

TECHNICAL REFERENCE

**Guidelines on the selection criteria for metal
additive manufacturing processes**



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DNV GL Singapore
Nanyang Technological University
National Metrology Centre
National University of Singapore
Setsco Services Pte Ltd
Singapore Armed Forces
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Contents

	Page
Foreword _____	7
1 Scope _____	8
2 Normative references _____	8
3 Terms and definitions _____	8
4 Abbreviated terms _____	9
5 Comparison between CM and AM processes _____	9
6 Framework for manufacturing process selection _____	15
7 Design suitability for AM process _____	18
8 Selection of AM material and process alternatives _____	23
9 AM process feasibility from the business perspective and AM process selection _____	28
10 Design for AM: benefit and examples _____	32
 Annex	
A Example of process selection _____	35
 Tables	
1 General differences between CM and AM _____	10
2 Advantages and disadvantages of CM (sand casting and CNC machining) and AM (PBF-M and DED) _____	12
3 Comparison of manufacturing processes based on redesign purpose using AM _____	14
4 Common metal materials for metal PBF-M _____	25
5 Comparison of CNC machining, metal PBF-M and DED _____	27
6 Recommended manufacturing process according to the number of parts _____	31
A.1 Formulation of the selection decision support problem _____	36
A.2 Relative importance through the ranking method _____	36
A.3 Rating process alternatives with respect to attributes _____	37
A.4 Normalised value of attributes _____	37
A.5 Rankings of process alternatives _____	38
 Figures	
1 General framework of process selection _____	16
2 A procedure for design suitability check _____	21
3 A chart for part and process selections based on design complexity and production volume after design feasibility check _____	22
4 A chart for process selection based on the relationships between manufacturing cost and design complexity _____	22

5	A selection procedure for material and AM process alternatives_____	24
6	A procedure of business analysis and final AM process selection_____	29
7	Cost comparison according to the number of parts_____	31
8	Metal printed joint with lattice structure_____	32
9	Conformal cooling channel of injection moulding_____	33
10	Schematic of gradient alloy specimen_____	34
A.1	An example of an aircraft jet engine bracket _____	36
	Bibliography _____	39

Foreword

This Technical Reference (TR) was prepared by the Working Group on Military Additive Manufacturing set up by the Technical Committee on Additive Manufacturing under the purview of MSC.

This TR is a provisional standard made available for application over a period of three years. The aim is to use the experience gained to update the TR so that it can be adopted as a Singapore Standard. Users of the TR are invited to provide feedback on its technical content, clarity and ease of use. Feedback can be submitted using the form provided in the TR. At the end of the three years, the TR will be reviewed, taking into account any feedback or other considerations, to further its development into a Singapore Standard if found suitable.

This TR is expected to be used by AM design engineers, manufacturing engineers, maintenance engineers, industry associations, research institutions and government agencies.

Acknowledgement is made to the following organisations for their kind permission to reproduce their materials into this TR:

- 3D Hubs [Table 4,5,6 and Figure 7] <https://www.3dhubs.com/guides/cnc-machining/#basics>
- ISO/ASTM 52900/52921 [Terms and definitions] <https://www.iso.org/committee/629086.html>
- Singapore University of Technology and Design [Figure 8] <https://www.sutd.edu.sg/>
- Thales Alenia Space [Figure 3]. <https://www.thalesgroup.com>

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Guidelines on the selection criteria for metal additive manufacturing processes

1 Scope

This Technical Reference (TR) provides guidelines for process selection between conventional manufacturing (CM) and additive manufacturing (AM) involving metals.

It helps to determine the suitability of AM as a manufacturing process on an existing design or new design. In addition, benefits and limitations of manufacturing processes and factors of process selection are illustrated to support the decision-making of the process.

This TR does not include process-specific guidelines and specific material data/design solutions.

2 Normative references

The following referenced documents are referred to in this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies.

ISO/ASTM 52900	Additive manufacturing – General principles – Terminology
ISO/ASTM 52901	Additive manufacturing – General principles – Requirements for purchased AM parts
ISO/ASTM 52910	Additive manufacturing – Design – Requirements, guidelines and recommendations
ISO/ASTM 52911-1	Additive manufacturing – Design – Part 1: Laser-based powder bed fusion of metals
ISO/ASTM 52921	Standard terminology for additive manufacturing – Coordinate systems and test methodologies