

## Laser Exhaust – as it pertains to the fabrication of thermoplastic materials

Lasers are increasingly being used as a replacement to conventional engraving systems offering higher speeds, accuracy and improving productivity. Lasers have become an essential tool in industry, education, and research for engraving, marking, and cutting a vast array of organic material of which thermoplastics have become a preferred media.

The fabrication process of any of these materials will result in some form of exhaust being generated as the laser thermally breaks down the substrate. These fumes are a mixture of particulates and gaseous matter. Organic materials such as plastics produce more complex fumes. Most of these fumes, roughly 90% by weight, are small spherical particulates. The remaining 10% would be the gaseous organic compounds known as VOCs. (Volatile Organic Compounds) A number of these compounds have been assigned occupational exposure limits and as such need to be removed from the workplace by installing and using an effective exhaust system.

### Concentration Levels and Ventilation Standards

*High concentrations of PMMA vapors can cause eye and respiratory irritation, headache and nausea. The American Conference of Governmental Industrial Hygienists (ACGIH) Air Contaminant Standard for PMMA places the maximum permissible exposure level at a time weighted average (TWA) of 50 ppm (parts per million)*

Whether you are working from an industrial location or a residential area, you will need to address the issue of fume extraction. How extensive you decide to go essentially depends on your location, fabrication materials and your typical laser usage. As a best practice, Rowmark recommends laser fabricators provide exhaust ventilation as close to the point of generation of vapors as practical in addition to utilizing all standard manufacturing safety practices.

### Exhaust Alternatives – two basic types of extraction

- **Vent to Air** – Exhausts contaminated air from the laser cabinet through a channel of duct work outside the building where it blends with fresh air to neutralize to permissible exposure levels. The primary advantages to this system are the simplicity and minimal expense.
- **Extraction Units** – Stand-alone units which capture the laser exhaust and move it through a series of filters which include a pre-filter, HEPA filter and then a carbon filter which will remove particulates above 3 microns. While this method can be expensive both in equipment and replacement filters, the primary advantage to an extraction unit is avoiding issues with environmental regulations.

As an industry leader in the manufacture of thermoplastic sheet, Rowmark is committed to excellence in product, performance, and service in accordance with our ISO 9001:2015 certification. This information is provided based on internal audits, information from raw material suppliers, product composition and Rowmark's manufacturing process. Information on any OSHA hazardous components above .01% (by weight) is provided in Section 15 of Rowmark's material safety data sheets.