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Australian STANDARD®

STANDARDS Australia

Additive manufacturing — General principles

Part 2: Overview of process categories and feedstock



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Australian Automotive Aftermarket Association
Australian Ceramic Society
Austroads
Charles Darwin University
Department of Defence (Australian Government)
Engineers Australia
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Metro North Health, Queensland Government
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This page explains the meaning of the language and structure of this Standard.

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Requirements

To conform to a Standard, all requirements in the Standard need to be met.

A requirement is any statement in the Standard which uses the word "shall".

Recommendations, permissions and possibilities

The following words are commonly used in Standards, but statements using them do not have to be followed to conform to the Standard:

(a) "should" means that something is recommended.

(b) "may" means that something is permitted.

(c) "can" means that something is possible.

Structure of Standards

A Standard always has the following parts:

(i) The Preface states who developed the Standard, what the Standard is aiming to do, and how it relates to other documents.

(ii) The Scope states what the Standard is about, what it covers and what it does not cover.

(iii) The Normative references clause lists other documents that are referenced in the Standard as part of requirements.

(iv) The Terms and definitions clause defines important terms to help with understanding the Standard.

A Standard may also include other parts, such as the following:

(1) A normative appendix sets additional requirements that need to be conformed to.

(2) An informative appendix provides additional information or guidance. They usually do not contain requirements. If an informative appendix does contain requirements, the Standard will explain when those requirements apply.

(3) A Bibliography lists documents referenced in the Standard but not as part of requirements.

Many Standards include notes. Notes provide recommendations and/or guidance only. They never contain requirements.

Preface

This Standard was prepared by the Standards Australia Committee MB-028, Additive Manufacturing.

The objective of this document is to describe the process fundamentals of Additive Manufacturing (AM). It also gives an overview of existing process categories, which are not and cannot be exhaustive due to the development of new technologies. This part of ISO 17296 explains how different process categories make use of different types of materials to shape a product's geometry. It also describes which type of material is used in different process categories.

This document is identical to, and has been reproduced from, ISO 17296-2:2015, *Additive manufacturing — General principles - Part 2: Overview of process categories and feedstock.*

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Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms "normative" and "informative" are used in Standards to define the application of the appendices or annexes to which they apply. A "normative" appendix or annex is an integral part of a Standard, whereas an "informative" appendix or annex is only for information and guidance.

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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).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 261, *Additive manufacturing*.

ISO 17296 consists of the following parts, under the general title *Additive manufacturing — General principles*:

— *Part 1: Terminology* [1]

— *Part 2: Overview of process categories, part types and feedstock*

— *Part 3: Main characteristics and corresponding test methods*

— *Part 4: Overview of data processing*

[1] To be published.

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Introduction

Additive manufacturing is a versatile technology that can be used throughout the product development process. The additive manufacturing processes can be used to manufacture prototypes, tool and fully functional end-use parts. In addition to engineering, the application areas of this interdisciplinary technology now include fields ranging from e.g. architecture and medicine, to archaeology and cartography, as well as arts, toys, education, entertainment.

During its somewhat turbulent development, different terms and definitions have emerged which are frequently ambiguous and confusing. Moreover, there are various different processes available on the market and it is not always clear what opportunities and limitations they offer in terms of application.

This part of ISO 17296 aims to offer a description of the general working principles for the different process categories and the processing of feedstock material into the desired product geometry. This will enhance the understanding of the process and improve the communication between the customer and suppliers of products and services.

The principles and process categories described in this part of ISO 17296 refer to commercially available technology that has proven practically useful and viable on the market for several years.

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Additive manufacturing — General principles

Part 2: Overview of process categories and feedstock

1 Scope

This part of ISO 17296 describes the process fundamentals of Additive Manufacturing (AM). It also gives an overview of existing process categories, which are not and cannot be exhaustive due to the development of new technologies. This part of ISO 17296 explains how different process categories make use of different types of materials to shape a product's geometry. It also describes which type of material is used in different process categories. Specification of feedstock material and requirements for the parts produced by combinations of different processes and feedstock material will be given in subsequent separate standards and are therefore not covered by this part of ISO 17296. This part of ISO 17296 describes the overreaching principles of these subsequent standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 17296-1, *Additive manufacturing — General principles — Part 1: Terminology*[2]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17296-1 apply.

4 Part types and their classification

4.1 General

Parts produced by additive manufacturing can be used as both prototypes and production parts (the term “prototype” is described in ISO 17296-1). Production parts are used for different applications at the end of the product development (cycle) and reflect all requirements of the desired product. For both prototypes and production parts, different processes and materials can be used depending on the type of the part, application and industry, and cost and delivery time requirements. It is the responsibility of the developer to design the parts and to decide on their specification. Close consultation with the component manufacturer is advisable, depending on the customer's expertise.

4.2 Classification of parts

Parts shall further be divided into different classes, from the most rigorous class regarding quality and traceability (class 1) to the least rigorous class regarding quality and traceability. The details of these classes will be defined in specific further standards related to the feedstock, process and application.

5 Process chains

The process chain involved in additive manufacturing technologies is characterized by direct fabrication of parts based on 3D CAD data. Intermediate stages, such as tool manufacturing, are unnecessary.

[2] To be published.

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