**Chapter 46 Additive Manufacturing (3D Printing)**

46.1 Application

46.1.1

Additive manufacturing equipment and operations shall comply with this section and other applicable provisions of this Code.

46.1.1.1

Nonindustrial additive manufacturing shall comply with Section 46.2.

46.1.1.2

Industrial additive manufacturing shall comply with Section 46.3.

46.1.2 Permits

Permits, where required, shall comply with Section 1.12.

46.1.3 Installation, Operation, and Maintenance

3D printers and associated additive manufacturing equipment shall be installed, operated, and maintained in accordance with this Code, the listing, and the manufacturer's instructions.

46.2 Nonindustrial Additive Manufacturing

Nonindustrial additive manufacturing equipment and operations shall comply with 46.2.1 through 46.2.6. Additive manufacturing operations and equipment that do not comply with 46.2.1 through 46.2.5 shall comply with Section 46.3.

46.2.1

Equipment used in nonindustrial additive manufacturing shall be listed and labeled in accordance with UL 60950-1, Information Technology Equipment — Safety — Part 1: General Requirements; UL 62368-1, Audio/Video, Information and Communication Technology Equipment — Part 1: Safety Requirements; or UL 2011, Outline of Investigation for Machinery.

46.2.2

Nonindustrial additive manufacturing shall be self-contained and utilize maximum 8 gal (30 L) prepackaged production materials.

46.2.3

The operation of the nonindustrial additive manufacturing shall not create a hazardous electrical classified environment outside the unit as defined in NFPA 70, Article 500.

46.2.4

Nonindustrial additive manufacturing shall only use plastic filament production materials, which are listed with the 3D printer and identified in the manufacturer's instructions.

46.2.5

Nonindustrial additive manufacturing shall not utilize inert gas for creating an inert environment or a combustible dust collection system.

46.2.6

Nonindustrial additive manufacturing shall be permitted in all occupancy groups.

46.3 Industrial Additive Manufacturing

Industrial additive manufacturing equipment and operations shall comply with 46.3.1 through 46.3.9.

46.3.1

3D printers used in industrial additive manufacturing shall be listed and labeled in accordance with UL 2011, Outline of Investigation for Machinery, or approved for the application based on a field evaluation conducted by an approved agency.

46.3.2

Industrial additive manufacturing operations that use, store, or produce combustible powders or dusts shall comply with Chapter 40 and this section.

46.3.3

3D 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 AHJ upon request.

46.3.4

Industrial additive manufacturing operations that store, use, or produce combustible, nonmetallic powders shall comply with NFPA 654.

46.3.5

Industrial additive manufacturing operations that store or use combustible metals shall comply with NFPA 484.

46.3.6

Ancillary equipment provided for recycling, sieving, vacuuming, or handling combustible powders shall be designed and approved for such use.

46.3.7

Additive manufacturing processes that utilize inert gases shall comply with Chapter 60. A gas detection system shall be provided in rooms or indoor areas in which the inert gas is present. Gas sensors shall be provided in the areas where the gas is expected to accumulate and in other locations required by the AHJ.

46.3.7.1

The gas detection system shall be designed to activate an audible and visible supervisory alarm at a normally attended location upon detection of inert gas at the 8-hour timeweighted average concentration.

46.3.7.2

The gas detection system shall be designed to activate an audible and visible alarm within the room or immediate area where the system is located and automatically shut off flow of the inert gas to the 3D printing equipment upon detection of inert gas at the threshold limit value-short-term exposure limit concentration.

46.3.8\*

Where required by the AHJ, a report evaluating the acceptability of technologies, processes, products, facilities, materials, and uses associated with the operation shall be provided in accordance with Section 1.4 and approved. The evaluation shall be conducted by an approved agency.

46.3.9

Industrial additive manufacturing shall only be conducted in the occupancy groups associated with the manufacturing operations and as permitted by NFPA 400 maximum allowable quantity tables.