

Conducting a burn test on fabric of unknown fiber content

Compiled by Lisa Cox

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Handout: "The Burn Test" from *Threads Magazine*¹

Sometimes you want to use a fabric from your stash or one you find at a thrift store or are given as a gift, but you don't know the fiber content. Sometimes, it doesn't matter, but sometimes you want to know if it will hold up to heat or steam or if it will generate too much static or if it's 100% cotton, etc.

Conducting a burn test can be helpful in identifying fiber content. "While a burn test will tell you a lot, it won't tell you everything."² Blends can be difficult to identify because they display the attributes of all fibers in the product. "Some of the fabrics are blends, and the blend of fibers may make the burn test a rather unreliable test for fiber content. Moreover, some fabrics have chemical finishes and sizings applied to them that will change the way they burn..."⁵

What to do:

Safety first – always take precautions, use a fire-proof container (an empty, clean tuna can is good because it's disposable and the mess is easy to clean up), use fireproof tweezers or tongs, do not use plastic containers, do the experiment in a well-ventilated area especially if you are testing synthetics,⁴ keep hair and clothing out of the flame, have fire extinguishing materials handy – a bucket of water to drop flaming items into is convenient. "Some fibers are slow in igniting, but then burn quickly. Others can burn hot and produce a painful burn..."³

Remember to always be careful!

Method:

Cut the swatch: cut a 1 inch square, 2x½ inch rectangle, or a triangle that is approximately half of a 2x1 inch rectangle.

Pull threads⁶: pull some of the threads along the edge of the swatch. You'll need 3 to 5 threads about an inch long, twisted together.

Fire source: use unscented candles or a disposable lighter. Matches do not work because they burn too fast and contribute too strong a smell to the experiment. Refillable lighters also contribute a strong smell.

Use tweezers or tongs: Hold the swatch in fireproof tweezers, tongs, or between two large coins. If you suspect the fabric has synthetic fibers in it, be especially careful about potential quick flare-ups when the flame touches the threads and fabric.

Ignite the threads: Pass the twisted threads into the open flame then quickly blow out the flame. Examine the

ash or other residue left after burning. Little black balls that are hard to crush indicate non-natural fiber content.

Notice how the fibers interact with the flame: Pass the swatch of fabric near the flame. Notice whether the swatch scorches, smolders, shrinks away from the flame, curls away from the flame, melts, ignites slowly, or ignites quickly.¹ Compare how the fabric acts with the table in the handout.

Examine the burn:

- flame – Put the fabric into the flame. Does it burn quickly, burn slowly, sizzle, try to sputter and go out, melt, or drip like burning tar? Is the flame dull yellow or bright yellow or another color? Is the flame bright or dim?¹ Compare with the handout.

- odor – smells like paper burning, or like hair burning, like celery, vinegar, or has a strong or weak chemical smell?¹ Compare to handout.

- burn pattern after removing from flame – Does it continue to burn quickly, slow down, or almost extinguish? Is there an afterglow? Does it continue melting?¹ Compare to handout.

Examine the residue: Is the ash easy to crush? Is the residue powdery, sticky, hard, shiny, fine or grainy? Is the ash fine, gray, and powdery/“feathery”¹ or is it fine, black, and powdery? Does it produce a small black easy to crush bead of burned fibers² or a round, shiny, hard, black bead like plastic?¹ Compare to handout.

Differentiating the fibers:

Natural fibers like cotton, silk, wool, and linen will leave an ash that is easy to crush. The smoke during the burn is gray or white.⁵ Mercerized (chemically treated) cotton will leave a black ash.¹ Linen burns slower than cotton² and takes longer to ignite.⁵ It also has less of an afterglow, but is otherwise very similar to cotton.²

“Cotton/Linen/Hemp/Rayon/Bamboo): [Will] Ignite and burn quickly, may flare, leaves a glowing ember after flame is extinguished. Smoke is white or light colored and smells like burnt paper or leaves. Ash is light gray or white and very soft.... Protein (Silk/Wool, Cashmere, Alpaca etc): Burns slowly and shrinks or curls away from the flame. Will not stay lit after flame is removed. Very little smoke is produced but it smells like burnt hair (wool) or feathers (silk). Ash is a gritty powder or a dark brittle, easily crushable bead.”⁴

“Hemp: A cellulose fiber, burns quickly with bright flame. It leaves no melted bead and after burning [there is] no sign of flame... It smells like burning leaves or wood. The ash is gray and smoke has no fume hazard.”⁵

Rayon and Tencel are man-made fibers, but they are made from cellulose, not petroleum products, therefore they perform more similarly to natural fibers. Rayon burns faster than cotton, produces a more intense yellow flame than cotton, and unlike cotton, there is no afterglow.² Caution: burning rayon may flare up dangerously and its smoke is “slightly hazardous.”⁵ It leaves no bead unless it has a fabric finish.⁵

Silk: Silk curls away from the flame, leaves an easily crushable dark bead, is self-extinguishing, and leaves ash that is a dark, gritty, fine powder. It smells like burned hair or charred meat. It gives out little or no smoke and

the fume has no hazard.”⁵

“To be fully sure if the fabric is 100% silk, instead of a burn test, place it in a small glass container with bleach. If overnight the fabric completely dissolves and is gone in the morning, it's silk!”²

Man-made fibers like polyester will leave dense black beads that are difficult to crush. Polyester “has a slightly sweet chemical odor. It leaves no ash but its black smoke and fumes are hazardous.”⁵

“Synthetics (Nylon/Polyester/Acrylic): Ignite and burn quickly and can continue to burn after a flame is removed—exercise caution. Fiber may shrink from the flame, melt, and can drip (DANGER) leaving a hard plastic-like bead. Burning these fabrics will produce black smoke and hazardous fumes. Nylon smells like plastic when burnt but can also produce a celery-like smell; Acrylics burn with a strong, acrid, chemical smell. Polyester smells slightly sweet, also with a chemical odor.”⁴

“Acrylic, Modacrylic, Polyacrylic: 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 a strong acrid, fishy odor. Although no ash is left, their black smoke and fumes are hazardous.”⁵

Sources:

I will post the URLs to Facebook so that you will have clickable links.

¹Threads Magazine burn test handout. There is also a video from Threads magazine:

<http://www.threadsmagazine.com/item/31497/how-to-identify-fabrics-with-a-burn-test>

²Christine Haynes Craftsby blog: <https://www.craftsy.com/blog/2015/02/burn-test-for-fiber-content/>

³Fabric University burn test page: <http://www.fabriclink.com/University/BurnTest.cfm>

⁴Dharma Trading Co. website: <http://www.dharmatrading.com/home/the-fire-test.html>

⁵Fabric Mart Fabrics burn test page: <http://www.fabricmartfabrics.com/Burn-Test-Chart.html>

⁶Debi Mitchell’s video on distinguishing 100% cotton from blends. She burns several different fabrics in her demonstration. She also suggests how to pull some fibers and burn the threads first.

<https://www.youtube.com/watch?v=kAlqLCVvyG8>