

Exaction Force™ to Zero Defects

The goal of static eliminators is to solve a static problem. This means lowering surface charge on a web or sheet to a level where the problem such as ignition of vapor, static shocks, static cling and dust attraction are eliminated. Below is a chart of common static problems and the surface charge level where symptoms of the problem begin to appear.

Common static problems

Surface voltage begins to cause problems.

<i>STATIC PROBLEM</i>	<i>VOLTAGE</i>
Zero Defects	Less than 3000 volts
Microscopic Dust Attraction	>3,000 Volts
Common Dust attraction	>5,000 Volts
Ignition of Vapor	>5,000 Volts*
Static Cling	>7,000 Volts
Static Shocks	>10,000 Volts
Surface Damage to coatings	>10,000 Volts
Printing and coating defects	>10,000 Volts

*AES: Analysis of Electrostatic Measurements on Webs IEEE/IAS Toronto, CA Oct 3-8, 1993

[Link to Dr. Seaver's Paper](#)

This chart is used to targets the static problem solution.

THE PROBLEM	THE SOLUTION
Stop common dust attraction	Keep surface charges below 5000 volts
Prevent the ignition of flammable vapor	Keep surface charges below 5000 volts*
Stop Static Cling	Keep surface charge below 7000 volts
Stop Static Shocks	Keep surface charge below 10,000 volts
Printing and Coating Defects	Keep surface charge below 10,000 volts

Static eliminators that lower the static charge **consistently** below 3000 volts on a web or sheet, at speed, are efficient static eliminators.

In reality most static eliminators including both passive and active perform well enough to meet this goal. However, the key word is **consistently!**

Should you use Passive or Active static eliminators?

Use Passive static eliminators first and wherever possible because of the benefits – Here is why.

The first examples of effective passive static eliminators were lightning rods. When a voltage field develops on the cloud, it induces a field toward the grounded lightning rods from a considerable distance. Ions are produced at the rod points in proportion to the strength of the voltage field reaching the points. The high charge is lowered enough so that there can be no lightning strike to the rods and there is a cone of discharge protection around the rods. There is no static limit because the higher the charge inducing from the cloud, the further away the ionization begins between the cloud and the lightning rods. There is no static limit and no speed limit because the exchange of ions is only accelerated.

Modern versions of an efficient passive ionizer are designed specifically for converting operations. They use microscopic conductive fiber points, not sharp rigid points, which are grounded and placed across a charged web or sheet surface typically about $\frac{3}{4}$ " (18 mm) away. The efficient passive ionizer model of controlled non-contact ionization is very efficient so the small points begin to ionize the surface voltage when it reaches less than 2000 volts. This is well below the threshold of symptoms for static problems in converting operations.

Modern passive static eliminators also produce an efficient Exaction Force™. This is a major advancement because they avoid the side effects common to powered static eliminators. Powered static eliminators

What is an efficient Exaction Force™?

When only the **correct polarity and number of ions are produced** to neutralize the surface static charge to a level where the surface static problem is solved, this is efficient Exaction force. Powered static eliminators use high voltage to produce ions and they produce both polarities of high voltage. This causes side effects which affect their performance and reliability. Someday they will produce the Exaction Force™ but today they have side effects.

Why is the Exaction Force™ important?

The efficient Exaction Force™ produced by modern passive static eliminators provide great benefits because the High Voltage Side Effects are eliminated:

No attraction of particles and dust to the points means they stay clean and keeps working.

No electro-chemical effects at the points resulting in contamination and loss of metal.

No imbalance of ions

No limit of static charge level.

No limit on machine speed

Long term continuous performance is achieved.

Modern passive static eliminators are the engineers dream solution in the following situations and application:

The best choice for high speed machines –

The best choice for high static levels-

The best choice for dusty or particulate carrying air –

The Best choice clean areas –

The Best choice to stop surface damage and surface defects -

The Best choice for nip discharge and separation discharge –

The Best Choice for long term performance on machines (OEM) –

However, not all passive static eliminators are equal to this performance. Older type passive devices are much less efficient.

“Comparing the ionization performance of Static String® and Thunderon* cord” Dr. Kelly Robinson
(Read the report summary) [Link to Dr. Robinsons Summary](#)

Static String® and ion 360™ rods produce 20 times the ionization of any other ion cord or tinsel product