

A decorative graphic on the left side of the slide. It consists of a blue parallelogram and a light green parallelogram, both tilted at an angle. The blue shape is in the foreground, and the green shape is partially behind it. They are set against a dark blue background with diagonal stripes.

# Yield Strength

# Progress

- Finding online resources/databases where we can check the accuracy of the generated output
- Having difficulty finding because there are only approximately 40 items have yield strength data and they are also not in element format.

[https://www.engineersedge.com/material\\_science/yield\\_strength.htm](https://www.engineersedge.com/material_science/yield_strength.htm)

[https://www.engineeringtoolbox.com/young-modulus-d\\_417.html](https://www.engineeringtoolbox.com/young-modulus-d_417.html)

Acetals	2.8	65	
Acrylic	3.2	70	
Aluminum Bronze	120		
Aluminum	69	110	95
Aluminum Alloys	70		
Antimony	78		
Aramid	70 - 112		
Beryllium (Be)	287		
Beryllium Copper	124		
Bismuth	32		
Bone, compact	18	170 (compression)	
Bone, spongy	76		
Boron			3100
Brass	102 - 125	250	
Brass, Naval	100		
Bronze	96 - 120		

Typical tensile strengths of some materials

Material	Yield strength (MPa)	Ultimate strength (MPa)	Density (g/cm <sup>3</sup> )
Structural steel ASTM A36 steel	250	400	7.8
Mild steel 1090	248	841	7.58
Human skin	15	20	2.2
2800 Maraging steel	2617	2693	8.00
AISI 4130 Steel, water quenched 855°C (1570°F), 480°C (900°F) temper	951	1110	7.85
Titanium 11 (Ti-6Al-2Sn-1.5Zr-1Mo-0.35Bi-0.1Si), Aged	940	1040	4.50
Steel, API 5L X65	448	531	7.8
Steel, high strength alloy ASTM A514	690	760	7.8
High-density polyethylene (HDPE)	26-33	37	0.95
Polypropylene	12-43	19.7-80	0.91
Stainless steel AISI 302 - Cold-rolled	520	860	8.19
Cast iron 4.5% C, ASTM A-48	130	200	
"Liquidmetal" alloy	1723	550-1600	6.1
Beryllium 99.9% Be	345	448	1.84
Aluminium alloy 2014-T6	414	483	2.8
Polyester resin (unreinforced)	55		
Polyester and Chopped Strand Mat Laminate 30% E-glass	100		



# Progress

- In order to compare with online data, we modified the word "abbreviation" in the prompt, changed it to "full name" to see if there is any match to the online data.
- Unfortunately, it is an unsuccessful try.
- The Chatgpt can generate more output but they are just repeated in pattern.
- For example: (see image on the right):
- It use the same element name with different number prefixes, with yield strength that are not constant(so wired)

6061 Aluminum	240	
7075 Aluminum	450	
2024 Aluminum	240	
5052 Aluminum	210	
6063 Aluminum	240	
2014 Aluminum	240	
3003 Aluminum	110	
5056 Aluminum	240	
5086 Aluminum	240	
6061 Aluminum Alloy	240	
7075 Aluminum Alloy	450	
2024 Aluminum Alloy	240	
5052 Aluminum Alloy	210	
6063 Aluminum Alloy	240	
2014 Aluminum Alloy	240	
3003 Aluminum Alloy	110	
5056 Aluminum Alloy	240	
5086 Aluminum Alloy	240	



# Question

- Is there no yield strength Database in ChatGPT? Seems it likes Aluminum Alloy very much
- How to improve the prompt to generate more materials existing in real-world?



# Hours Summary

Date	Hours	Description of Work
02/11/2024	2	Generated data using starter code.
02/19/2024	2	Modified prompt to match names in online database