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Technical Data Sheet: CMG Tech-X 17-4PH HMs metal filament for 3D printing

Description

17-4PH is a heat treatable stainless steel with high strength and corrosion resistance as well as magnetic. CMG Tech-X 17-4PH HMs filament is a high flexibility metal-polymer composite containing more than 90 percent by weight metal powder, allowing printing of parts with high quality surface. Filaments are available in 1.75 mm and 2.85 mm diameters. Functional prototypes printed with CMG Tech-X 17-4PH HMs filament have successfully been tested and passed application tests at customer sites. These include engineering ratchets for use in bicycle shifters, crimp jaws to seal against high internal pressure (50 bars) in electrical machines and nozzles for use in roof production in the automotive sector.



Fig. 1: Sintered engineering ratchet printed with CMG Tech-X 17-4PH HMs filament for use in bicycle shifter.

Scaling factor

Typical values:

x-y: 119%

z: 118%

Range: 116-121% depending on printing parameters, build direction, part size, part geometry and sintering conditions



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Shelf life

6-12 months if properly stored. Keep away from moisture. Store in a dry and clean place at room temperature.

Typical printing parameters:

Nozzle temperature: 120-160 °C, typical 140-160 °C (direct drive printers) & 150-160 °C (Bowden tube printers)

Print bed temperature: 20-30 °C

Debinding & Sintering

Debinding:

At CMG Technologies or with appropriate debinding station. Debinding is carried out in acetone at 42 °C with weight loss of 5-6 %. Typical debinding time is 24-72 hours depending on size of part, wall thickness and infill %.

Sintering:

At CMG Technologies or with appropriate sintering furnace. Sintering is carried out at 1275 °C for 1-2 hours in H₂ atmosphere with backbone polymer removal at 600 °C. Backbone polymer removal should be carried out under overpressure or vacuum for bright sintered parts.

Typical properties:

All measurements were carried out by external analytical labs. Mechanical property, hardness and density measurements are in accordance with ASTM A370, ASTM E18, and RP146, respectively. All test specimens were printed flat in x-y printing direction.

Property	As-sintered	H900 heat treated
Yield strength, 0.2% offset (MPa)	893	976
Tensile strength (MPa)	916	987
Elongation (%)	5.8	4.9
Hardness, HRC	39	40
Density (g/cm ³)	7.93	7.83



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