



Designation: F2792 – 10

## Standard Terminology for Additive Manufacturing Technologies<sup>1,2</sup>

This standard is issued under the fixed designation F2792; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This terminology includes terms, definitions of terms, descriptions of terms, nomenclature, and acronyms associated with additive-manufacturing (AM) technologies in an effort to standardize terminology used by AM users, producers, researchers, educators, press/media and others.

NOTE 1—The subcommittee responsible for this standard will review definitions on a three-year basis to determine if the definition is still accurate as stated. Revisions will be made when determined to be necessary.

### 2. Referenced Documents

#### 2.1 ISO Standard:<sup>3</sup>

ISO 10303 -1:1994 Industrial automation systems and integration -- Product data representation and exchange -- Part 1: Overview and fundamental principles

### 3. Significance and Use

3.1 The definitions of the terms presented in this standard were created by this subcommittee. This standard does not purport to address safety concerns associated with the use of AM technologies. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use of additive manufacturing.

### 4. Terminology

#### 4.1 Definitions:

**3D printing**, *n*—fabrication of objects through the deposition

<sup>1</sup> This terminology is under the jurisdiction of Committee F42 on Additive Manufacturing Technologies and is the direct responsibility of Subcommittee F42.91 on Terminology.

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<sup>2</sup> Through a mutual agreement with ASTM International (ASTM), the Society of Manufacturing Engineers (SME) contributed the technical expertise of its RTAM Community members to ASTM to be used as the technical foundation for this ASTM standard. SME and its membership continue to play an active role in providing technical guidance to the ASTM standards development process.

<sup>3</sup> Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland, [http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=20579](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=20579)

of a material using a print head, nozzle, or another printer technology.

DISCUSSION—Term often used synonymously with additive manufacturing; in particular associated with low-end machines.

**additive manufacturing (AM)**, *n*—process of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies. Synonyms: additive fabrication, additive processes, additive techniques, additive layer manufacturing, layer manufacturing, and freeform fabrication.

**additive systems**, *n*—machines used for additive manufacturing.

**direct metal laser sintering (DMLS®)**, *n*—use of laser sintering to make metal parts directly from metal powders without intermediate “green” or “brown” parts; term denotes metal-based laser sintering systems from EOS GmbH - Electro Optical Systems. Synonym: direct metal laser melting.

**facet**, *n*—typically a three- or four-sided polygon that represents an element of a 3D polygonal mesh surface or model; triangular facets are used in STL files.

**fused deposition modeling (FDM®)**, *n*—making of thermoplastic parts through heated extrusion and deposition of materials layer by layer; term denotes machines built by Stratasys, Inc.

**laser sintering (LS)**, *n*—production of objects from powdered materials using one or more lasers to selectively fuse or melt the particles at the surface, layer by layer, in an enclosed chamber.

DISCUSSION—Most LS machines partially or fully melt the materials they process. The word “sintering” is a historical term and a misnomer, as the process typically involves full or partial melting, as opposed to traditional powdered metal sintering using a mold and heat and/or pressure.

**prototype tooling**, *n*—molds, dies, and other devices used to produce prototypes; sometimes referred to as bridge tooling or soft tooling.

**rapid prototyping**, *n*—additive manufacturing of a design, often iterative, for form, fit, or functional testing, or combination thereof.

**rapid tooling**, *n*—the use of additive manufacturing to make tools or tooling quickly, either directly, by making parts that