilla guide to CNC machining



https://lcamtuf.coredump.cx/gcnc/

https://player.vimeo.com/video/707650918?badge=0autopause=0&player_id=0&app_id=58479

https://thenounproject.com (not free anymore □□)

How to a make Crystal Clear Ice Sphere

https://www.smooth-on.com/product-line/mold-max/?quicksearch

https://fabacademy.org/2021/labs/kamplintfort/students/mattissen-gerhard/assignments/week15/

https://fabacademy.org/2021/labs/kamplintfort/students/mattissen-gerhard/assignments/week18/

https://fabacademy.org/archives/2015/eu/students/postma.ronald/02_progress/week_09.html

https://fabacademy.org/2020/labs/leon/students/adrian-torres/week15.html

ferris File-A-Wax 148x88x37mm

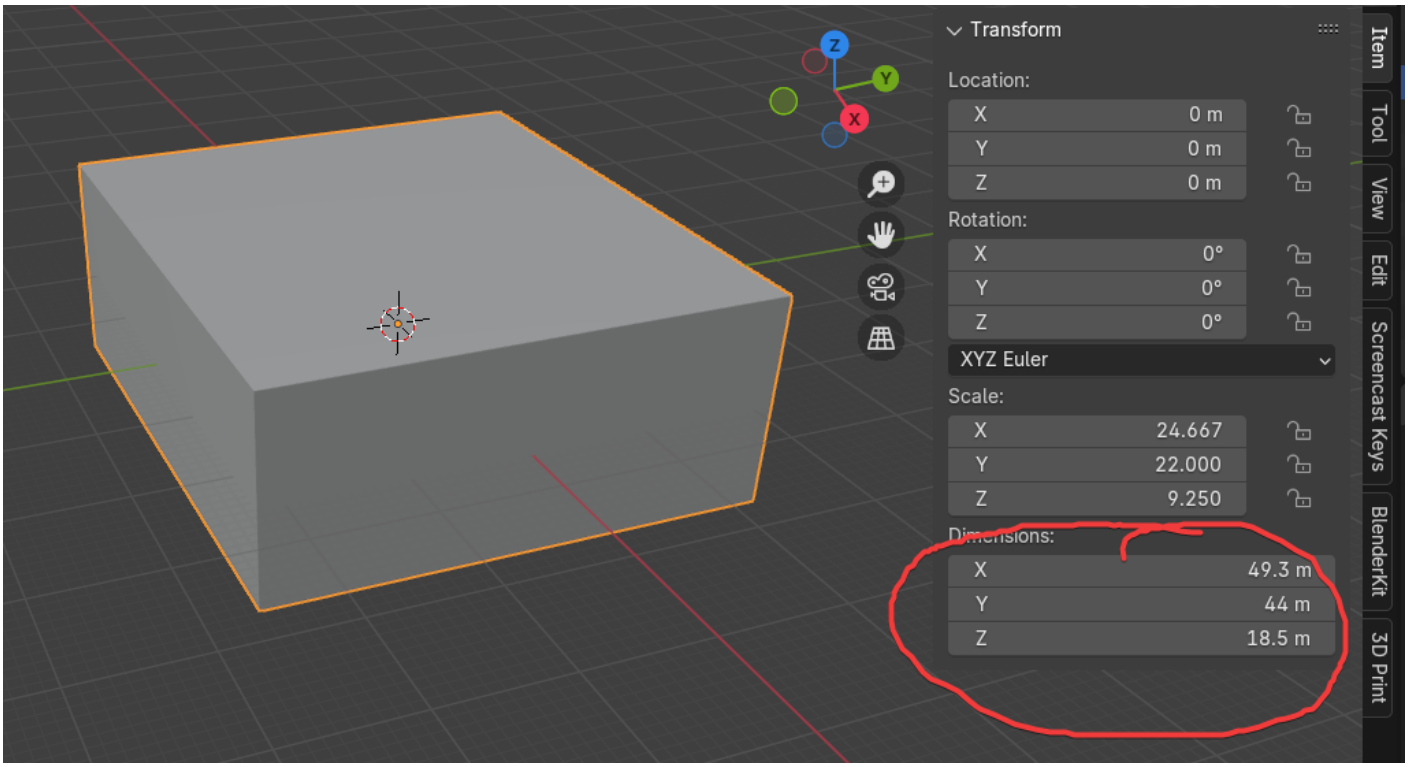
https://youtu.be/wMRSPXt48CI?si=QapaiAiej4CBpQQa

3D Printed Injection Molds - The Crafsman Steady Craftin

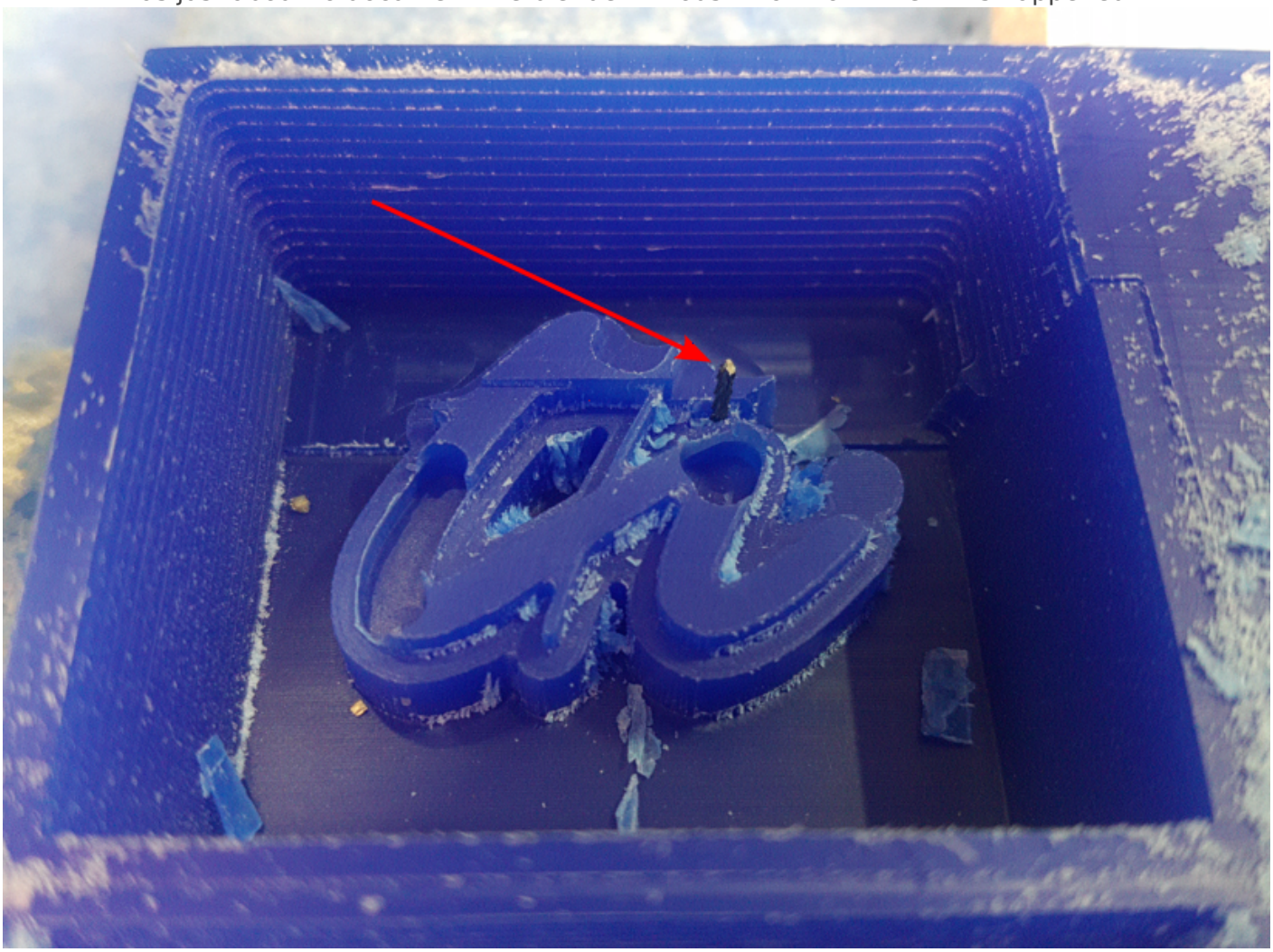
Lifecasting:

Blender - mods

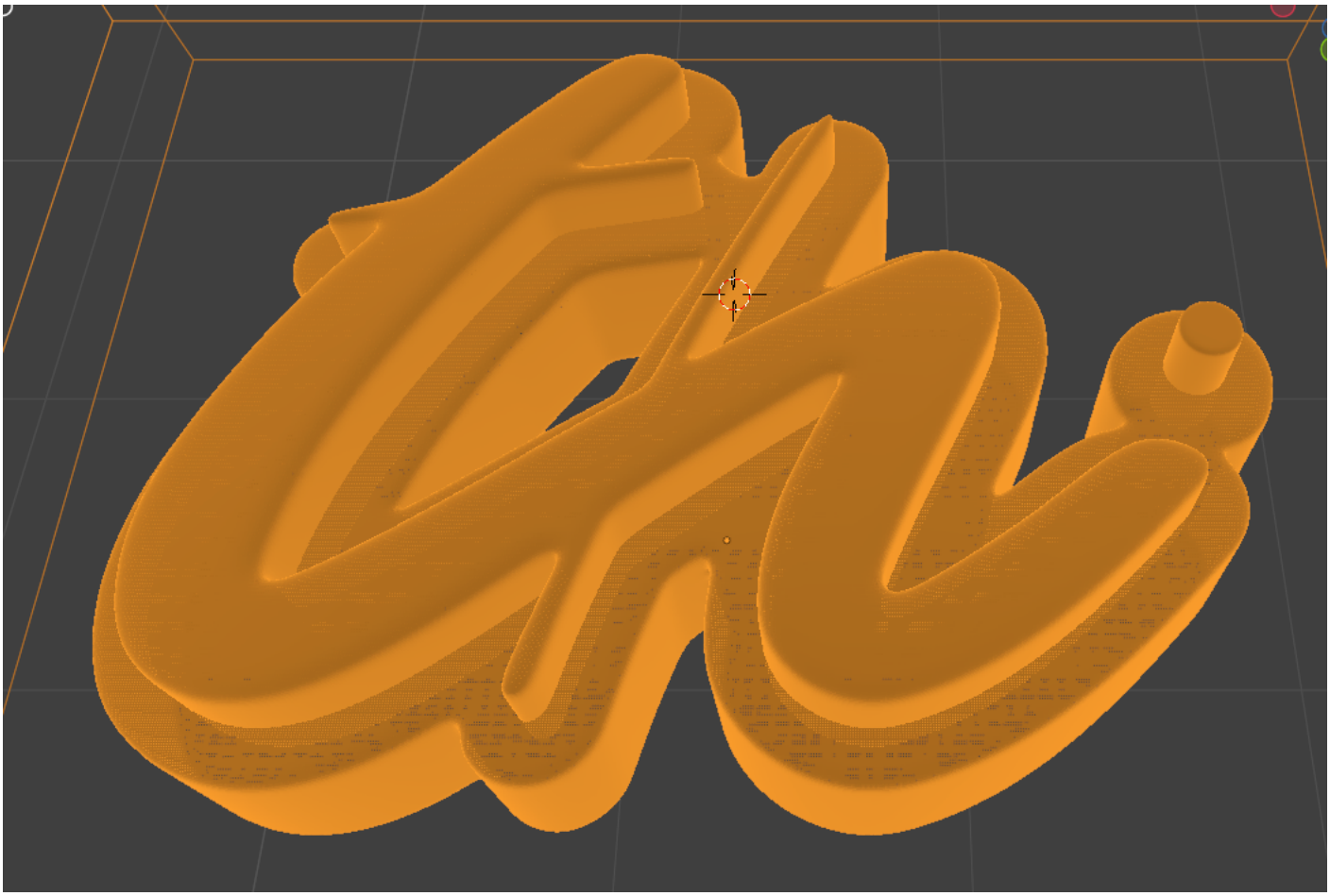
If you model your part in blender, you should start with a cube 49.3333 m x 44 m x 18.5 m in size.



Hmm....I was just about to document the blender - mods - workflow when this happened:



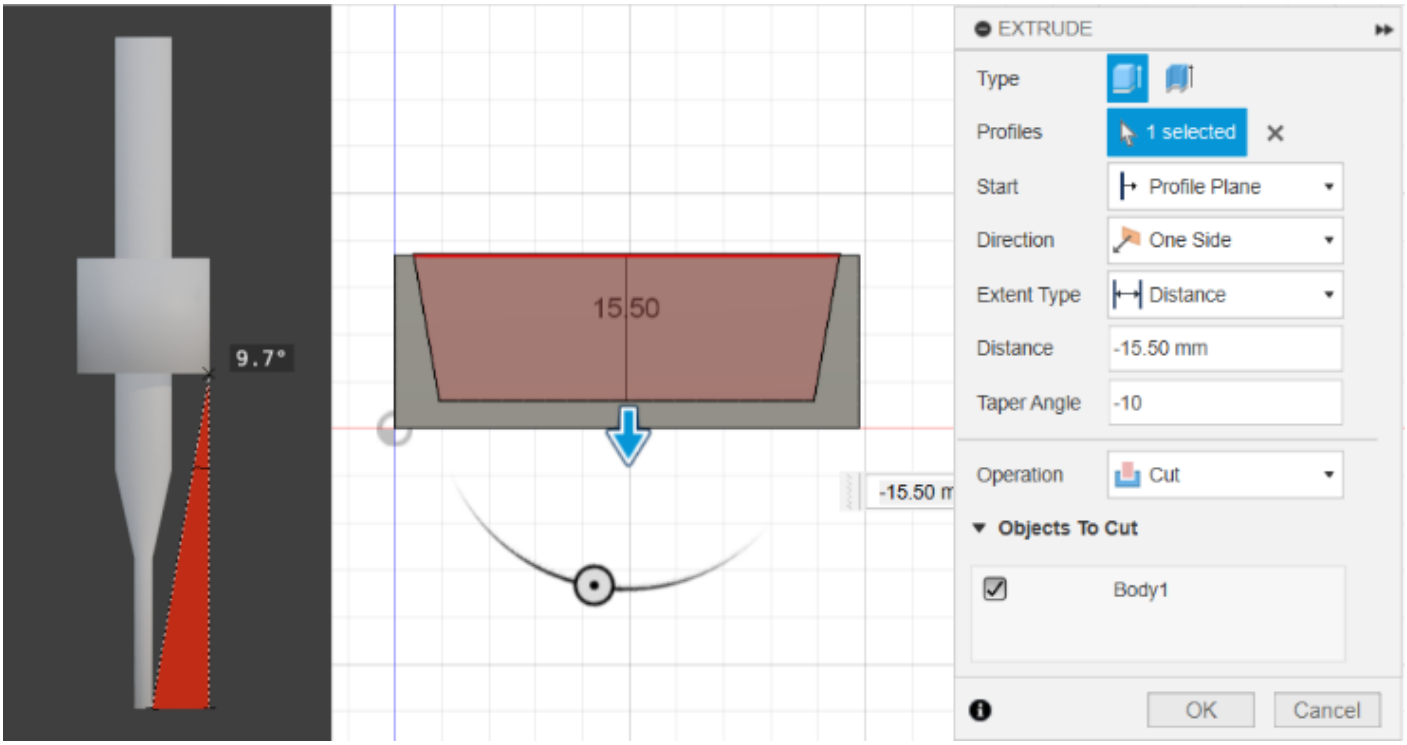
If the roughing doesn't enter in a hole and the finishing is 5 mm deeper, the tool breaks.



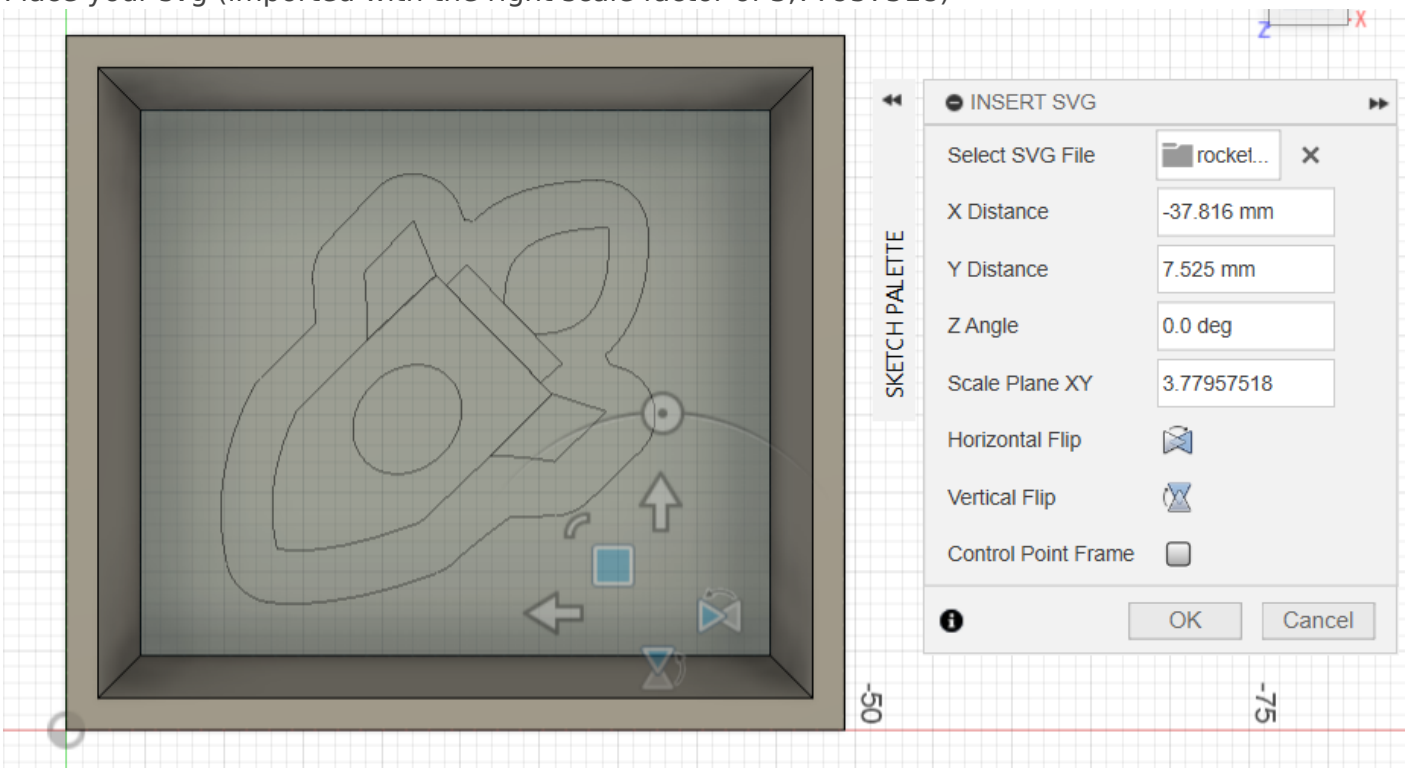
Let's use Fusion □□

Fusion

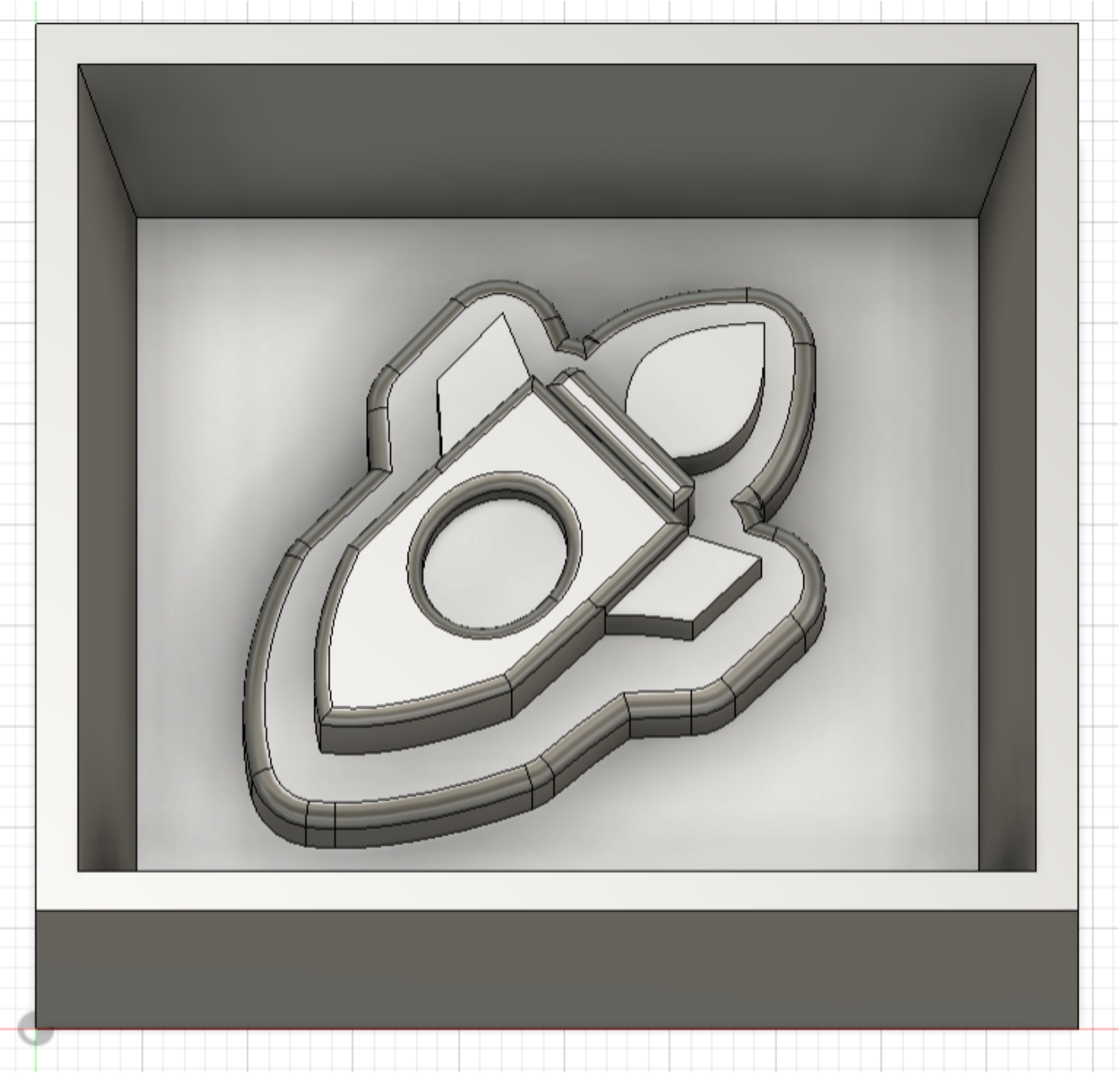
Extrude a box 49,3333 mm x 44 mm x 18,5 mm Create a cavity 2mm from the edge, 15,5 mm deep. If you give the sidewalls a 10° draft angle, you won't be able to hit it with the 1mm mill.



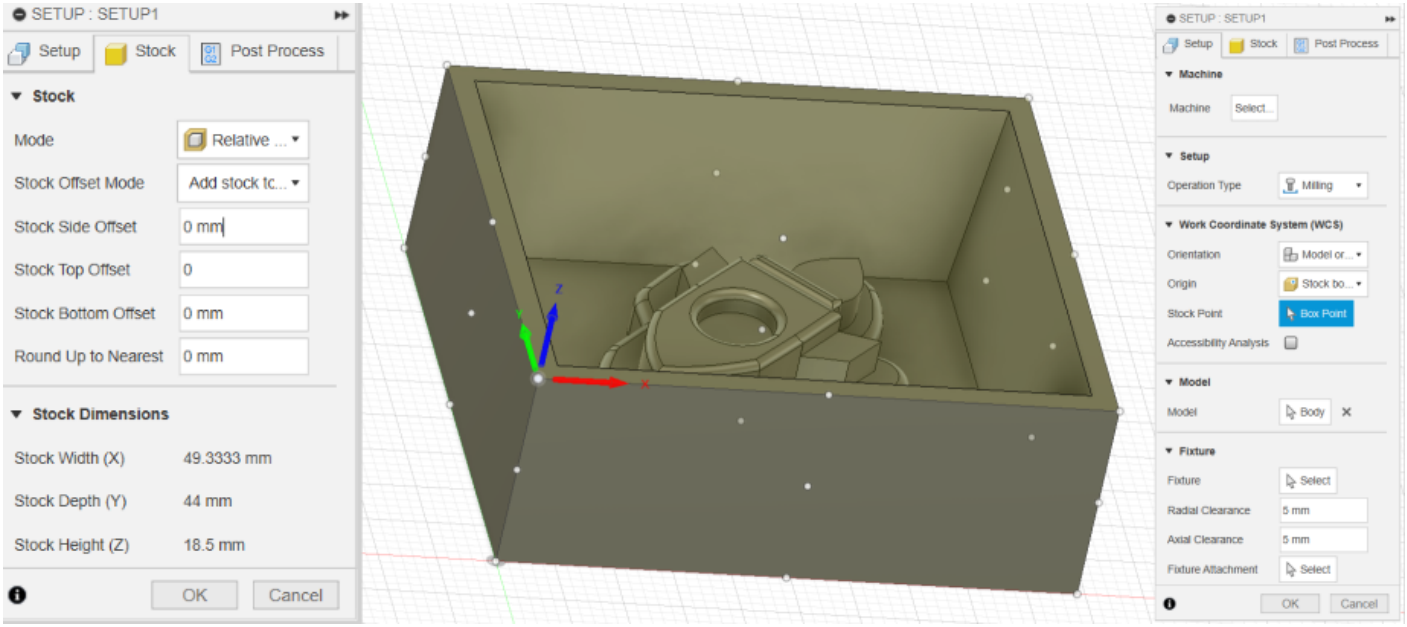
Place your svg (imported with the right scale factor of 3,77957518)



and extrude it.



In the Manufacturing workbench we create a setup, with a stock of 0-offset and the origin bottom-left at the upper corner:



For the roughing I use "Adaptive Clearing" with the following settings:

ADAPTIVE : ADAPTIVE1

Tool

Tool	Select...
	#5 - Ø3.175mm...
Coolant	Flood

Feed & Speed

Preset	Default pres...
Spindle Speed	5000 rpm
Surface Speed	49.8728 m/min
Ramp Spindle Speed	5000 rpm
Cutting Feedrate	1000 mm/min
Feed per Tooth	0.2 mm
Lead-In Feedrate	1000 mm/min
Lead-Out Feedrate	1000 mm/min
Transition Feedrate	1000 mm/min
Ramp Feedrate	333.333 mm/min
Plunge Feedrate	333.333 mm/min
Plunge Feed per Re...	0.0666667 mm

Shaft & Holder

OK Cancel

ADAPTIVE : ADAPTIVE1

Geometry

Machining Boundary	None

Stock Definition

Define Stock By	Stock bo...

Model

Avoid/Machine Surfaces

View Absolute Values	
Surface Groups	Group

Name	Radial	Axial
Model	0 mm	0 mm

Total Radial Stock To...	0.5 mm
Total Axial Stock To l...	0.5 mm

OK Cancel

ADAPTIVE : ADAPTIVE1

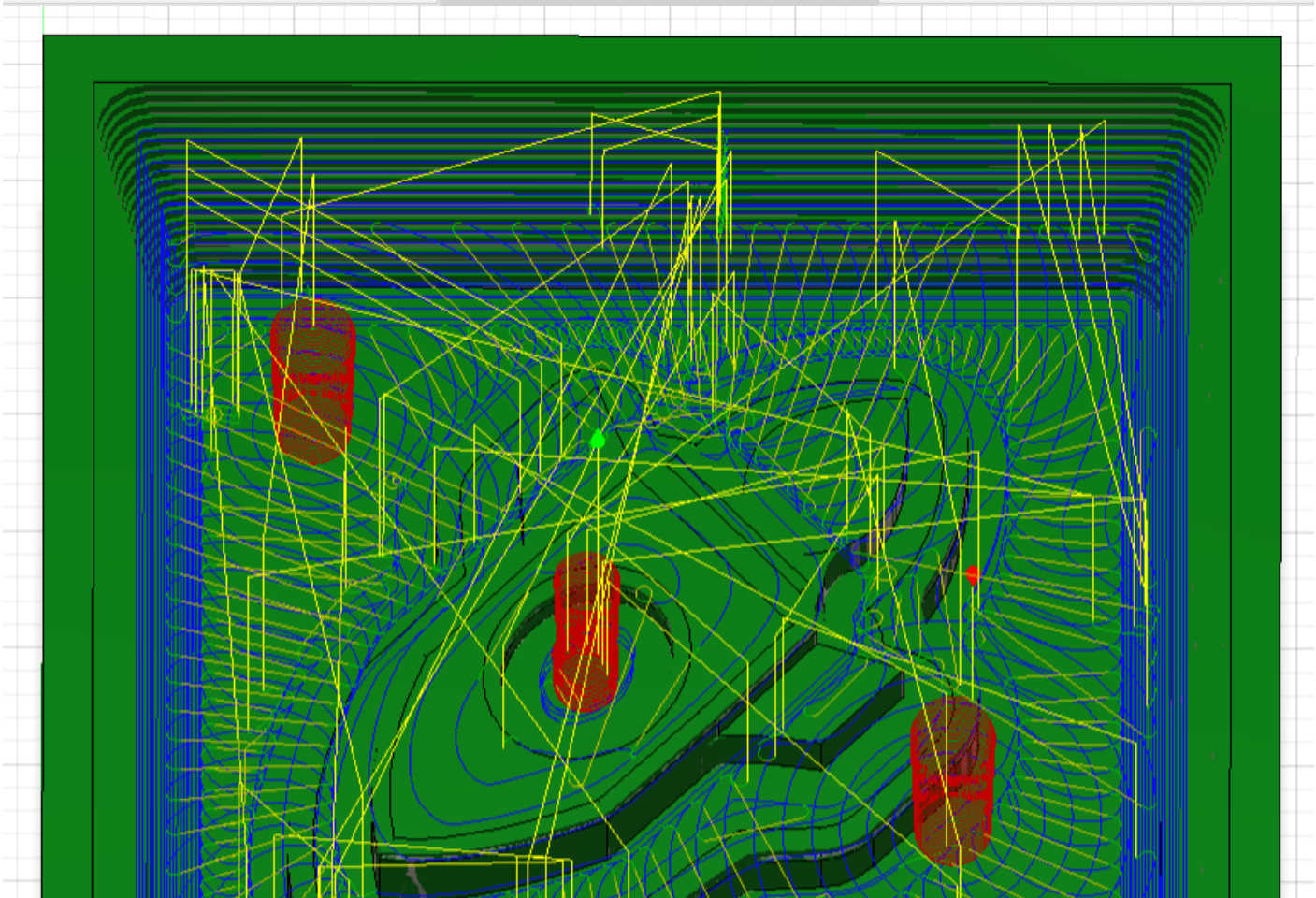
Passes

Tolerance	0.1 mm
Machine Shallow Areas	
Optimal Load	1.27 mm
Both Ways	
Minimum Cutting Radi...	0.3175 mm
Machine Cavities	☑
Use Slot Clearing	
Direction	Climb
Maximum Roughing S...	7.9375 mm
Fine Stepdown	0.79375 mm
Flat Area Detection	☑
Minimum Stepdown	0.0001 mm
Minimum Axial Engage...	0 mm
Order by Depth	
Order By Area	

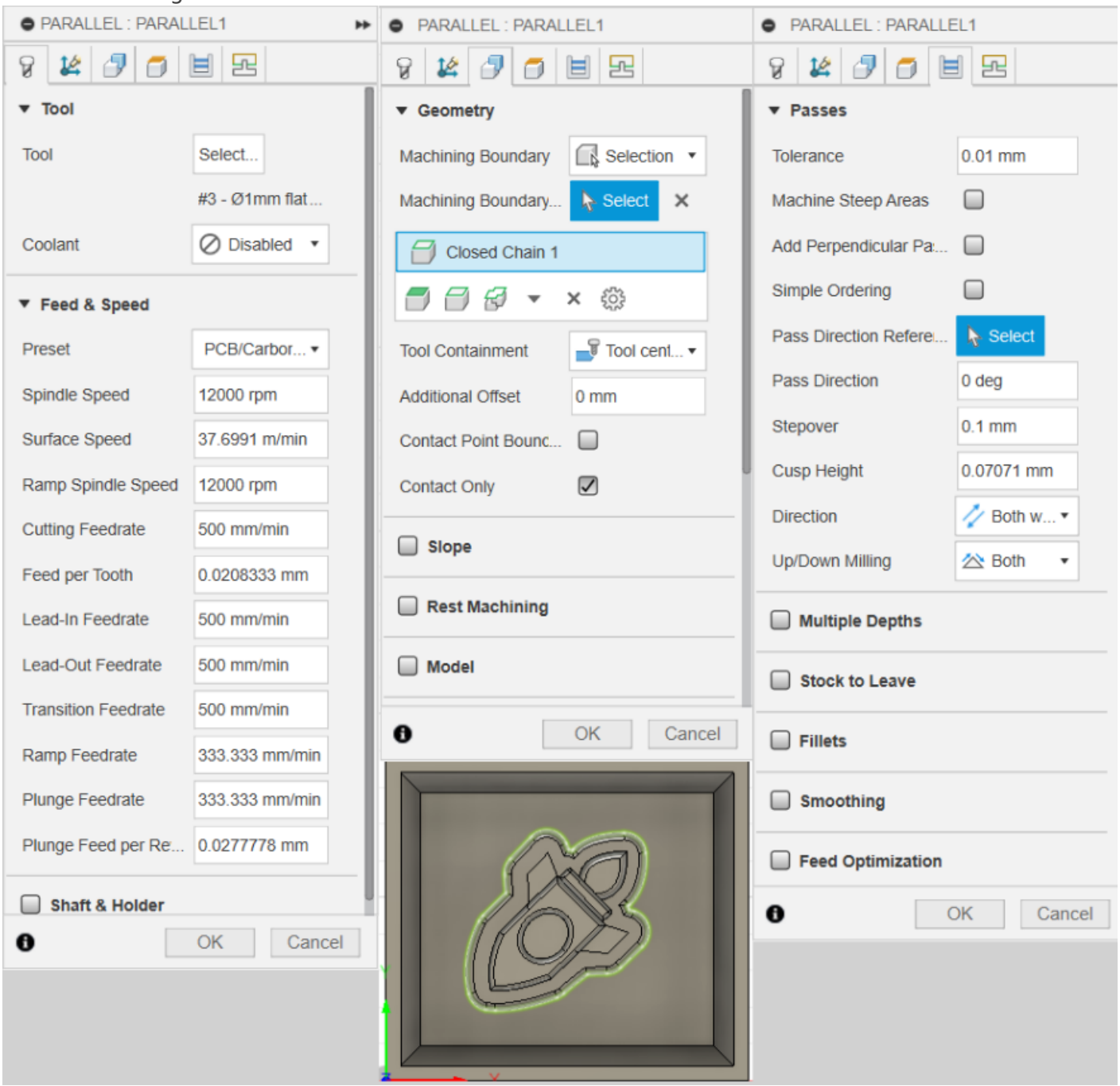
Stock to Leave

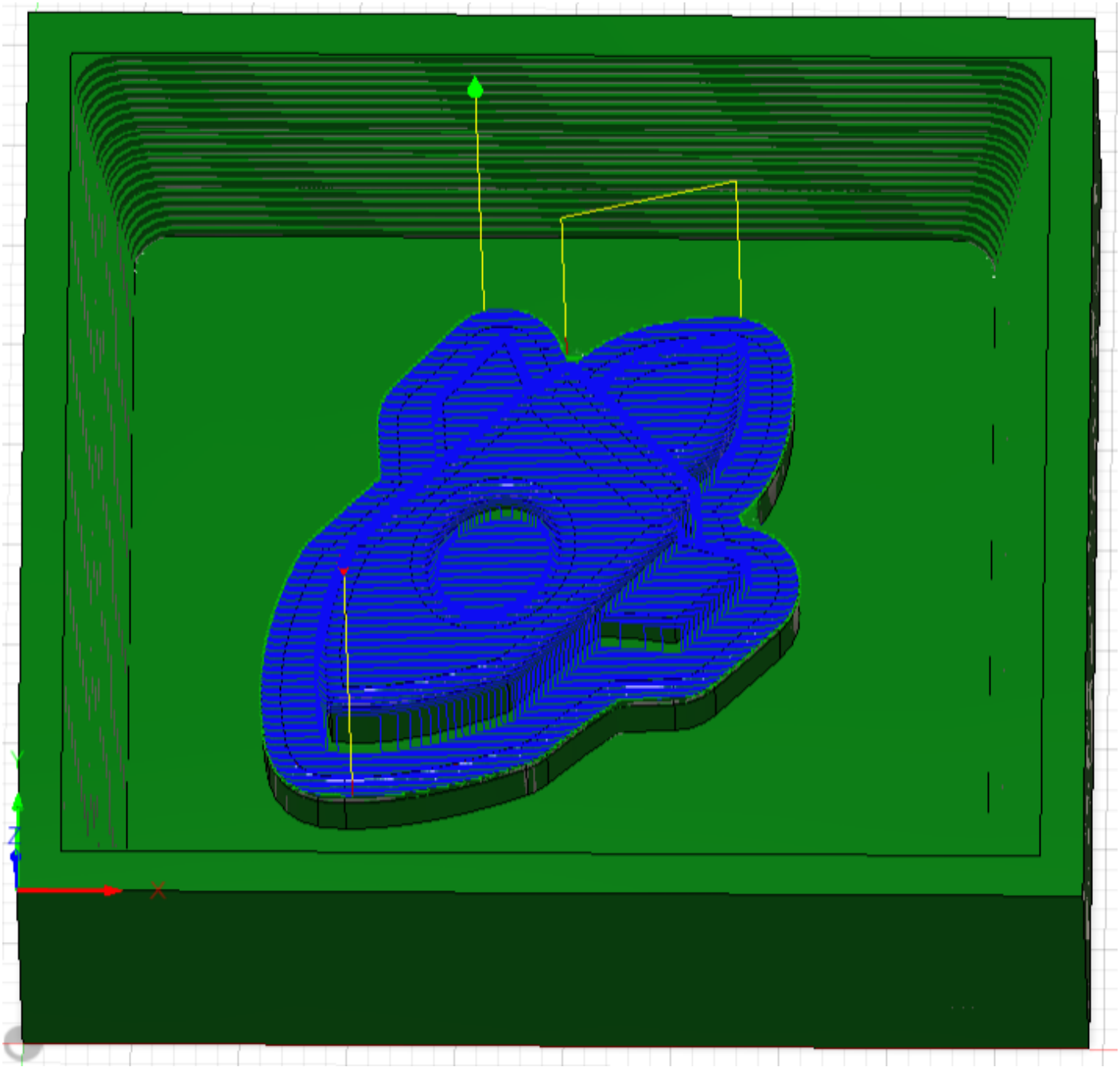
Fillets

OK Cancel



For the finishing I use Parallel:





Total time is 23:27

Materials

General

- important information
  - pot life: how long do we have between mixing two components together and pouring
  - cure time: how long it takes to harden
  - post cure (but not so important)
  - mix ratio
  - what if someone gets it on their skin/in their eye/mouth
  - what protective equipment is needed?
    - protective mask?
    - fume hood?
    - goggles?
    - long sleeves?

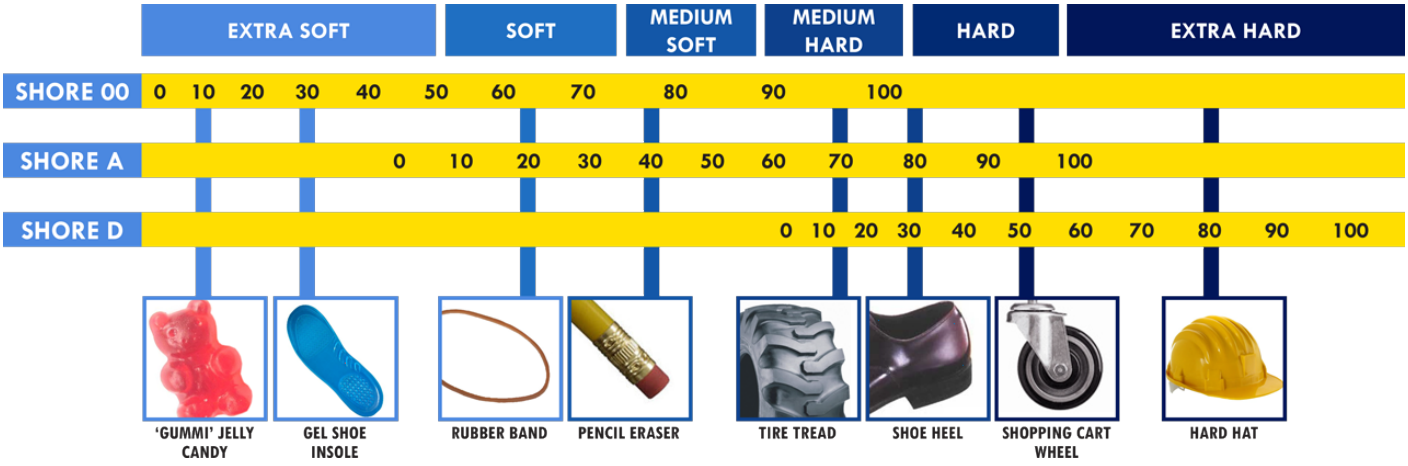
Specification

Material	Pot Life	Cure time	Mix Ratio	Useful Temp (max)	Useful Temp (min)	Heat Deflection Temp	Shore Hardness
Mold Star 15 SLOW	50 min	4 h	1:1	232 °C	-53 °C	-	15A
Mold Star 30	45 min	6 h	1:1	232 °C	-53 °C	-	30A
Sorta-Clear 37	25 min	4 h	1:1	-	-	-	37 A
Smooth Cast 305	7 min	30 min	1:1	-	-	50 °C	70 D
Smooth Cast 326	7-9 min	60 min	1:1	-	-	50 °C	72 D

General Info about (Shore Hardness Scale)

- The **Shore 00** Hardness Scale measures rubbers and gels that are *very soft*

- The **Shore A** Hardness Scale measures the hardness of flexible mold rubbers that range in hardness from very soft and flexible, to medium and somewhat flexible, to hard with almost no flexibility at all. *Semi-rigid* plastics can also be measured on the high end of the Shore A Scale
- The **Shore D** Hardness Scale measures the hardness of *hard* rubbers, semi-rigid plastics and hard plastics.



Safety Information

Mold Materials

- **Mold star 15 slow cure**
  - safety
  - use in properly ventilated area
  - Safty glasses, long sleeves and rubber (vinyl only! Latex will inhibit the cure of the rubber) gloves
  - store in room temprature (23°C) (warmer reduces shelf life)
  - mixing container should have straight edges and flat bottom
  - mixing sticks should be flat and stiff
  - product has a limited shelf time!

  IMPORTANT:
  - avoid contact with eyes, slight transient irritation possible
  - flush with water 15 min and seek medical attention
  - remove from skin with waterless hand cleaner, then soap and water

- **Mold Star 30**
  - safety
  - same as mold star 15

- **SORTA-Clear 37**
  - safety
  - same as mold star 15

  IMPORTANT:
  - use only with adequate ventilation

Cast Materials

- **Smooth-Cast 326**
  - safety
  - store in warm environment (23 °C)
  - liquids are moisture sensitive and will asorb atmospheric moisture
  - mixing container should be clean and made out of metall, glass or plastic
  - mixing in a well ventilated area
  - safety glass, long sleeves and rubber gloves to minimize containment risk
  - test application is recommended!

  IMPORTANT:

  > ⚠WARNING: Known to the state of CA to cause cancer, birth defects or reproductive harm

  - PART A (YELLOW):
  - contains diphenyldiisocyante
  - SUSPECTED OF CAUSING CANCER
  - vapors can be significant if heated or sprayed may cause lung damage and sensitization
  - only use with adequate ventilation!
  - contact with eye and skin may cause severe irritation!
  - flush eyes with water for 15min and get immediate medical attention
  - remove from skin with soap and water
  - PART B (BLUE):
  - is irritating to the eye and skin
  - avoid prolonged or repeated skin contact
  - flush eyes with water for 15min and get immediate medical attention
  - remove from skin with soap and water

- **Smooth-Cast 305**
  - safety
  - wear safety glasses, long sleeves and rubber gloves to minimize contamination risk
  - only in well-ventilated area

  IMPORTANT:

  >

> ⚠WARNING: Known to the state of CA to cause cancer, birth defects or reproductive harm

- PART A:
- IRRITATING TO EYES, SKIN & MUCOUS MEMBRANES
- contains Methylene Diphenyl Isocyanate
- SUSPECTED OF CAUSING CANCER
- do not get in eyes and mucous membranes
- do not take internally
- do not breathe fumes
- use only with adequate ventilation
- WEAR CHEMICAL RESISTANT GLOVES AND EYE PROTECTION !!
- PART B:
- not that contaiges
- CAUTION: HOT!!
- GETS HOT WHEN MIXED (100 °C), cool before handling

off the shelf materials:

- **chocolate**
- **candle wax**
- **soap**
- **nougat**

Chocolate

We have the https://springlane.de/products/sous-vide-garer-henry-inkl-vakuumierer-und-vakuumiertuten