

# ISO/ASTM 52941:2020 (E)

## Additive manufacturing — System performance and reliability — Acceptance tests for laser metal powder-bed fusion machines for metallic materials for aerospace application

---

### Contents

|         |  |
|---------|--|
|         | Foreword   |
| 1       | Scope  |
| 2       | Normative references   |
| 3       | Terms and definitions  |
| 4       | Equipment  |
| 5       | Environmental and operational conditions   |
| 6       | Qualification testing  |
| 6.1     | General  |
| 6.2     | Laser beam tests   |
| 6.2.1   | Testing the laser power for continuous wave lasers                                       |
| 6.2.2   | Testing the laser power stability for continuous wave lasers                             |
| 6.2.3   | Testing of pulsed wave lasers  |
| 6.2.4   | Evaluation of the laser beam characteristics   |
| 6.2.5   | Evaluation of the minimum laser beam waist position in different working plane locations |
| 6.2.6   | Evaluation of the thermal stability of the minimum beam waist position                   |
| 6.2.7   | Testing the laser beam position  |
| 6.2.8   | Trajectory accuracy  |
| 6.2.9   | Scanning speed   |
| 6.2.10  | Requirements for equipment with multiple laser beam sources                              |
| 6.3     | Mechanical function test   |
| 6.3.1   | General  |
| 6.3.2   | Build platform positioning   |
| 6.3.3   | Feeding platform positioning   |
| 6.3.4   | Other powder feed processing mechanics   |
| 6.3.5   | Movement of the powder spreading device  |
| 6.4     | Heating system   |
| 6.5     | Atmosphere inside the working space  |
| 6.6     | Data recording   |
| 6.7     | Safety systems   |
| 6.8     | Optional tests   |
| 6.8.1   | Demonstrators and test artifacts   |
| 6.8.2   | Build area assessment  |
| 6.8.3   | Gas flow test by hot wire anemometer   |
| 6.9     | Requalification  |
| 7       | Test report  |
| Annex A | (informative) Example of a test report   |
| Annex B | (informative) Geometric pattern for the trajectory accuracy test                         |