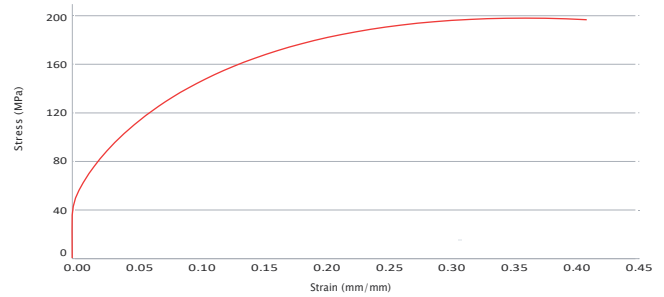


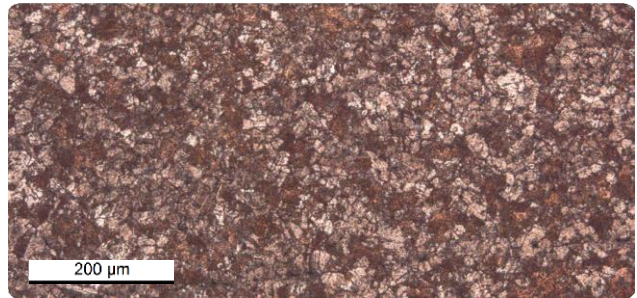
Copper

Characterized by its electrical and thermal conductivity and ductility, Copper is ideal for electrical equipment, plumbing, and heat transfer applications.



COMPOSITION %

| | |
|-------|---------|
| Cu | 99.9 |
| O | 0.01 |
| Other | Balance |



PERFORMANCE

| | Standard | Studio System™ As-Sintered | MIM - MPIF 35 typ ¹ As-Sintered |
|--|-----------------------|-------------------------------|---|
| Electrical conductivity | ASTM E1004 | 85.2 %IACS | n/a |
| Coefficient of thermal expansion (CTE) | ASTM E228 20 - 38 °C | 17.01 *10 ⁻⁶ /°C | 15.7 *10 ⁻⁶ /°C |
| | ASTM E228 20 - 66 °C | 17.15 *10 ⁻⁶ /°C | 16 *10 ⁻⁶ /°C |
| | ASTM E228 20 - 93 °C | 17.22 *10 ⁻⁶ /°C | 16.4 *10 ⁻⁶ /°C |
| | ASTM E228 20 - 121 °C | 17.33 *10 ⁻⁶ /°C | 16.7 *10 ⁻⁶ /°C |
| | ASTM E228 20 - 149 °C | 17.43 *10 ⁻⁶ /°C | 16.9 *10 ⁻⁶ /°C |

MECHANICAL PROPERTIES

| | Standard | Studio System™ As-Sintered | MIM - MPIF 35 typ ¹ As-Sintered |
|---------------------------------|-----------|-------------------------------|---|
| Ultimate tensile strength (MPa) | ASTM E8M | 195 | 207 |
| Yield strength (MPa) | ASTM E8M | 45 | 69 |
| Elongation (%) | ASTM E8M | 37 | 30 |
| Density (g/cc) | ASTM B311 | 8.75 | 8.5 (min) |