

## Melting Plastics in Autoclaves Can Result In Respiratory Hazards



Melted plastic tray Biologyze



Melted plastic bag and supplies Univ. of Alberta, Biological Sciences

**Autoclaves**, devices that operate at high temperatures using steam and pressure, can be an effective method to treat medical and biological waste. A variety of makes, models, and sizes can be found throughout Tufts University to treat waste generated in clinical and laboratory settings. While most users are aware of the physical hazards associated with autoclaves such as lacerations from sharp or broken tubes and instruments, burns from hot objects, and vision impairment from splashes, potential inhalation hazards associated with melted plastic are often overlooked.

Plastic dishes, pipettes, racks, and tubes typically make up a majority of waste that is autoclaved. In addition, plastic trays are commonly used to allow for the easy loading of waste bags as well provide containment for potential leaks. Some plastic items, if heated, have the potential to emit volatile organic compounds (Hadar, Tirosh, Grafstein, & Korabelnikov, 1997). Examples include plastics containing acetal, such as test tube racks, which can release formaldehyde gas and plastics made with polystyrene, such as buckets and scoops, which can release styrene and ethyl benzene (Hadar, Tirosh, Grafstein, & Korabelnikov, 1997). The National Institute for Occupational Safety and Health identifies all three chemicals as presenting respiratory hazards. In addition, formaldehyde is considered a potential occupational carcinogen (CDC, NIOSH).

To avoid inhalation hazards, users are highly encouraged to adhere to the following guidelines: First, users should work with their supply vendors to purchase items that are suitable for autoclaves, and they should pay specific attention to the temperature range in which the autoclave is programmed. For example, appropriate trays can include, but are not limited to, those made of polypropylene or polycarbonate (Grainger). Second, users should work with their maintenance vendor to ascertain the autoclave is serviced according to the manufacturer's recommendation. Specific attention should also be paid to local and general exhaust controls aimed at minimizing potential inhalation hazards. Finally, users should be aware of the items being placed in the autoclave. Users should inspect and discard reusable items such as trays that show evidence of burns. Furthermore, users should be cautious that disposable items, such as tubes, do not contain chemicals or chemical residue that when heated could create additional inhalation hazards.

The use of autoclaves to treat medical and biological waste will continue at Tufts University for the foreseeable future. While attention is paid to the obvious physical hazards associated with this equipment, users should be aware of potential inhalation hazards associated with plastic items.

### References

1. Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. *NIOSH Pocket Guide to Chemical Hazards*. Retrieved from <http://www.cdc.gov/niosh/npg>
2. Grainger. *QuickTips Technical Resource #213*. Retrieved from <http://www.grainger.com/content/qt-types-of-plastics-213>
3. Hadar, J., Tirosh, T., Grafstein, O., & Korabelnikov, E. (1997). Autoclave Emissions-Hazardous or Not. *Journal of the American Biological Safety Association*, 2 (3), 44-51.

\*PLEASE DISPLAY ON COMMUNITY BOARDS OR SHARE WITH ANYONE WHO WOULD BE INTERESTED