ENVIRONMENTAL DEFENSE FUND
finding the ways that work

Issue Brief: Synthetic Textiles

Overview:
Synthetic textiles are flexible man-made materials composed of artificial fabrics. Common synthetic textiles include rayon, polyester, nylon, acrylic and spandex among others. Many of these textiles are made from polymeric resins derived from fossil fuels, which carry the environmental impacts of greenhouse gas emissions and natural resource depletion. Most synthetic textiles are produced using one of two methods: melt spinning or solvent spinning. Melt spinning uses heat to melt the fibers together and solvent spinning uses chemical solvents to dissolve fibers into fluids before binding them together. Reactive spinning is a less common method that requires polymer science technology. The production methods are chosen based on certain qualities of the fibers such as their melting point or solvent solubility. Melt spinning and solvent spinning require different energy and material inputs and therefore have different environmental and human health impacts. Generally, melt spinning has less harmful environmental and human health impacts because it does not require the toxic chemicals often used in solvent spinning. Solvent based spinning processes comprise 20% of the U.S. synthetic textile industry but contribute to 94% of total industry VOC emissions. Producing synthetic textiles also consumes considerable amounts of energy and water and produces hazardous byproducts of production that must be responsibly managed.

Priority Concerns:

- **Toxic Chemicals:** Some synthetic textiles are made of and are treated with toxic chemicals such as spinning solvents, acrylonitrile, formaldehyde and PBDE (Brominated Flame Retardants). Brominated flame retardants are applied to prevent textiles from catching on fire and are considered persistent pollutants because they are resistant to environmental degradation. Also, some chemicals used to finish synthetic textiles can be carcinogenic (cancer-causing), made from heavy-metals dyes, or potentially allergenic. *(See Industrial Chemical Brief for more information)*
- **Energy Consumption:** Producing synthetic textiles is energy intensive and contributes to greenhouse gas emissions and climate chance. Producers can cut costs and reduce energy impacts with improved efficiency. Also, petroleum based synthetic textiles not only require fuel to produce but are composed of petroleum based materials, which further contributes to the environmental impacts of this fossil fuel.
- **Air and Water Pollution:** Wastewater and air emissions from production can contain oxygen-depleting substances and heavy metals, which can threaten ecosystems and human health. Most air and water emissions from synthetic textile production include VOC's (Volatile Organic Compound) and particulates. VOC's are chemicals that quickly vaporize into the atmosphere, and particulates are small particle pollutants suspended in gas.
- **Water Consumption:** A significant amount of water is required to produce synthetic textiles.
- **Waste Management:** If not managed properly, hazardous wastes from production can harm ecosystems.

What Can You Do?
Support Synthetic Textiles Produced With the Melt Spinning Method: Melt spinning uses heat instead of toxic chemicals to bind fibers together and has fewer environmental and health risks.
Ask Questions: Find out what kind of textiles are being used in the products you purchase, what they are made of, what their environmental and human health impacts are and whether or not safer alternatives exist.

Additional Resources:

- **EPA Synthetic Textile Info:** http://www.epa.gov/ttn/chief/ap42/ch06/final/c06s09.pdf
- **Environmental Defense Toxic Chemical Information:** http://www.environmentaldefense.org/page.cfm?tagid=90
- **Council for Textile Recycling:** http://www.textilerecycle.org/
- **EPA Textile Waste Information:** http://www.epa.gov/msw/textile.htm

What Now?
Some important considerations regarding sustainability and product choices include:

- Does this choice significantly reduce the environmental impacts across the lifecycle of this product?
- Is there a business opportunity to generate increased cost savings and improve customer satisfaction?

Environmental Defense Fund is about solutions – And we're here to help! Please give us a call:
Michelle Harvey, (479) 685-1581
mharvey@edf.org
Andrew Hutson, (479) 685-1303
ahutson@edf.org

Additional Life Cycle Sustainability Questions for Synthetic Textiles

Step 1: Product Design
- Is this textile designed to be recyclable or reusable?
- Is this textile designed to be durable?

Step 2: Raw Materials
- What is the textile made of?
- What chemicals are use to make this textile? Are safer alternatives available?
- How are chemicals used in production selected? What environmental and human health considerations were made?
- How much energy and water are used in producing this textile? Can these amounts be reduced?

Step 3: Manufacturing
- What is being done to monitor and minimize VOC (Volatile Organic Compound) and NO_2 (Nitrous Oxide) air emissions?
- Is the Solvent Spinning method used? (this process requires the use of toxic chemicals) Melt spinning does not require the use of chemical solvents and produces fewer VOC emissions.
- Does the manufacturing process require the use of formaldehyde or heavy metals? (Not preferred)
- Does the synthetic fiber contain acrylonitrile? Acrylonitrile is derived from propylene and ammonia and produces toxic emissions.
- Are the textiles treated with biodegradable detergents and softeners? (Preferred)
- How extensive is the solvent recovery system? Solvent recovery systems are used to recycle solvents used in solvent spinning and can reduce emissions by 40% or more.
- How are reduced emissions due solvent recovery tracked and improved?
- Are the manufacturers compliant with applicable environmental and human health laws? Can they prove it?
- How are solid and hazardous wastes being managed and minimized?
- What technologies are the factories using to minimize the discharge of pollutants?
- What externally audited environmental management systems are in place? Are audit results public?
- What efforts are being made to improve the energy efficiency of the manufacturing?
- What percentage of energy used in manufacturing is renewable energy?

Step 4: Packaging and Distribution*
- What action has been taken to reduce the volume of packaging of this product?
- Is the packaging made of post-consumer recycled materials?
- Can the package be reused? Can it be recycled? What is the recycling rate of the material?
- Is the packaging bio-degradable? What is the composting rate?
- What mode of transportation will be used? What is the distance of travel? (Air pollutes the most)
- Are there opportunities for local sourcing?

**See Packaging Brief*

Step 5: Use, Reuse and Maintenance
- What are the risks to human health during exposure to this textile?
- What are the risks to the environment during normal use of this textile?
- Can this textile be reused?

Step 6: End of Life
- Is this textile recyclable? How easy is it for consumers to recycle?
- Is this textile bio-degradable? How long does it take to break down in the environment?