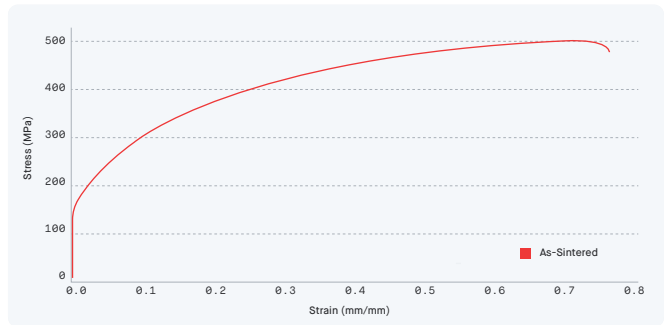


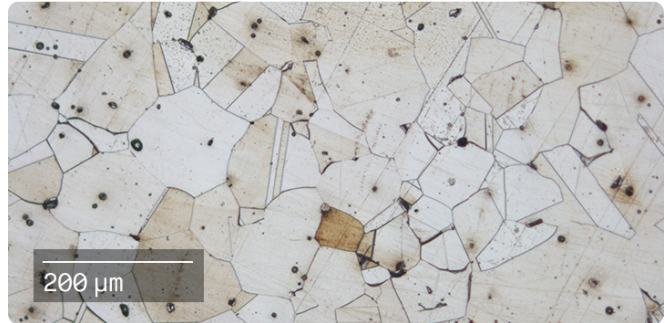
[Material Data Sheet]

316L Stainless Steel



COMPOSITION %

| | |
|----|-------------|
| Fe | Balance |
| Cr | 16-18 |
| Ni | 10-14 |
| Mo | 2-3 |
| Mn | 2 (max) |
| Si | 1 (max) |
| C | 0.045 (max) |



MECHANICAL PROPERTIES ¹

| Standard | Shop System™ | | ASTM B883 / MPIF 35 ² |
|---|--------------|-----------|----------------------------------|
| | As-Sintered | | As-Sintered |
| Ultimate tensile strength - xy (MPa) | ASTM E8M | 505 ± 16 | 450-520 |
| Yield strength - xy (MPa) | ASTM E8M | 150 ± 12 | 140-175 |
| Elongation - xy (%) | ASTM E8M | 76 ± 12 | 40-50 |
| Young's modulus - xy (GPa) | ASTM E111 | 195 ± 4 | 190 (typ) |
| Unnotched Charpy impact energy - xy (J) | MPIF 59 | 191 ± 5 | 190 (typ) |
| Hardness (HRB) | ASTM E18 | 58 ± 2 | 67 (typ) |
| Density (g/cc) | ASTM B311 | 7.8 ± 0.1 | 7.6 |

PERFORMANCE ³

| Standard | Shop System™ | ASTM B883 / MPIF 35 ² |
|---------------------------------|--------------|----------------------------------|
| Boil test (corrosion) | ASTM F1089 | Pass |
| Copper sulfate test (corrosion) | ASTM F1089 | Pass |
| Sulfuric acid test (corrosion) | MPIF 62 | <0.005 g/dm ² /day |

ATTRIBUTES & APPLICATIONS

- Corrosion resistant Medical components for use in endoscopy & orthopedics
- Structural components (e.g. housings & frames)
- Jewelry & decorative items
- Fluid transfer components (e.g. manifolds)
- High temperature applications

OTHER STANDARD DESIGNATIONS ⁴

- UNS S31673
- EN 1.4404

1. Mechanical properties noted represent mean values +/- 1 standard deviation across Xy & Yz orientations for as-printed samples.
 2. Per ASTM B883 - 19, Standard Specification for Metal Injection Molded (MIM) Materials and MPIF Standard 35, Materials Standards for Metal Injection Molded Parts (MPIF 35-MIM, 2018)
 3. Prior to corrosion resistance testing, all test samples were hand ground to remove surface oxidation and passivated in accordance with ASTM A967
 4. Listed designations are for reference purposes only. Composition and mechanical properties may vary.
 End-use material performance is impacted (+/-) by certain factors including but not limited to part geometry and design, application and evaluation conditions, etc.