PPG TESLIN® Label Stock

For increased worker safety in vapor-filled environments

A primary goal of the Global Harmonization System of Classification and Labeling of Chemicals (GHS) for hazardous goods labels is to enhance worker safety, but few know the right choice of label material can make work places safer as well.

The dangers of static build-up with pressure-sensitive labels

When labels are processed through digital laser printers, they are charged through an electrostatic process that causes print toner to adhere to the label surface. When printed labels are peeled, that action can generate static charge (tribocharging), which has the potential to ignite vapors in industrial environments in which chemicals, solvents and flammable materials are present.

Real-world example

Recently, an employee working at U.S. paint manufacturer was filling 5-gallon pails of primer using an automated filling device. As pails were filled, the employee sealed the lids and applied a self-adhesive label to each pail, discarding the label-backing into a wheeled trash bin nearby.

During the course of his work, the employee noticed that primer was splashing to the floor from the portable tank feeding the automated filler. While mopping the floor with a cleaning solution, the employee contacted the wheel of the cart with the mop head, generating a static spark that jumped from the wheel and ignited the solvent in the cleaning solution, setting the mop head on fire.

Although the fire was quickly extinguished, an investigation by the paint manufacturer later determined that the voltage from the wheeled trash bin was generated by the electrostatically charged label-backings contained in the trash bin.

Corrective action

After making this determination, the paint manufacturer immediately engaged its label management vendor and an independent testing center to identify the label stocks that would generate the lowest amount of electrostatic voltage during label application.

Electrostatic testing of pressure-sensitive labels

The independent testing facility gathered 8½ x 11" samples of three commonly used pressure-sensitive label stocks, supplied in sheet form with release liners. The three label substrates were:

- TESLIN® label stock, a microporous polyolefin-based material
- PET (polyethylene terephthalate) thermoplastic polymer
- Vinyl (polyvinyl chloride)

Testing Environment

The independent testing facility preconditioned the labels for a minimum 72 hours, then conducted testing in a controlled-environment room with a temperature of 72°F. The first set of tests was completed with 30% relative humidity (RH); the second, four days later, with 50% RH.

Test Procedures

Labels were evaluated according to the following measurements:

- The voltage generated on the label when the release liner was peeled off
- The time needed for the voltage to dissipate in free space when the label was grounded.

Static measurements were performed using an ETS Model 406 Static Decay meter equipped with special electrodes designed for label-static testing, referencing test method ANSI/ESD Adv11.21, "Triboelectric Generation By Inclined Plate Method."

Test Results

72 degrees F/50% RH

Voltage Generation						
Sample	**Voltage kV**		**Decay Time Seconds (Average)**			
			Grounded		Ungrounded	
	Average	Max	10%	50%	10%	50%
Teslin label	3.89	5	<0.01	<0.01	0.89	-
PET	18.56	25	-	0.59	-	3.91
Vinyl	30	30	-	-	-	-

72 degrees F/30%RH

Voltage Generation						
Sample	**Voltage kV**		**Decay Time Seconds (Average)**			
			Grounded		Ungrounded	
	Average	Max	10%	50%	10%	50%
Teslin label	16.9	20	0.31	<0.01	-	1.77
PET	26.6	>30	-	5.35	-	9.51
Vinyl	>30	>30	-	-	-	-

Peeling the release liner from the label generated varying levels of static charge on the individual labels, as summarized in the following:

Charge generation

- *Teslin* labels achieved the lowest levels of voltage generation, averaging 16.9kV at 30% RH and 3.89kV at 50% RH.
- PET labels had average values 26.6kV at 30% RH and 18.56 kV at 50% RH.
- Vinyl labels generated in excess of 30kV at 30% RH and 50% RH.

Charge decay

When possible, decay time to 10% was also measured.

- *Teslin* labels had the fastest grounded decay time of less than 0.01 seconds at 50 percent RH.
- PET labels had a decay time of 1.58 seconds in the same conditions.
- Vinyl labels were unable to bleed off the static charge at either humidity level, whether the measuring electrodes were grounded or ungrounded.

Conclusion

Based on these results, the paint manufacturer selected *Teslin* label stock as the default label stock for its ability to dissipate static and accommodate laser-printing. By switching to *Teslin* label stock, the paint manufacturer has substantially increased worker safety and diminished the risk of fire by reducing static during label peeling and application in its production facilities.