

Table 11—Quality Control Requirements—Binder Jetting—Production Components

	Parameter	AMSL 1	AMSL 2	AMSL 3
Test specimens	Chemical analysis (see 7.4)	100 %	100 %	100 %
	Tensile testing (as applicable) (see 7.5) ^a	1 specimen in 1 orientation (1 total)	1 specimen in 2 orientations (1 in Z and 1 at 90° to Z) (2 total)	3 specimens, orientations by agreement
	Impact testing (see 7.6) ^a	—	1 set in the Z orientation, 1 set 90° degrees from Z	1 set in the Z orientation, 1 set 90° degrees from Z
	Hardness testing (see 7.7)	100 %	100 %	100 %
	Microstructure analysis (see 7.8)	100 %	2 orientations (1 perpendicular to Z and 1 parallel to Z)	2 orientations (1 perpendicular to Z and 1 parallel to Z)
Component in the final condition	Visual inspection (see 7.10.1)	100 %	100 %	100 %
	Volumetric NDE (see 7.10.3)	Sample	100 %	100 %
	Surface NDE (see 7.10.2)	Sample	100 %	100 %
	Density testing (see 7.9)	Sample	Sample	Sample
	Hardness testing (see 7.7)	Sample	Sample	100 %
	Dimensional inspection (see 7.10.4)	Sample	Sample	100 %

^a Tensile and impact testing are not required for hard metals, see Annex C for guidance.

8 Documentation

8.1 General

The additive manufacturer shall establish and maintain documented procedures to control all documents and data required by this standard.

Documents and data may be in any type of media (hard copy or electronic) and shall be:

- maintained to demonstrate conformance to specified requirements;
- legible;
- retained and readily retrievable;
- stored in an environment to prevent damage, deterioration, or loss;
- available and auditable.

8.2 Minimum Documentation and Retention

The documentation listed below shall be retained by the additive manufacturer for a minimum of 10 years following the date of manufacture:

- print location (site, room, building);
- build/batch number;
- printer model;
- printer firmware and software versions;
- MPS;
- records of feedstock as defined in Section 4;
- DPD file as defined in Section 4;
- for binder jetting: scaling strategy;
- thermal post-processing times, temperatures, and cooling media;
- for HIP processing: standard for the gas used, pressure, temperature, dwell time, and cooling rate;
- test records, including records of the examinations (NDE), mechanical testing, and metallographic evaluations, as described in Section 7;
- other documents provided with the component(s) as outlined in 8.3.

NOTE Purchaser or regulatory requirements may specify a longer record retention period.

8.3 Documentation Provided with the Component(s)

At a minimum, the following documentation shall be supplied in conformance with EN 10204, type 3.1 by the additive manufacturer for each component:

- certificate of conformance;
- MPS;
- printer model;
- printer firmware and software versions;
- test records, including records of the examinations (NDE), mechanical testing, and metallographic evaluations, as described in Section 7;
- deviations from governing design and/or construction specifications/standards;
- a record of all repairs or rework.

The purchaser can specify supplemental documentation requirements in accordance with Annex B.

9 Handling, Storage, and Shipping

Components shall be packaged for storage or transit in accordance with the written specifications of the additive manufacturer or as otherwise specified by the purchaser.

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