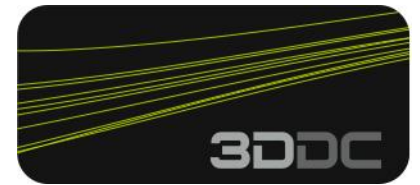


3DDC Metal Sintering (DMP/DMLS)



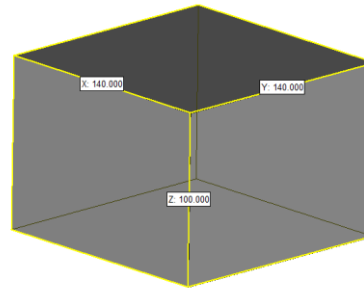
3D systems ProX200



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Build Volume 140x140x100mm



Machine Properties:

Laser	300W
Build volume	140 x 140 x 100 mm
Accuracy	80 μ m
Repeatability	X=20 μ m , Y=20 μ m , Z=20 μ m
Current powder	Maraging Steel (1.2709)
Surface roughness (Ra)	3 – 5 μ m

Available Materials: **Maraging Steel.**

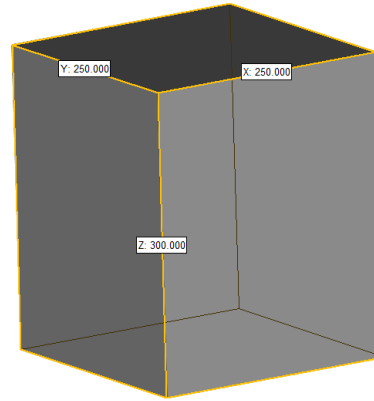
Mechanical Properties¹

	CONDITION	AS-BUILT ²	AFTER POST HEAT TREATMENT ³
Ultimate Tensile Strength, MPa	ASTM E8	1110 \pm 50	
Yield Strength, MPa	ASTM E8	860 \pm 50	
Elongation at break, %	ASTM E8	11 \pm 3	
Hardness		37 \pm 2 HRC	55 \pm 2 HRC
Density		approx. 100%	

Renishaw AM250



Build Volume 250x250x300mm



Machine Properties:

Laser	200W
Build volume	250 x 250 x 300 mm
Accuracy	80 μ m
Repeatability	X=20 μ m , Y=20 μ m , Z=20 μ m
Current powder	Maraging Steel (1.2709)
Surface roughness (Ra)	3 – 5 μ m

Available Materials: **Maraging Steel.**

Mechanical properties of additively manufactured parts

	As built	Standard deviation ($\pm 1\sigma$)	Age hardened (See note 1)	Standard deviation ($\pm 1\sigma$)
Tensile strength (UTS) (See note 2)				
Horizontal direction (XY)	1141 MPa	7 MPa	1806 MPa	6 MPa
Vertical direction (Z)	1122 MPa	14 MPa	1794 MPa	9 MPa
Yield strength (see note 2)				
Horizontal direction (XY)	1016 MPa	8 MPa	1753 MPa	20 MPa
Vertical direction (Z)	999 MPa	20 MPa	1730 MPa	20 MPa
Elongation at break (see note 2)				
Horizontal direction (XY)	7.3%	1%	5.5%	1%
Vertical direction (Z)	7.5%	1%	7%	1%
Modulus of elasticity (see note 2)				
Horizontal direction (XY)	160 GPa	5 GPa	170 GPa	8 GPa
Vertical direction (Z)	162 GPa	10 GPa	175 GPa	11 GPa
Hardness (Vickers) (see note 3)				
Horizontal direction (XY)	363 HV0.5	5 HV0.5	542 HV0.5	7 HV0.5
Vertical direction (Z)	355 HV0.5	7 HV0.5	543 HV0.5	8 HV0.5
Surface roughness (R_a) (See note 4)				
Horizontal direction (XY)	3.5 μ m to 5 μ m			
Vertical direction (Z)	4 μ m to 6 μ m			

Density of additively manufactured maraging steel M300 is typically 99.8%, measured optically on a 10 mm x 10 mm x 10 mm sample at 75x magnification.