APPENDIX F -Supplier Quality Requirements: Additive Manufacturing (i.e., 3D printed plastic parts)

This appendix defines the minimum documentation and data package a supplier must furnish with each shipment of 3D printed plastic parts so OTTO can meet customer flow-down requirements for certification, traceability, and inspection. It applies to any supplier producing plastic parts for OTTO via additive manufacturing such as FDM/FFF, SLA/DLP, SLS/MJF, or equivalent processes.

SQM Clause Cross-References (per SQM Appendix E):

- **C100: Certificate of Conformance (C of C)**
- **C102: Raw Material Cert: NON-METAL (e.g., plastic, silicon, fabric, thermoplastic polymer, photopolymer resin, etc.)**
    - Because AM feedstock traceability is easy to lose (especially with powder reuse or filament spooling), suppliers must provide a documented chain from the raw material producer to OTTO. Specifically, suppliers shall provide the raw material test report issued by the original resin/filament/powder manufacturer that includes:
        - Material trade name, generic resin type (e.g., PA12, PEEK, ABS-M30, nylon 11), and material spec compliance (e.g., ASTM, ISO, or OEM-specific spec called out on the OTTO drawing).
        - Manufacturer lot/batch number for the parts/order provided.
        - Manufacturing date and, where applicable, shelf-life/expiration date.
        - For SLS/MJF/powder-bed or vat processes: percentage of virgin vs. recycled/reclaimed material used in the build.
    - **Reclaimed Powder Limits (SLS / MJF):**
        - Suppliers must declare virgin-to-recycled ratio per build.
        - Unless otherwise specified on the OTTO drawing, recycled powder blends shall not exceed the raw material manufacturer's validated refresh specification (e.g., typically 20% virgin for HP MJF, 30–50% virgin for standard SLS). The supplier must document their specific mix ratio on the material certification and cannot alter that ratio between approved FAIs and production lots.

- **Q101: First Article Inspection Report and Q100: First Article Inspection Report per AS9102**
    - Assigned code is based on part application (Q101 – commercial, Q100 aerospace).
    - **Build Orientation & Nesting Control:**
        - Supplier is to include build orientation image/setup as part of their FAI submissions.
        - Supplier is to maintain the same approved build orientation and nesting thru-out production builds.
        - Changes to build orientation and nesting as to be submitted per SQM Section 14.0 and may require a new FAI submission.

For material procured by OTTO's tier 1 supplier (holder of the OTTO Purchase Order), the cert packet submitted to OTTO shall be validated by the supplier's authorized representative.

Additional Certifications - Required with each shipment:

- **Build Traveler / Process Record**
    - For each build job, supplier shall retain and make available upon request:
        - Machine make/model, serial number, and calibration status/date.
        - Build file identification (revision-controlled STL/3MF/AMF tied to the released OTTO drawing/model, with ECN or revision reference).
        - Layer thickness and key process parameters (e.g., laser/print power, scan speed, extrusion temperature, bed/chamber temperature, fill/infill pattern and density) as applicable to the process.
        - Build start/end date and time and build operator identification.

        - Environmental conditions (chamber atmosphere, humidity control) where relevant to the material (e.g., nylon moisture control).

- Documentation of all post-processing steps applied such as support removal, bead blasting/media finishing, thermal/annealing cycles, infiltration, dyeing, machining of critical features, etc.
    - **C116**: **Sandblast/Bead Blast Certificate** (where applicable)
        - Visual inspection to adhere to Class A/B/C defect guidelines per SQM Appendix D.
- Certifications for any subcontracted post-processing (e.g., heat treat, machining)
    - Certification must provide the same traceability standards as noted above.

Records

Supplier shall maintain records per SQM Section 19.0