Static Electricity and Digital Printing

Static electricity is a significant problem in digital printing.

Fraser has worked with leading manufacturers of printing machinery and digital print technology to become the foremost provider of high quality, cost-effective solutions to these problems.

The problems can be one or more of the following:

1) Print Quality - where the ink droplets are distorted by the field of the static charge on the media surface.

2) Dust attraction - dust attraction must be prevented, or if it is unavoidable it must be removed from the substrate along with neutralising static charges before printing.

3) Shocks to operators - high levels of static electricity can be built up in all industries where synthetic materials are used. In digital printing, it is very common in roll to roll printing and when removing rigid sheets from flat bed printers.

It is especially problematic in UV printing on rigid media but it can also be present in solvent printing on flexible materials.
This document concentrates of UV printing on plastic substrates, but includes sections about removing dust and avoiding shocks.

INDEX:

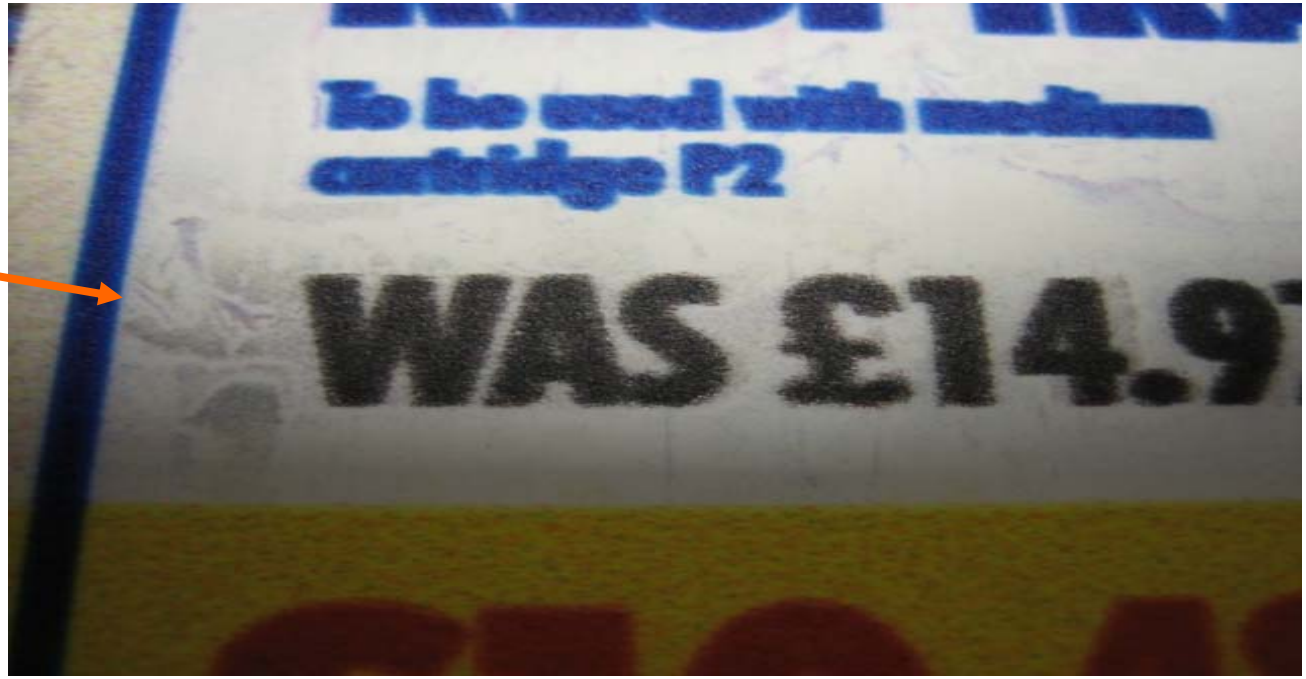
The Static Problem: Print Quality in UV Printing

Static electricity causes the ink to be diverted to non-image areas, causing misting and unacceptable quality.

This is especially noticeable on a white or light coloured background.

Some materials hold more static than others. Often thick foam or sandwich materials are especially problematic.

Materials protected by a plastic film can become very charged when the film is removed.



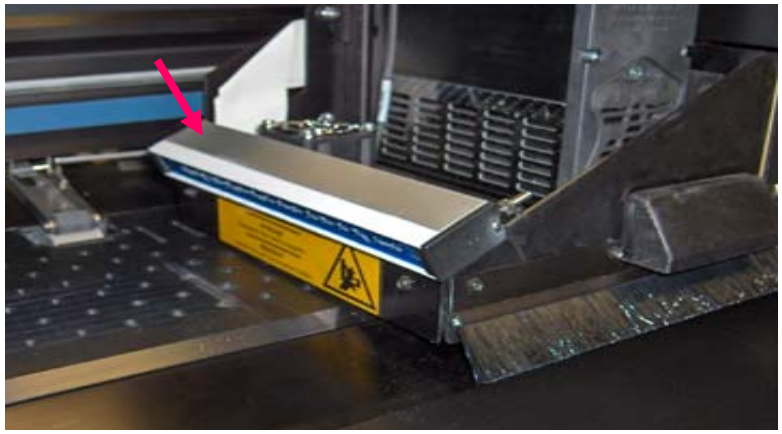
The same job with static eliminator bars turned ON.

The white areas are clean, with no misting or contamination.

Static Electricity and UV Printing. Print Quality continued

Fraser offer 3 solutions to printing quality problems, using Fraser Static Eliminator Bars.

1250-S Bar mounted either side of Print Head



A 1250-S Static Eliminator Bar mounted on each side of the carriage, as above, outside of the UV lamps, at 45°, neutralises the sheet at each pass.

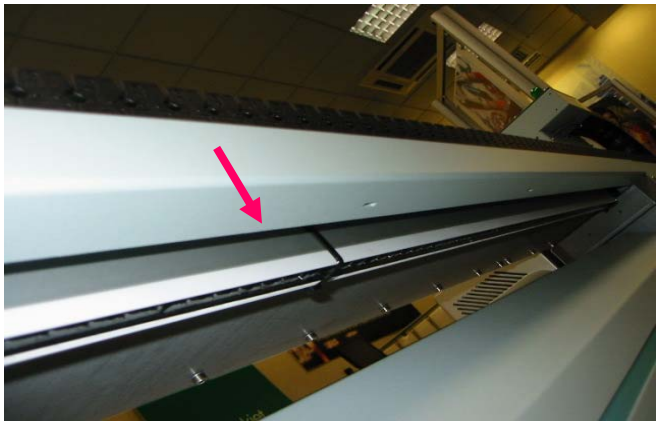
The Power Unit can be mounted on the carriage, if this is permitted, or it can be mounted at the end of the caterpillar track. The cable from the 1250-S Bar is EMC screened to prevent any electrical interference, and it is also very flexible and durable.

For: Best static neutralisation system for this specific issue.

Against: Some carriages are too small to hold the Bars and/or Power Unit.

See pages 4 to 9 for examples

1250-S Bar mounted on Gantry Leading Edge or Printer Feed Gate



Where the carriage is not suitable to hold 2 small Static Eliminator Bars, one long Bar can be mounted on the gantry leading edge or on the feed gate to neutralise the sheet, as shown above.

The long range of the 1250-S Bar allows it to neutralise the charge in the widest range of material thicknesses. The Power Unit can be mounted on the side of the machine.

For: Simple, easy installation.

Against: A large system can be more expensive than Bars mounted on the carriage.

See pages 10 for example.

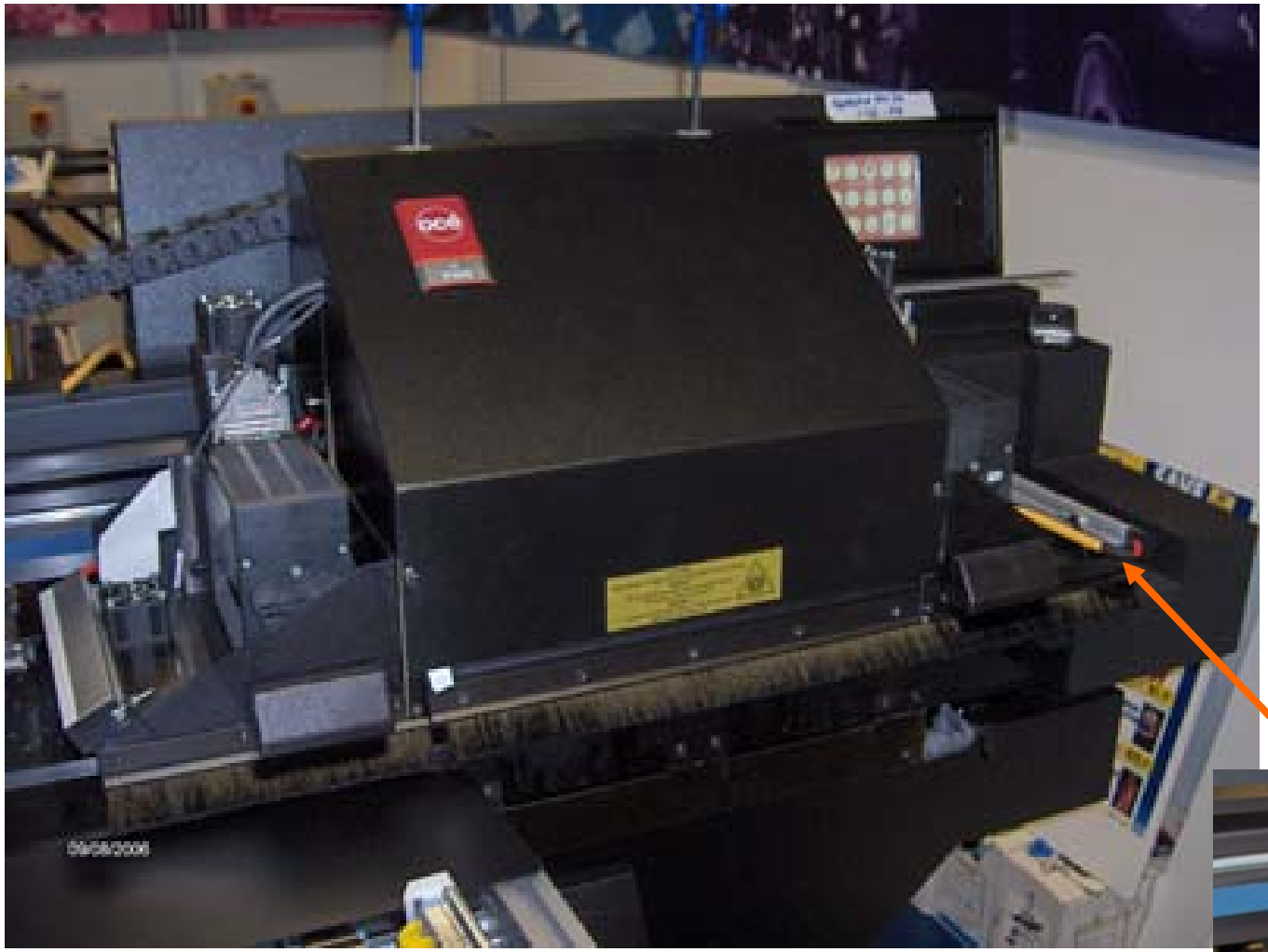
Long Range 3D coverage Ionstorm Bars above Bed

Fraser`s unique Ionstorm Long range Static Eliminators can be mounted above the print bed of open flat bed printers to shower the whole area with ionised air to neutralise the static charge - see above. Two Bars are required for most machines sizes.

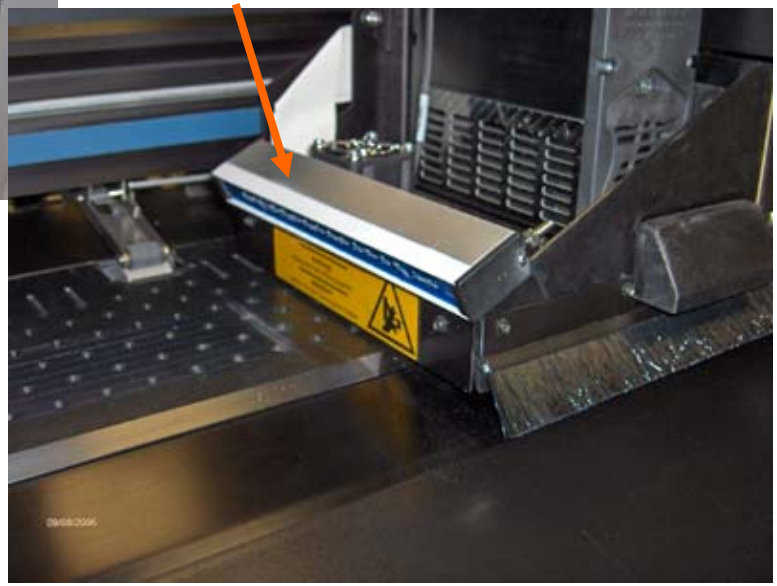
For: Neutralises the static charge generated when pulling off protective film, preventing dust attraction and ink deflection during printing.

Fitted above the machine - not on it.

Against: More expensive than other options.



1250-S Static Eliminator Bar

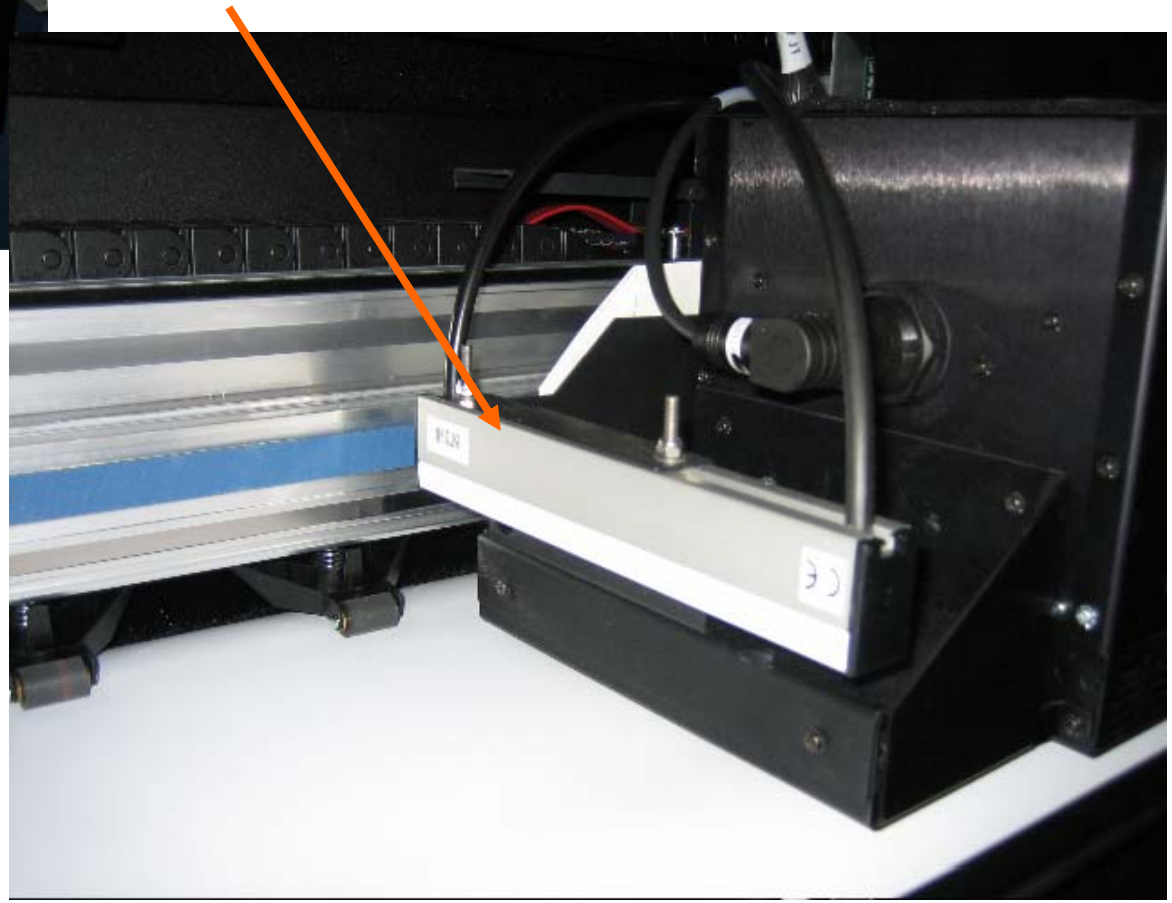


Océ / Colorspan 72UVR

Power Unit at other end of caterpillar track.

1250-S Static Eliminator Bar on each side of the carriage. Best if angled at 45° from the UV lamps. This gives better effectiveness and reduces ink contamination.

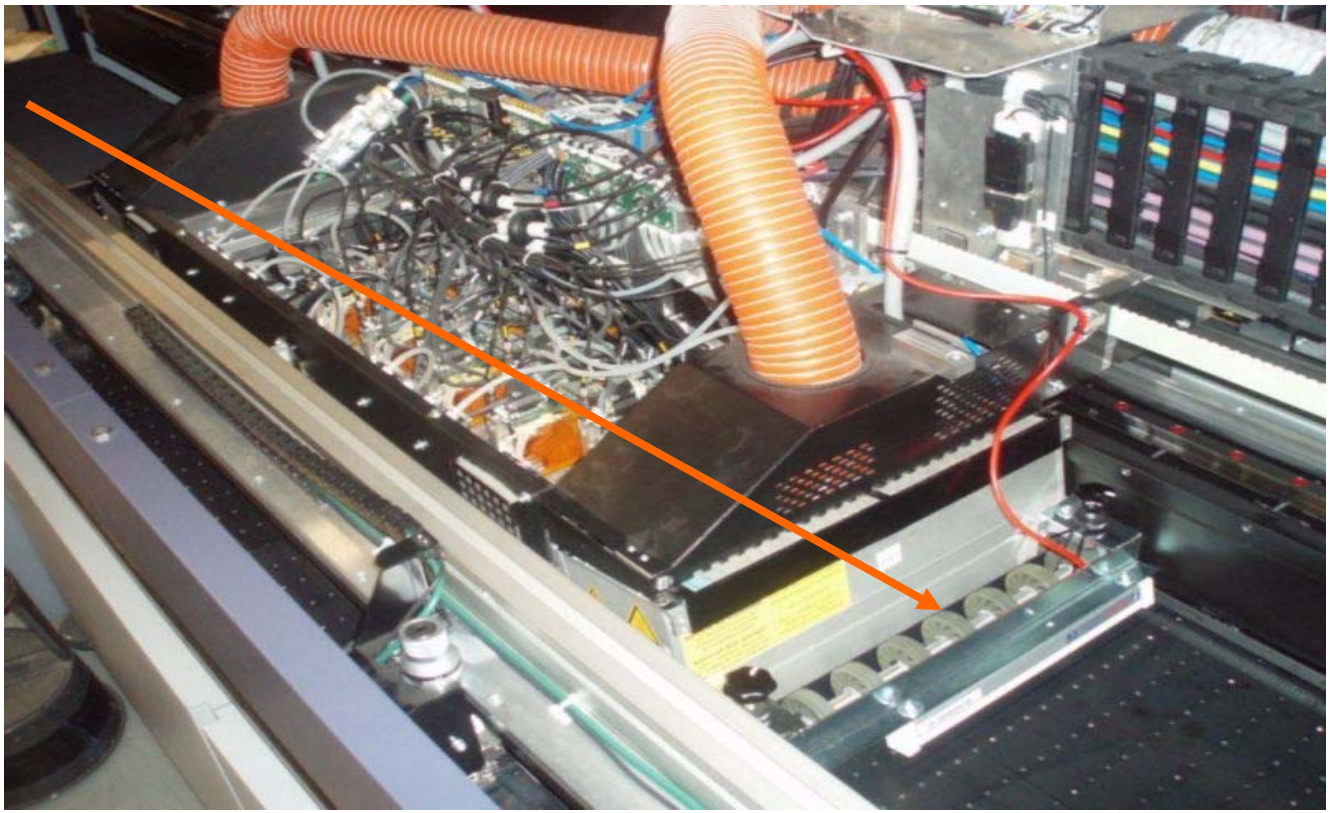
Power Unit is mounted at other end of caterpillar track.



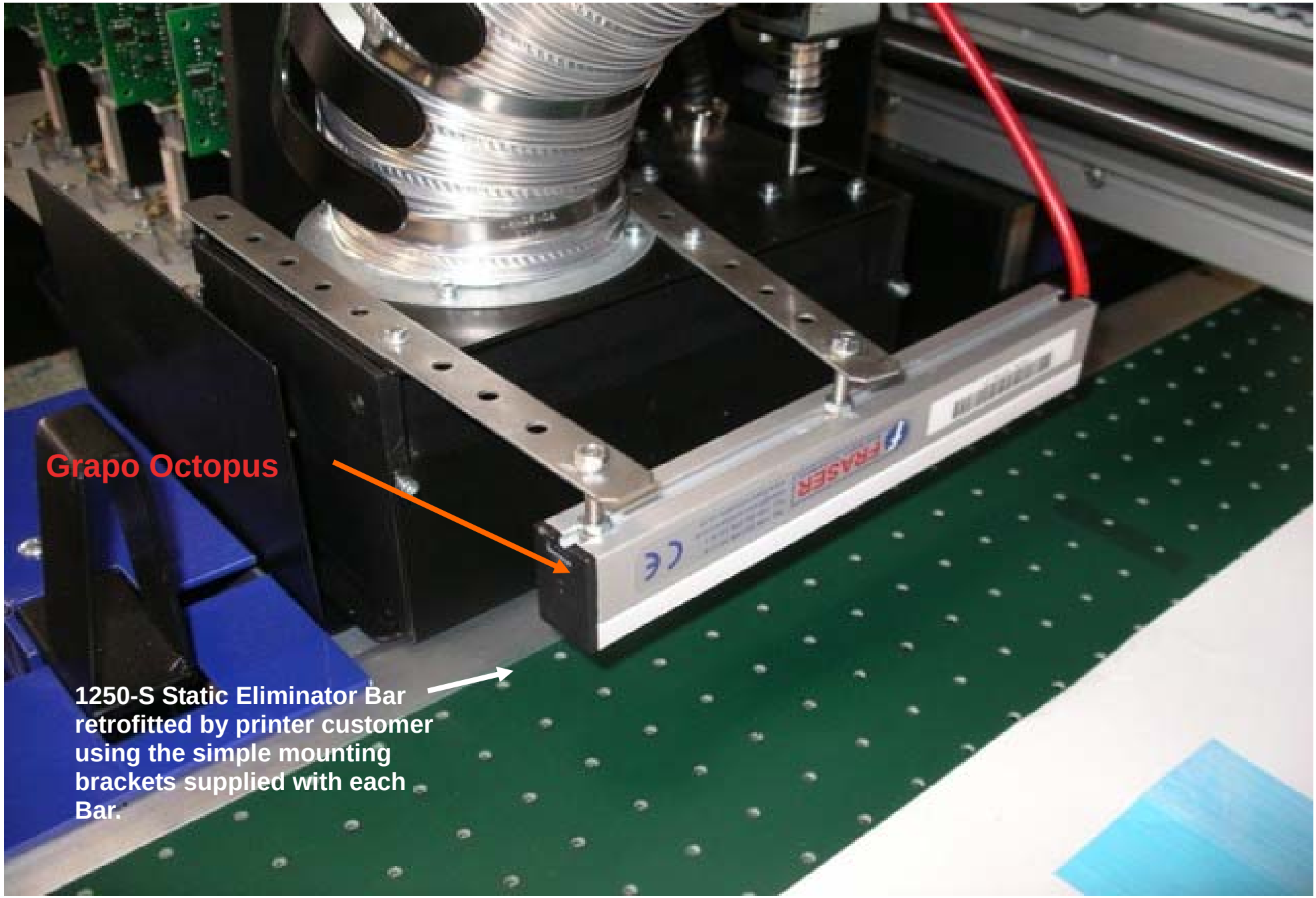
HP Colorspan 5400

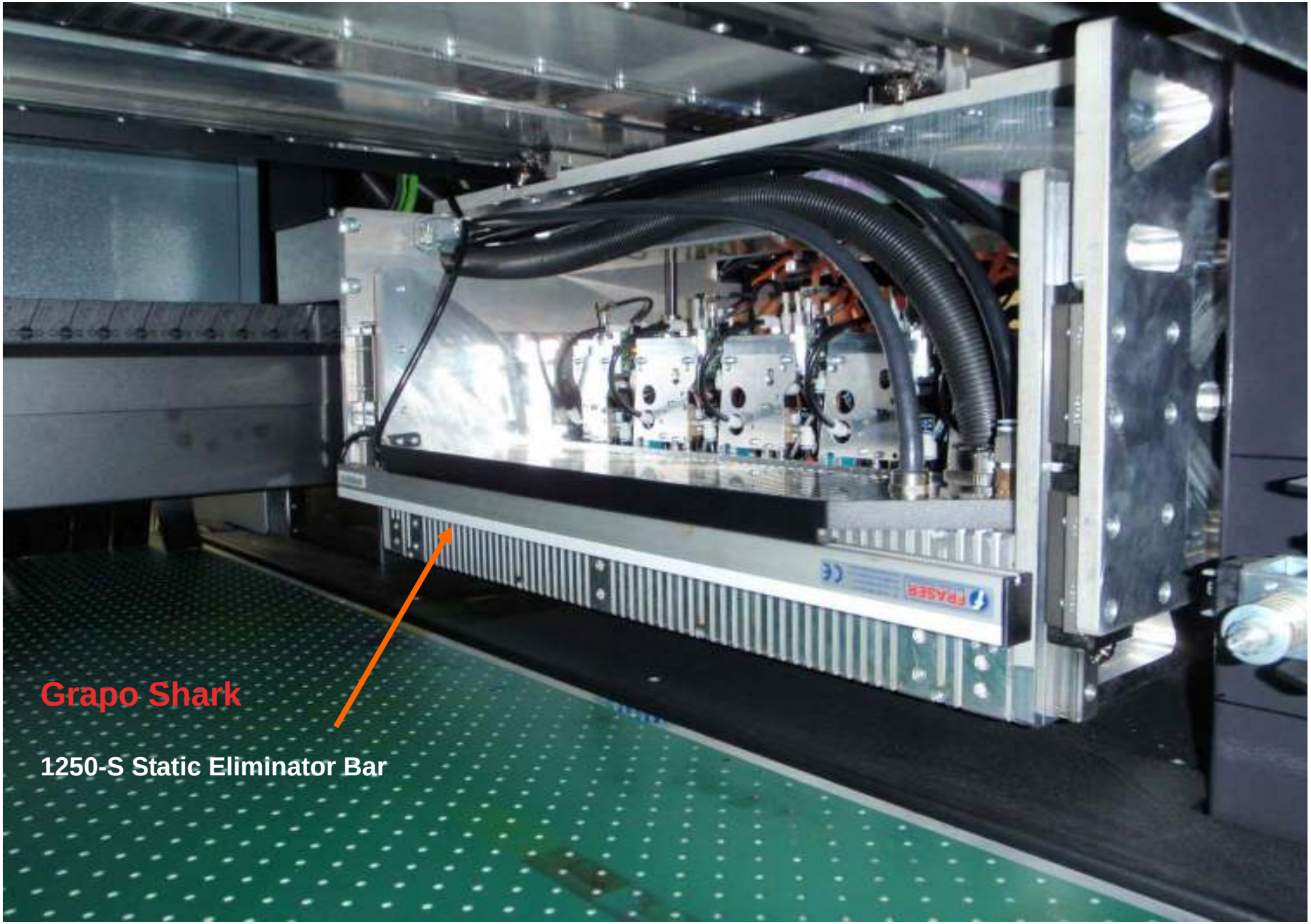

Agfa Annapurna
Static Eliminator Bars

1250 Static Eliminator Bars



Durst


Grapo Octopus
1250-S Static Eliminator Bar retrofitted by printer customer using the simple mounting brackets supplied with each Bar.


Grapo Shark
1250-S Static Eliminator Bar


Fujifilm Acuity
Our innovation made UV inkjet a reality
1250-S Static Eliminator Bar

1250-S Static Eliminator Bar mounted on the side of the Ibis track carrying frame

Océ Arizona

2 x Ionstorm Bars to ensure that the sheets are completely static free before and during printing

Raster Printer

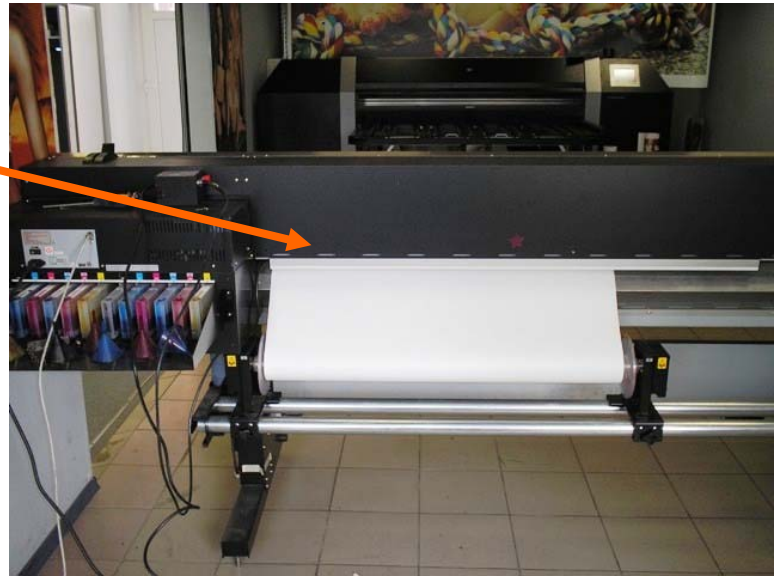
This customer uses an Ionstorm Long Range Static Eliminator to shower the bed with ionised air to kill the static charge in the sheet. For larger sheets 2 Bars are required.

Roland Printer

101 Static Discharge Brush

406/7 Tapebrush

1250S Static Eliminator Bar



Dust and Static

Positive dust attraction to a plastic sheet begins when the surface voltage of the static electricity exceeds 1.5kV. When the charge exceeds 20kV all the airborne dust within 1m of the sheet will be attracted to it.

When you clean a typical plastic sheet with a dry cloth you can generate in excess of 20kV.

When you remove the protective film from a sheet you can generate in excess of 50kV.

It is not a surprise that dust attraction can be a major quality problem for the digital printer.

A 4100 Ionised Airgun does 2 jobs:

1) It removes the dust.

2) It kills the static charge which has attracted the dust.
This charge is normally in the sheet, but it can also be in the dust.
This is important because it means that the sheet cannot re-attract dust unless the operator regenerates the charge by bad handling.

It is best to hold the sheet above the table for best static neutralisation as shown in central photo. For large sheets this may not be possible.

928 Anti-Static Brush

914 Anti-Static Brush

914 and 928 Anti-Static Brushes are alternatives to the 4100 Guns if the dust problem is light duty, or infrequent.

Static Electricity and Laminating

Numerous static issues are encountered when applying protective optically clear self adhesive lamination film to the printed face of a graphic display board, they include the attraction of contamination which becomes sandwiched between the graphic board and the protective film.

In addition repulsion of both surfaces can lead to air bubbles also being trapped between both layers. Where static attraction between both surfaces occurs it is often difficult to place both surfaces together without creasing, folding etc.,

At the nip the point where the release backing web is peeled free from the lamination film, huge static charges are generated leading to the attraction of contamination to the glued side of the film well before both surfaces meet up for laminating. Often as laminated board is hauled out from the laminating head along the lay up table operators receive large static shocks.

By neutralising both the film and graphic board before lamination occurs many of these issues are immediately eliminated, the nip is a very important position to neutralise.

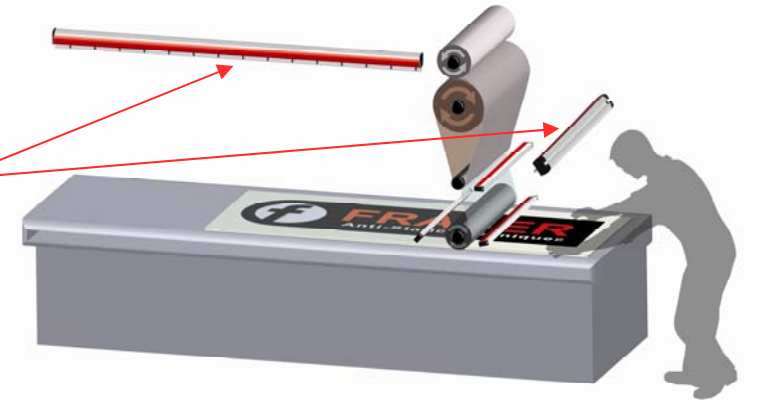
Standard 1250 ionising bars can be used in close proximity to the critical areas or long range 3D coverage can be achieved using Ionstorm bar(s).

A long Ionstorm bar can be used over the haul off table to prevent operator shocks. Where such tables are used on a mounting machine, the laminating head moves along the table whilst the backing release sheet is manually removed, the Ionstorm bar will prevent all of the static issues normally encountered in this process.

Before commencing lamination with a mounting machine, it is advised to pre-clean and neutralise the graphic board surface with a 4100 ionised air pistol.

1250-Slot Bar

3850 Ionstorm Bar and Controller



Lamination in progess

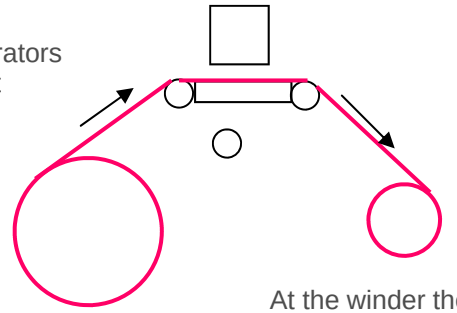
Static Shocks in Digital Printing

Static shocks occur wherever operators handle statically charged plastic products. Please contact Fraser for more information about general static problems.

The most common source of shocks in digital printing is in roll to roll printing. This is explained below:

At the unwind static is generated at the point where the film separates from the roll.

This can give shocks to operators and it can result in poor print quality.



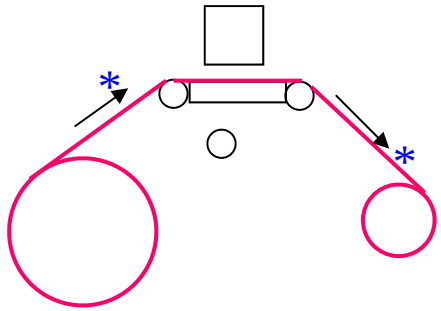
At the winder the charge in the film accumulates in the roll until it can give serious static shocks.

Fraser 850 Anti-Static Cord is available in reels of 10m, 25m and 50m.

Fraser can offer a range of solutions to these problems.

The simple solution is to use Fraser 850 Anti-Static Cord on the unwind and also on the rewind.

Hang the 850 Cord on the material in the positions shown by the * One end must be connected to an earth.



The material must be in free air opposite the * not against a roller or other part of the machine.

For enquiries and further details, please contact the manufacturer:

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