

Class 4 – Flammable Solids

Division 4.1 – Flammable Solids are:

- Wetted explosives that are Class 1 explosives when dry, that are sufficiently wetted to suppress explosive properties.
- Self-reactive materials that are thermally unstable and can undergo strong exothermic decomposition even in the absence of oxygen. Readily combustible solids that can cause fire through friction, such as matches. Powdered, granular or pasty materials must be classified as Division 4.1 when the time of burning of one or more of the test runs, per the UN Manual of Tests and Criteria, is less than 45 seconds or the rate of burn is more than 2.2 mm/sec. Powders of metals or metal alloys are classified as Division 4.1 when they can be ignited and the reaction spreads over the whole length of the sample in ≤ 10 minutes.

Division 4.2 – Spontaneously Combustible include the following categories:

- *Pyrophoric materials* – liquids or solids that can, without an external ignition source, ignite within 5 minutes after coming into contact with air.
- *Self-heating materials* – substances that, when in contact with air and without an energy supply, are liable to self-heat. A material of this type that exhibits spontaneous ignition, or if the temperature exceeds 200° C (393° F) during the 24 hour test period, is classified as a Division 4.2

Division 4.3 – Dangerous When Wet materials are materials that, when in contact with water, are liable to become spontaneously flammable or to give off flammable or toxic gas at a rate of > 1L/kg of material/hr.

The following list contains some examples of Class 4 materials, **but is not all inclusive**:

Flammable Solids	Spontaneously Combustible	Dangerous When Wet
Matches	Activated carbon	Alkaline earth metal alloys
Nitrocellulose membrane filters	Lithium alkyls	Aluminum powder
	Pentaborane	Barium
Silicon powder	Phosphorus	Calcium Hydride
Wetted explosives	Potassium sulfide, anhydrous	Calcium
Sulfur	Oily rags	Calcium carbide
Titanium Powder, wetted	Seed cake	Magnesium
Zinc resinate	Sodium sulfide, anhydrous	Lithium
Naphthalene	Butyl lithium	Sodium
		Sodium Borohydride

If there is a question as to whether the material you wish to ship is a class 4 material, notify EHS and ask to have a determination made.