



# AM 420S

Austenitic stainless steel for laser powder bed fusion

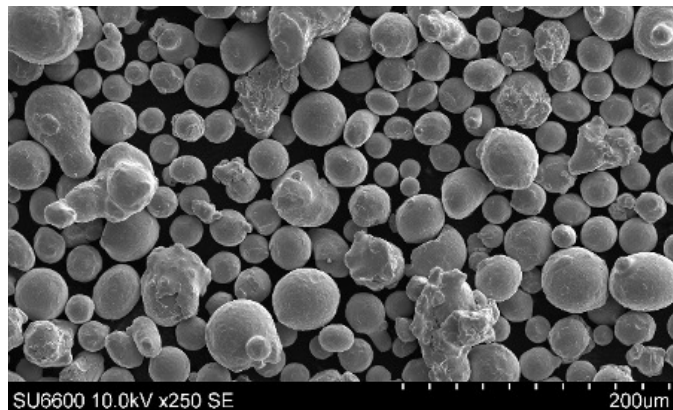
## General material description

**AM 420S** is a nitrogen gas atomized, good flowable spherical powder for additive manufacturing. It is a general-purpose medium carbon-chromium hardenable martensitic steel with good strength and good corrosion resistance in mild environments. It is capable of being through hardened up to 50 HRC by air-cooling in medium and small sections. Typical applications are cutting utensils, surgical and dental instruments, molds and multi-purpose tools.

## Equivalent materials:

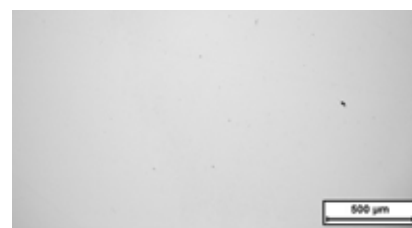
- 1.4021/1.4028
- SAE 51420
- AISI420

Chemical composition, % (typical values)	
Element	Content, %
Cr	12.5
Mn	1.2
Si	0.5
C	0.23
O	0.06
N	0.07
Fe	Balance



Typical powder properties		
Nominal particle range	20-63 µm (max 1% oversize, max 8% undersize)	MPIF05, ASTM B214, ISO4497
Hall flow	15 s/50 g	MPIF03, ASTM B213, ISO4490
Apparent density	4.1 g/cc	MPIF04, ASTM B212, ISO3923/1

Typical mechanical properties						
Surface condition	As-printed surface			Machined surface		
	Stress Relieve*		Quench / Temper**	Stress Relieve*		Quench / Temper**
Heat treatment	SR200	SR650	QT200	SR200	SR650	QT200
	<b>Z-direction - Build direction</b>					
UTS (MPa)	1610	-	1685	1835	1040	1855
YS (MPa)	1000	-	1290	1240	865	1470
Elongation (%)	6	-	6	10	16	8
IE (J)				23.5		37.5
<b>X/Y-direction - Perpendicular</b>						
UTS (MPa)				1925	1070	-
YS (MPa)				1330	870	-
Elongation (%)				12	16	-
Hardness HRC				49	32	48



Non etched



Etched

Figure: As printed microstructure

(\*) Stress relieve: slow heating to either 200 or 650 °C, holding at temperature 1 hour, followed by slow furnace cooling.

(\*\*) Quench and temper: slow heating to 400-850 °C under protective atmosphere or vacuum, austenitising at 980 °C for 1 hour, quenching in oil. Tempering at 200 °C in air for 1 hour.

### Standard packaging:

20 kg (4x5 kg, 1 L PE bottles packed in cardboard box)

(Other tailored particle sizes and packaging are available under conditions)