



No health and safety issues with HP Multi Jet Fusion Technology

3D printing materials and emissions are strictly tested



HP Multi Jet Fusion 3D printing solutions are strictly checked for potential impact on health and safety of users. This includes printing materials and their handling, as well as the release of particles and substances during operation. Based on comprehensive testing, no health risks are expected when the innovative HP devices are used as intended.

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Thermoplastics and agents not classified as hazardous

Printing substrates such as HP 3D thermoplastic material (e.g. HP 3D High Reusability PA12 material) as well as fusing and detailing agents for HP Jet Fusion 3D printers are not classified as hazardous – according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)⁽¹⁾, the assessment criteria for mixtures in the European Union (Regulation (EC) No 1272/2008, as amended)⁽²⁾, and applicable requirements in the United States (OSHA CFR 1910.1200, as amended)⁽³⁾. Therefore, from the chemistry perspective, they are neither classified nor labelled as toxic, carcinogenic, mutagenic, toxic to reproduction, sensitising or corrosive. And as the material powders consist of particles with an average diameter of approximately 60 µm, their physical properties do not present the toxicological intensity typically seen with smaller solid particles.

In fact, HP Jet Fusion 3D printers feature enclosed systems for powder management, which are designed in a way which reduces the likelihood of inadvertently coming into contact with printing material powder. Large models are equipped with a special installation for actively removing residual particles. Outside the machine, incidental levels of particles can simply be removed with a suitable vacuum cleaner⁽⁴⁾ or wiped off e.g. the skin with cold water – as described in the respective safety data sheets and/or user guide.

Particles emissions well below critical levels

Indicative fine dust emissions testing of representative HP Jet Fusion 3D printers⁽⁵⁾ shows that devices are well below applicable U.S. Permissible Exposure Limits⁽⁶⁾, German Occupational Exposure Limit Values⁽⁷⁾, Australian Workplace Exposure Standards⁽⁸⁾ and Singapore Occupational Exposure Levels of Toxic Substances⁽⁹⁾. The number of released particles in the ultrafine size range (UFPs) is far below the precautionary German Blue Angel guide value as defined by the strict DE-UZ 205 award criteria^{(10),(5)}. For 3D printing systems, this scenario can be applied as an auxiliary reference since no mandatory workplace exposure limits are available for UFPs to date.

Substance release meets safety requirements as well

Emissions of ozone meet applicable U.S. Permissible Exposure Limits⁽⁶⁾, German Occupational Exposure Limit Values⁽⁷⁾, Australian Workplace Exposure Standards⁽⁸⁾ and Singapore Occupational Exposure Levels of Toxic Substances⁽⁹⁾ as indicative testing of representative HP Jet Fusion 3D printers demonstrates.⁽⁵⁾ For the release of major individual volatile organic compounds (iVOCs) typical for a particular printing system, the same testing indicates that these meet applicable guide values like e.g. EU Derived No-Effect Level values⁽¹¹⁾ or relevant U.S. occupational exposure limit and guide values⁽¹²⁾ as applicable.⁽⁵⁾

Supporting references:

⁽¹⁾ Globally Harmonized System of Classification and Labelling of Chemicals (GHS), ST/SG/AC.10/30/Rev. 5, United Nations, 2013. ⁽²⁾ Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures, European Parliament and Council, 2008 (as amended). ⁽³⁾ Occupational Safety and Health Standards, Toxic and Hazardous Substances, 1910.1200, U.S. Occupational Safety and Health Administration (OSHA), 2012 (as amended). ⁽⁴⁾ If a customer is cleaning a lot of powder, an explosion-proof vacuum needs to be used. ⁽⁵⁾ HP commissioned indicative testing of HP Jet Fusion 3D 3200 and 4200 printers operated with HP 3D PA12 material, carried out by the Fraunhofer Wilhelm-Klauditz-Institute (WKI), Braunschweig, Germany, 2016/2017 following the recommendations of the respective user manual under <https://support.hp.com/us-en/product/hp-jet-fusion-3d-4200-printer/11461058/manuals>. Indicative testing of devices of the HP Jet Fusion 300/500 (Color) series with HP 3D HR CB PA12 material was carried out by UL Environment Inc., Marietta (GA), USA, in 2018. ⁽⁶⁾ Permissible Exposure Limits (PELs-TWA), 29 CFR 1910.1000 Z-1 and Z-2, U.S. Occupational Safety and Health Administration (OSHA), 2006. ⁽⁷⁾ Workplace limits (AGW), TRGS 900, German Ordinance of Hazardous Substances (GefStoffV), German Committee on Hazardous Substances (AGS), 2006 (as amended). ⁽⁸⁾ Workplace Exposure Standards for Airborne Contaminants (WES), Safe Work Australia, 2013. ⁽⁹⁾ Permissible exposure levels of toxic substances, in: Workplace Safety and Health (General Provisions) Regulations (G.N. No. S 134/2006), Singapore Government, 2006 (as amended). ⁽¹⁰⁾ Basic criteria for award of the German Blue Angel environmental label for Office Equipment with Printing Function, DE-UZ 205, RAL gGmbH. ⁽¹¹⁾ Derived No-Effect Level (DNEL) Values as introduced by the REACH regulation, appendix 1, no. 1.0.1., 1 July 2007. ⁽¹²⁾ Workplace Environmental Exposure Level (WEEL) 8-hour TWA, Occupational Alliance for Risk Science (OARS).

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