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Additive manufacturing of polymers — Feedstock materials — Qualification of materials for laser-based powder bed fusion of parts

Fabrication additive de polymères — Matières premières — Qualification des matériaux pour la fusion laser de pièces sur lit de poudre

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11

Email: copyright@iso.org
Website: www.iso.org

ASTM International
100 Barr Harbor Drive, PO Box C700
West Conshohocken, PA 19428-2959, USA
Phone: +610 832 9634
Fax: +610 832 9635
Email: khooper@astm.org
Website: www.astm.org

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Contents

Page

Foreword ... **iv**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Symbols and abbreviations ... **1**
4.1 Symbols ... 1
4.2 Abbreviations ... 2
5 Sampling ... **2**
5.1 General ... 2
5.2 Characterisation of virgin powder and powder blends ... 2
5.3 Characterisation of used powder ... 2
6 Factory test report ... **3**
6.1 General ... 3
6.2 Particle size distribution ... 3
6.3 Residual monomer content/extract content ... 3
6.4 Supplementary data ... 3
7 Factors influencing processability ... **4**
7.1 General ... 4
7.2 Spreadability of the powder ... 4
7.3 Relative humidity of the powder (surface moisture) ... 4
7.4 Particle size distribution ... 5
8 Factors affecting part quality ... **5**
8.1 General ... 5
8.2 Melting behaviour, melt flow and MVR ... 6
8.2.1 General ... 6
8.2.2 Laboratory methods ... 6
8.2.3 Melt volume-flow rate (MVR) ... 6
8.3 Melting temperature and recrystallisation temperature ... 7
Annex A (informative) **Hausner ratio, H_R** ... **9**
Annex B (informative) **Determination of the melt volume-flow rate (MVR)** ... **12**
Annex C (informative) **Round robin MVR test** ... **15**
Bibliography ... **18**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 261, *Additive manufacturing*, in cooperation with ASTM Committee F42, *Additive Manufacturing Technologies*, on the basis of a partnership agreement between ISO and ASTM International with the aim to create a common set of ISO/ASTM standards on additive manufacturing, and in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 438, *Additive manufacturing,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Additive manufacturing of polymers — Feedstock materials — Qualification of materials for laser-based powder bed fusion of parts

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1 Scope

This document provides guidance and recommendations for the qualification of polymeric materials intended for laser-based powder bed fusion of polymers (PBF-LB/P). The parameters and recommendations presented in this document relate mainly to the material polyamide 12 (PA12), but references are also made to polyamide 11 (PA11). The parameters and recommendations set forth herein cannot be applicable to other polymeric materials.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/ASTM 52900, *Additive manufacturing — General principles — Fundamentals and vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/ASTM 52900, apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Symbols and abbreviations

4.1 Symbols

The following symbols are used throughout this document:

Symbols	Designation	Unit
D_{V10}	10 % quantile of particle size based on the sample volume	µm
D_{V50}	50 % quantile of particle size based on the sample volume	µm
D_{V90}	90 % quantile of particle size based on the sample volume	µm
H_R	Hausner ratio	—
s_r	standard deviation of repeatability	—
s_R	standard deviation of reproducibility	—
T_B	processing temperature range	°C
T_{ic}	initial crystallisation temperature	°C
T_{im}	initial melting temperature	°C
V_∞	bulk volume	mL
V_0	tapped volume	mL

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