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## Can additive manufactured materials meet ISO cleanroom standards?

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An ISO 14644-1 cleanroom is a contained environment where particle counts must be kept low in order for the cleanroom to function properly and meet critical certification criteria. These particles are typically dust, airborne microbes, aerosol particles, and chemical vapours. The Additive Manufacturing Department at Daresbury Laboratory was used to appraise the Cleanroom mechanical assembly process. This study has shown that 3-D printed materials can be utilised to meet ISO Cleanroom standards. Four printing methods were used, Fused Filament Fabrication (FFF), Direct Metal Laser Sintering (DMLS), Polyjet, and Stereolithography (SLA) to create nine DN16 ConFlat Flanges made from RESIN, MED610, PLA, and TI-64. A DN16 ConFlat Flange was chosen because it is a small component that will keep printing costs low, but it is also large enough to be particle counted successfully.

It has been demonstrated that ultrasonic cleaning can significantly reduce component contamination and, in some cases, raise the ISO level. The PLA DN16 CF Flanges were made clear and coloured to see if this factor affected the particle count. Because stainless steel is commonly acknowledged and used in the cleanroom industry, it will be chosen as the baseline for this study. In particle count readings, the RESIN and MED610 surpassed the Stainless-Steel. RESIN and MED610 will be utilised for configurable components such as tools, guides and bracketry in future processes that require ISO 4 cleanroom conditions.

### Funding Agency

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

**Author:** HANLEY, Thomas (Science and Technology Facilities Council)

**Co-author:** ALLISON, Steven (Riverside College)

**Presenters:** ALLISON, Steven (Riverside College); HANLEY, Thomas (Science and Technology Facilities Council)

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