
**Specification for Additive
Manufacturing File Format (AMF)
Version 1.2**

*Spécification normalisée pour le format de fichier pour la fabrication
additive (AMF) Version 1.2*



This document is a preview generated by ERS



COPYRIGHT PROTECTED DOCUMENT

© ISO/ASME International 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester. In the United States, such requests should be sent to ASTM International.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Terms and definitions	1
3 Key considerations	2
3.1 General.....	2
3.2 Guidelines for the inclusion of future new elements.....	3
4 Structure of this specification	3
5 General structure	4
6 Geometry specification	5
6.1 General.....	5
6.2 Smooth geometry.....	6
6.3 Restrictions on geometry.....	7
7 Material specification	7
7.1 General.....	7
7.2 Mixed and graded materials and substructures.....	9
7.3 Porous materials.....	9
7.4 Stochastic materials.....	10
8 Colour specification	10
8.1 General.....	10
8.2 Colour gradations and texture mapping.....	11
8.3 Transparency.....	12
9 Texture specification	12
10 Constellations	12
11 Metadata	13
12 Compression and distribution	13
13 Minimal implementation	14
Annex A (informative) AMF XML schema implementation guide	15
Annex B (informative) Performance data and future features	23
Bibliography	26

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*, in cooperation with ASTM F 42.91, *Terminology*, 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.

This second edition cancels and replaces the first edition (ISO/ASTM 52915:2013), which has been technically revised. This revision contains changes to normative language and details of a minimum implementation, as well as corrections and clarifications.

Introduction

This International Standard describes an interchange format to address the current and future needs of additive manufacturing technology. For the last three decades, the stereolithography (STL) file format has been the industry standard for transferring information between design programs and additive manufacturing equipment. An STL file defines only a surface mesh and has no provisions for representing colour, texture, material, substructure and other properties of the fabricated object. As additive manufacturing technology is evolving quickly from producing primarily single-material, homogeneous objects to producing geometries in full colour with functionally-defined gradations of materials and microstructures, there is a growing need for a standard interchange file format that can support these features.

The Additive Manufacturing File Format (AMF) has many benefits. It describes an object in such a general way that any machine can build it to the best of its ability, and as such is technology independent. It is easy to implement and understand, scalable and has good performance. Crucially, it is both backwards compatible, allowing any existing STL file to be converted, and future compatible, allowing new features to be added as advances in technology warrant.

Specification for Additive Manufacturing File Format (AMF) Version 1.2

1 Scope

This International Standard provides the specification for the Additive Manufacturing File Format (AMF), an interchange format to address the current and future needs of additive manufacturing technology.

The AMF may be prepared, displayed and transmitted provided the requirements of this specification are met. When prepared in a structured electronic format, strict adherence to an extensible markup language (XML)^[1] schema is required to support standards-compliant interoperability.

A W3C XML schema definition (XSD) for the AMF is available from ISO from <http://standards.iso.org/iso/52915> and from ASTM from www.astm.org/MEETINGS/images/amf.xsd. An implementation guide for such an XML schema is provided in [Annex A](#).

It is recognized that there is additional information relevant to the final part that is not covered by the current version of this International Standard. Suggested future features are listed in [Annex B](#).

This International Standard does not specify any explicit mechanisms for ensuring data integrity, electronic signatures and encryptions.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1

AMF consumer

software reading (parsing) the Additive Manufacturing File Format (AMF) file for fabrication, visualization or analysis

Note 1 to entry: AMF files are typically imported by additive manufacturing equipment, as well as viewing, analysis and verification software.

2.2

AMF editor

software reading and rewriting the Additive Manufacturing File Format (AMF) file for conversion

Note 1 to entry: AMF editor applications are used to convert an AMF from one form to another, for example, convert all curved triangles to flat triangles or convert porous material specification into an explicit mesh surface.

2.3

AMF producer

software writing (generating) the Additive Manufacturing File Format (AMF) file from original geometric data

Note 1 to entry: AMF files are typically exported by computer-aided design (CAD) software, scanning software or directly from computational geometry algorithms.

2.4

attribute

characteristic of data, representing one or more aspects or descriptors of the data in an element

Note 1 to entry: In the XML framework, attributes are characteristics of elements.