

**SLOVENSKI STANDARD**  
**kSIST-TP FprCEN ISO/ASTM TR 52958:2026**  
**01-april-2026**

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**Dodajalna izdelava kovinskih izdelkov - Spajanje prahu na podlagi (PBF) - Sočasno zaznavanje nespojenih mest med procesom PBF-LB s koaksialno nameščenimi fotodiodami (ISO/ASTM DTR 52958:2026)**

Additive manufacturing of metals - Powder bed fusion (PBF) - In-situ coaxial photodiode monitoring for lack of fusion flaw detection in PBF-LB (ISO/ASTM DTR 52958:2026)

Additive Fertigung von Metallen - Pulverbettfusion (PBF) - Bewährte Verfahren zur In-Situ-Fehlererkennung und -analyse für laserbasierte PBF (ISO/ASTM DTR 52958:2026)

Fabrication additive de métaux - Fusion sur lit de poudre - Surveillance par photodiode coaxiale in situ pour la détection de défauts de fusion en PBF-LB (ISO/ASTM DTR 52958:2026)

**Ta slovenski standard je istoveten z: FprCEN ISO/ASTM TR 52958**

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**ICS:**

25.030            3D-tiskanje            Additive manufacturing

**kSIST-TP FprCEN ISO/ASTM TR  
52958:2026**            en,fr,de

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# FINAL DRAFT

## Technical Report

### ISO/ASTM DTR 52958

## Additive manufacturing of metals — Powder bed fusion (PBF) — In-situ coaxial photodiode monitoring for lack of fusion flaw detection in PBF- LB

*Fabrication additive de métaux — Fusion sur lit de poudre —  
Surveillance par photodiode coaxiale in situ pour la détection de  
défauts de fusion en PBF-LB*

ISO/TC 261

Secretariat: DIN

Voting begins on:  
2026-01-27

Voting terminates on:  
2026-04-21

**ISO/CEN PARALLEL PROCESSING**

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Reference number  
ISO/ASTM DTR 52958:2026(en)

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Published in Switzerland

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## ISO/ASTM DTR 52958:2026(en)

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## ISO/ASTM DTR 52958:2026(en)

### Foreword

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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 aim 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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# Additive manufacturing of metals — Powder bed fusion (PBF) — In-situ coaxial photodiode monitoring for lack of fusion flaw detection in PBF-LB

## 1 Scope

This document provides a workflow comprising experimental procedures and flaw detection algorithms aimed at locating flaws in parts produced during the powder bed fusion-laser-based (PBF-LB) process of metals. It emphasizes the use of coaxial photodiode-based in-situ monitoring and statistical and clustering machine learning algorithms, particularly for detecting lack of fusion-induced flaws. The workflow delineates setting thresholds for statistical detection and determining the number of clusters for machine learning algorithms, utilizing intentional seeded flaws in parts. Validation procedures are provided through computed tomography scanner data. Hardware limitations and considerations for multi-laser processes are addressed, with attention to potential issues.

## 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 terminology 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 clustering algorithm

unsupervised machine learning methods with unlabelled input data is grouped by similarity

### 3.2 coaxial photodiode arrangement

type of sensor arrangement on the powder bed fusion-laser-based machine aligned with the laser beam path

### 3.3 computed tomography CT

non-destructive examination technique capturing radiographic projections of an object at various rotational angles followed by mathematical reconstruction to produce a three-dimensional volume data set or one or more two-dimensional cross-sectional images