

## PROJECT

### Identifying fibres by burning test

**Title of the Project** : Fabric Identification by the Burn Test

**Purpose of the Project:** To know the type of fiber by burn test.

**Hypothesis** : Burn test is the most accepted method for identifying the true nature of any fabric. This test is carried out to know whether a fabric is made up of a natural fiber, man made fiber.

**Materials:** cotton, woollen, silk, nylon, acrylic, polyester and rayon sample cloths.

**Procedure:** we collect some samples of various types of natural and synthetic fiber cloths to identify the characteristics of the fiber by burning test. We take the one fiber in the sample cloth and burn it in a burning candle. By the observation in flame, odour and ash we tabulated the data of the characteristics of the fiber.

**Intruduction:** We wear many types of cloths in our daily life. Some of them are natural fibers. They are cotton, wool and silk. These natural fibers are not sufficient to fulfil the needs of the polulation. So the need of synthetic fibers is essential. These fibers prepared by some chemicals. We use Nylon, Polyester, Acrylic and rayon fibers in our daily life. Synthetic fibres absorb less water and dry at a faster rate. Some are even water proof. Most of them possess several unique characteristics. They are durable, less expensive, readily available, affordable and are easy for maintenance. So they are essential for us.



**Natural fibers – Cotton, Silk and wool**



**Nylon**



**Rayon**



**Acrylic**



**Polyester**

### Synthetic fibers

Prepared by  
K.VENKATA RAMANA-8008423323  
Kvr.lohith@gmail.com  
SRIKAKULAM – DISTRICT

## The Method

To conduct a test, cut a small sample of fabric, hold it with a pair of tweezers and place it over a small flame. Take all necessary precautions and keep a bowl of water nearby to extinguish the flame when the test is complete. Observe the sample for the results listed here to determine the fibre content.

Fibers can also be identified through the smell of the smoke it gives off in burning, and the ash or melted bead that remains after it has burned.

### Reaction of Fibers to the Burn Test

#### Cotton

It is a cellulose fiber. It burns and may flare up when lit. No melted bead is left by it. After burning, it continues to glow. It gives out smell like that of a burning paper. The smoke is gray or white. The ash is fine, soft that can be easily crumbled.



#### Jute

Also a cellulose fiber, doesn't shrink from flame. It leaves no melted bead and after burning no sign of flame is seen but it does not melt. It smells like burning leaves or wood. The ash is gray and smoke has no fume hazard.

#### Linen (Flax)

A cellulose fiber, it takes longer to ignite. It is easily extinguished by blowing on it. Other properties are similar to hemp and jute.

#### Rayon

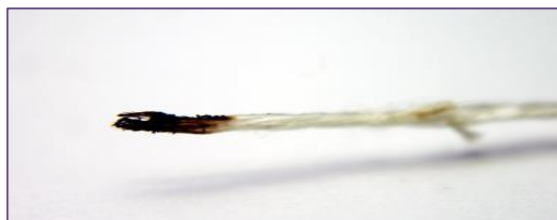
Is a manufactured cellulose fiber. It burns without flame or melting and may flare up. Unless there is a fabric finish, it doesn't leave any bead. After the flame is removed, it may glow a bit longer than cotton. It smells like burning paper and leaves soft, gray ash. Its smoke is a little hazardous.



After burning Cotton fiber

Ash : Gray, feathery with a smooth edge

Odor : Burning paper



After burning Rayon fiber

Ash: Gray, feathery with a smooth edge

Odor: Burning paper

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K.VENKATA RAMANA-8008423323  
Kvr.lohith@gmail.com  
SRIKAKULAM – DISTRICT

## Silk

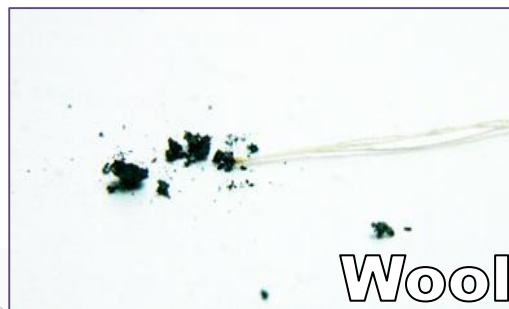
Is a protein fiber which burns slowly and curls away from the flame. It leaves dark bead which can be easily crushed. It is self-extinguishing and leaves ash that is dark, gritty, fine powder. It smells like burned hair or charred meat. It gives out a little or no smoke and the fume has no hazard.



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## Wool

Is a protein fiber which burns slowly. It sizzles and curls away from flame and may curl back onto fingernail. It leaves beads that are brittle, dark, and easily crushed. It is self-extinguishing and leaves harsh ash from crushed bead. It gives out a strong odor of burning hair or feathers. It gives out dark smoke and moderate fume.



## Nylon:

Are made from petroleum. Due to their fabric finish, they quickly burn and shrink to flame. The beads are hard, grayish and uncrushable. After flame, they burn slowly and melt. They are self-extinguishing but drip dangerously. Their odor is like celery and they leave no ash but the fume is very hazardous.

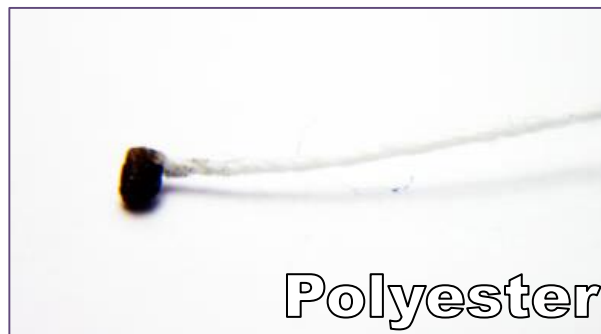
## Polyester

Is a polymer produced from coal, air, water, and petroleum products. It burns quickly and shrinks away from flame, may also flare up. It leaves hard, dark, and round beads. After the flame, it burns slowly and is not always self-extinguishing. It has a slightly sweet chemical odor. It leaves no ash but its black smoke and fume are hazardous.

## Acrylic

Made from natural gas and petroleum, they flare up at match-touch, shrink from flame, burn rapidly with hot sputtering flame and drip dangerously. Beads are hard, dark, and with irregular shapes. They continue melting after flame is removed and are self-extinguishing. When burning, they give out strong acrid, fishy odor. Although no ash is left but their black smoke and fume are hazardous.

Prepared by  
K.VENKATA RAMANA-8008423323  
Kvr.lohith@gmail.com  
SRIKAKULAM – DISTRICT



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### **.Describes the Burning tests for identification of fibers.**

| Fiber   | Near flame                 | Type of burning/flame                                   | Odour of burning                    | residue   |
|---|----------------------------|---|-------------------------------------|---|
| Cellulosic Fibers-cotton, Lenin,jute, rayon     | Catches fire easily        | Continue to burn with a bright flame; have an afterglow | Burning paper like smell            | Light, feathery, grayish/black smooth ash                 |
| Protein fibre – wool, silk                      | Smolder and burn           | Slow flickering flame; sizzle and curl                  | Burning hair of feathers like smell | Silk-crisp dark ash; wool-dark, irregular, crushable bead |
| Synthetic fibre – nylon, polyester, acrylic,etc | Strik on approaching flame | Soften, melt and burn                                   | Mixed smell of chemicals            | Hard, black uncrushable bead                              |

### **Precautions:**

The burn test has to be carried out with great precaution. Arrangement of water near the site of test should be made. The test should be done in a metal bucket, an old tuna tin or a glass ashtray. Plastic containers should always be avoided.

**Conclusion:** As the procedure of fabric identification helps to ascertain the structure of the materials, it is essentially undertaken by the weavers and other textile companies. The textile industry uses various machines, such as, inspection machine, burn machine, fabric dyeing machine, fabric insulation machine and such other machines for carrying out the burn tests of fabrics. The fashion industry is one of its most important aspect as they make specific demands for special or usual cloth materials. The enormous reputations of many famous fashion designer brands are regularly rising all over the world and their clothing lines have special labels declaring to have passed fabric burn tests.

**References:** Internet articles, Physical science text book, some science magazines.

Prepared by K.VENKATA RAMANA-8008423323 [Kvr.lohith@gmail.com](mailto:Kvr.lohith@gmail.com)  
SRIKAKULAM – DISTRICT

## PROJECT REPORT

**Title of the Project** : Fabric Identification by the Burn Test.  
**Class** : 8 th  
**Subject** : Physics  
**School** : Z,P.High School, Lolugu, Ponduru Mandal, Srikakulam district  
**Time frame** : 5 days

**Material/Sources used tools:** Internet, News paper clippings, Science books, etc.,

**Details of procedure followed:** we collect some samples of various types of natural and synthetic fiber cloths to identify the characteristics of the fiber by burning test. We take the one fiber in the sample cloth and burn it in a burning candle. By the observation in flame, odour and ash we tabulated the data of the characteristics of the fiber.

**Finding Observations:** In the burn test,

- If it smells like burning hair, the yarn is wool or silk.
- If it smells like burning paper, the yarn may be cotton, or rayon.
- If the yarn melts in the flame, it is a synthetic fibre such as nylon and acrylic.

**Experiences faced:** when we burn the cellulose, protein and synthetic fibers, we observe the characteristics of the fibers. The burn test has to be carried out with great precaution. Arrangement of water near the site of test should be made. The test should be done in a metal bucket, an old tuna tin or a glass ashtray. Plastic containers should always be avoided.

**Project outcome** : At the end of the project we know the characteristics of the fibers. As the procedure of fabric identification helps to ascertain the structure of the materials, it is essentially undertaken by the weavers and other textile companies.

**Name of the group members and work allotment:**

| Sl.No | Name of the team member | Work allotment |
|-------|-------------------------|----------------|
| 1     |                         |                |
| 2     |                         |                |
| 3     |                         |                |
| 4     |                         |                |
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| 6     |                         |                |

Date of Submission :

Signatures

Prepared by  
 K.VENKATA RAMANA-8008423323  
 Kvr.lohith@gmail.com  
 SRIKAKULAM – DISTRICT