

FIBRES IDENTIFICATION

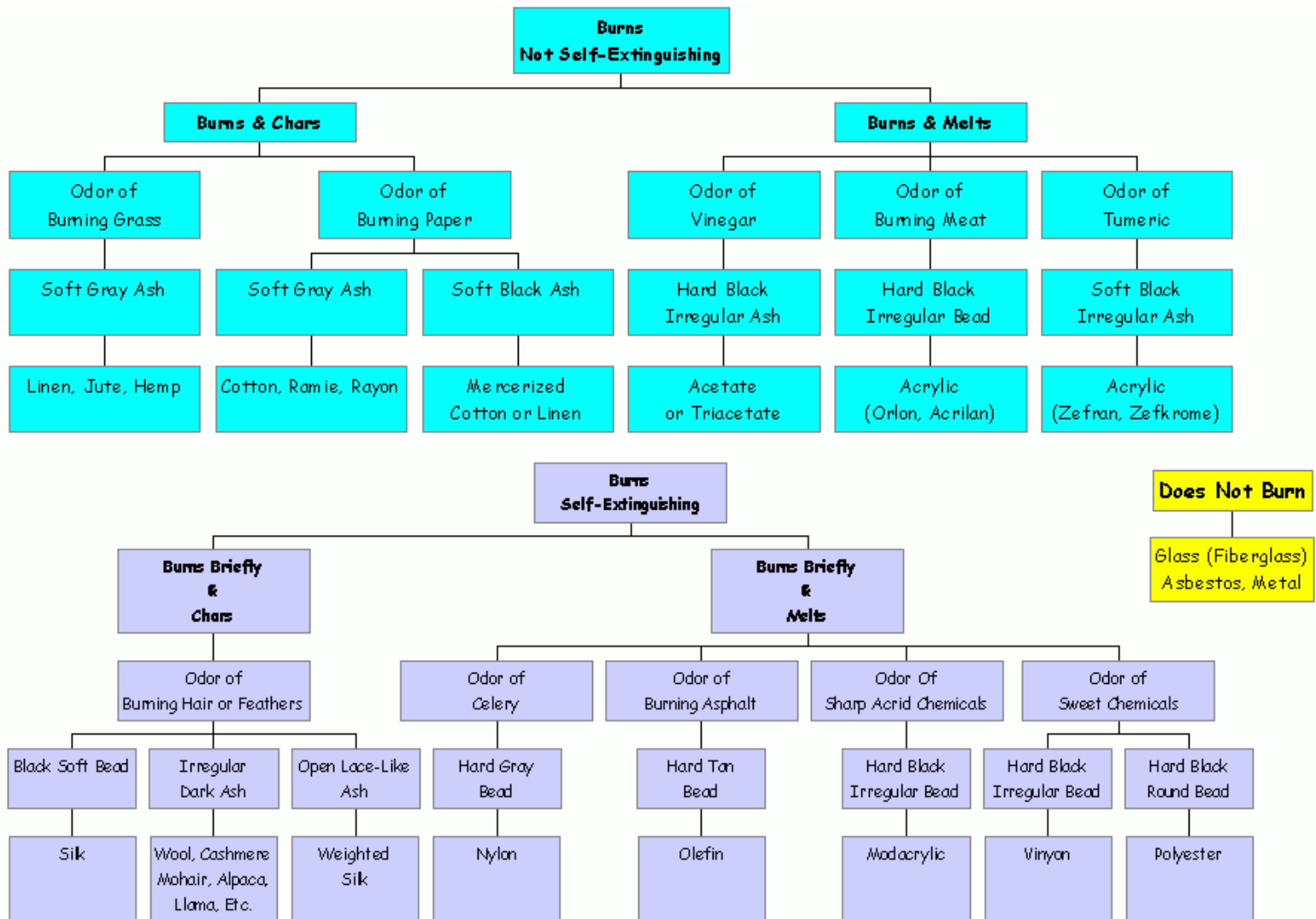
(CHEMICAL TESTS)

Fibre identification

Physical tests (Review)

- 1) Visual assessment under microscope
- 2) Burning test
- 3) Visual assessment of color under UV light
- 4) Floatation test (based on Specific Gravity)
- 5) Surface Feel of fibre/fabric
- 6) Visual assessment of fibre twist
- 7) General visual assessment

Fibre identification (Burning Test)



SOLVENT TEST

- The test involves treating the fibers in certain solvents for identifying them.
- The technical test is becoming difficult to conduct as most of the manufactured fibers and their blends are chemically similar.
- There is no individual chemical or solvent test for separating or identifying the fibers in combinations.

Fibre identification

2. Chemical tests

1. Solvent test
2. Chemical Staining of fibre
3. Classification based on dye-stuff application

DISTINGUISHING ANIMAL FROM VEGETABLE FIBERS WITH AN ALKALI:

- As strong alkali (NaOH) destroy animal substances, a 5% of soda (Na_2CO_3)/Sodium Hypochlorite solution (NaClO) in water can be used to eliminate wool and silk fibers from a sample that contains a mixture of fiber.
- The vegetable fibers will not be affected by this solution.

DISTINGUISHING VEGETABLE AND ANIMAL FIBERS WITH AN ACID:

- As dilute acid destroy vegetable fibers, a 2% Sulphuric acid (H_2SO_4) solution can be used.
- A drop of solution is placed on the sample, which is then pressed with a hot iron.
- The spotted area will become charred if the sample is cotton linen or rayon or cellulose acetate.

- DISTINGUISHING LINEN FROM COTTON

- Cotton and linen are immersed in a 1% solution of ethyle alcohol (C_2H_5OH or CH_3CH_2OH) to give red rose color.
- Later ,they are washed and immersed into ammonia (NH_3), linen retains the red color but cotton does not.

- DISTINGUISHING SILK FROM WOOL:

- The use of concentrated cold hydrochloric acid (HCl) will dissolve the silk and the wool fiber swells .
- Alkali solution in water can be used to eliminate wool.

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- DISTINGUISHING NYLON FROM OTHER FIBRES:
 - If the fabric is thought to contain nylon, the fabric may be immersed in a boiling solution of sodium hydroxide (NaOH). The nylon is insoluble in such a solution.

However,

- Nylon is soluble concentrated formic acid (CH_2O_2).

- DISTINGUISHING POLYESTERS FROM OTHER FIBRES:

Polyester is soluble in hot meta-cresol $\text{CH}_3\text{C}_6\text{H}_4(\text{OH})$; however, unlike acetate it is not soluble in acetone ($\text{C}_3\text{H}_6\text{O}$), and unlike nylon it is not soluble in concentrated formic acid (CH_2O_2).

- DISTINGUISHING ACRYLICS FROM OTHER FIBRES:

Acrylic fibers can dissolve in 70% solution of ammonium thiocyanate (NH_4SCN) at 130°C but the other fibers will not.

- DISTINGUISHING GLASS, METAL, ROCK, CERAMIC FIBERS FROM OTHER FIBRES

Hydrofluoric acid (HF) won't eat plastic but dissolve glass, metal, rock, ceramic.

Moreover hot Phosphoric acid (H_3PO_4) dissolve glass, metal and rock.