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# Additive manufacturing of metals — Finished part properties — Post-processing, inspection and testing of parts produced by powder bed fusion



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# Additive manufacturing of metals — Finished part properties — Post-processing, inspection and testing of parts produced by powder bed fusion

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# Preface

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

The objective of this document is to specify requirements for the qualification, quality assurance and post processing for metal parts made by powder bed fusion.

This document specifies methods and procedures for testing and qualification of various characteristics of metallic parts made by additive manufacturing powder bed fusion processes, in accordance with ISO/ASTM 52927, categories H and M.

This document is intended to be used by part providers and/or customers of parts.

This document specifies qualification procedures where appropriate to meet defined quality levels.

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# Contents

**Preface** ii
**Foreword** v
**Introduction** vi
**Section 1 Scope** 1
**Section 2 Normative references** 1
**Section 3 Terms and definitions** 2
**Section 4 Abbreviations** 2
**Section 5 Qualification** 2
5.1 General 2
5.2 Part validation 2
5.3 Technical documentation relating to part(s) produced 3
5.4 Facility documentation 3
5.4.1 Additive manufacturer documentation requirements 3
5.4.2 Subcontractor documentation requirements 3
5.5 Quality assurance documentation 4
**Section 6 Post processing** 4
6.1 General 4
6.2 Post-build activities 4
6.3 Thermal treatment 5
6.3.1 General 5
6.3.2 Reducing residual stresses 5
6.3.3 Reducing anisotropy 5
6.3.4 Prepare material for mechanical post-processing 5
6.3.5 Densification 5
6.3.6 Annealing and aging 5
6.4 Separation from the built platform and support structures 6
6.5 Surface finishing 6
6.5.1 Surface finishing operations 6
6.5.2 Machining allowances 6
**Section 7 Inspection and testing** 6
7.1 General 6
7.2 Metallurgical testing 7
7.2.1 Objective 7
7.2.2 Test specimen selection, design, and preparation for part characterization 7
7.2.3 Test methods, parameters, and test specimens 8
7.2.4 Chemical analysis 9
7.2.5 Metallurgical properties 9
7.2.6 Determining the non-metallic inclusion content 9
7.2.7 Analysis and test report 9
7.3 Material testing 9
7.3.1 General 9
7.3.2 Orientation in the build space 10
7.3.3 Test specimen geometry and surface quality 10
7.3.4 Density (part) 10
7.3.5 Archimedean method 12
7.3.6 Image analysis of metallographic specimens 13
7.4 Mechanical testing 15
7.4.1 Static testing 15
7.4.2 Dynamic testing 20
7.5 Surface quality inspection 21
7.6 Geometrical inspection (form, dimension, and tolerances) 21

7.7 Non-destructive testing ..... 21
**Bibliography** ..... **22**

# Foreword

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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 document 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).

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This document was prepared by Technical Committee 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 Objective 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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# Introduction

As with conventional manufacturing processes (e.g. casting and milling), metallic parts produced by additive manufacturing technologies have critical-to-quality characteristics. These characteristics include density, strength, hardness, surface quality, dimensional accuracy, residual stresses, absence of cracks, voids, and structural homogeneity, which are typically tested in additively manufactured components. The quality of additively manufactured components is essential for functional components produced on an industrial scale. Thus, it is necessary to qualify additive manufacturing processes according to uniform criteria and to apply standardised in-process and post-process testing.

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# Australian Standard®

# Additive manufacturing of metals — Finished part properties — post-processing, inspection and testing of parts produced by powder bed fusion

## Section 1 Scope

This document specifies requirements for the qualification, quality assurance and post processing for metal parts made by powder bed fusion.

This document specifies methods and procedures for testing and qualification of various characteristics of metallic parts made by additive manufacturing powder bed fusion processes, in accordance with ISO/ASTM 52927, categories H and M.

This document is intended to be used by part providers and/or customers of parts.

This document specifies qualification procedures where appropriate to meet defined quality levels.

## Section 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 3369:2006, *Impermeable sintered metal materials and hardmetals — Determination of density*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 18265, *Metallic materials — Conversion of hardness values*

ISO 21920-1, *Geometrical product specifications (GPS) — Surface texture: Profile — Part 1: Indication of surface texture*

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

ISO/ASTM 52907, *Additive manufacturing — Feedstock materials — Methods to characterize metal powders*

ISO/ASTM 52920, *Additive manufacturing — Qualification principles — Requirements for industrial additive manufacturing processes and production sites*

ISO/ASTM 52927*Additive manufacturing — General principles — Main characteristics and corresponding test methods*[1)]

ISO/ASTM 52928, *Additive manufacturing — Feedstock materials — Powder life cycle management*[2)]

ISO/ASTM/TS 52930, *Additive manufacturing — Qualification principles — Installation, operation and performance (IQ/OQ/PQ) of PBF-LB equipment*

ANSI/ASME Y14.5, *Dimensioning and Tolerancing*

ASTM B311, *Standard Test Method for Density of Powder Metallurgy (PM) Materials Containing Less Than Two Percent Porosity*

ASTM B962, *Standard Test Methods for Density of Compacted or Sintered Powder Metallurgy (PM) Products Using Archimedes' Principle*

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