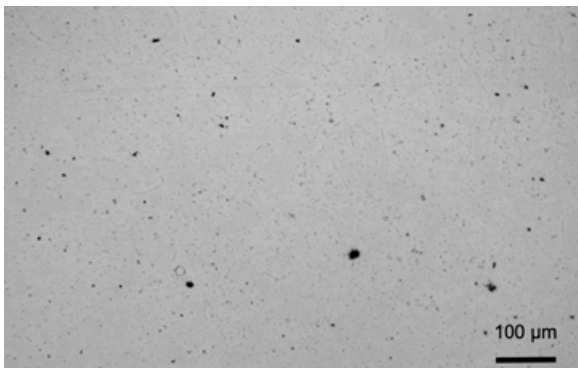


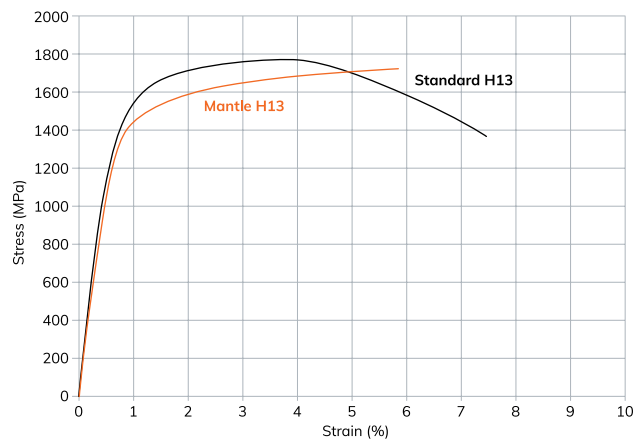
H13

Mantle's H13 material is a versatile tool steel for production-grade tools. Mantle's H13 material is optimized for our TrueShape™ additive manufacturing process that combines rough part creation with precision finishing to deliver a complete precision part solution.

Microstructure of Mantle H13 Heat Treated



Stress-Strain Chart of Mantle H13 and Standard H13



Mechanical Property	Standard	Mantle Printed H13 (as sintered)	Mantle H13 Heat Treated (double tempered @ 525C)	Mantle H13 Heat Treated (double tempered @ 575C)	Standard H13 Heat Treated (double tempered @ 575C)
Ultimate Tensile (MPa)	ASTM E8	1,430	2,070	1,720	1,770
Tensile Yield (MPa)	ASTM E8	830	1,620	1,410	1,585
Elongation (%)	ASTM E8	6	3.6	5.8	7.4
Hardness (HRC)	ASTM E18	42	52	45	49
Density (g/cm ³)	ASTM B311-17	7.47	7.47	7.47	7.78
Relative Density (%)	ASTM B311	96	96	96	100

Thermal Property	Standard	Mantle Printed H13 (as sintered)	Mantle H13 Heat Treated (double tempered @ 525C)	Mantle H13 Heat Treated (double tempered @ 575C)	Standard H13 Heat Treated (double tempered @ 575C)
Thermal Conductivity (W/m-k)	ISO 22007-2	18.25	21.48	21.48	24.3