Qualification of Polymer-based Additive Manufacturing Processes and Components Production Control for Use in the Petroleum and Natural Gas Industries

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Contents

Page

1 Scope 1
1.1 Purpose 1
1.2 Applicability 1
1.3 Additive Manufacturing Specification Levels (AMSL) 1
2 Normative References 2
3 Terms, Definitions, Acronyms, and Abbreviations 4
3.1 Terms and Definitions 4
3.2 Acronyms and Abbreviations 6
4 Requirements for the Additive Manufacturing Process 8
4.1 General 8
4.2 Additive Manufacturer Requirements 8
4.3 Feedstock Requirements 10
4.4 Substrate Requirements 15
4.5 Additive Manufacturing Printing Equipment 15
4.6 First Article Component 17
4.7 Post-build Processing—First Article Component 20
4.8 QC Requirements—MEx—First Article Inspection 21
4.9 QC Requirements—PBF—First Article Inspection 22
4.10 QC Requirements—VPP—First Article Inspection 23
4.11 Integrated Substrate 24
5 Limits on the Qualification of the Additive Manufacturing Process 24
5.1 General 24
5.2 Requalification Exceptions 24
5.3 Essential Additive Manufacturing Variables 25
6 Component Production Control 27
6.1 General 27
6.2 Manufacturing Process Specification 27
6.3 Pre-build Check 27
6.4 Batch Control/Powder Recycling 28
6.5 Process Interruptions 28
6.6 Post-build Processing 28
6.7 Marking and Identification of Production Components 29
7 Production Component Quality Requirements 29
7.1 General 29
7.2 Monitoring and Measuring Equipment 29
7.3 QC Procedures 29
7.4 Sampling 29
7.5 QC Personnel Requirements 30
7.6 Control of Nonconforming Components 30
8 Production Component Testing 32
8.1 General 32
8.2 MEx QC Requirements—Production Components 32
8.3 PBF QC Requirements—Production Components 33
8.4 VPP QC Requirements—Production Components 34
9 Production Component Documentation 36
9.1 General 36
9.2 Minimum Documentation and Retention 36
9.3 Documentation Provided with the Component(s) 36

10 Handling, Storage, and Shipping 37
Annex A (informative) Non-essential AM Variables Guidance 38
Annex B (informative) Supplemental Documentation Requirements 39
Annex C (informative) Guidelines for AM Audit—Technical Questions 40
Annex D (informative) Additional Testing Requirements 46
Annex E (informative) AM Equipment Farm Approach—Batch 47

Figures

1 Qualification Process Flowchart 2
2 Nonconformances Notification Flowchart 31

Tables

1 Minimum Requirements to be Defined in the Filament Feedstock Specification 11
2 Minimum Requirements to be Defined in the Powder/Granulate Feedstock Specification 12
3 Minimum Requirements to be Defined in the Resin Feedstock Specification 13
4 QC Requirements—MEx—First Article Inspection 21
5 QC Requirements—PBF—First Article Inspection 22
6 QC Requirements—VPP—First Article Inspection 23
7 Test Requirements for the First Article—Integrated Substrate 24
8 MEx (FFF, FDM, FGF) Essential AM Variables 25
9 PBF (SLS, MJF) Essential AM Variables 26
10 VPP (SLA, DLP) Essential AM Variables 26
11 Sampling 30
12 QC Requirements for MEx—Production Components 33
13 QC Requirements for PBF—Production Component 34
14 QC Requirements for VPP—Production Component 35
A.1 Non-essential AM Variables 38
C.1 Examples of the Items to Be Addressed During a Facility Audit 40

Qualification of Polymer-based Additive Manufacturing Processes and Components Production Control for Use in the Petroleum and Natural Gas Industries

1 Scope

1.1 Purpose

This standard specifies requirements for qualification of the manufacturing process, component production control, marking, and documentation of additively manufactured polymer-based components used in the petroleum and natural gas industries when referenced by an applicable API equipment standard or otherwise specified as a requirement for conformance. The qualification process flowchart is shown in Figure 1.

1.2 Applicability

This standard applies to additively manufactured polymer-based components (including composites) produced by material extrusion [also referred to as fused filament fabrication (FFF) or fused deposition modeling (FDM) and fused granulate fabrication (FGF)],powder bed fusion [also referred to as selective laser sintering (SLS) or multi jet fusion (MJF)] and VAT Photopolymerization (VPP) [in both curing variants]by laser also referred to as stereolithography (SLA) and by light projection also referred to as digital light processing (DLP)].

1.3 Additive Manufacturing Specification Levels (AMSLs)

This standard establishes requirements for three AMSLs. These three designations—AMSL 1, AMSL 2, and AMSL 3—define increasing levels of additive manufacturing (AM) technical, quality and qualification requirements.

NOTE An AMSL can be assigned to a component by a product specification or standard, the purchaser, or the additive manufacturer.