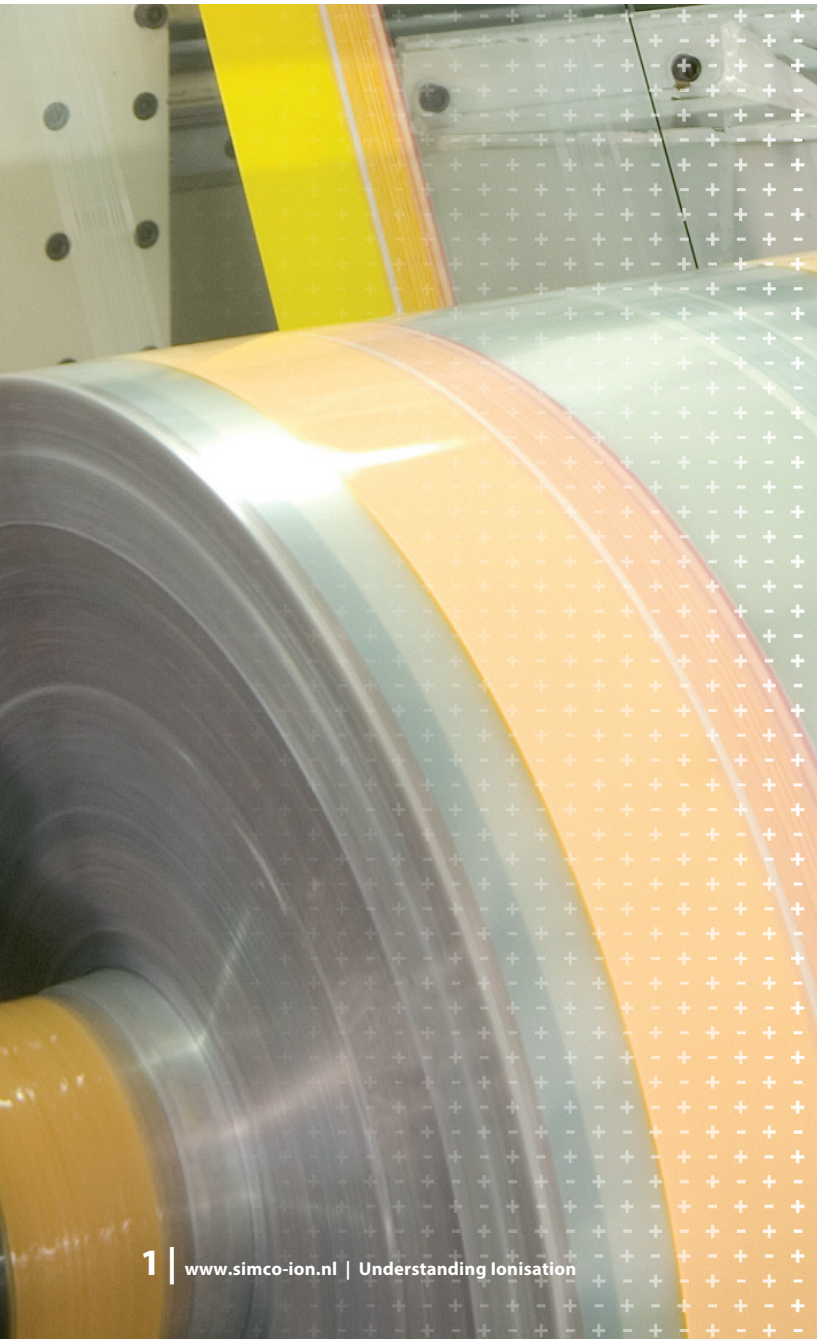
SIMCO ION™
An ITW Company

static control made **Easy!**

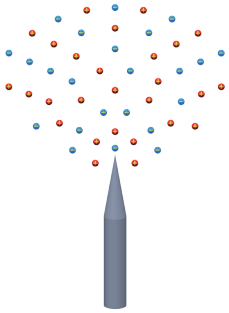
Understanding Ionisation



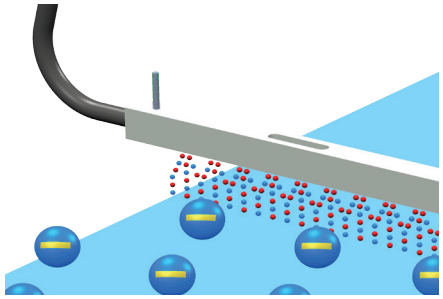
How does ionisation work?

Ionisation systems to eliminate static charge use high voltage on sharp emitters pins to generate corona discharge in the air and thus creating a large number of ions.
Ions are gas atoms that have additional electrons (negative ion) or have lost electrons (positive ion).

Neutralisation of a charged surface is provided by attraction of the charged surface of ions in the air. Meaning, a positive charged surface will attract negative ions and vice versa.



Ionisation emitter



Ionisation bar

How effective is ionisation to eliminate static charges?

Ionisation with high voltage is the most effective way of neutralising static electricity on non-conductive surfaces. The amount of ions created is many times more than actually needed to compensate the static charge.
The effectiveness of the neutralisation is affected by a number of factors:

- The level of the surface charge (attraction force)
- The distance between charged surface and ioniser (Sweet spot)
- The speed of the material
- The pin spacing of the ioniser
- The high voltage on the emitters of the ioniser
- Ionisation technology (AC, DC, frequency)
- Emitter geometry and cleanliness
- Ion lifespan and generation
- Air flow
- Surrounding parts

How do all this factors come into play and how important are they?

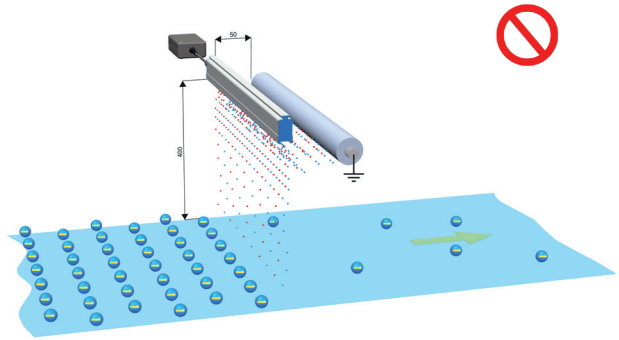
All factors are directly related and influence one another.
Each ioniser has an optimum distance depending on the used technology, the material speed and upstream charge magnitude. It is too complex to explain all factors but the most important ones follow in an example.

The point of installation can already cause many limiting factors; distance, speed of the material and surrounding conductive parts that drain ions to ground before they can reach the charged surface. Basically each ioniser works most efficiently when placed at its

minimum working distance and as far as possible from conductive surrounding parts.

Example:
Worst case scenario:
Anti static bar mounted 400 mm distance, Web speed
1000 m/min, metal at 50 mm distance to the bar. The efficiency of the bar to neutralise the static charge is greatly diminished by the metal and the combination of high speed and large distance.

The bar placed at 100 mm with no metal close by will perfectly neutralise the material.



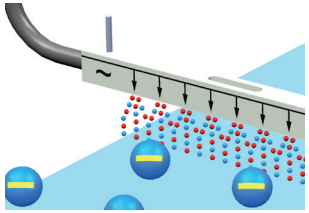
Different types of ionisers and technology

Ionisers can be categorised:

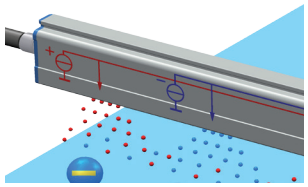
- anti static bars
- anti static bars with air assist
- anti static blowers
- anti static nozzles
- anti static guns

Ionisers use several technologies:

- AC
- Pulsed DC



AC ionisation

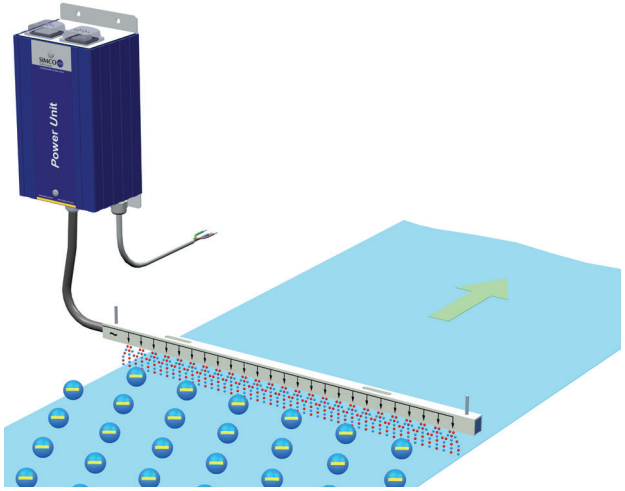


Pulsed DC ionisation

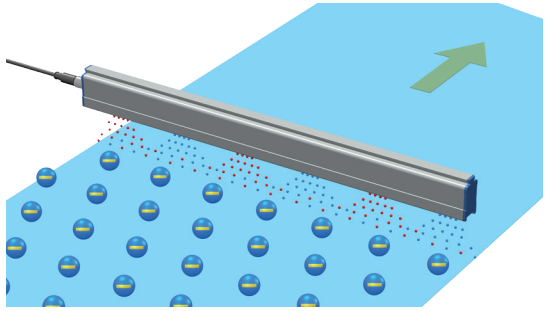
Within these technologies a few variables determine the effect and range of application of ionisers. The most important factors are the level of the high voltage and the frequency.

AC systems work with the mains frequency (50 or 60 Hz). They are very effective at close range. Positive and negative ions that are produced recombine during their travel to the charged surface making them neutral air molecules and ineffective to neutralise the static charge. The higher the used frequency, the less distance can be covered.
To improve the working distance, air assistance with compressed air or from a blower can be added to force the ions to travel in a higher speed so they cannot recombine as quickly.

AC systems use a bulky transformer and need a high voltage cable from the transformer to the ioniser.



Pulsed DC systems use two high voltage sources that can be set to virtually any frequency or voltage.
With higher voltages larger distances can be covered. With lower frequencies larger distances can be covered. Both factors together make very powerful and efficient ionisers.
Pulsed DC systems do not need air assistance to be effective over a large distance.
They come with built-in 24 V DC powered high voltage supplies and are much more compact and do not have external high voltage cables.



Which technology suits your application?

It depends;

- What is your problem?
- What is the desired result?

Consult a Simco-Ion representative near you or
Download the whitepaper: Ionisation selection.

Contact: www.simco-ion.co.uk/contact
Whitepaper: www.simco-ion.co.uk/wpisg