

# Seattle Fire Department

## Permit Conditions

3203

Site Address: \_\_\_\_\_

Inspector: \_\_\_\_\_

### Additive manufacturing (3D Printing)

#### NOTICE

**This permit shall be kept on the premises designated herein at all times and shall be readily available for inspection by the fire code official. (SFC 105.3.5)**

#### General

1. 3D printers and associated additive manufacturing equipment shall be installed, operated and maintained per the Seattle Fire Code, the listing of the equipment, and the manufacturer's instructions. (SFC 320.1.2)
2. Only the production materials listed for use with the equipment and included in the manufacturer's instructions shall be used. (SFC 320.11.3)
3. Permits shall be obtained from the fire code official in accordance with the SFC prior to engaging in **industrial** additive manufacturing operations (3D Printing). (SFC 320.3.1)

**Industrial additive manufacturing (3D printing) operations that typically utilize combustible powders or metals, an inert gas supply, a combustible dust collection system or that create a hazardous (classified) location area or zone outside the equipment shall comply with the following:**

1. 3D printers used in industrial additive manufacturing shall be listed and labeled in accordance with UL2011 or approved for the application based on a field evaluation conducted by an approved agency. (SFC 320.3.2)
2. Printing powders used in industrial additive manufacturing operations shall be tested for combustibility in accordance with NFPA 484 or NFPA 652 as applicable. A copy of test reports shall be provided to the fire code official upon request. (SFC 320.3.4)
3. Industrial additive manufacturing operations that store, use or produce combustible(nonmetallic) dusts shall comply with NFPA 654. (SFC 320.3.5)
4. Industrial additive manufacturing operations that store or use combustible metals shall comply with NFPA 484. (SFC 320.3.6)
5. Ancillary equipment provided for recycling, sieving, vacuuming or handling combustible powders shall be designed and approved for such use. (SFC 320.3.7)
6. Additive manufacturing processes that utilize inert gases shall comply with Chapter 53 of the SFC. Ventilation or gas detection shall be provided in accordance with Section 5307 of the SFC. (SFC 320.3.9)
7. Where required by the fire code official, a report evaluating the acceptability of technologies, processes, products, facilities, materials and uses associated with the operation shall be provided in accordance with Section 104.8.2 of the SFC. (SFC 320.3.10)
8. Industrial additive manufacturing shall be conducted only in the occupancy groups associated with manufacturing operation and permitted by the Chapter 50 in maximum allowable quantity tables in the

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SFC. Where approved, the report in number 7 above shall be permitted to provide the technical basis for determining compliance with the appropriate occupancy classification. (SFC 320.3.12)

**Nonindustrial additive manufacturing (3D printing) operations that do create a hazardous (classified) location area outside the equipment and do not utilize an inert gas supply or a combustible dust collection system shall comply with the following:**

1. 3D printers used in nonindustrial additive manufacturing shall be listed and labeled in accordance with UL 2011, UL 60950-1 or UL 62368-1. The listing shall also verify:
  - a. The 3D printers are self-contained and utilize maximum 30-liter prepackaged production materials.
  - b. The operation of the 3D printers shall not create a hazardous (classified) electrical area or zone outside the unit.
  - c. If any hazardous (classified) electrical area or zone exists inside the unit's outer enclosure, the area shall be protected by intrinsically safe electrical construction or other acceptable protection methods.
  - d. The 3D printers shall not utilize inert gas or an external combustible dust collection system. (SFC 320.2.1)
2. Nonindustrial additive manufacturing is allowed in all occupancy groups. (SFC 320.2.2)
3. If the additive manufacturing equipment and operations do not comply with item 1 above, then they shall comply with the Industrial additive manufacturing (3D Printing) requirements. (SFC 320.2)