

REVISIONS:

Rev	By	Date	Pages Revised or Added
N/C	Michelle Man	10/25/2021	Document Initial Release
A	Jonathan John	11/22/2023	<ul style="list-style-type: none"> - Add specs limit - Updated spec limit for Flex and Compression prism to XY direction from TBD - Added thickness requirements to table 3 and removed it from table 2, as thickness varies by test method - Added note 6 for table 3
B	Jonathan John	10/4/2024	<ul style="list-style-type: none"> -Page 4, note 1, added the sentence “See approved PCD for accepted ASTM deviations”. In note 1, and change “ave” to “avg” for note 2 -Page 5, table 3, updated average thickness to nominal thickness. Added “derivatives and controlled data set procedures” to notes 3, 4 and 5

1. SCOPE:

1.1 Form:

This detailed specification along with the base specification NMS 800 establishes the requirements for the manufacturing of aerospace laser powder bed fusion (LPBF) powder.

The base specification shall govern where no additional requirement is specified; in such cases, the applicable sections are omitted from this detail specification.

2. Type: All products qualified to this detail specification have the following classification: HexPEKK®-100 Powder.

3. Material Testing Requirements:

3.1 Powder Physical Properties

Table 1 Powder Physical Properties

Property ^(1,2)	Number of Tests per Lot	Requirements
FTIR Match % ⁽³⁾	1	

3.3 As-printed Specimen Mechanical Properties

Table 3 As-printed Specimen Mechanical Properties

Property	Test Method ⁽¹⁾	Requirements ⁽²⁾	Thickness Requirements ⁽⁶⁾
Tension Strength and Modulus ⁽³⁾ Room Temperature, Ambient Orientation: ZX	ASTM D638 DF2 Geometry	6 W U H Q J 84.0 ksi 6 W U H Q J 10.19 ksi Modulus: 0.6569 to 0.7658 msi, avg	0 L Q , Q G 0.157 to 0.148 inch, H (0.13 nominal)
Compression Strength and Modulus ⁽⁴⁾ Room Temperature, Ambient Orientation: XY	ASTM D695 Prism	6 W U H Q J 24.3 ksi 6 W U H Q J 25.32 ksi Modulus: 0.980 to 1.059 msi, avg	0 L Q , Q G 0.488 to 0.506 inch, H (0.50 nominal)
Flex Strength and Modulus ⁽⁵⁾ Room Temperature, Ambient Orientation: XY	ASTM D790	6 W U H Q J 20.8 ksi 6 W U H Q J 24.78 ksi Modulus: 0.775 to 0.875 msi, avg	0 L Q , Q G 0.1808 to 0.1546 inch, H (0.13 nominal)

(1) Specific procedures should be identical to those used in the original material qualification program.

(2) “ind” refers to individual measurements. “avg” refers to the average of 5 specimens.

To be conducted by either Manufacturer or Purchaser: A set of 5 specimens is required from each powder lot that may be used to produce multiple powder drums by the manufacturer.

/ L P L W V F R P S X W H S Specimens should be distributed randomly within the build volume and shall not be sampled from one build location only.. D Q G

(3) Specimens are printed per “Tension SL.SLI” derivatives and controlled data set procedures. Material supplier is required to print the specimens per NPS 89800 latest version. Modulus strain range: 1,000 to 3,000 AE per ASTM D638 modified DF2 geometry shown in Appendix A of NMS 800.

(4) Specimens are printed per “Compression SL.SLI” derivatives and controlled data set procedures.. Material supplier is required to print the specimens per NPS 89800 latest version. Modulus strain range: 1,000 to 3,000 AE per ASTM D695.

(5) Specimens are printed per “Flex SL.SLI derivatives and controlled data set procedures.”. Material supplier is required to print the specimens per NPS 89800 latest version. Modulus strain range: 5,000 to 20,000 AE using deflectometer. Span length is 16T, T=Average Specimen Thickness.

(6) Computed from actual qualification printed specimen thicknesses. A minimum of 3 thickness measurements across the specimen width and length (per applicable ASTM requirements) using an appropriate measuring device. “avg” refers to average measurements; limits computed at . . .

QUALIFIED PRODUCTS LIST

Supplier Product
Designation

Supplier Name and Production
Location

Date
Qualified

Specification
Callout⁽¹⁾