

[Polyvinyl Alcohol](#)

This state-of-the-art synthetic material prized in the high-tech field for its hydrophilic (literally "water loving") properties with innovative design, creating an ultra-absorbent, drip-free process. Made from a water soluble and biodegradable material, extremely microporous and hi-tech polymer retains water while remaining dry to the touch. When wet the capillary action of the micropores allows the Poly Vinyl Alcohol to become about 10-20 degrees cooler than the existing air temperature, which provides cooling effect to the user. When it stops cooling (between 30 to 120 min. depending on conditions), you simply re-wet and its cool again.

General Characteristics of PVA:

1. Possesses a three dimensional open cell structure
2. Hydrophilic
3. Anti-bacterial
4. Durable and long lasting
5. Highly resistant to chemicals
6. Anti-microbial fibers repels odor
7. Absorbs 8 times its weight in water

Polyvinyl Alcohol (PVA) is a unique functional resin (high polymer) manufactured from vinyl acetate monomer (VAM) via a multi-step process. VAM is polymerized into polyvinyl acetate (PVAc) and then converted to PVA. PVA is a safe, biodegradable, water soluble polymer with a wide range of applications [such as eye drops and ladies cosmetics](#).

<http://www.jtbaker.com/msds/englishhtml/p5282.htm> msds

<http://perrychem.com/PVA.html>

Questions

1. **What is the percentage of coverage of the PVA material on the shirt?**
 - a. The shirt circles are 2" each. Each shirt has 20 circles per shirt, or approximately 40 inches of cooling coverage. On a adult large shirt, this represents approximately 35% coverage of the top halves of the shirt.

Keep in mind, it is the combination of cooling coverage AND the mesh breathability that provide the optimum combination. Studies showed that too much PVA coverage did not allow enough air movement. Conversely, studies also showed that shirts without the PVA cooling technology or limited coverage, do not cool. Therefore, FROS-T works to apply to the optimum coverage from laboratory and field studies.

2. What makes our FROS-T shirt different than other shirts in the industry?

- a. First, there are no other shirts in the industry with our advanced technology of integrated polymer materials with the fabric. Our utility patent protects are application of this technology.
- b. As far as the fabric in the shirt alone, there is no difference between our shirt and a comparable premium shirt on the market. We use 4-way stretch, premium sports mesh polyester and spandex combinations. We feel our shirts provide optimum mobility and stretch, then we add our advanced technology cooling polymers to make the ultimate shirt.