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Foreword

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Introduction

For many companies, additive manufacturing (AM) represents an alternative to more conventional manufacturing processes such as casting, forging, and milling. The trend towards complex, customised, or consolidated components, in addition to opportunities for reduced lead times and decentralised production allows an economically feasible use for a growing number of areas. This also applies to many series applications, which add further demands on the efficiency and consistency of the processes. In particular, components used in different fields (e.g. automotive industry, mechanical engineering, railway sector, aerospace, medical technology, etc.) are subject to high demands in terms of quality and safety.

The manufacturing of products used for applications subjected to specific requirements, relies on that the products' compliance to these requirements can be assured. Additive manufacturing is no exception to this. To this end, the production chain and environment must be designed in such a way that the process quality and the resulting product quality are always consistent and reproducible. To assure this consistency and reproducibility, it is of utmost importance to ensure that the involved workforce is adequately qualified for all stages of production.

This document describes the activities and responsibilities of the designers in the field of additive manufacturing. The aim of this ISO standard is to specify the qualification tests to be employed in the assessment of an AM Designer’s knowledge and skills when designing metal AM solutions for a non-specific industry. Consideration of the criteria defined within the framework of this document creates a basis for fulfilling the requirements for specific products.

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Additive manufacturing of metals — Qualification principles — Tasks and related skills for AM

1 Scope

This document describes AM design related tasks and corresponding skills for designing AM parts made by metal AM processes.

This document is thought to provide guidance for selection, training, and development of personal in a designing role related to metal AM processes.

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/ASTM 52900 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
AM Designer
A person who exploits knowledge of AM process capabilities to create idealised geometrical, shape and functional design data for a component to be made by metal AM processes, whilst not necessarily planning and executing component manufacture.

4 Tasks and responsibilities

4.1 General

The AM designer should receive appropriate theoretical and practical training, or prior equivalent experience in an AM designer role.

The person should have knowledge on mechanical design methodology, geometrical modelling software, CAD software and relevant digital tools related with the designer activities.

The designer should be competent for the intended application and sector of the part. Different applications and sectors state different requirements (e.g., relating to safety factors, material properties, inspection, and testing), which may impact the design for AM activity.

Each metal AM process has specific requirements that affect the design for AM activity (e.g., machining allowances, build orientation, test specimens). AM Designers shall be familiar with the requirements for each AM process used.

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