

Face Mask Manufacture

A guide to the uses of static generation
in the manufacture of face masks



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The Urgent Requirement

Face masks have always been an important piece of PPE equipment, especially in the medical sector. However, now more than ever, face masks are in critical need and their quality is relied upon for the health and safety of both the wearer and others.

As manufacturers boost their output across the world to meet demand, they are looking to Meech static generation equipment to combat issues they have been facing:



Particle Filtration Issues:

The performance of the filtration is paramount to the face masks/respirators, especially within medical applications. It has been found that as the demand for masks has increased and as manufacturers ramp up production, many imported face masks are not suitably complying to the set N95 standards*. This may lead to further issues:

- Puts wearers at increased risk
- Product rejection
- Decreased repeat purchase

For a mask/respirator to comply to N95 standards, the mask must filter 95% of airborne particles.



Material Misalignment:

Face masks are constructed of several layers of material, which are sandwiched together before being bonded. Slippage of the materials can cause several problems on the production line:

- Incorrect placement
- Manufacturing downtime to rectify the issue
- Increased scrappage
- Poor finish quality
- Incomplete bond seal

Any issues on the production line can cause the loss of valuable production time, which is especially important given the growing demand.



The Application of Static Generation

Meech offers a range of static generation equipment, which produce a controlled charge. This helps to solve the existing issues within face mask manufacture in the following ways:

Case Study 1:

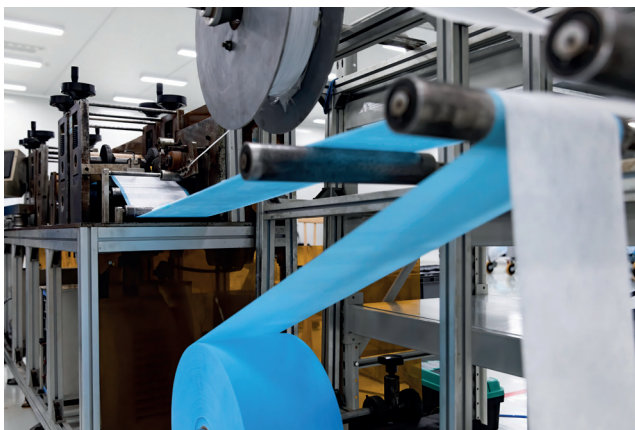
Problem: Increased particle filtration performance is required in order to perform effectively and meet N95 standards.

Solution: Install an IonCharge 50 generator to the production line with connected 993R Spark-Free Generator Bars. The bars are placed above the grounded rollers in order to create an earth pull, in order to drag the charges through the material. The added static charge within the filtration material itself (enhanced further by a high dielectric constant additive) allows a greater particle entrapment, as airborne particles that pass through the mask are increasingly attracted to the filtration material's charge, thus trapping more particles and improving the overall filtration performance.

Case Study 2:

Problem: Material not aligning correctly on the production line, leading to increased production downtime and increased scrappage as the masks were bonded together incorrectly.

Solution: Install a Meech IonCharge 30 static generator, paired with Meech 993R Spark-Free Generator Bar. The 993R imparts a charge to the material, temporarily pinning the layers together with static charge before they are permanently heat bonded. This ensures the layers of materials are correctly placed and limits the movement of the materials as they pass through the production line.



Which Generator?

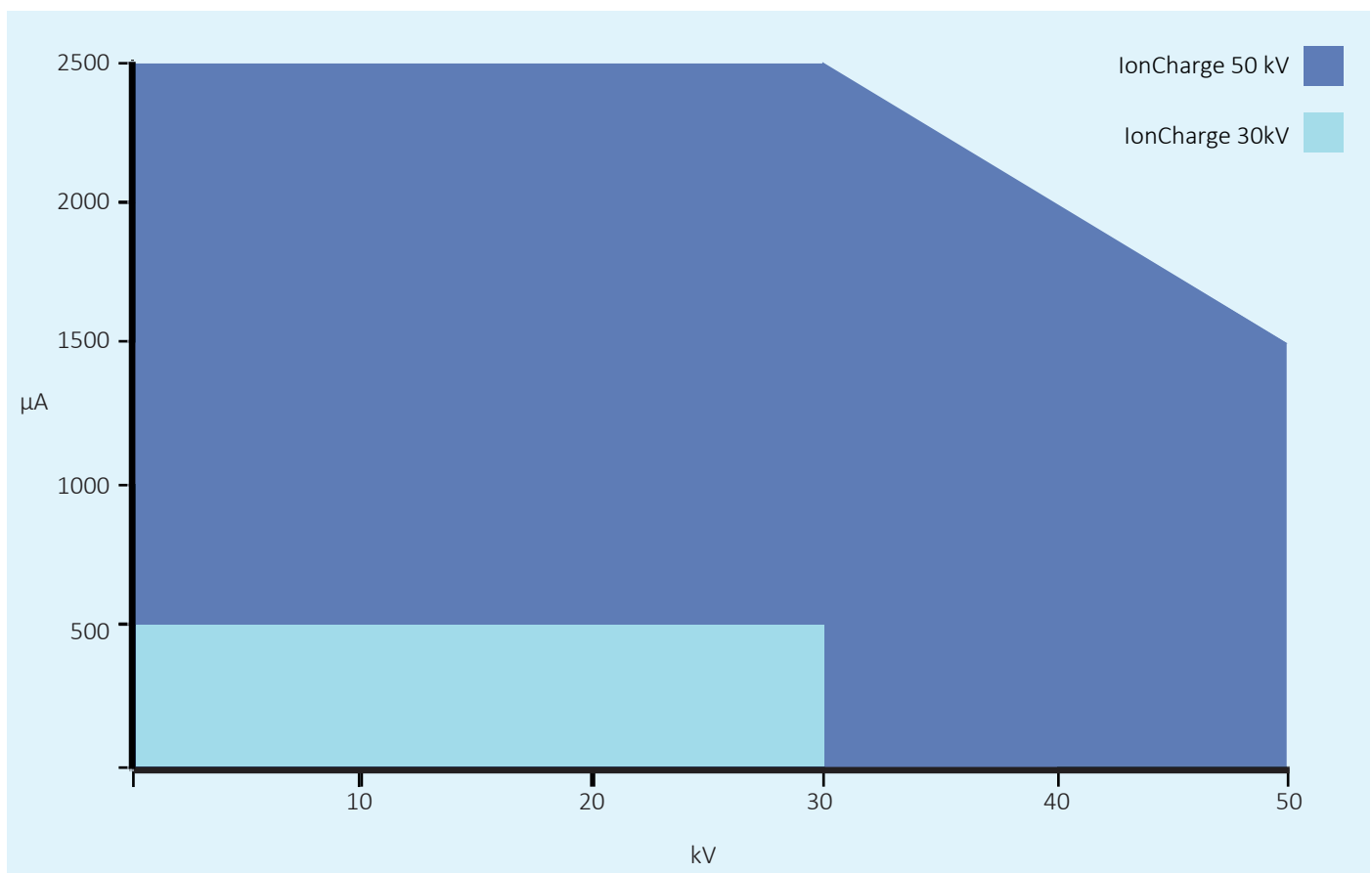
There are a number of different factors which may influence which generator is most suitable for your particular application. These include operating range, pin pitch, number of bars etc. For this reason, we always advise that you speak to one of our industry experts, who will be able to discuss your application in depth and suggest the most suitable operating configuration to meet your production needs.

Generator Operating Limits:

The graph below shows a comparison of the operating limits of the IonCharge 30 and IonCharge 50.

Providing the Solution:

Our application solutions are shown across the next few pages. These include suitable generators as well as our static generation bar.



Engineered Solution: IonCharge 30kV (15W)



Product Overview:

IonCharge 30 uses advanced high voltage technology and software for a controlled static charge via our range of static generator bars and pinning heads, including the 993R. The static charge can be either positive or negative (model dependant) . It is used to impart a static charge and is used for temporary bonding between materials, at least one of which is insulative.

The IonCharge30 provides independently selectable voltage and current and the inclusion of a colour touchscreen interface provides simple adjustment and clear display of settings. The functionality and simple adjustment and control of the output voltage and current means that the IonCharge30 is extremely versatile and effective for a range of applications and materials. including during the manufacture of face masks.

Feature	Benefit
15 Watt Power Output	Providing range for voltage (0-30kV) and current (0-0.5mA). Therefore, performance can be optimised for a variety of applications and maximum pinning effect can be achieved without risk of overload.
Hyperion 24V DC Power Supply	24V DC power is often the preferred power supply for use with industrial equipment for several reasons including safety, reliability and ease of installation.
Independently Selectable Voltage and Current	Increased control across a range of applications and material types.
Colour Touch Screen User Interface	Clear and intuitive information display and simple input of settings.
SmartControl Connectivity	When connected to a SmartControl unit there are the benefits of remote monitoring and control.
Compact and Lightweight	Provides flexibility in positioning.
Twin High Voltage Outputs	Multiple generator bars can be connected. NOTE: HV output socket requires accessories with a short plug connector.

Engineered Solution: IonCharge 50kV (75W)



Product Overview:

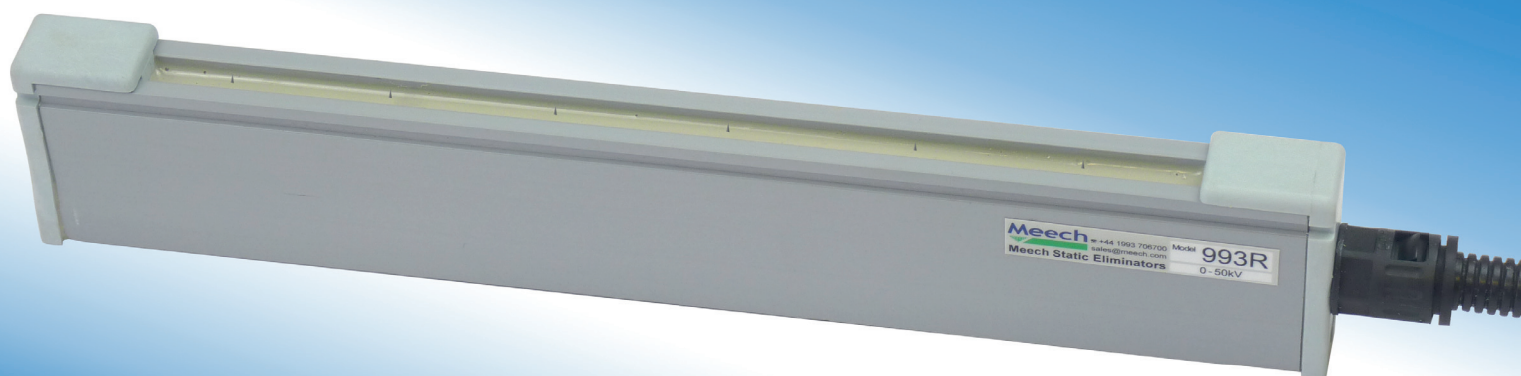
IonCharge 50 (75W) static generator is especially suited to face mask manufacture. It uses advanced high voltage technology and software for a controlled static charge via our range of static generator bars and pinning heads, including the 993R Spark-Free generator bar.

The IonCharge 50 provides independently selectable voltage and current and the inclusion of a colour touchscreen interface provides simple adjustment and clear display of settings.

The functionality and simple adjustment and control of the output voltage and current means that the IonCharge50 is extremely versatile and effective for a range of applications and materials.

Feature	Benefit
High Power from 75W Providing Output Range For Voltage (0-50kV) and Current (0-2.5mA)	Performance can be optimised for a variety of applications and maximum pinning effect can be achieved without risk of overload.
Hyperion 24V DC Power Supply or 240V AC Power Supply	Choice of power supplies for flexibility in meeting installation requirements.
Fast Rise Time (50ms into 10MΩ)	For responsive performance and precise pinning.
Voltage regulation at 50kV better than 1.0%	For accurate static generation.
Independently Selectable Voltage and Current	Increased control across a range of applications and material types.
Colour Touch Screen User Interface	Clear and intuitive information display and simple input of settings.
SmartControl Connectivity	When connected to a SmartControl unit there are the benefits of remote monitoring and control.
Twin High Voltage Outputs	Multiple generator bars can be connected.

Engineered Solution: 993R Spark-Free Generator Bar



Product Overview:

The Meech Model 993R is a high performance generator bar for use with the Meech range of 30kV and 50kV high voltage DC static generators.

Resistively coupled emitter pins deliver smooth, controlled static charge delivery and pinning whilst spark-free operation avoids tripping out on intermittent applications.

Feature	Benefit
Resistively coupled emitter pins	Power is delivered in a smooth, controlled manner. .
Spark-free operation	Eliminates incidences of flash over often experienced with bars directly coupled to the high voltage supply. Greatly improved operator safety.

If you have issues that you are facing within your production process of face masks and respirators and would like to discuss possible solutions, please get in touch with one of our industry experts.



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