Some 3-D printers may be bad for your lungs

By Hiawatha Bray Globe Staff, October 1, 2019, 1:59 p.m.

Rize Inc. sells 3-D printers that minimize the release of potentially harmful gases and particles. RIZE INC.

If you spend much time working around 3-D printers, you might want to open a window.

A recent report from the Georgia Institute of Technology and Underwriters Laboratories warns that low-cost 3-D printers can give off carcinogenic gases and microscopic plastic particles that can cause lung irritation if inhaled. But Rize Inc., a Concord maker of 3-D printers, said Tuesday its products have just been certified by UL under a new standard aimed at reducing the risk of exposure.

Marilyn Black, vice president and senior technical adviser at UL, said her research has identified more than 200 volatile organic compounds given off by various brands of 3-D printers. About 25 percent of the compounds pose some kind of health risk. "Some of them are carcinogens," Black said, "[and] some are known reproductive toxins."

In addition, the plastic filaments used to build 3-D-printed objects give off "nanoparticles" of plastic material that mix with air and are easily inhaled. These particles are known to cause lung irritation, and some research indicates that long-term exposure could lead to cardiovascular problems.

Black said brief exposure to the machines poses little risk, but long-term exposure should be avoided. The printers should be used in well-ventilated rooms, and perhaps installed underneath an exhaust hood like those mounted over kitchen stoves to remove away smoke.

According to the Wohlers Report, an industry publication that tracks 3-D printing, sales of low-cost 3-D printers — those priced at $5,000 or less — have surged in recent years, with worldwide sales of 591,000 units in 2018 alone. Analyst Terry Wohlers estimates that about 2.1 million such printers are in use worldwide.

Many of the printers are used in education, from grade schools to universities.

"I was just in Bangalore last week, and 400,000 of those printers are going to public schools in India," Wohlers said. It's not clear how many of these printers are operated with proper ventilation.

Meanwhile, Rize said that its 3-D printers are the first to be certified under a new safety standard created by UL and two other standards bodies, technically known as ANSI/CAN/UL 2904. Founder Eugene Giller said he saw the problem years ago and founded Rize to make printers that would not throw off vapors and nanoparticles.

"If you want to take this technology mainstream, it has to be safe technology that can be put anywhere," Giller said.

Rize printers aren't cheap. The least expensive model, designed for advanced industrial prototyping, costs $28,000.

Still, chief executive Andy Kalambi said the company has sold units to colleges and universities, and even some public schools.

But there's hope for would-be purchasers with tight budgets. A UL representative said in an e-mail that other makers of 3-D printers are working with UL to bring their machines into compliance with the new standard. UL wouldn't reveal the names of the companies.

But Markforged, a 3-D printer maker based in Watertown, said in an e-mail that the company "is currently working with UL to test our printers for the UL 2904 standard, and we look forward to getting our compliance results soon." Markforged said its printers, which sell for as little as $3,500, use a plastic compound that generates lower emissions than many competing machines.

The company also said its printers have passed safety standards issued by the Occupational Safety and Health Administration.

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Hiawatha Bray can be reached at hiawatha.bray@globe.com. Follow him on Twitter @GlobeTechLab.

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