

# FUSED DEPOSITION MODELING

## 3D PRINTING SAFETY FACT SHEET

### 3D PRINTING AT MSU

Spartan innovators are discovering new ways of using 3D printing to aid in their research and teaching. Inexpensive and easy to operate, Fused Deposition Modeling (FDM) is the most popular type of 3D printing at MSU.

Users should understand the hazards presented by their printers and implement the safety practices outlined in this fact sheet.

### HAZARDS & SAFETY PRACTICES

#### VOCs and Nanoparticles

When plastic filament is heated, it produces volatile organic compounds (VOCs) and nanoparticles that can be inhaled.

Use exhaust ventilation or a filtered enclosure when using any filament besides PLA.

#### Flammable Chemicals

Organic solvents like ethanol, isopropyl alcohol, and acetone used in bed preparation can catch fire upon contact with heat.

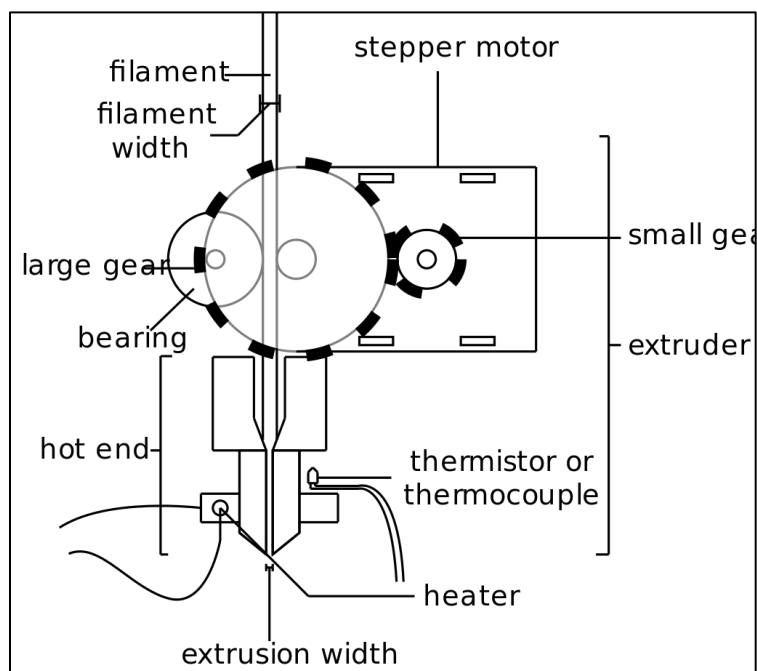
When cleaning with flammables, use a wetted towel rather than a spray bottle. Aerosolized flammables can catch fire upon contact heated components.

Containers 750mL in size or smaller can be kept on working surfaces, away from heat sources. Larger containers should be stored in a designated chemical storage area.

#### Sharps

Removing support material using sharp instruments like razors and clippers can cause cuts and abrasions.

Handle sharp instruments with care and know the location of a first aid kit.



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### Electrical

Assembly and maintenance of printers can expose electrical components capable of causing shocks.

Always assemble and disassemble according to manufacturer instructions. Ensure the power cable does not fray.

### Heat

FDM printers use multiple heated components like print nozzles and print beds.

Only handle components that are cool.

### ENCLOSURES & VENTILATION

All FDM users are encouraged to use an enclosure. PLA filaments may be used without ventilation or enclosure. **A filtered enclosure or exhaust unit is usually required to use other filament types such as ABS, PMMA, PETG, and nylon.** Enclosures offered by the manufacturer are preferred, but users may also build their own enclosure or purchase a third-party unit.

### POST-PROCESSING BATHS

Some support materials can be dissolved by submerging in post-processing baths containing caustic chemicals like sodium hydroxide. If a caustic bath is used, all chemical safety practices must be followed. Read the full EHS 3D printing manual for detailed requirements. EHS recommends using polyvinyl alcohol (PVA) support material which can be dissolved in a plain water bath.

### REGISTER YOUR FDM PRINTER

Environmental Health & Safety keeps inventory of all 3D printers on MSU campus. Please contact EHS to receive an inventory number and accompanying label at [ehs@msu.edu](mailto:ehs@msu.edu) or 517-355-0153.

