

# Production System™ P-1 Specifications

Designed to bridge the gap between bench top development and mass production, the Production System™ P-1 is an open platform binder jetting solution for process and materials development as well as serial production of small, complex parts.

The Production System™ P-1 supports both non-reactive and reactive metal powders using the same Single Pass Jetting™ technology leveraged across the Production System family of products, combining mass production-level quality and consistency with enhanced process flexibility to support serial production or direct process transfers to the Production System™ P-50.

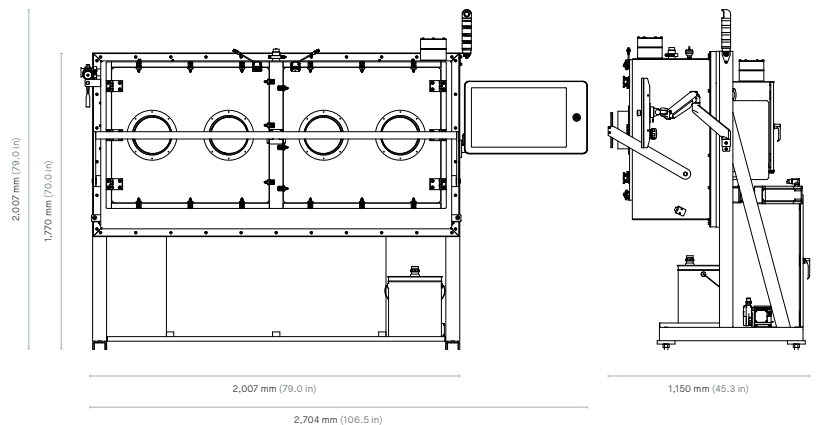
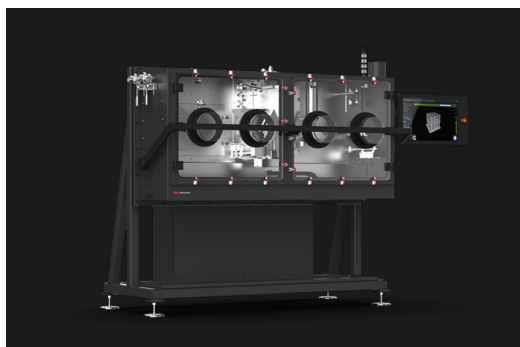
### Key Production System™ P-1 benefits

- Patent pending Single Pass Jetting™ technology enables speeds up to 1,350 cc/hr
- Constant wave spreading enhances print bed uniformity and density
- Patented anti-ballistics technology drives printhead longevity and part quality
- Inert build chamber provides reactive metal support and powder consistency
- Real-time optical bed inspection
- Open material platform

### TECHNOLOGY

	Print technology	Single Pass Jetting™
	Print direction	Uni-directional
<b>PERFORMANCE</b>	Binder jetting module	2 Piezo-electric printheads (4,096 nozzles)
	Max build rate (65 µm layer thickness)	1,350 cc/hr (82 in <sup>3</sup> /hr)
	Resolution	Native 1,200 dpi
	Layer thickness <sup>1</sup>	30 µm - 200 µm (green)
<b>PHYSICAL</b>	Part tolerance	± 0.5%
	External dimensions	1,770 x 2,007 x 1,150 mm (70 x 79 x 45 in)
	Weight	900 kg (1,984 lb)
	Build box size	200 x 100 x 40 mm (7.9 x 3.9 x 1.6 in)
	Chamber environment	CDA or Nitrogen inerting (<2% Oxygen)
<b>ELECTRICAL</b>	Onboard control	24-inch touchscreen display
<b>POWDERS</b>	Power requirements	380 - 480 V, 50/60 Hz, 3-phase, 4 wire 11 Amp
	Material platform	Open platform (third party MIM powders)

### DIMENSIONS



1. Default profiles available for 50 µm — 100 µm; 30 µm — 200 µm layer thickness is material and powder dependent.

# Production System™ P-50 Specifications

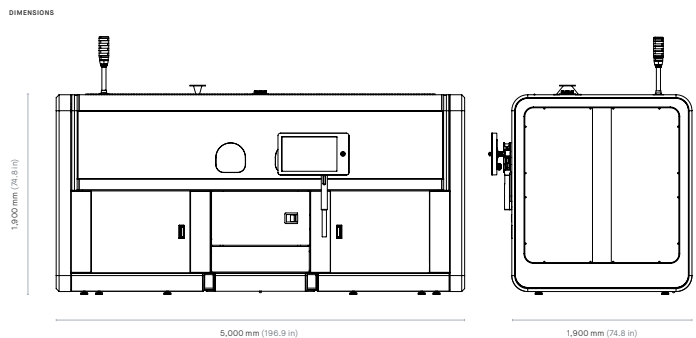
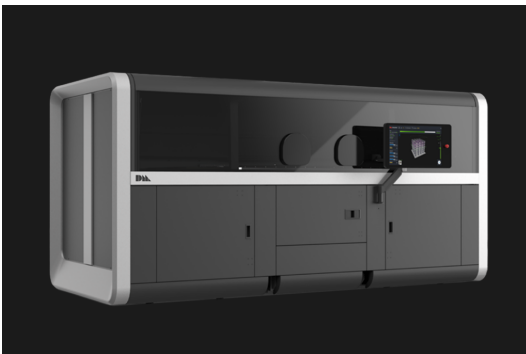
Created by leading inventors of binder jetting and single-pass inkjet technology, the Production System™ P-50 is designed to be the fastest way to 3D print metal parts at scale.

The Production System™ P-50 Printer leverages Desktop Metal's patent pending Single Pass Jetting™ technology to achieve print speeds up to 12,000 cc/hr, producing parts at costs competitive with conventional mass production techniques. Designed with an inert environment to process low cost MIM powders across non-reactive and reactive metals, the Production System™ P-50 offers the reliability and consistency required for high-volume, end-use applications.

### Key benefits

- Patent pending Single Pass Jetting™ technology
- Bi-directional printing enables speeds up to 12,000 cc/hr
- Constant wave spreading enhances print bed uniformity and density
- Patented anti-ballistics technology drives printhead longevity and part quality
- Anti-banding technology improves reliability through printhead redundancy
- Inert build chamber provides reactive metal support and powder consistency
- Real-time optical bed inspection
- Open material platform

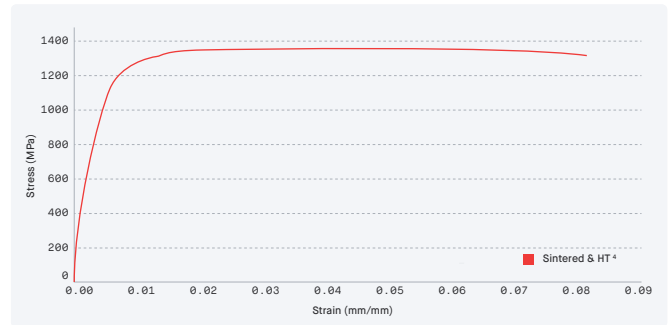
TECHNOLOGY	Print technology	Single Pass Jetting™
	Print direction	Bi-directional
	Binder jetting module	8 piezo-electric printheads (16,384 nozzles)
PERFORMANCE	Max build rate (65 µm layer thickness)	12,000 cc/hr (732 in <sup>3</sup> /hr)
	Resolution	Native 1,200 dpi
	Layer thickness <sup>1</sup>	30 µm - 200 µm (green)
	Part tolerance	± 0.5%
PHYSICAL	External dimensions	1,900 x 5,000 x 1,900 mm (74.8 x 196.9 x 74.8 in)
	Weight	4,751 kg (10,476 lb)
	Build box envelope	490 x 380 x 260 mm (19.2 x 15.0 x 10.2 in)
	Chamber environment	CDA or Nitrogen inerting (< 2% Oxygen)
	Onboard controls	24-inch touchscreen display
ELECTRICAL	Power requirements	380 - 480 V, 50/60 Hz, 3-phase, 4 wire 60 Amp
POWDERS	Material platform	Open platform (third party MIM powders)



1. Default profiles available for 50 µm - 100 µm; 30 µm - 200 µm layer thickness is material and powder dependent.

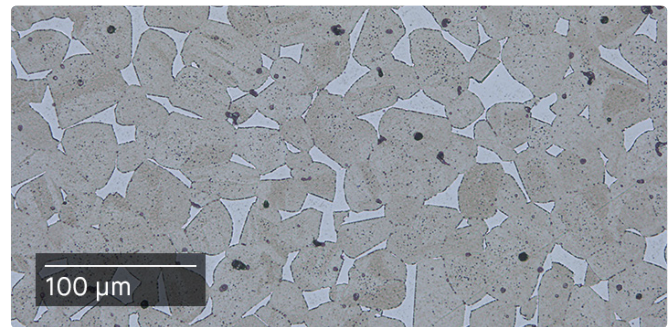
[Material Data Sheet]

# 17-4 PH Stainless Steel



## COMPOSITION %

Fe	Balance
C	0.07 (max)
Cr	15.5 - 17.5
Ni	3.0 - 5.0
Cu	3.0 - 5.0
Mn	1.0 (max)
Nb + Ta	0.15 - 0.45
Si	1.0 (max)
S	0.03 (max)



## MECHANICAL PROPERTIES

	Standard	Production System™ As-Sintered	ASTM B883 / MPIF 35 min As-Sintered	Production System™ H900 Heat Treated / ASTM A564	ASTM B883 / MPIF 35 H900 Heat Treated / ASTM A564
Ultimate tensile strength <sup>1</sup> (MPa)	ASTM E8M	900 ± 20	790-900	1,315 ± 45	1,070-1,190
Yield strength <sup>1</sup> (MPa)	ASTM E8M	655 ± 26	650-730	1,130 ± 42	970-1,090
Elongation at break (%)	ASTM E8M	10.9 ± 0.9	4-6	8.4 ± 2.4	6
Young's modulus <sup>2</sup> (GPa)	ASTM E8M	-	180-190	-	-
Hardness (HRC)	ASTM E18	29.5 ± 1.5	27	42.5 ± 0.4	35
Density	g/cm <sup>3</sup>	7.7	7.5	7.7	7.5
Surface roughness <sup>3</sup> (µm Ra)	ISO 4287	3-8	-	3-8	-

## ATTRIBUTES & APPLICATIONS

- Acid & corrosion resistant
- High strength, hardness & elongation
- Surgical tooling / end-of-arm components (e.g. grippers, cutters)
- Mechanical components (static & dynamically loaded)
- Impact components (e.g. golf iron heads)

## OTHER STANDARD DESIGNATIONS

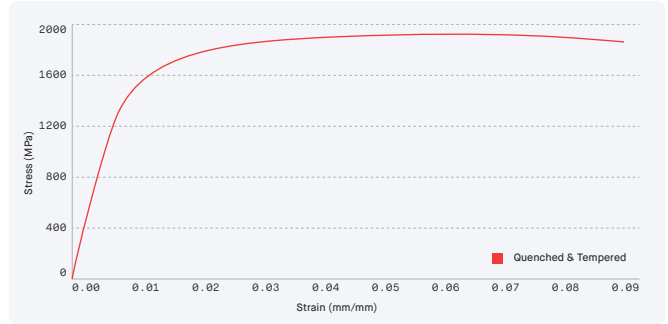
- UNS S17400
- EN 1.4542

1. YS & UTS properties noted represent mean values across Xy & Yx orientations.  
 2. Modulus available upon request.  
 3. Surface roughness measured in Z direction after sintering & sand blasting.  
 4. Stress strain curve reported in X print orientations after H900 heat treatment.

[Material Data Sheet]

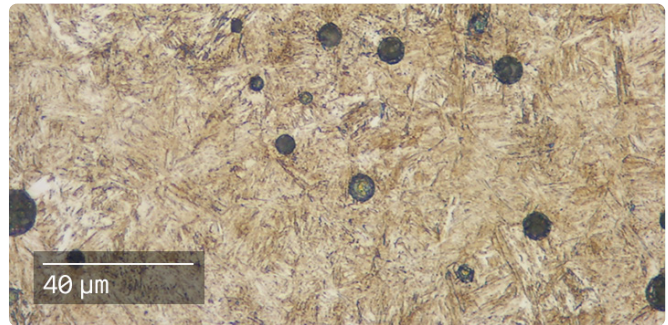
# 4140

## Low-Alloy Steel



### COMPOSITION % (AISI/SAE 4140)

Fe	Balance
C	0.3 - 0.5
Cr	0.8 - 1.2
Mn	1.0 (max)
Mo	0.2 - 0.3
Si	0.6 (max)



### MECHANICAL PROPERTIES

	Standard	Production System™ Quenched & Tempered	ASTM B883 / MPIF 35 (min - typ) Quenched & Tempered
Yield strength <sup>1</sup> (MPa)	ASTM E8M	<b>1,455 ± 34</b>	1,070 – 1,240
Ultimate tensile strength <sup>1</sup> (MPa)	ASTM E8M	<b>1,880 ± 29</b>	1,380 – 1,650
Elongation at break (%)	ASTM E8M	<b>4.8 ± 1.1</b>	3 – 5
Young's modulus (GPa)	ASTM E1111	<b>203 ± 9</b>	205
Hardness (HRC)	ASTM E18	<b>47.1 ± 0.7</b>	46
Density	g/cm <sup>3</sup>	<b>7.5</b>	7.5
Surface roughness <sup>2</sup> (μm Ra)	ASTM B311	<b>3 – 8</b>	-

### ATTRIBUTES & APPLICATIONS

Low-Alloy heat-treatable steel used in applications requiring high strength, hardness, & toughness

Good elongation with quality impact & abrasion resistance

Automotive parts, armament components, jigs, fixtures, tooling, gears, sprockets, wrenches & structural housings

Mechanical components (static & dynamically loaded)

Impact components (e.g. golf iron heads, hammers, crash cans)

### OTHER STANDARD DESIGNATIONS

UNS G41400

EN 1.7225

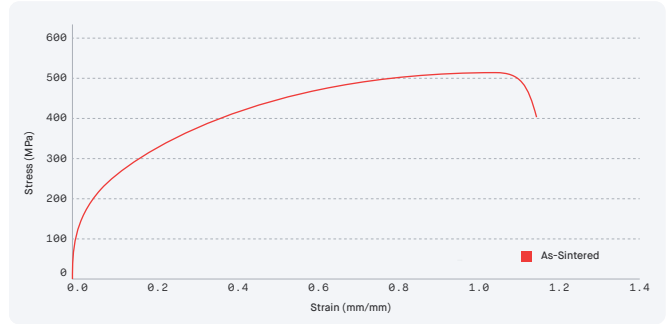
42CrMo4

1. YS & UTS properties noted represent mean values across Xy orientation.  
 2. Surface roughness measured in Z direction after sintering & sand blasting.  
 3. Stress strain curve reported in X print orientations after quenching and tempering.



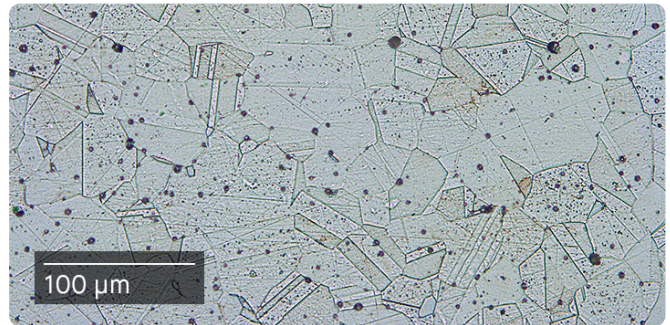
[Material Data Sheet]

# 316L Stainless Steel



**COMPOSITION %**

Fe	Balance
C	0.03 (max)
Cr	16.0 - 18.0
Ni	10.0 - 14.0
Mo	2.0 - 3.0
Mn	2.0 (max)
Si	1.0 (max)



**MECHANICAL PROPERTIES**

	Standard	Production System™ As-Sintered	ASTM B883 / MPIF 35 As-Sintered
Ultimate tensile strength <sup>1</sup> (MPa)	ASTM E8	510 ± 7	450-520
Yield strength <sup>1</sup> (MPa)	ASTM E8	155 ± 5	140-175
Elongation at break (%)	ASTM E8	75.3 ± 4.0	40-50
Young's modulus <sup>2</sup> (GPa)	ASTM E8	-	-
Hardness (HRB)	ASTM E18	65.8 ± 1.0	67
Density	g/cm <sup>3</sup>	7.9	7.6
Surface finish <sup>3</sup> (µm Ra)	ISO 4287	3 - 8	-

**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)

**OTHER STANDARD DESIGNATIONS**

- UNS S31673
- EN 1.4404

1. YS & UTS properties noted represent mean values across Xy & Yx orientations.  
 2. Modulus available upon request.  
 3. Surface roughness measured in Z direction after sintering & sand blasting.