



# Prevent Winter Static



By Dr. Kelly Robinson  
Contributing Editor

Static becomes worse in the winter when heating systems operate. Cold air holds less moisture than warm air. So, the relative humidity of heated air is low, perhaps below 10% on cold days. Static goes up when the humidity goes down.

Now is the time for maintenance to prevent winter static. Below is my "Static Prevention Checklist," which is an updated version of the one that first appeared in my September 2009 "Static Beat" column. I'm sure you can add items that are important to your operations.

Your HVAC system is your first line of defense against static. Change filters to make sure the airflow is unimpeded. If your system has a humidifier, service it according to the manufacturer's instructions.

Keeping the relative humidity sufficiently high is a great way to avoid winter static.

Take good care of your neutralizers (static bars, tinsel, etc.) because they are your workhorses for keeping static levels low. Dust and debris on the pin tips degrades the output of static bars. Clean your static bars according to the manufacturer's recommendations, which typically will include cleaning the pin tips with a soft brush. Replacing static brushes, tinsel, and ionizing strings annually is a good practice. These passive devices are inexpensive.

Measure the gap from each neutralizer to the film surface. Manufacturers typically

recommend that static bars should be located 2–4 in. from the film surface. Tinsel and ionizing string should be located 0.5–2 in. from the surface. Depending on your application, static brushes can be located 0 (contacting)–0.5 in. from the surface.

The roller, belt, and guide surfaces that touch your products should be clean because your product accumulates a little static charge every time it

touches these surfaces. A thin layer of grease, dirt, or other contaminant on the surfaces can greatly increase tribocharging. Cleaning the surface can restore good static performance.

"Tacky" (cleaning) rollers are a special case because dust, debris, and contaminants are intended to accumulate on the roller surface. Maintain these rollers according to the manufacturer's recommendations.

The rubber or polymer coverings on drive, nip, cleaning, spreader, and lay-on rollers often are sources of sparks because static can accumulate on the surfaces of these rollers. To prevent these sparks, clean these rollers and measure their resistivity. If the resistivity is too high, replace them with static dissipative rollers.

Static is worse when the film slips and slides over low-wrap rollers. Check the bearing drag using a simple spin-down test as described by Tim Walker in "Web Lines" (June 2008 *PPFC*). The spin-down test itself is simple: Drive the roller to a given speed; measure the roller speed; note the speed and start the stop watch; and measure the time until the roller stops. Keep a log of the spin-down times for each of your low-wrap rollers. Shorter times indicate increased risk of static from bearing drag. If the time is too short, replace the roller bearings.

Films that track poorly or weave have many problems, including higher static from film slipping over rollers. Solve this by aligning rollers. Similarly, bowed rollers also can generate high static from film slipping over the roller. Check the bow and make sure it is no higher than needed.

Nip rollers and lay-on rollers can generate high levels of static caused by high pressure contact. Check the engagement pressures and nip gaps to make sure the contact pressure is no higher than necessary.

Maintain film tensions within the range for good conveyance to minimize static. If the tension is too high, the contact pressure between the film and roller surfaces is higher than necessary, which can cause higher static. Low tension that causes the film to lose traction and weave can cause high static because the film slips and slides over rollers.

Finally, achieving good wound roll integrity with an appropriate winding tension profile also minimizes static. Cinching causes static when the outer surface of one lap slides over the inner surface of the adjacent lap. Winding tension that is too high causes contact pressure between the film laps that is higher than necessary.

Prevent winter static with good maintenance. Reliable operation during the winter months will be your just reward.



## Checklist to Prevent Static

Maintain your HVAC system, especially the humidifier.
<b>Ionizer Care</b>
Clean ionizer pin tips.
Replace static brushes, tinsel, and ionizing string.
Check installation of each neutralizer, especially the gap from the neutralizer to the film surface, which should be within the range 0.5–2.0 in.
<b>Rollers and Transport Belts</b>
Clean the surfaces of rollers, transport belts, and guides.
Clean or restore the surfaces of "tacky" (cleaning) rollers.
Check that the electrical resistivity of belts and polymer-covered rollers is not too high.
Change the bearings on low-wrap rollers where the spin-down time is too short.
Check roller alignment.
<b>Process Adjustments</b>
Verify that the curvature on bowed rollers is as low as possible.
Check that the engagement pressures on nip rollers and lay-on rollers are as low as possible.
Check that film tensions are within specified levels.
Verify that the winding stock roll tension profile is as specified.