

## FLAME RETARDANT LAB COAT USE REQUIREMENTS

Flame retardant lab coats shall be worn by personnel conducting experiments or otherwise working with the quantities of the materials and in the conditions noted below.

Additionally, flame retardant lab coats shall be worn by personnel in close proximity to the individual performing the work.

Material <sup>†</sup>	Quantity Being Used*	Conditions Temperature of Material & Ignition Source
<b>Pyrophoric Materials</b> (Air Reactive Materials)	Any	Any
<b>Water Reactive Materials</b> (Release flammable gas)	Any	Any
<b>Flammable Gases</b>	Any	Any
<b>Explosive Materials</b>	Any	Any
<b>Class IA Flammable Liquid</b> FP <73°F & BP <100°F	>100 mL	Any
<b>Class IB Flammable Liquid</b> FP <73°F & BP >100°F	>1 L	Any amount when working in close proximity to an ignition source
<b>Class IC Flammable Liquid</b> FP ≥73°F – <100°F	>2 L	1. Equal to or greater than the material's FP & 2. When working in close proximity to an ignition source

<sup>†</sup> A list of common flammable material is available on the [RMS web site](#).

*\*If the hazard of the material has been eliminated through a system design e.g., chemical is in a completely enclosed system then the flame retardant PPE is not required.*

### Note

When working with lesser quantities or in lesser conditions lab coats shall be made of cotton or cotton blend.

## Definitions and Abbreviations

1. **Boiling Point (BP)** – The temperature at which a liquid boils and turns to vapor.
2. **Close Proximity (personnel)** – This is the distance determined by the researcher where if a flash occurred a second person could be affected. As a guideline, consider anyone within 10 feet of the work within close proximity.
3. **Close proximity (vapors to an ignition source)** – This is the distance determined by the researcher that a vapor from an open container could reasonably be expected to migrate to an ignition source and be ignited. Consider 5 feet from an open container to an ignition source as close proximity.
4. **Flash Point (FP)** – The minimum temperature at which a liquid or a solid emits vapor sufficient to form an ignitable mixture with air near the surface of the liquid or the solid.
5. **Ignition Source** – Any open flame, spark, or heat generating piece of equipment in close proximity of the flammable liquid being used. Heat generating equipment includes but is not limited to hot plates, heat guns, drying ovens, incubators, heating mantels, etc.

### 6. **Pyrophoric (Air Reactives)**

For pyrophoric materials, oxidation of the compound by oxygen or moisture in air proceeds so rapidly that ignition occurs. Many finely divided metals are pyrophoric, and their degree of reactivity depends on particle size, as well as factors such as the presence of moisture and the thermodynamics of metal oxide or metal nitride formation. Other reducing agents, such as metal hydrides, alloys of reactive metals, low valent metal salts, and iron sulfides, are also pyrophoric.

Examples:

- Alkali metals (potassium, cesium)
- Finely divided metal dusts (nickel, zinc, titanium)
- Hydrides (barium hydrides, diborane, diisobutyl aluminum hydride).

### 7. **Water Reactives**

Water-reactive materials are those that react violently with water. Alkali metals (e.g., lithium, sodium, and potassium), many organometallic compounds, and some hydrides react with water to produce heat and flammable hydrogen gas, which ignites or combines explosively with atmospheric oxygen. Some anhydrous metal halides (e.g., aluminum bromide), oxides (e.g., calcium oxide), and nonmetal oxides (e.g., sulfur trioxide), and halides (e.g., phosphorus pentachloride) react exothermically with water, resulting in a violent reaction if there is insufficient coolant water to dissipate the heat produced.

Other examples:

- Anhydrides (acetic anhydrides)
- Carbides (calcium carbide)
- Halides (Acetyl chloride, titanium chloride, stannous chloride)
- Hydrides (sodium hydride)
- Organometallics (tetramethyl aluminum)
- Sodium oxides
- Peroxides (sodium peroxide)
- Phosphides (aluminum phosphide) and
- Others (chlorosulfonic acid, aluminum tribromide).