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# Additive manufacturing — Design — Part 1: Laser-based powder bed fusion of metals

*Fabrication additive — Conception —*

*Partie 1: Fusion laser sur lit de poudre métallique*



Reference number  
ISO/ASTM 52911-1:2019(E)

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## Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Symbols and abbreviated terms</b> .....	<b>2</b>
4.1 Symbols.....	2
4.2 Abbreviated terms.....	3
<b>5 Characteristics of powder bed fusion (PBF) processes</b> .....	<b>3</b>
5.1 General.....	3
5.2 Size of the parts.....	4
5.3 Benefits to be considered in regard to the PBF process.....	4
5.4 Limitations to be considered in regard to the PBF process.....	5
5.5 Economic and time efficiency.....	5
5.6 Feature constraints (islands, overhang, stair-step effect).....	6
5.6.1 General.....	6
5.6.2 Islands.....	6
5.6.3 Overhang.....	6
5.6.4 Stair-step effect.....	6
5.7 Dimensional, form and positional accuracy.....	7
5.8 Data quality, resolution, representation.....	7
<b>6 Design guidelines for laser-based powder bed fusion of metals (PBF-LB/M)</b> .....	<b>8</b>
6.1 General.....	8
6.1.1 Selecting PBF-LB/M.....	8
6.1.2 Design and test cycles.....	8
6.2 Material and structural characteristics.....	8
6.3 Support structures.....	9
6.4 Build orientation, positioning and arrangement.....	11
6.4.1 General.....	11
6.4.2 Powder spreading.....	11
6.4.3 Support structures design.....	12
6.4.4 Curl effect.....	13
6.5 Anisotropy of the material characteristics.....	14
6.6 Surface roughness.....	14
6.7 Post-production finishing.....	14
6.7.1 General.....	14
6.7.2 Surface finishing.....	15
6.7.3 Removal of powder residue.....	15
6.7.4 Removal of support structures.....	15
6.7.5 Adjusting geometric tolerances.....	15
6.7.6 Heat treatment.....	15
6.8 Design considerations.....	16
6.8.1 General.....	16
6.8.2 Cavities.....	16
6.8.3 Gaps.....	16
6.8.4 Wall thicknesses.....	16
6.8.5 Holes and channels.....	17
6.8.6 Integrated markings.....	17
6.9 Example applications.....	17
6.9.1 General.....	17
6.9.2 Integral design (provided by CETIM — Technical Centre for Mechanical Industry).....	17

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6.9.3	Gear wheel design (provided by Fraunhofer IGCV).....	19
6.9.4	Impossible crossing (provided by TNO — The Netherlands Organisation for applied scientific research).....	20
<b>Annex A (informative) Materials for PBF-LB/M.....</b>		<b>22</b>
<b>Bibliography.....</b>		<b>23</b>

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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](http://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](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 261, *Additive manufacturing*, in cooperation with ASTM 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.

A list of all parts in the ISO 52911 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Laser-based powder bed fusion of metals (PBF-LB/M) describes an additive manufacturing (AM) process and offers an additional manufacturing option alongside established processes. PBF-LB/M has the potential to reduce manufacturing time and costs, and increase part functionality. Practitioners are aware of the strengths and weaknesses of conventional, long-established manufacturing processes, such as cutting, joining and shaping processes (e.g. by machining, welding or injection moulding), and of giving them appropriate consideration at the design stage and when selecting the manufacturing process. In the case of PBF-LB/M and AM in general, design and manufacturing engineers only have a limited pool of experience. Without the limitations associated with conventional processes, the use of PBF-LB/M offers designers and manufacturers a high degree of freedom and this requires an understanding about the possibilities and limitations of the process.

The ISO 52911 series provides guidance for different powder bed fusion (PBF) technologies. It is intended that the series will include this document on PBF-LB/M, ISO 52911-2<sup>1)</sup> on laser-based powder bed fusion of polymers (PBF-LB/P), and ISO 52911-3<sup>2)</sup> on electron beam powder bed fusion of metals (PBF-EB/M). Each document in the series shares [Clauses 1](#) to [5](#), where general information including terminology and the PBF process is provided. The subsequent clauses focus on the specific technology.

This document is based on VDI 3405-3:2015. It provides support to technology users, such as design and production engineers, when designing parts that need to be manufactured by means of PBF-LB/M. It will help practitioners to explore the benefits of PBF-LB/M and to recognize the process-related limitations when designing parts. It also builds on ISO/ASTM 52910 to extend the requirements, guidelines and recommendations for AM design to include the PBF process.

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1) Under preparation.

2) Under preparation.