



Document No.: NMS 800 Rev A -, October 4th, 2024

NCAMP Material Specification
This specification is generated and maintained in accordance with NCAMP
Standard Operating Procedures, NSP 100

Hexcel Corporation HexPEKK®-100 powder for
Laser Powder Bed Fusion

Prepared by: Alden Winn (Hexcel), Michelle Man (NCAMP), Jonathan John (NCAMP)

Reviewed by: Royal Lovingfoss (NCAMP/NIAR), Rachael Andrulonis (NIAR), John Tomblin (NIAR), Steve Ward (Collins Aerospace), Michael Puzin (Airbus), Lauren Rezac (NCAMP AER)

Distribution Statement A. Approved for public release; distribution is unlimited.

National Center for Advanced Materials Performance
Wichita State University – NIAR
1845 Fairmount Ave., Wichita, KS 67260-0093, USA

TABLE OF CONTENTS

- 1. Scope.....4
- 2. Classification.....4
- 3. References.....4
- 4. Definitions.....4
- 5. Process Control Document.....5
- 6. Material Requirements.....5
- 7. Qualification.....6
 - 7.1. Qualification Of A Material.....6
 - 7.1.1 Powder Physical Properties.....6
 - 7.1.2 As-printed Specimen Physical Properties.....7
 - 7.1.3 As-printed Specimen Mechanical Properties.....8
 - 7.2. Retention of Qualification Status.....8
- 8. Material Test Methods.....8
 - 8.1. FTIR.....9
 - 8.2. Particle Size.....9
 - 8.3. DSC.....9
 - 8.4. Test Failure.....9
- 9. Drum Identification.....9
- 10. Traceability.....9
- 11. Storage and Handling of Powder.....10
- 12. Safety – Hazardous Materials.....10
- 13. Rounding of Values.....10
- 14. Applicable Documents.....10
 - 14.1. NCAMP Publications:.....10
 - 14.2. US Government Publications.....10
- 15. Environmental, HealtronmTj /TT0 1 Tf 0.004 Tc -0.002 Tw 12 -0 0 12 86.4 343.43onmT14 67.08 (li

Regrind

Material from fabricated parts that has been reclaimed by

7. Qualification

All requests for additional material qualification shall be directed to NCAMP or the governing regulatory body.

7.1. Qualification Of A Material

Supplier will submit a signed test report/Certificate of Conformance that demonstrates the candidate material’s ability to meet the specifications in Table 1 and Table 2. The report will include the following information:

- 1) Supplier name and product designation
- 2) Test Results, including individual specimen values, to prove material meets the requirements of this specification
- 3) Powder lot number
- 4) Date of Manufacture
- 5) A statement that no changes in product formulation, raw materials, basic methods of manufacture, or plant site have occurred since the material was qualified

7.1.1 Powder Physical Properties

Table 1 Powder Physical Properties

Property ⁽¹⁾⁽²⁾	Test Method	Number of Tests per Lot
FTIR Match % ⁽³⁾	ASTM E1252	1
Particle Size ⁽⁴⁾	ISO 13319	3
DSC ⁽⁵⁾	ASTM D3418	1

⁽¹⁾ Specific procedures should be identical to those used in the original material qualification program. See Section 8 for material test methods

⁽²⁾ “ind” refers to individual measurements. “avg” refers to the average measurements. “max” refers to maximum measurement.

⁽³⁾ Fourier-Transform Infrared (FTIR) spectroscopy comparison versus powder standard. Powder standard shall be the same standard used in qualification. This is ronsilit

⁽⁴⁾ Manufacturer is to measure particle size D50 from a sigl unique l . This testing

Measure glass transition temperature in accordance with A TM D3418.

7.1.2

October 4th, 2024

NMS 800 Rev A -

process.

All tests are performed in a temperature and humidity controlled environment. Temperature is maintained at 75° F +/- 15° F and humidity maintained below 60% RH.

8.1. FTIR

Fourier Transform Infrared Spectroscopy

11. Storage and Handling of Powder

Feedstock, after fabrication and testing (if applicable), shall be properly stored in sealed containers according to the feedstock manufacturer's recommendations with a recommended temperature range of 60-90 °F and 60% maximum relative humidity.

12. Safety – Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address all the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

13. Rounding of Values

apdoc (1.4) 16famietensm (famiel to thisuespec (if) elats ofssens necy (s) 1a 5rs1c(per)7 (s)44 (i) To4 (s)4douse v

The KC monitoring, typically using control charts, must be provided to material users, certification agencies, and NCAMP staff upon request. The CPP monitoring must also be provided to material users, certification agencies, and NCAMP staff upon request, but proprietary information may be coded or normalized.

19. Acknowledgement

A Supplier shall mention this specification number and the applicable detail specification number and their revision letters, if any, in all quotations and when acknowledging purchase orders.

20. Rejection

Materials not conforming to this specification and the applicable detail specification, or to modifications authorized by Purchaser, will be subject to rejection.

Appendix A: Coupon Geometry

Note: All dimensions are reference only. Width, length, and radius to read and record only.

