1250 and Super 80 Bars

The 1250 Bars are important products, so we will give some background about their development.

The original shockless static eliminator bars originated in the 1940s and used a capacitive coupling with the high voltage to reduce the energy on the emitter pins so that you did not receive a shock. This was not very efficient - you need at least 7kV in the Power Unit to generate about 3kV at the emitter pins.

Simco and Haug still use this technology because it is cheap and compact.

History

The 1250 Bar was our original high performance static eliminator bar. It uses a resistive coupling with the high voltage to make it shockless. This enables it to be considerably more powerful than most bars utilising the old capacitive coupling method.

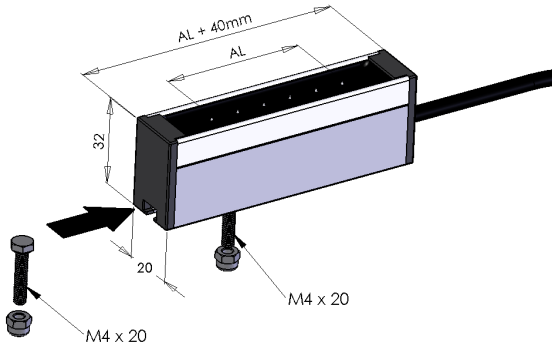
Using 5.5kV we can achieve a voltage on the emitters of about 5kV, which gives three times the performance of older designs.

The original 1250 Bar design was made in 2001 and had blue resin and white end caps. Mounting was with fixed studs in the bottom of the Bar, as shown above. This Bar was very successful.

In 2006 a machinery manufacturer asked us to make the 1250 Bar more compact with a flexible mounting system, so we designed the 1250-S. The “S” means “slot” in which the M4 hexagon head mounting screws slide. The elimination of the white end cap made it more compact.

At the same time we changed the colour of the epoxy resin from blue to black, purely for cosmetic reasons.

The 1250-S is easier to install in many applications because the fixing studs can be positioned anywhere in the slot.



The original 1250 design is still available, but most people choose the 1250-S because of its easier installation. There is no difference in performance or price between the 1250 and 1250-S. In the rest of this manual we will refer to the 1250-S to include the 1250 and Super 80 unless we say otherwise.

Notes

The 1250 / 1250-S Bars, which work with 5.5kV, are very powerful static eliminators. However with machine speeds increasing all the time, we needed to offer machinery manufacturers a Bar which could cope with speeds in excess of 1000m/min. In 2008 we therefore launched a more powerful 8kV version of the 1250-S, called Super 80.

The Super 80 Bar has bigger resistors inside to cope with the higher voltage and a higher resistance value to make them shockless.

Externally the Super 80 is the same as the1250-S. The only visible difference is that the emitters on the Super 80 are 15mm apart, compared to 10mm separation on the 1250-S.

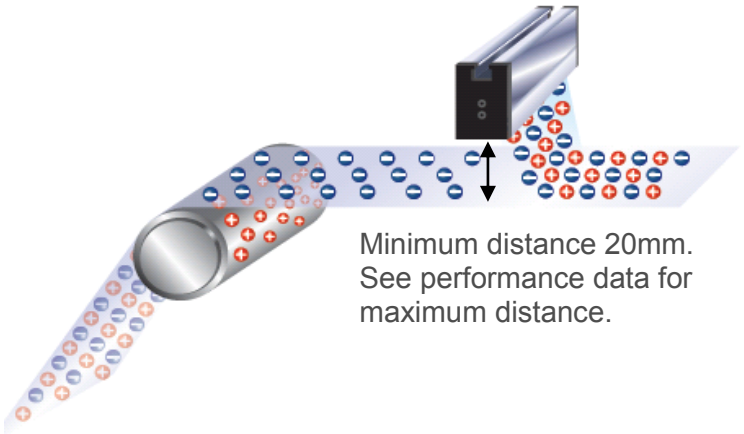
Super 80 with emitters at 15mm pitch

1250-S with emitters at 10mm pitch

Description

The 1250 (and 1250-S and Super 80) Bars are “short” range static eliminators designed to be positioned close to the product to be neutralised. The 1250 should be within 150mm of the product, the Super 80 within 200mm.

Generally the closer to the material, the better the performance - see performance data later to see the relative efficiency at various distances. However, the Bar ***should not*** be positioned closer than 20mm from the material as this will not allow the ionised air to cover the whole surface.



Minimum distance 20mm. See performance data for maximum distance.

How it works

The 1250 Bar has a row of sharp emitters which are connected to the high voltage supply through resistors. When you apply high voltage to a sharp point the electric field becomes very intense and the air breaks down into (+) and (-) ions. The air becomes “ionised”.

This field of ionised air is projected outwards by the design of the 1250-S Bar. The ionised air wants to go to earth, but is prevented from this by the white plastic extrusion. So the ions travel outwards away from the emitters towards the static charge.

Notes

You can feel this movement of ionised air if you put your hand 50mm above the emitters - there is a cool sensation.

The high voltage alternating current produces both positive and negative ions from the same emitter. If the static charge is positive (for example) it will attract negative ions to neutralise itself and propel positive ions away.

The ions have a life of about 2 seconds - after this time they recombine or go to earth.

If the static eliminator bar cannot be positioned close to the product the ions can be transported by air assistance. See 1250-AB Airboost Bar.

Construction

Body: Anodised aluminium and ABS extrusion.
Black ABS endcaps.

Internal materials are a specially formulated epoxy resin which is resistant to ozone and UV light.

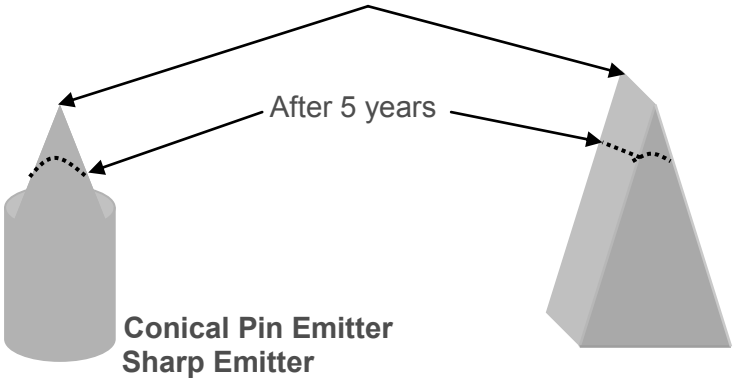
Maximum length of Bar is 6m. This is longer than most competitors. Minimum length is 80mm.

Emitters: The 1250 Bar has special "stay sharp" emitters which are etched out of flat 0.3mm hardened sheet. This is important in the ionisation process - the sharper the better.

All emitters are subject to "spark" erosion in the ionisation process. This gradually reduces the sharpness of a point. Our competitors use conical pins which lose their sharpness much quicker than our design. Our emitters will always have a maximum radius of 0.15mm - even after 10 years. After 5 years the radius of the point of a conical pin will be typically 0.5mm resulting in decreased performance.

This is an important sales point and is illustrated below:

When New - the sharp points produce good ionisation



Fraser Stay-Sharp Emitter **Conical Pin Emitter**

With the conical pin the erosion has reduced the sharpness and the performance is much lower. A 2mm pin will have a point radius of at least 0.5mm after 5 years.

With the Fraser emitter here is the same erosion but the emitter stays sharp with a radius of 0.15mm which is guaranteed by the thickness of the emitter

Competitors claim that their emitters have special benefits. One competitor (Meech) claims that their emitters are more hygienic than others - what nonsense! We are the only company to offer a 5 year warranty on emitters.

Notes

Conditions:

Max temperature is 85° for the FR-ABS extrusion

Humidity: max 70%, non-condensing. In higher humidity there will be some loss of performance as the surface moisture allows energy to flow to earth instead of being used to ionise the air.

The construction of the 1250 is waterproof. This means that it will not be damaged by washing or high humidity. This allows it to be used in food applications where regular wash-downs are used to clean machinery between production runs.

Care should be taken that the emitter pins face Downwards, so that water does not accumulate around them. The power must be turned off during washing. It should be turned on when the bar is dry. Many competitors - Simco, Haug, Meech do not have standard waterproof bars.

Cable Options

The standard cable is the black Hi-Flex cable. This is a high quality cable with great flexibility.

Specification:
30kV inner cable.
Spiral screen providing EMC protection against interference
PVC outer jacket to provide protection and flexibility
Diameter is 7mm max.
Minimum bend radius is 35mm.
Maximum temperature of cable 90°.

Cable entry:
Standard arrangement is coming out of one end of the Bar.

Right Angle Entry:

90° cable entry can be specified with the Hi-Flex cable. The cable centre is 10mm from the end of the Bar and the effective length of the Bar is reduced by 15mm at the cable end there is a small extra charge for 90° cable entry. See pricelist.

Bars in Series

Some applications require Bars to be in series - in a string of 2 or more Bars. The reasons for this may be simplifying the cable arrangement or serving more bars from the same Power Unit. It should be noted that if one of these Bars becomes damaged all of the other Bars become useless.

Notes

Conduit Covered Cable

ATEX certified EX Bars must have conduit covered cable. Both a plastic and metal conduit are certified.
This is available for other 1250 and Super 80 Bars as an option. The plastic conduit is preferred.

This “armoured” cable has a minimum bend radius of 80mm.

It is available with a 90° cable exit in plastic only.

It may be used for Bars in Series.

The extra cost of this option is shown on the pricelist.

1255 Version of 1250

Some engineers want to have a detachable cable. This is understandable if the cable is liable to be damaged - it is much cheaper to replace the cable than the whole Bar.

We designed the 1255 Bar for these customers, to compete with Eltex and other competitors.

However it should be noted that the detachable cable is a source of possible danger. If the cable is detached when the HV is ON then the connector will be live and could give the operator a serious shock.. This is covered in the instructions and is well labelled, but it should be pointed out to the customer that they should make sure that the cable is only disconnected when the Power Unit is turned off.

This Bar is available as a 1255 with fixed studs or 1255-S in the 1250-S body with a fixing slot. The price in the price list includes 2m of detachable cable.

See Datasheet for details on the effective length which is reduced because of the internal connection in the Bar.

Notes

Sales Points for the 1250-S (and Super 80) Bars

Reliability

Encapsulation:
All the sensitive electronic parts are encapsulated in epoxy. This means that they are protected from the environment. Many of our competitors have equipment which will be damaged by damp conditions or water.

Robust Body:
Designed for many years of reliable operation.

Stay Sharp Emitters:

See details on page 3. The emitter pins are warrantied for 5 years.

Performance

Resistive coupling:
For any given high voltage, resistive coupling allows a higher pin voltage for better ionisation. With the 1250-S the pin voltage is up to 5kV (Power Unit 5.5/6kV.)

With the Super 80 the pin voltage is up to 7.5kV (Power Unit 8kV)

Distance:

For short range equipment the ionised air field is large and intense giving performance at distances up to 150mm (1250-S) and 200mm (Super 80).

It is always better to install the Bars at a closer distance subject to the minimum distance. See page 12 for performance comparisons between the 1250-S and Super 80 Bar at various distances.

Installation

Easy to install:
Flexible mounting studs in 1250-S and Super 80.
Alternatively fixed studs with original 1250 design.

Safety

Shockless operation:
both 1250 and Super 80 Bars are shockless in operation. This is achieved by having resistors between the emitters and the high voltage.

These high voltage resistors have the following values:

1250 & 1250-S:	100MOhm	- for use with 5.5kV
Super 80:	150MOhm	- for use with 8kV

Please note that if the resistors are joined in parallel, for examples by a hand touching more than one emitter, then the resistance is reduced and the energy on the pin, and so the shock level, is increased.

Notes

Safety

Ozone:
all static eliminators produce ozone. This is a natural consequence of using high voltage. It is the same with photocopiers and laser printers which use high voltage.

Ozone is a poisonous gas. The ozone produced by our bars is many times below the international standard of 0.1 parts per million in air. The Super 80 Bar produces about twice as much ozone as the 1250 Bar, because of its higher voltage.

You can smell ozone when it is 10 times below the international standard.

We recommend that Super 80 Bars are used only in well ventilated applications to avoid concern from customers.

Emitter Pins:
These are sharp, because sharp points produce better performance. Care must be taken when handling Bars - it is easy to cut your fingers if they touch the emitters.

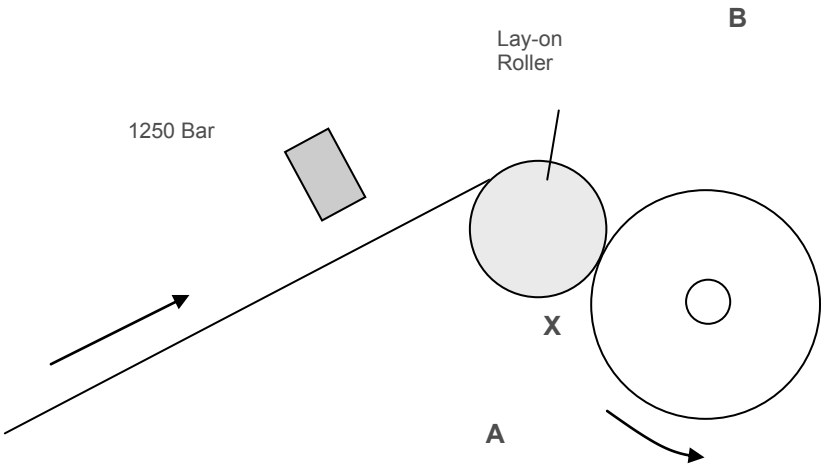
Installation of Bars

Full instructions are supplied with every order, but it is important that you know the most important points regarding the installation of 1250 and Super 80 Bars. See also basics of Static Elimination earlier in this Manual.

Immediately before the problem area

The static charge may be regenerated as the material passes over a roller or further process. If you neutralise the charge too early it may regenerate and still cause the problem.

A good example of this is neutralising the static charge on a film winder which has a lay-on roller. Putting a static eliminator bar before the lay-on roller could be a waste because the charge will be regenerated as it leaves the lay-on roller. This is shown below:



Putting a Static Eliminator Bar before the lay-on roller as shown in the sketch is easy. But it is usually not effective because the static charge will be regenerated by the interaction between the lay-on roller and the film - in position X in sketch.

It is much more effective to put a long range static eliminator in position A or B

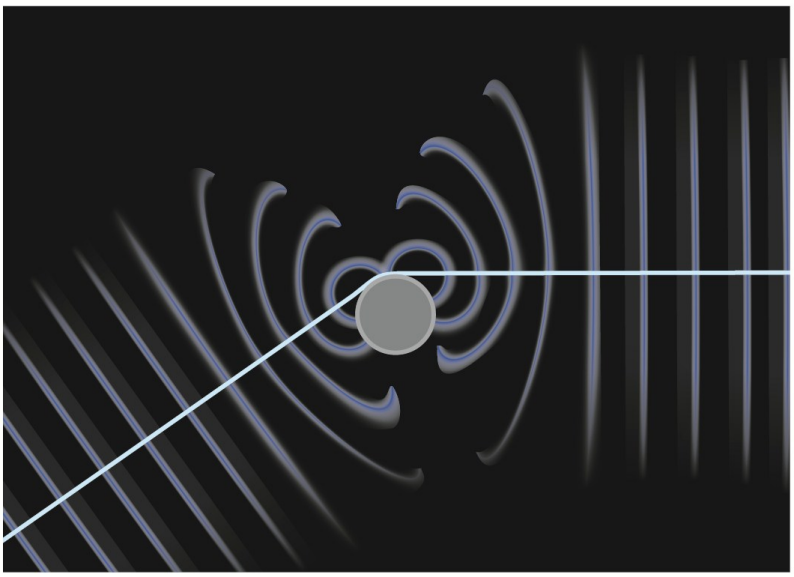
Notes

Material in Free Air

It is best if the material is in free air, not touching another body such as a roller or conveyor. When the material touches another body the static charge "couples" with that body and is not available for measurement or neutralisation.

With a thin material - such as a plastic film - nearly 100% of the charge couples with the other body, so static neutralisation will be impossible.

With a more 3-dimensional product, such as a big moulding on a conveyor, some of the charge will couple with the moulding and some of the charge will be available for neutralisation. The more 3-dimensional the product, the more charge is available for neutralisation.



Film

The static field lines are normally at 90° to the film. When the film passes over a roller, the static field couples with the roller , as shown in the picture above - and cannot be measured or neutralised.

This is also the reason why the Bar should be >50mm after the roller, or other body. The field needs this space to reform.

Distance from Material

See the performance data on page 12 to see the relative performance data. The 1250 Bar is 7 times more effective at 50mm than at 100mm from the material.

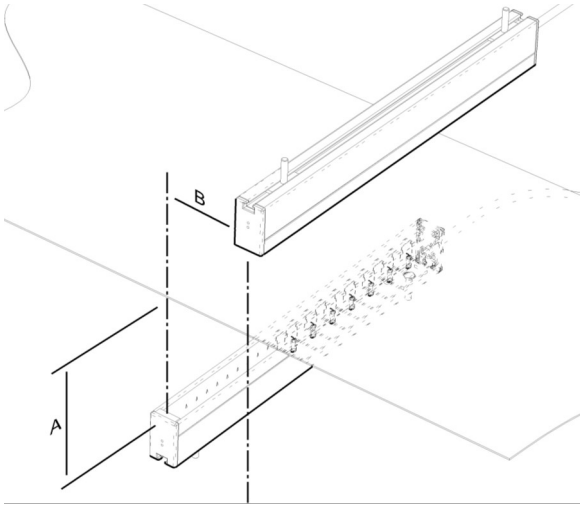
Multi-Bar Installations

For most applications neutralising film on one side is sufficient to neutralise the static charge on both sides - the material is transparent to the charge.

When the material is thick - more than 200micron - or very fast moving, one Bar on each side of the material may be required. There is no scientific formula for this, it is a matter of judgement. It is usually better to over-specify if you are in doubt - the customer`s first priority is to solve the problem.

Notes

With a two Bar installation the Bars should not be directly opposite each other as they could theoretically interfere with each other and create a charge.

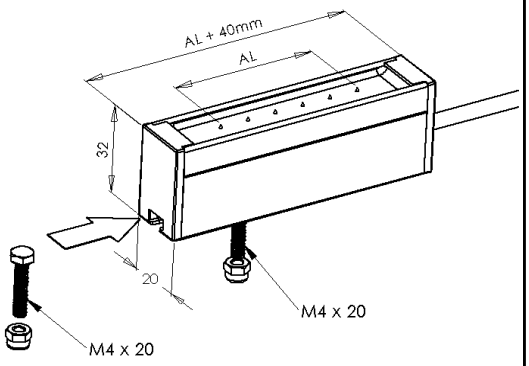


In a 2 Bar installation, distance “B” in the sketch should be at least 50mm.

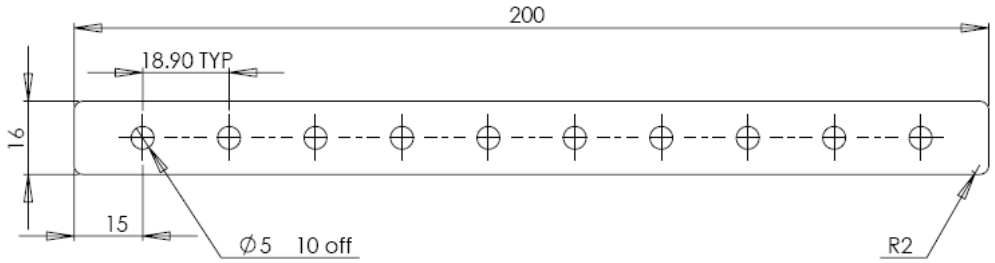
Mounting the Bar

The M4 x 20mm studs which slide in the slot of the 1250-S are supplied with fixing strips in the following quantities:

Bars up to 1m: 2 studs
Bars >1m - 2m: 3 studs + extra stud for each additional 1m or part of 1m



The stainless steel fixing strips supplied with the Bars:



Notes

Performance of Super 80 and 1250 Static Eliminator Bars

The 1250 Bar was designed to be 3 or 4 times as powerful as traditional static eliminators, yet using the lower supply voltage of 5.5kV compared to the 7 or 8kV of those competitors.

To maintain our position in the market, to allow our OEM customers to increase machine speeds and to cope with more static generative materials, we launched the Super 80 Static Eliminator Bar in 2008.

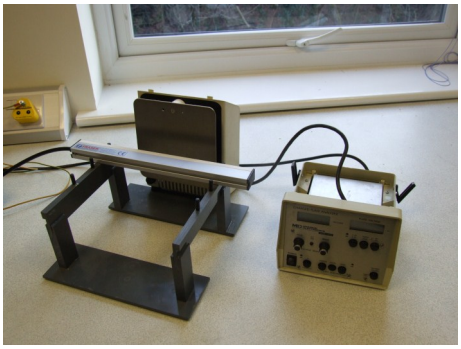
Both Bars have the same body - the only external difference is that the emitters on the 1250 Bar are at a 10mm pitch, while the Super 80 emitters are at a 15mm pitch. See photo.

Both Bars are very powerful - the Super 80 produces nearly 5,000,000 ions per cm^3 at a distance of 25mm. The 1250 generates an ion density of about 4,000,000 ions per cm^3 at the same distance.

When should the Super 80 be used instead of the 1250 Bar?

The answer is that the 1250 Bar will cope with 90% of static problems. The remaining 10% of problems where the Super 80 could be used is when speeds are over 500m/min or where the distance between the Bar and the product is more than 100mm. However, we usually recommend the 3024F Bar instead of the Super 80 Bar.

For a complete performance comparison between the 1250 Bar and the Super 80 Bar we used a charge plate monitor which measures how quickly the Bar reduces a charge of 5000V to 500V.
The results at distances of 25mm, 50mm, 100mm and 150mm, averaging positive and negative readings, are:



Testing the Bars

Decay Time 5000V to 500V in Seconds

Distance	1250 (5.5kV)	Super 80 (8kV)	
25mm	0.011 sec	0.008 sec	37% better
50mm	0.028 sec	0.02 sec	40% better
100mm	0.19 sec	0.125 sec	52% better
150mm	1.12 sec	0.65 sec	72% better

The extra power of the Super 80 is most noticeable at longer distances.

This data also shows the relative efficiency at the various distances. For example, both Bars are more than 6 times as powerful at a distance of 50mm than at 100mm.

It is interesting that when air movement is involved - such as in a 2000 Blower or 5100 Ionised Airknife - there is very little difference in performance. So for these products we will continue to use the 1250 Bar, not the Super 80 Bar.

Notes

Applications

There are so many applications for 1250 Bars that a complete listing is impossible. The following tries to give you an idea of the range of industries and applications for these Bars:

Plastic Film and Sheet including:

Extrusion	Converting	Tape Lines
Printers	Centre Winders	Sheet cutters
Laminators	Perforators	Embossing
Bagmakers	Signs	

Plastic Mouldings including:

Blow Moulding	Thermo & Vacuum Form	Injection moulding

Packaging, Food etc including:

Stretch wrapping	Closures,	Plastic Bottles
Canning	Conveying	Wrappers,
Overwrappers	Checkweighers	Ink jet
Shrink sleeve	Tamper Evident	Label application
Cigarettes	Drying	Vertical Form Fill Seal

Paper and Printing

Digital Printing	Paper Mills	Converting
Paper Products	Tissue	Paper Folders
Wallpaper presses	Screen Printing	Pad Printing
Flexo Presses	Gravure presses	Forms Presses
Label Presses	Sheet and Web Presses	

Textile

Carding	Beaming	Warping
Sizing	Stenters	Finishing
Inspection Machines	Transfer Printing	Non-wovens
Technical Fabrics	Creels	Lace machines
Narrow fabrics		

General Industry

Conveyors	Pneumatic transport and handling

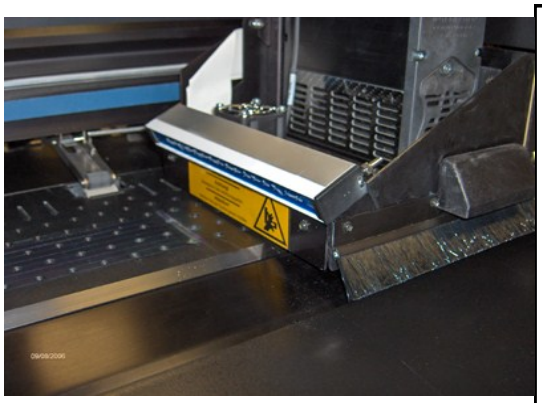
Hazardous Applications

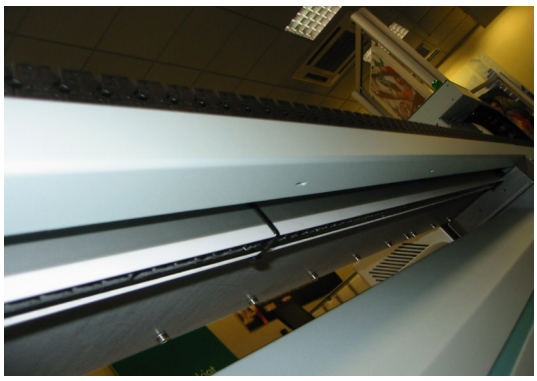
For EX / ATEX applications see EX1250

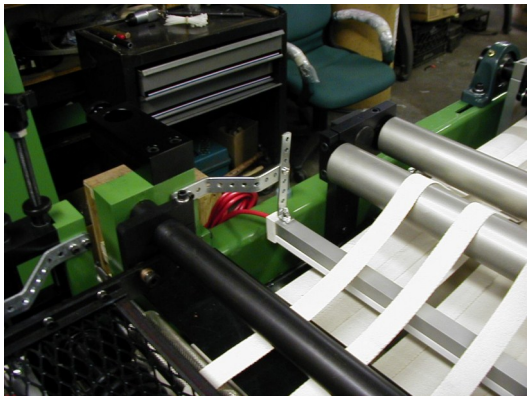
The 1250 can be used as a replacement on many competitive systems - subject to special connectors etc not being required. Please contact factory for possibilities.

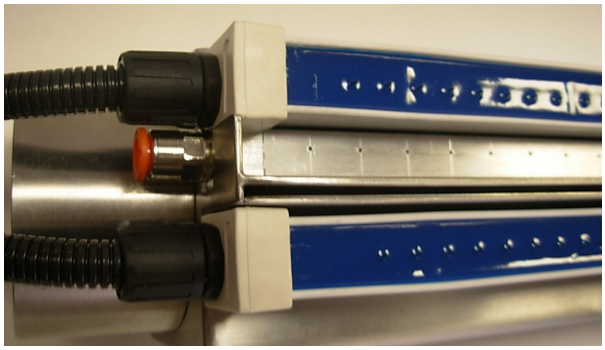
Notes

1250 Application Photos









2 x 1250 Bars on an OEM film cleaner which uses high speed air and suction.

The first bar neutralises the static in the dust and material to allow the dust to be cleaned off.

The second bar makes sure that the material has no static after the cleaning process.

Notes