

# SPT323 - Material Comparison Part 1: Material Selection

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## Identify Materials:

**Material 1:** Zinc-Coated (Galvanized) Stainless Steel

**Material 2:** Ultrafuse 316L Steel

| Material | Yield Strength | Ultimate Tensile Strength | Young's Modulus | Hardness (Vickers Hardness) | Ductility | Fatigue | Cost per Unit Mass | Estimated Weight of Prototype |
|----------|----------------|---------------------------|-----------------|-----------------------------|-----------|---------|--------------------|-------------------------------|
| 1        | 510 MPa        | 555 MPa                   | 190 GPa         | 900 HV10                    | 60-70%    | 240 MPa | \$0.00068 per gram | ~20-40 grams                  |
| 2        | 251 MPa        | 561 MPa                   | 190 GPa         | 128 HV10                    | 60-70%    | 146 MPa | \$0.17 per gram    | ~20-40 grams                  |

## Material Project: Fastener Comparison

My project purpose is to compare the differences between off-the-shelf stainless steel fasteners and 3D printed fasteners. The materials of choice are Zinc-Coated (Galvanized) Stainless Steel (comparable to 304 Stainless Steel), and Ultrafuse 316L Steel (which is 316 Stainless Steel equivalent). The purpose of this project is to conclude whether or not the joint strength of 3D printed fasteners is viable for the production and use of 3D printed fasteners. This test is more comparable in material than my last project test as this will be a stainless steel comparison with the main underlying difference being fabrication type.

I am hoping that this experiment demonstrates the difference in material composition and how that affects fabrication, cost, viability, and overall strengths each kind of fastener has.

## Resources

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Purchase wholesale galvanized steel per kg price of 1kg galvanized steel for industrial purposes -

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Ultrafuse 316L. (2022). Ultrafuse FFF.

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Weight & count chart of popular fasteners. (2022). ITA Fasteners.

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