ARRK DMLS Material Datasheet - LaserForm® 17-4PH (A)

MATERIAL PROPERTIES (for comparative purposes only).

Material:

- Excellent corrosion resistance
- High strength with good toughness

Mechanical Properties [1,2,3]				
MEASUREMENT	**CONDITION**	**AS BUILT**	**H900**	**H1150**
Ultimate strength (MPa | ksi)	ASTM E8M			
Horizontal direction[4] - XY Vertical direction[5] - Z		NA 1100 ± 90	1450 ± 10 1380 ± 20	1180 ± 10 1080 ± 50
Yield strength Rp0.2% (MPa | ksi)	ASTM E8M			
Horizontal direction[4] - XY Vertical direction[5] - Z		NA 830 ± 110	1280 ± 30 1260 ± 100	1130 ± 20 1020 ± 170
Elongation at break (%)	ASTM E8M			
Horizontal direction[4] - XY Vertical direction[5] - Z		NA 19 ± 4	11 ± 1 12 ± 2	12 ± 1 16 ± 4
Hardness, Rockwell C	ASTM E18	32 ± 4	40 ± 2	35 ± 3
Impact toughness[6] (J | ft-lb)	ASTM E23	71 ± 20	7 ± 2	11 ± 5

Thermal Properties[7]				
MEASUREMENT	**CONDITION**	**METRIC**		
Thermal conductivity (W/(m.K) | Btu/(h.ft².°F))	at 100°C / 212 °F	18.3		
CTE - Coefficient of thermal expansion (µm/ (m.°C) | µ inch/(inch. °F)	at 0°C	11.6		
Melting range (°C | °F)		1400 - 1450		

[1] Parts manufactured with standard parameters on a ProX DMP 320, Config B
[2] Values based on average and double standard deviation
[3] H900 and H1150 indicate heat treatments targeting resp. H900 and H1150 conditions
[4] Tested on ASTM E8M specimen with rectangular cross sections
[5] Tested on ASTM E8M specimen with circular cross sections type 4
[6] Tested with Charpy V-notch impact test specimens type A at room temperature
[7] Values based on literature
NA = Not available

Surface Quality*		
MEASUREMENT	**As Built**	**Sand Blasted**
Surface Roughness R_a		
Horizontal direction (XY) (µm|µin)	5 - 7	4 - 7
Vertical direction (Z) (µm|µin)	6 - 8	4 - 8
Chemical Composition		
Element	% of Weight	
Fe	Bal.	
C	<0.07	
Mn	<1.00	
P	<0.040	
S	<0.030	
Si	<1.00	
Cr	15.00-17.50	
Ni	3.00-5.00	
Cu	3.00-5.00	
Nb+Ta	0.15-0.45	

*Parts manufactured with standard parameters on a ProX 320, Config B