



PRICE Dirty Details: Key Points

The Byproducts of a Fire and Their Characteristics: Soot and Smoke

- **Smoke** is a complex mixture of different gases and particles in the air that arise from incomplete combustion of materials.
 - Smoke can contain anything that was present in the space before the fire. Think about what materials are in your spaces (plastics, foams, wood products, synthetic fabrics, hazardous materials, etc.)
- **Soot** refers to the tiny carbon particles produced from incomplete combustion once they have been deposited onto a surface. The characteristics of soot alter depending on the type of fire.
 - Wet soot is more difficult to remove and results from a low oxygen, smoldering fire
 - Dry soot is easier to remove and results from a high-oxygen fire
 - Pungent and nearly invisible soot from a protein-based fire, one that consumes organic material

Deleterious Effects of Fire on Collections

- Extreme heat from a fire can compromise a material's structural stability – this can be chemical, physical, or a combination of both.
 - Glass will be more susceptible to shattering
 - Paper will become brittle and can crumble when touched
 - Plastics and synthetic fibers will melt
 - Others will burn either as a result of direct contact with the fire or because they reached their autoignition point
 - **Autoignition point** is the lowest temperature at which a material will spontaneously ignite
- Soot and smoke particulates become bonded to the surface of materials chemically and physically. Both result in discoloration and can lead to the degradation of those surface elements over time.
 - **Chemical cross-linking** occurs when moisture in the air interacts with soot and the surface elements of an object, causing chemical bonds to form between the two, making it more difficult to remove soot because of those bonds.
 - **Physical compacting** occurs when objects covered in soot are handled. The more an item is touched, the more the soot will become embedded into the surface, and the harder it will be to remove.

How to Respond to a Fire Incident

- Refer to your subject matter experts when determining a prioritization scheme for salvage. They may already have collection priorities established based on historical, artistic, iconic, or other values.

- After the high-priority collection items have been salvaged and triaged, the next priorities may then be determined by the material type, structural stability of items, and concentration of soot accumulation.
 - Porous, fibrous, and organic materials, such as paper and textiles, are especially sensitive to extreme heat and soot and should be a priority.
 - Items with physically compromised structures or have the heaviest soot layers are a priority to address.
- Clean objects in situ, and touch them as little as possible to prevent physical compacting the soot into the surface of collection items. If you have to touch an item, try handling it in areas that are less likely to be visible.
- Be alert to possible sources of cross- or re-contamination
 - Allocate “clean” and “dirty” spaces
 - Relocate triaged collection items to “clean” storage areas
 - Protect walking paths
 - Regularly clean work surfaces and tools
 - Change gloves often
 - If possible, create negative and positive pressure rooms or turn off air handling systems to reduce cross-contamination due to airflow.

Tools for Triage of Fire-Affected Collections

- For general use:
 - Variable speed HEPA vacuum with various-sized attachable hoses
 - Dry cleaning sponges
 - Trays and carts
- For non-porous surfaces:
 - Art gum
 - Vinyl powdered erasers
 - Groom Stick
 - Soft brushes
 - Cloth wipes
 - Glass microbeads
- For removal of sooty smells:
 - Odor absorbing chamber with carbon, baking soda, or unscented clay cat litter

Tips for Packing and Storing

- After triage, allow space and time for collections to air out.
 - Do not stack or tightly wrap items as it will compress soot on affected objects and hinder odor reduction.
- Maintain storage relative humidity (RH) below 55%, anything above 55% will support chemical cross-linking of any remaining soot on the surface of an item.
- Remember to consult with conservation staff throughout the process.