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Standards

Irish Standard Recommendation  
S.R. CWA 17454:2019

# Bionic Aircraft - Quality control of metal ALM parts using the Ultrasonic Technique

**S.R. CWA 17454:2019**

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## National Foreword

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**CEN**

**CWA 17454**

**WORKSHOP**

September 2019

**AGREEMENT**

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ICS

English version

## Bionic Aircraft - Quality control of metal ALM parts using the Ultrasonic Technique

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## European foreword

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The final text of CWA 17454 was submitted to CEN for publication on 2019-07-19. It was developed and approved by:

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Comments or suggestions from the users of the CEN-CENELEC Workshop Agreement are welcome and should be addressed to the CEN-CENELEC Management Centre.



## **Introduction**

Additive Layer Manufacturing of metallic high-performance parts is a cutting-edge manufacturing process which gives rise to a family of materials with a particular inner structure. In addition, this manufacturing process makes possible to manufacture, in a natural way, parts with high geometrical complexity in a single process.

Because this process is already under development for certain material families (such as AlSiSc), not all the properties of those layered materials are fully known yet. Therefore, the issues related to feasible quality control techniques are not fully defined. As a consequence of that, a deficit in specific standards related to this issue has been detected.

BIONIC AIRCRAFT research project (GA n° 690689, founded by the European Union's H2020 Programme) aims to further the knowledge on some of these unknown issues. This document gathers general conclusions derived from some of the results of this project that may be useful to go further in the development of specific standard on this field.

## CWA 17454:2019 (E)

### 1 Scope

This CWA provides a set of guidelines to control the quality of metal Additive Layer Manufactured (ALM) parts in terms of existence of defects by using ultrasonic technique. With the aim of characterizing the material in the aspects most relevant to the inspection, the measurement of some relevant acoustic parameters of the layered material is proposed first. Secondly, the most important configuration parameters are gathered together with a range of example values. After that, a set of specific guidelines for the automatic inspection under in-line conditions is provided. Finally, the specific highlights and restrictions coming from in-service conditions are explained.

This CWA does not include the basic vocabulary and general configuration and calibration steps for ultrasonic inspections, which are specified by the referenced general standards.

This CWA is not a testing procedure, because the specific parameters and scanning steps depend on each particular material and geometry of the part.

The information provided in this document is based on the results of the BIONIC AIRCRAFT research project.

### 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.

EN ISO 16811:2014, *Non-destructive testing — Ultrasonic testing — Sensitivity and range setting (ISO 16811:2012)*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions 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 <http://www.electropedia.org/>

#### 3.1

##### **ALM material**

3D solid structure made out of different metallic components by ALM manufacturing process

EXAMPLES     AlSi10Mg, AlSiSc alloys.

#### 3.2

##### **part**

3D structure with a defined function and targeted geometry

EXAMPLE     Complex geometry aeronautical metallic brackets located in the wings.

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