

forAM[®] 4140 20-53 GA

Structural steel powder for Additive Manufacturing

forAM 4140 GA is a nitrogen gas atomized, good flowable and spreadable spherical powder for additive manufacturing. A medium carbon structural steel that can be hardened and tempered.

Typical applications are high-grade cold worked parts in general engineering and automotive.

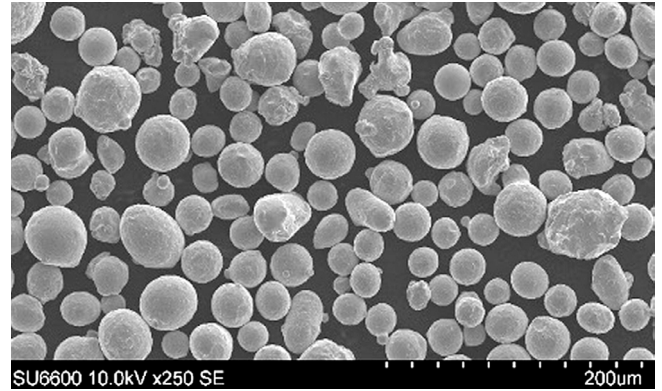
Equivalent materials:

- » 42CrMo4
- » 1.7225
- » SAE 4140
- » AISI 4140
- » SCM 440

For more information on forAM product line and other of Höganäs products, please contact your local sales representative.

Powder properties

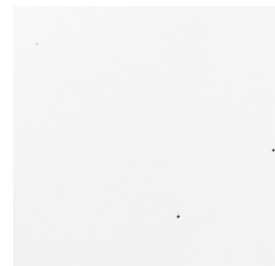
Chemical composition, (typical values)	
Element	Content, %
Cr	1.0
Mn	0.8
Mo	0.2
Si	0.3
C	0.4
O	0.06
Fe	Balance



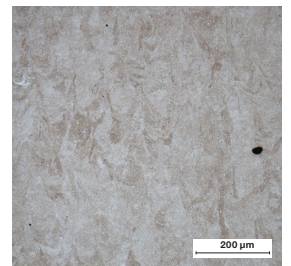
Typical powder properties		
Nominal particle range	20-53 µm (max 5% over and under size)	MPIF05, ASTM B214, ISO4497
Hall flow	14 s/50 g	MPIF03, ASTM B213, ISO4490
Apparent density	4.0 g/cm ³	MPIF04, ASTM B212, ISO3923/1

Mechanical properties

Surface condition is machined			
Heat treatment	SR ⁽¹⁾	QT200 ⁽²⁾	QT550 ⁽³⁾
Printed in Z-direction – Build direction			
UTS (MPa)	1,140	1,920	1,210
YS (MPa)	1,070	1,550	1,170
Elongation (%)	13	8	13
IE Notch in Y direction (J)	70	13	70

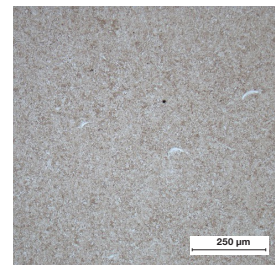


As Polished

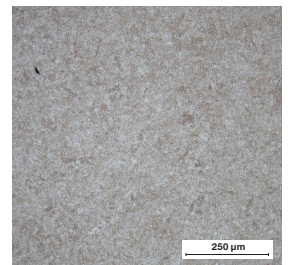


Stress relieved – Build direction

Heat treatment	SR ⁽¹⁾	QT200 ⁽²⁾	QT550 ⁽³⁾
Printed in X/Y-direction – Perpendicular			
UTS (MPa)	1,170	1,930	1,190
YS (MPa)	1,090	1,550	1,140
Elongation (%)	14	10	13
IE Notch in Z direction (J)	85	12	75
Hardness (HRC)	39	50	35



QT200 – Build direction



QT550 – Build direction

- (1) Stress relieved at 550 °C in Ar for 1 h
- (2) Quenched and Tempered - Austenitized at 840 °C in vacuum followed by a gas quench, Tempered at 200 °C in air
- (3) Quenched and Tempered - Austenitized at 840 °C in vacuum followed by a gas quench, Tempered at 550 °C in Ar

Standard packaging:

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

(Other tailored particle sizes, and packaging eg. 200 kg / 500 kg Flexbag, are available under conditions)