

Static Electricity and Ways to Prevent it

As users and converters of pressure sensitive tapes, we need to understand static electricity: where it develops, the dangers associated with it, and, of course, ways to control it. Static electricity is much more prevalent in low humidity conditions and the coming months are typically the driest months of the year. Adchem offers this information in order to inform, to protect your employees, as well as help ensure quality, high performing product.

What is static electricity?

Static electricity builds up when one surface is positively charged and the other surface is negatively charged. Nature's desire for balance cause the charges to attract one another, resulting is the discharge we call static. On a small scale, you see static discharge in the form of a spark when you touch a door knob after walking across a carpet. On a much larger scale, when the electrical potential occurs between clouds and the Earth the resulting discharge is in the form of a lightning bolt.



What has static to do with the use of a PSA tape?

The act of unwinding and winding a rolled product like a pressure sensitive tape creates a buildup of positive and negative charges which, eventually, may lead to a static electricity discharge. This discharge can be small and simply go unnoticed or it may be very large and potentially dangerous. If you have ever felt the hair on your arms stand up when near an unwinding roll of tape, you have felt static electricity. Films are particularly prone to creating a static build up.

Why is static a problem to me?

- The discharge of static electricity may be only a small shock or build to the point that a lightning bolt-like spark will reach out and strike the operator, delivering life threatening voltage.
- Static discharge is a spark. Areas with flammable liquids or gases must remain spark-free at all times. A static build up in such areas can be potentially life threatening.
- The release of energy seen and felt in a static discharge can damage the release liner of the product being unwound. When the silicone is disrupted by static it will no longer function as a release system in the area affected by the discharge.
- For example, if you are rewinding large rolls of tape to smaller rolls, your customer may have defective material because it will no longer unwind properly at that spot.

How do I deal with static?

The first step is to identify the 'hot' areas, those that seem to be generating the highest static charge. This can be accomplished with a small, inexpensive handheld electrostatic field meter. You will reach your own comfort level but in general, action should be taken when the charge approaches 10 (either +10 or -10). There are numerous ways to control static in your facility.

Humidity: Keeping the relative humidity above 50% will lessen the likelihood of static. This can be accomplished with a humidification system such as a simple series of water misters.



- **Static Tinsel** is a series of metallic strands extending from a copper wire core. Tinsel is mounted on the machine across the web in a 'hot' spot. The tinsel is most effective when it is 1/8" – 1/4" away from the moving web. It must be properly grounded on the machine where it is installed.

- **Static String** uses conductive fibers woven into string form. It can be elastic or non-elastic. It is mounted similar to tinsel. String is effective up to 1" away from the web.



- **Static Bars** are highly efficient, electrically powered bars, which are permanently mounted across the web for particularly troublesome static hot spots.

- **Static Blowers** are fans, that blow positively and negatively ionized air at the moving web thus neutralizing the charged surfaces.



Conclusion:

Consult a trained static control engineer to evaluate your facility and determine the best option for controlling static on your equipment. For the safety and well-being of your employees, your products and your customers, maintaining a static-free environment is critical.

For more information about static discharge as well as other technical papers, please visit our website at www.adchem.com/Resources/Articles.