

## Fire Research & Investigation Unit

# Heads Up



### BACKGROUND

Organic oils are used widely throughout our communities in a broad range of uses from furniture polishes to massage oils. Common examples include drying oils such as boiled linseed, fish and soya bean, cooking oils such as peanut, corn, olive and canola and oils commonly used in massage such as eucalypt.

There have been many fires in private homes and commercial properties such as drycleaners and massage spas causing significant damage and financial loss which were started by the spontaneous ignition (no introduced heat source) of residue from organic oils. This document is to alert suppliers and users of these oils about the fire hazards associated to their use and recommended safe handling practices.



*Above: a fire damaged this home after boiled linseed oil soiled rags ignited in a cupboard.*

### THE HAZARD

A well documented feature of organic oils is that they have self heating properties which in certain situations can progress to ignition if not correctly handled. When stored in bulk, there may be minimal increase in temperature but if the oil is spread as a thin layer on a porous surface like cotton cloth, the surface area exposed to oxygen (air) is increased and heating may occur. Research has shown that a small pile of rags smeared with boiled linseed at room temperature can ignite within hours. Once the fabric containing the oil residue ignites, there is enough heat generated to ignite nearby items.

Oil contaminated fabrics that have been sent for laundering have also been known to ignite while being dried. Enzyme-based laundry powders and cold washes do not remove all oils and fats and these can remain in the fabrics. In one test cotton towels containing linseed oil that were laundered self-heated to 575°C before bursting into flame.<sup>1</sup>

### INCIDENT DETAILS

#### Case study #1 ~ House Fire

The laundry of a house was destroyed by fire after rags which had been placed on a shelf ignited spontaneously. The rags had been used to apply boiled linseed oil to timber doors and had been placed in a plastic bag and rested on a wooden bench approximately 7 - 8 hours before the fire was reported.



*Right: The laundry bench where linseed oil-soaked rags spontaneously ignited*

## Case Study #2 ~ Commercial Laundry

An employee at a commercial laundry had placed 80 tea towels in a dryer for 15 minutes then opened the dryer door to stop the machine in order to close the business for the day. The tea towels were left in the drum of the dryer. Two hours later, the towels ignited without any other introduced heat and the resulting fire incinerated most of the contents. Fortunately this fire was contained within the body of the dryer. The tea towels had been exclusively used for the purpose of wiping baking items that had been sprayed with a Canola oil-based product.



*Above: the charred remains of the tea towels in the dryer.*

**Between 2005 and 2010 the Fire Service attended 59 incidents involving fire in commercial laundries and Laundromats.**

## Case Study #3 ~ Massage Oil



The owner of a massage business had washed and dried her towels, folding them and placing them in storage while still hot to ensure they remained "fluffy". 90 minutes later the owner smelt smoke and found the towels to be on fire.

*Left: The remains of the towels that ignited after being folded while still hot from the dryer.*

*Right: An unburnt towel showing oil staining after laundering.*



## LESSONS LEARNED/RECOMMENDATIONS

Fabrics that have been used to apply or soak up organic oils should be washed and hung out to ventilate before being stored away. Fires started by spontaneous combustion are known to have occurred in:

- rags used to apply oil onto furniture
- tea towels or similar used in cooking with natural oils of various types, usually peanut or canola oil
- towels from hairdressers
- bath towels or similar used in massage type industries/home massage, including hydrotherapy pools, where the fabric is contaminated with natural blended oils
- bedding sheets contaminated with various organic oils.

**Advice to retailers/suppliers** - instructions on organic oil containers should caution users to burn oily rags immediately after use, dispose of them in a sealed metal container or immerse them in water and hang out to dry, as they may self-ignite causing fires.

**Advice to laundry operators** - laundering may fail to remove oil or fat residues from fabrics. Where the cool down cycles of dryers are interrupted and fabric is left in the drum or deposited in a heap, the temperature within the fabric pile may increase significantly. If the heat cannot dissipate, the fabric will ignite resulting in a fire. This process can take several hours.

- always allow the drier to complete its full cycle including the cool down period
- before and after laundering, ensure fabrics that may have been contaminated with organic oils are spread out to allow the dissipation of heat
- educate staff about the possibility of spontaneous combustion and how to reduce the fire risk for your business.

**INFORMATION SOURCES** New Zealand Fire Service fire investigation reports & Kirks Fire Investigation 7th ed<sup>1</sup>.



For more information, or to contribute to 'Heads Up'  
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