Linseed oil is a yellowish oil obtained from the dried, ripened seeds of the flax plant (Linum usitatissimum, Linaceae). Linseed oil is a drying oil, meaning it can oxidise into a solid form. Due to this property, linseed oil is used on its own or blended with other oils, resins, and solvents as an impregnator and varnish in wood finishing, as a pigment binder in oil paints, as a plasticizer and hardener in putty, and in the manufacture of linoleum. Linseed oil is still widely used for the finishing and refinishing of furniture and timber products.

Two types of linseed oil are commonly sold, raw and boiled.

**Raw linseed oil** is oil which has been squeezed from flax seed and packaged with no additional additives or preservatives. Raw linseed oil dries very slowly, taking weeks to fully cure. It is commonly used to protect items exposed to the elements where drying time is not a consideration.

**Boiled linseed oil** is not boiled. Instead solvents are added which cause the linseed oil to dry more quickly, acting as if it were boiled. This makes it a better product for preserving when a quicker drying time is required.

With both raw and boiled linseed oil, and other oils used to finish wood, including some exterior deck sealers and wood stains, heat is generated during the drying process. This is because these oils do not dry like paint (through the evaporation of a solvent or water). Instead, they dry through the same chemical process that generates fire – oxidation.

This process generates heat and in some cases this heat may be sufficient to ignite the material it is on and then anything else nearby. This is called spontaneous combustion because it occurs without the need for a flame to be introduced.

For spontaneous combustion to occur, enough heat must accumulate so fire can start. You would never see a piece of furniture spontaneously combust because the oil oxidizes in open air so the surface never even gets warm to the touch! But a pile of oil-soaked rags can.

In many cases of spontaneous combustion of drying oils the cause has been a pile of oil soaked rags. As the oil oxidizes it generates heat. The rags act as an insulator, allowing the heat to build up until the cloth smokes and eventually ignites. The bigger the pile, the greater the possible heat and the greater the risk.

Ambient temperature is also a factor. The warmer it is, the quicker the rags can reach ignition temperature.
Case Study
School Fire
On a mild morning firefighters were called to a demountable classroom on fire which was threatening to spread to adjoining buildings.

On arrival they found the classroom well involved and the fire growing rapidly. After the fire was extinguished it was determined that the fire had started on a shelf inside the room.

The principal was spoken to and confirmed that a teacher had been using linseed oil on bookshelves, applying it with a brush which had been left on top of a shelf. This was the point which fire investigators identified as the point of origin for the fire. The brush had been in this location for at least 48 hours prior to the fire being discovered.

LESSONS LEARNED AND RECOMMENDATIONS

- Store rags or other applicators in a non-combustible container (metal) with a close fitting lid, away from the house and combustible materials.

- Rags or other applicators soaked with linseed or other drying oils may smoulder for several hours before flames are visible.

- Rags or other applicators used with linseed oil should be allowed to dry completely in a safe place, away from flammable materials. The best way to achieve this is to lay the rags out flat on a concrete driveway, or other non-combustible surface, and allow them to completely dry off.

NEED MORE INFORMATION?
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