

# Static Generation Application Guide



A guide to the benefits of static generation  
and its uses within multiple applications.



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# What is Static Generation?

Static generation creates a controlled static charge on a non-conductive material that will allow a temporary, adhesion between surfaces with charges of opposite polarity. A high DC voltage (up to 50kV) is safely produced and is connected to an array of suitably designed emitter pins to generate a “corona”.

Below is a further explanation and the benefits of Static Generation:

## Static Generation Equipment:

The DC voltage may be positive or negative. The emitter pins are positioned within close proximity of a grounded surface or, for greater effect, a generator bar with emitter pins of the opposite polarity. The material(s) to be bonded are passed into the “corona”, resulting in bonding to the grounded surface or to the other material.

## Benefits:

- Controlled static generation can bring a number of benefits to production processes such as thermal lamination, labelling, packing, roll-to-roll changeover, cast film extrusion, etc.
- Static generation equipment is able to effectively and reliably provide temporary bonding of materials with the result that in many applications the production processes can be optimised.

## How Temporary Adhesion Is Achieved

The generation of a controlled static charge on a non-conductive material will allow temporary adhesion between two or more surfaces. A high DC voltage of up to 50kV (positive or negative, depending on the application) is carried to a special array of emitter pins to create a “corona”. With the emitter pins positioned in close proximity to a grounded surface, material passing into the field will be charged and bonded to adjacent surfaces.

Examples of some of the benefits of static generation in industrial applications include the following:

- Ensuring material maintains its shape during production process
- Preventing inadvertent movement of materials that can result in equipment malfunctions
- Ensuring multi-layer material alignment to ensure process optimisation
- Minimising scrappage from misalignment of materials
- Preventing inadvertent material movement during secondary step in production or assembly
- Ensuring that air is removed from between materials being bonded together

Please refer to the examples contained in this application guide for more details on specific applications.

# 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 different applications in the following ways:

## Case Study 1:

### Card Insertion (Book, Magazine, DVD, Print Finishing)

**Problem:** Marketing flyers and advertising material that are inserted inside CD/DVD jewel cases, or magazines, will move during closing or during insertion into envelopes or plastic sleeves.

**Solution:** Use the Meech IonCharge30, and 994 Single Point Pinning System to ensure that any flyers or material that are being inserted into the cases can be electrostatically pinned into place, this will prevent the flyers and material from moving when closing the lid of the jewel cases or during insertion. The use of a single point pinning head minimises the electrostatic charge, this allows the jewel case to be closed or magazine to be sleeved, whilst minimising any static issues when over-wrapping.



## Case Study 2:

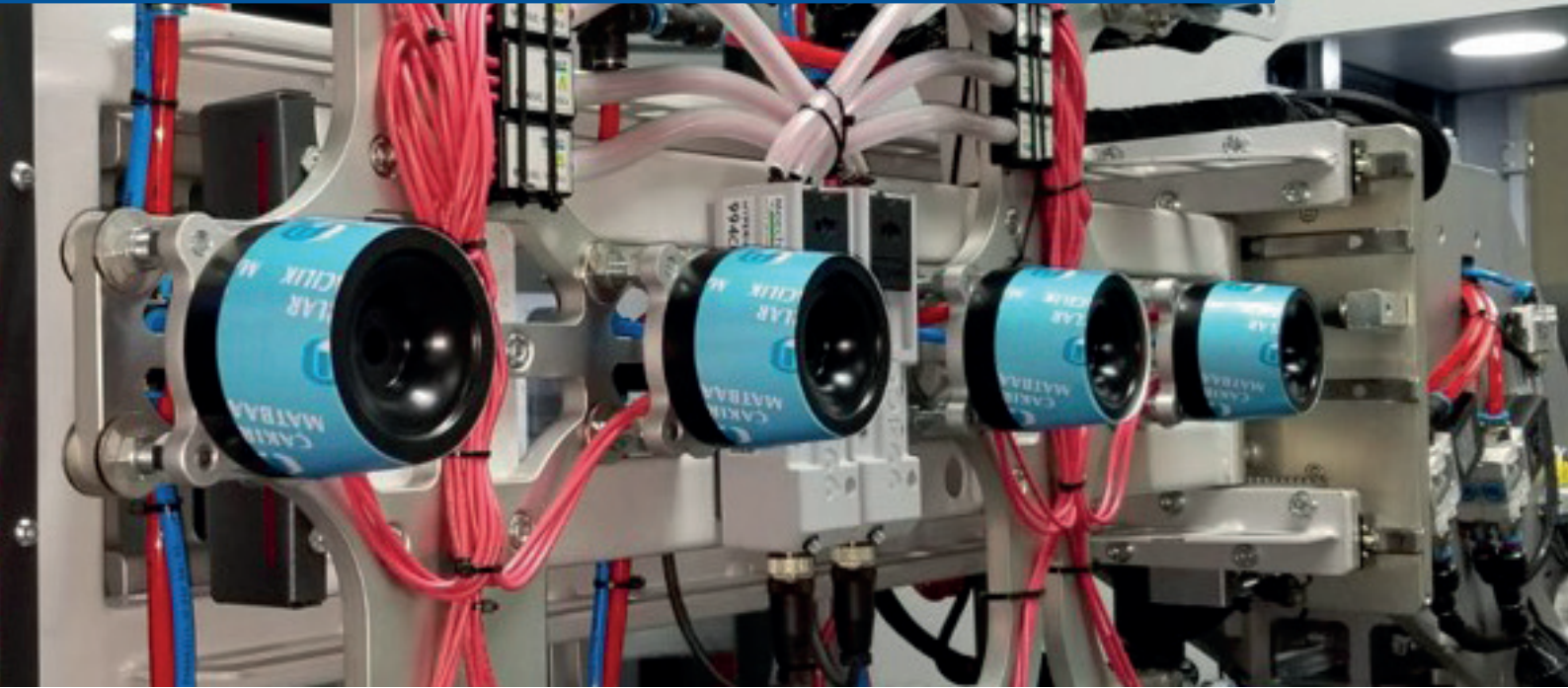
### Bag Making (Gusset Pinning, Hole Punching, Shingling)

**Problem:** Producing a gusset in a bag, can result in the material returning to its original shape, losing the gusset. Electrostatically pinning the material along the gusseted edge ensures the material holds its shape until it is welded.

**Solution:** Installing an IonCharge30 with a Meech 993R Spark-Free Generator Bar will allow the material to be temporarily pinned, preventing any unwanted movement of the material. Fixing a shield to the 993R bar to cover the emitter pins which are not adjacent to the gusset, prevents unnecessary charges being applied to the main body of the bag. This helps to ensure the bag will open easily when required.



# The Application of Static Generation:



## Case Study 3:

### Perforation Detection (Rewind Bag On Reel Counting)

**Problem:** In the production of making bags on a roll, the number of bags per roll needs to be counted. Generating an electrostatic spark as each perforation passes can provide a 5-volt signal which can be counted by the PLC.

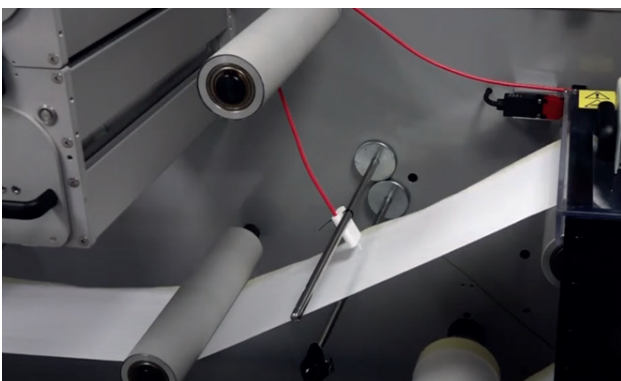
**Solution:** The use of a IonCharge30 generator with a spark detection output signal with a 993 non-resistive bar will provide the necessary signal for controlling a turret rewind core change process.

## Case Study 4:

### Hand Pinning 20KV

**Problem:** IML label printers and companies using IML labels need to ensure that the materials being used are suitable for the application. Whether this be testing of ink, lacquer, plastic film or a finished label, it is important that the conductive properties are suitable. The failure to ensure material suitability is likely to result in product scrappage, loss of production and customer dissatisfaction.

**Solution:** By using a Meech 995 Edge Pinning Claw and IonCharge30 Static Generator, you will remove the risk of incorrect materials being used in the production of IML labelled products. Through applying a static charge to the material stock being held against an aluminium sheet will allow the material to support the aluminium when the label is lifted.



# The Application of Static Generation:



## Case Study 5:

### Laminating (Formica, Work Tops) 50/60kV

**Problem:** Laminated sheets used for furniture etc, are manufactured by attaching one or two laminates to sheets of man-made board (e.g. MDF). As the laminate travels along the conveyor, the 3 parts can easily move out of alignment, or air gets trapped between the layers, leading to product rejection.

**Solution:** Through the installation of generator bars of opposite polarity positioned opposite each other, the laminate sheets are electrostatically bonded together so that the laminate feeds correctly into the press. The use of special resistor bars provides maximum pinning performance, whilst protecting operators from very high electrical shocks if touched. Positioning the bars close to the material allows maximum pinning effect, whilst the resistive technology prevents sparking between the bars when no product is between them.

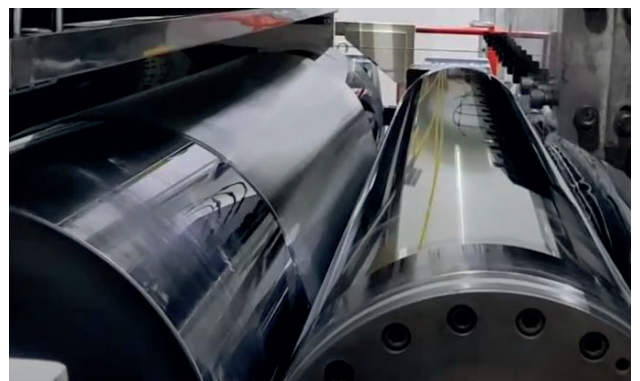


## Case Study 6:

### Edge pinning (cast film extrusion)

**Problem:** In cast film production liquid plastic is poured from an extruder die onto a cold roller. The temperature difference will cause the plastic to shrink reducing the width while increasing the thickness.

**Solution:** By positioning a Meech IonCharge50 generator and edge pinning heads over the edge of the film, the static charge that's applied will hold the film in position, reducing the risk of shrinkage.



# Helping the Medical Sector

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 the wearer and others.

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



## Material Slippage:

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
- Material slippage
- 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.



## 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.



# Static Generation: Applications for Face Mask Manufacture

Due to the increase in demand for face masks and PPE, Meech have looked at how the static generation equipment, can solve the existing issues within face mask manufacture in the following ways:



## Case Study 7:

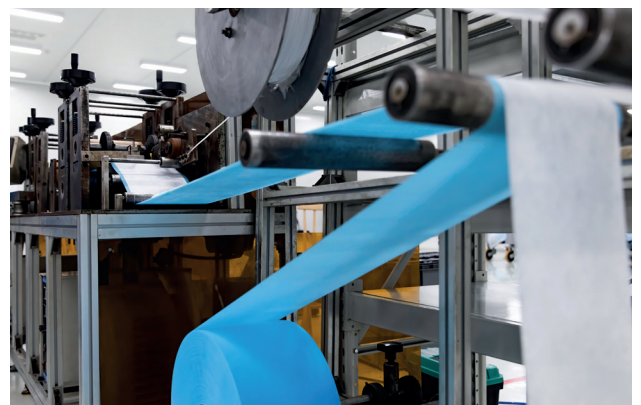
**Problem:** Material not aligning correctly on the production line, leading to increased production downtime and increased scrappage as the masks were bonded together incorrectly.

**Solution:** Install a Meech IonCharge30 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.

## Case Study 8:

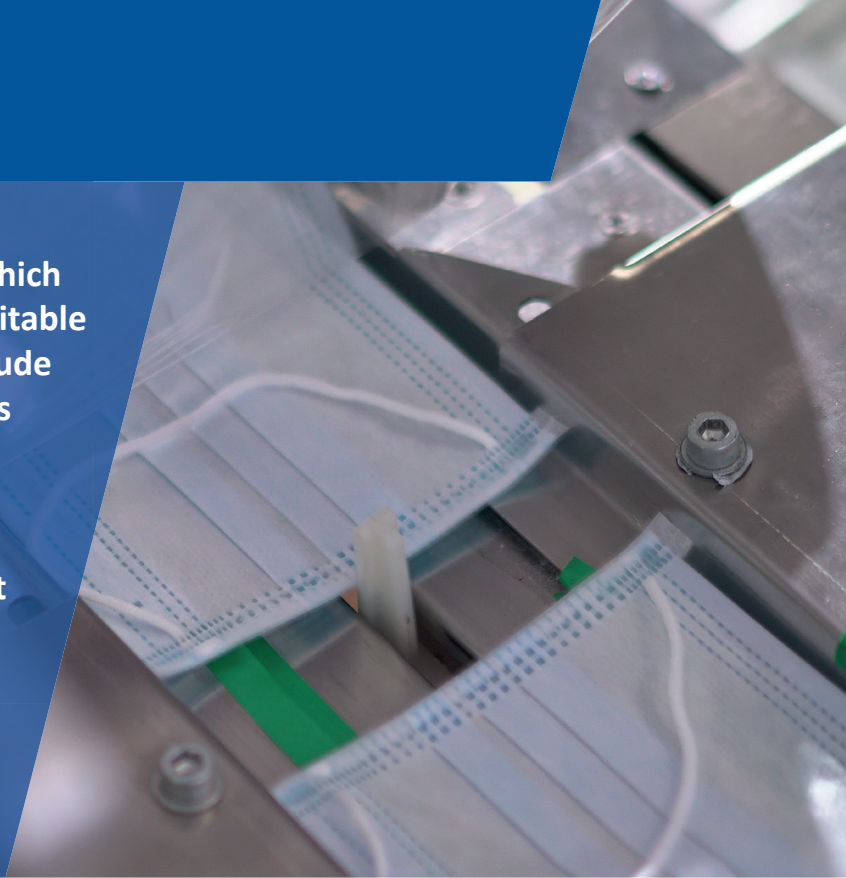
**Problem:** Increased particle filtration performance is required in order to perform effectively and meet N95 standards.

**Solution:** Install an IonCharge50 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 Techmer additive\*) allowed a greater particle entrapment, as airborne particles that passed through the mask are increasingly attracted to the filtration material's charge, thus trapping more particles and improving the overall filtration performance.



# 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.

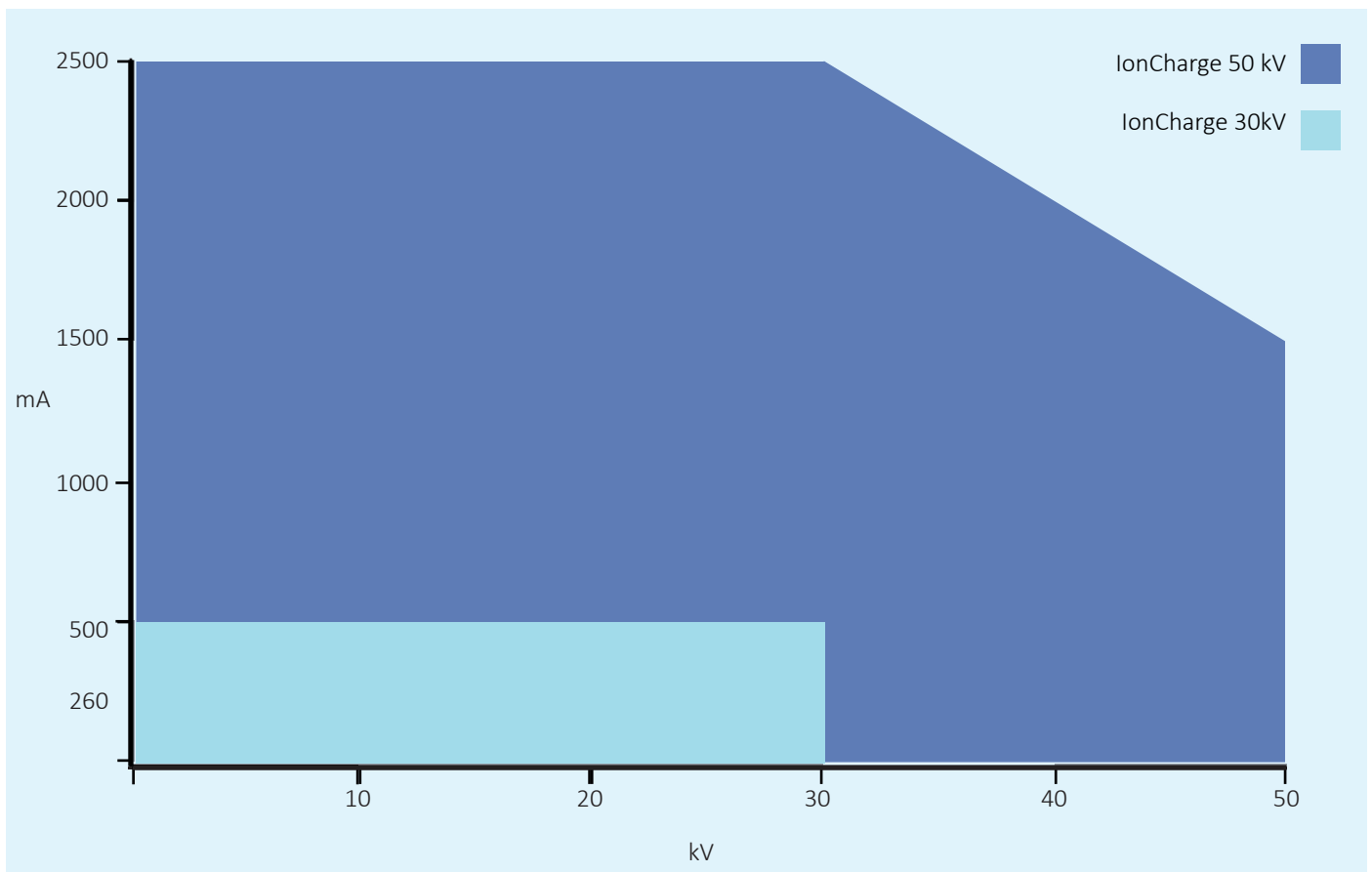


## Generator Operating Limits:

The graph below shows a comparison of the operating limits of the IonCharge30 and IonCharge50.

## Providing the Solution:

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



# Engineered Solution: IonCharge30 (15W)



## Product Overview:

IonCharge30 is designed for use across a range of common applications including pinning, bag making and card insertion. It uses advanced high voltage technology and software for a controlled static charge via our range of static generator bars and pinning heads. The static charge can be either positive or negative (model dependant) and is used to impart 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 touch-screen 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.

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, ease of installation.
Independently Selectable Voltage and Current	Increased control across a range of applications and material types.
Perforation and hole detection	Built in perforation and hole detection functionality for use in applications such as the manufacture of plastic bags.
Colour Touch Screen User Interface	Clear and intuitive information display and simple input of settings.
Industrial Network Connectivity (Optional)	Integration with PLC's for monitoring and control.
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: IonCharge50 (75W)



## Product Overview:

IonCharge50 (75W) static generator is designed for a range of applications, including core pinning, laminating and sheet pinning. It uses advanced high voltage technology and software for a controlled static charge via our range of static generator bars and pinning heads.

The IonCharge50 provides independently selectable voltage and current and the inclusion of a colour touch-screen 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.
Independently Selectable Voltage and Current	Increased control across a range of applications and material types.
Perforation and hole detection	Built in perforation and hole detection functionality for use in applications such as the manufacture of plastic bags.
Colour Touch Screen User Interface	Clear and intuitive information display and simple input of settings.
Industrial Network Connectivity (Optional)	Integration with PLC's for monitoring and control.
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: 995 Claw Style Edge Pinning



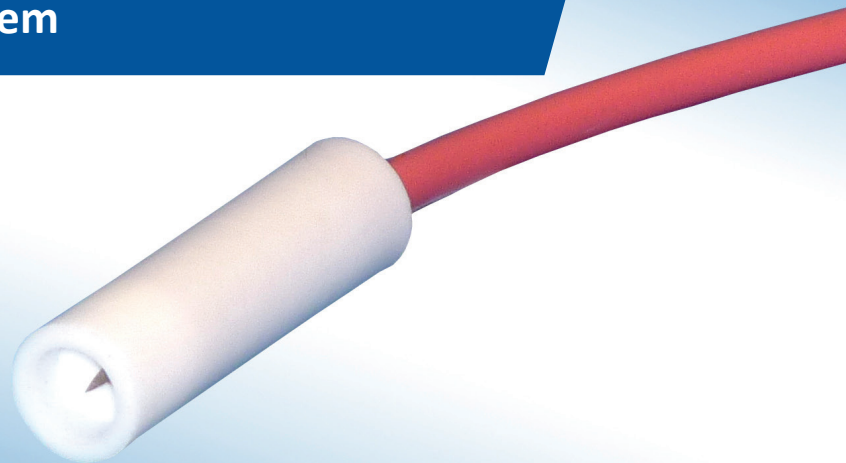
## Product Overview:

The 995 Edge Pinning Claw is a powerful pinning head intended for use on cast-film lines. Pinning the edges of the cast film to the chill roller prevents necking of the film. Resistively coupled titanium pins deliver spark free pinning.

The 995-CLAW can be powered by our 30kV IonCharge30 generator.

Feature	Benefit
Resistively coupled	Spark free, independent operation.
Flexible titanium pins	Adjustable to suit installation, long service life.

# Engineered Solution: 994SPP Single Point Pinning System



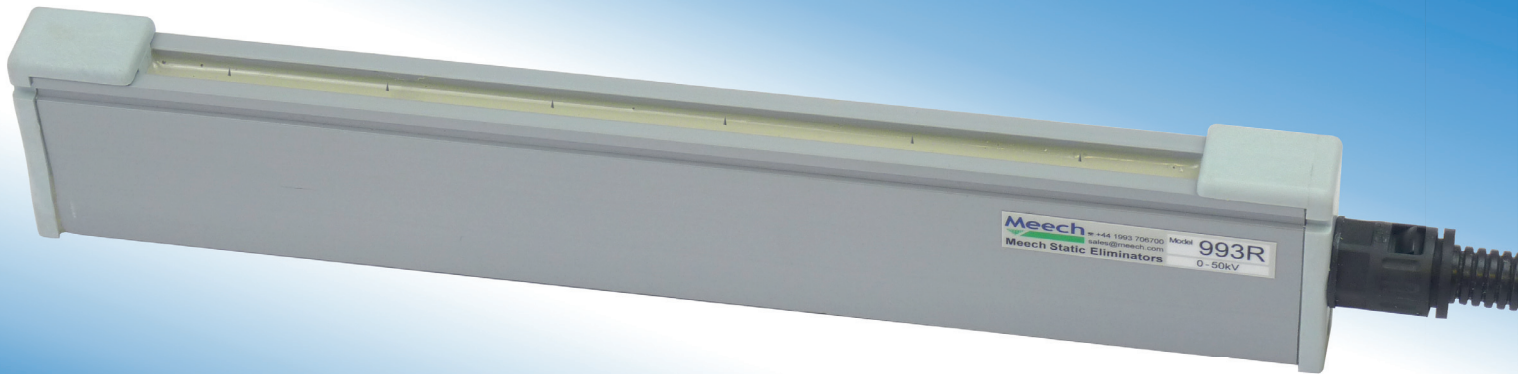
## Product Overview:

The 994 Single Point Pinning System provides extremely compact pinning heads. These are ideal for localised static pinning in applications such as in-mould labelling.

The pinning heads are connected to an IonCharge30 high voltage supply via a resistive splitter box (4 way or 6 way). The individual resistive coupling ensures smooth spark-free pinning, with completely independent operation of each head.

Feature	Benefit
Resistively coupled	Spark free, independent operation.
Flexible titanium pins	Adjustable to suit installation, long service life.

# 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 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.

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