

Answers to central issues  
in packaging, decorative and  
publication printing



**ellex**

electrostatic  
innovations



**Electrostatic printing assist  
ESA GNH61, ESA GNN75, ESA GNN71**

## 1

## NEED

## Why does gravure printing actually need electrostatic printing assist systems?



Until a few years ago, electrostatic printing assist systems were some kind of “face-lift” for publication printing, for instance for exclusive up-market magazines.

Today, consumers expect ultimate quality in their printed products. “Good” is just not good enough. In most publication printing presses, electrostatic printing assist systems are now a matter of course, because they provide substantial improvement in ink transfer, even at high printing speeds. “Missing dots” are thus a thing of the past. The final product is a higher-quality printed image having high ink and color density.



## 2

**BENEFITS**


## What good is an electrostatic printing assist system in packaging and decorative printing?

What has been the trend in publication printing can also be seen more and more in packaging and decorative printing. The competitiveness of products in the eyes of the consumer often relies on the visual impression created by the packaging or decorative design.

High quality design needs high print quality. This can best be achieved with electrostatic support, because it is the only technology that effectively prevents “missing dots”.

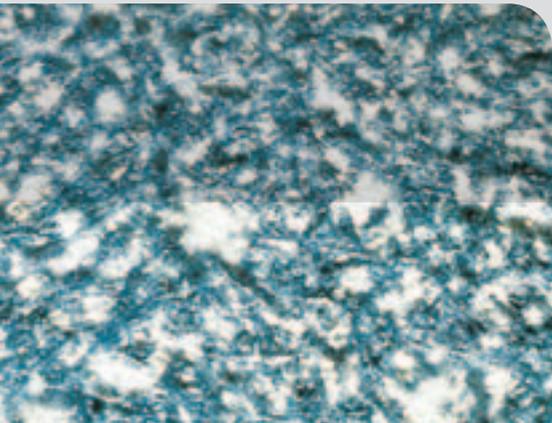
A packaging or decorative gravure press optimized with an electrostatic printing assist system (ESA) provides an immediate competitive advantage – ensuring that your customers will get the best in printing quality.



## 3

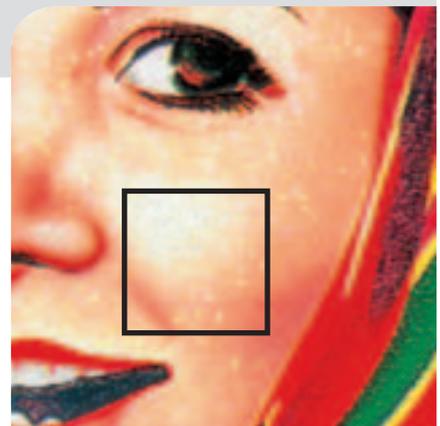
## PRIMARY ISSUE

## How do missing dots actually occur?



At first glance, the paper surface appears to be smooth. But, if you look at it through a microscope, you will see that it has a rough surface. In the nip, this irregular “fiber jungle” (in a 70 l/cm screen, for example) is faced with 4,900 cells per square centimeter. All of those cells are expected to transfer their ink content to the paper within a split second. This task, already difficult, is made even harder by the fact that some papers have poor surface compressibility and are not exactly elastic or pliant. Thus, at normal printing speeds, mechanical contact alone does not always result in complete ink transfer from cells to paper.

This phenomenon worsens at higher printing speeds. Coated substrates or other pre-impregnated materials also exhibit this problem.

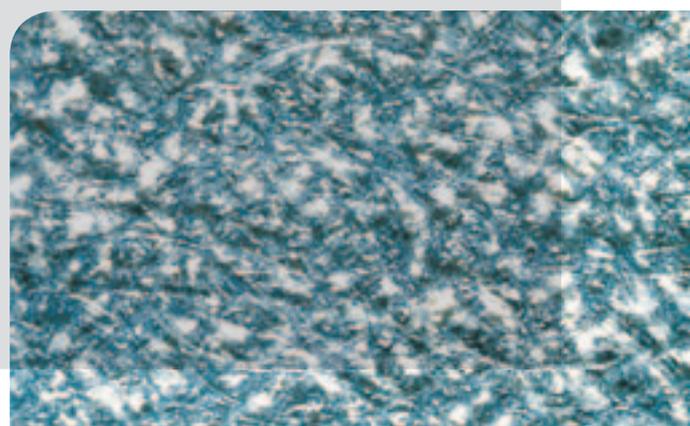




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SOLUTION

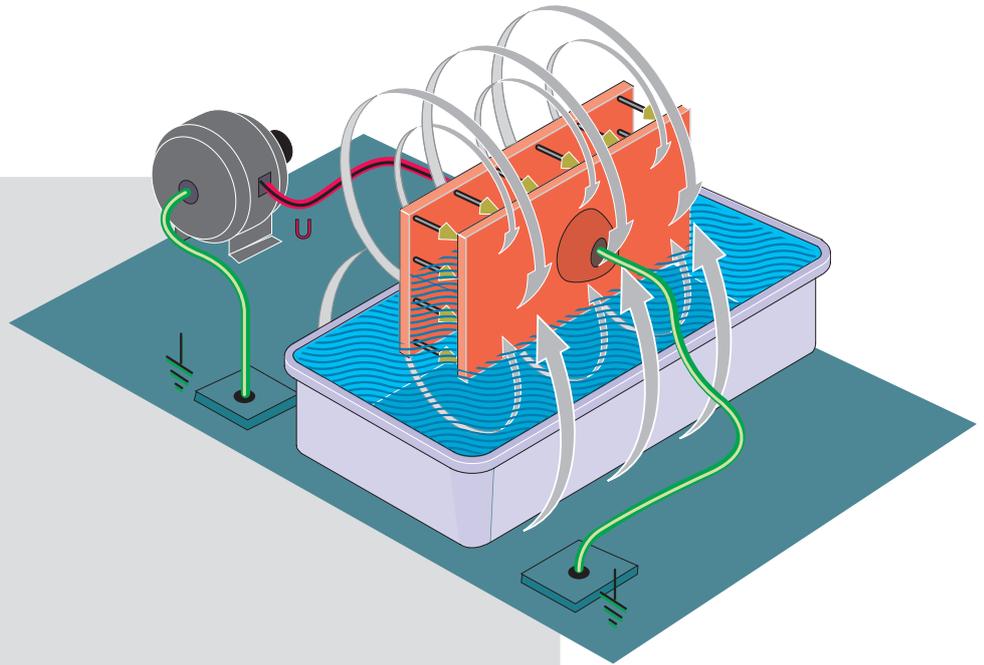
# What can electrostatic printing assist actually do to improve printing?



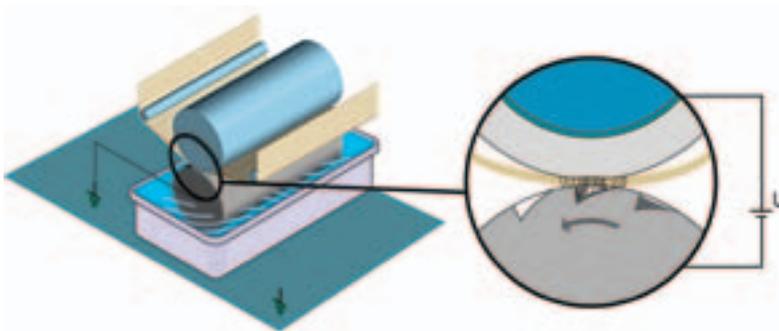
The electric field generated by the ESA in the printing nip (approx. 300 – 1,000 volts) causes the ink to be pulled completely out of the cells and transferred onto the substrate.

- The results**
- Ink transfer to the paper or the film surface with point accuracy – without excessive impression roller pressure. Missing dots are now a thing of the past.
  - Optimal printing results and regular color density in all grading ranges, especially in light and middle tones.
  - Improved print results also on difficult printing paper substrates, cardboards and films.
  - Faster production speeds.
  - Longer service life of the impression roller coatings through reduced impression roller line pressure.

## 5 PRINCIPLE



What is the principle applied in the electrostatic printing assist?



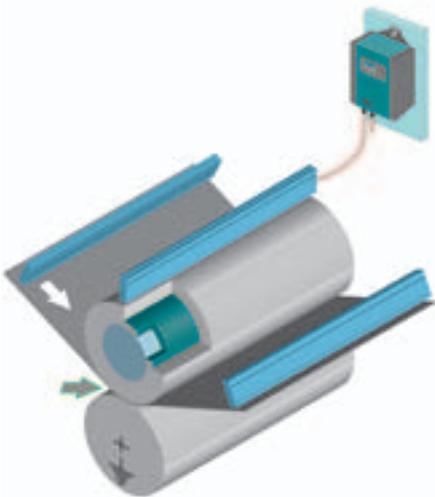
The Eltex electrostatic printing assist, ESA for short, is based on the principle of the plate-type capacitor. This means that a homogeneous electric field is generated between two plates, in which a dielectric is pulled to one side. The electrostatic printing assist applies this principle in the nip – at precisely the point where the ink is to be transferred onto the web.

This principle of ink transfer with electrostatic support works evenly over the entire width of the web and operates reliably from the slowest to the highest production speed.



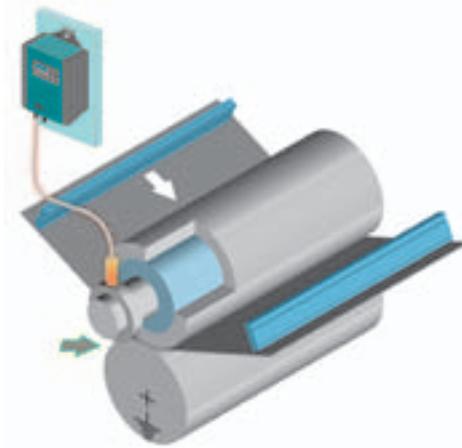
## How is the necessary voltage generated in the nip?

The Eltex electrostatic printing assist systems (ESA) are based on three different principles: Top-Loading (GNH61), Side-Loading (GNN71) and Core-Charging (GNN75). Both the Top-Loading and the Core-Charging principles are used in packaging and decorative gravure printing.



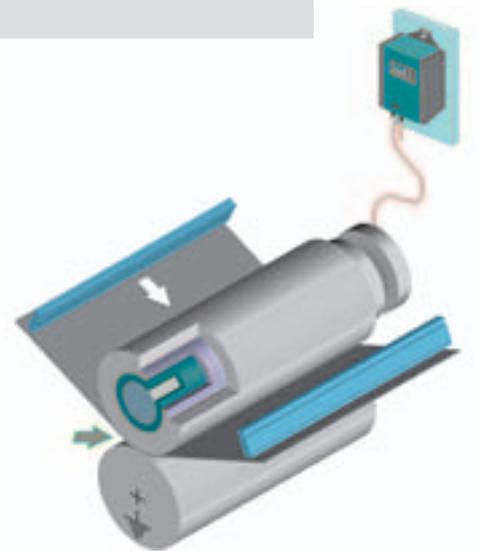
### GNH61 Top-Loading

The GNH61 electrostatic printing assist builds up the required nip voltage via a charging bar attached above the impression roller.



### GNN75 Core-Charging

The electrostatic printing assist system GNN75 builds up the voltage directly via the core of the impression roller. To do so, the bearings of the impression roller must be isolated from ground.



### GNN71 Side-Loading

The GNN71 system based on the Side-Loading principle is used only in publication gravure printing.

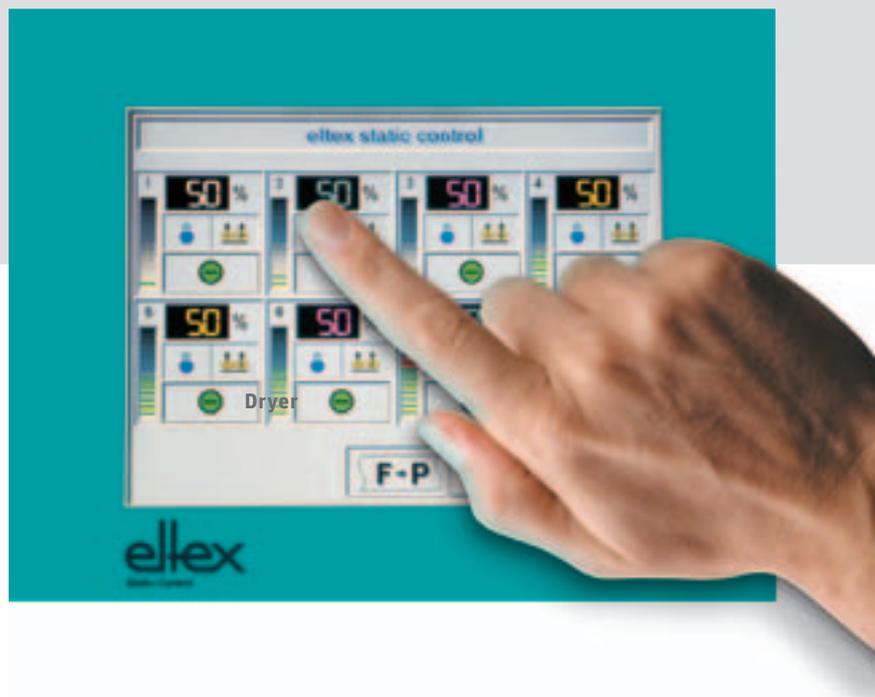
In all systems, the impression roller must have a special coating to ensure that the applied charge is allowed to leak-off via the surface of the impression roller into the nip and finally over the grounded impression cylinder.

## 7 COMPONENTS

# Which are the components of an ESA system?

### The remote control

The system can be controlled remotely via the Eltex Static Control (ESC). This component is designed as a touch screen version, and it simultaneously monitors all functions of the generators and of all other ESA-components, including the status and condition of the bars. Error messages are displayed in plain text.



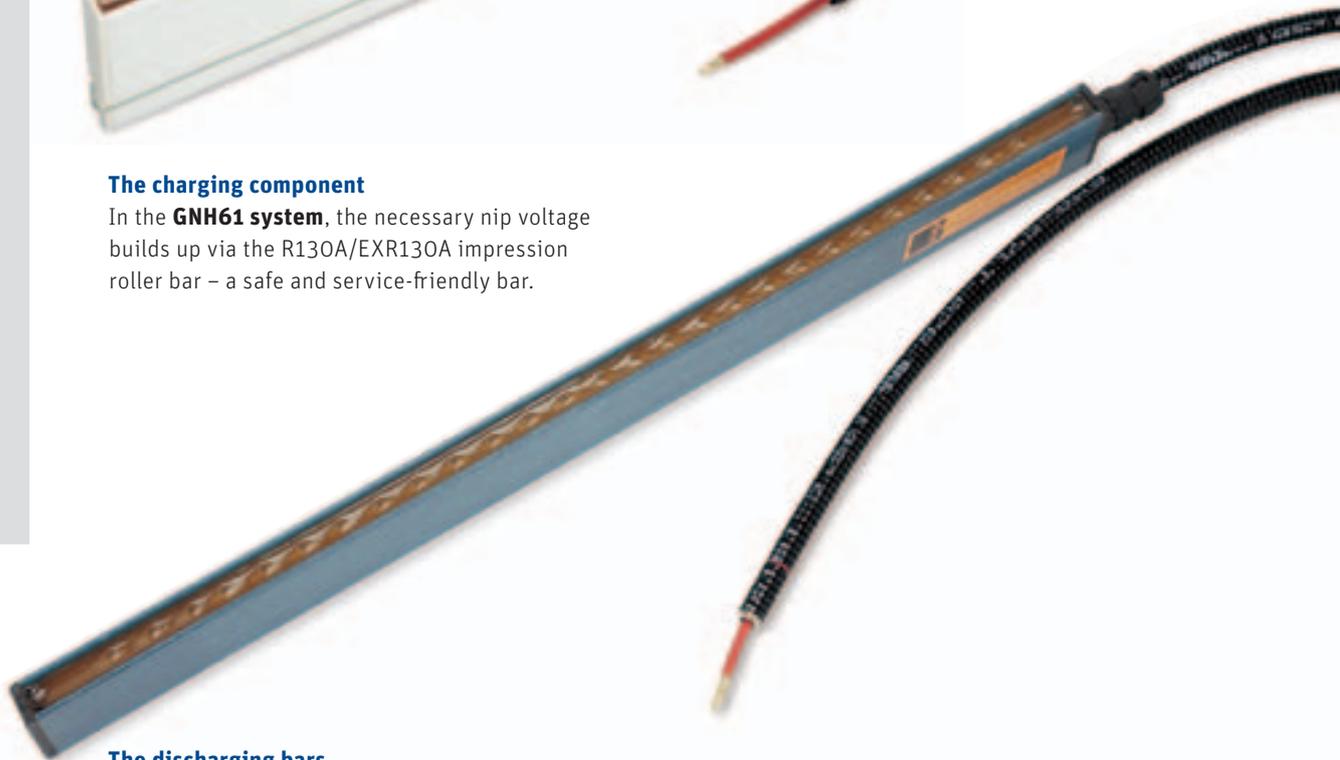
### The high voltage generator

Voltage is supplied via the Eltex HSG61/ HSG61EX high voltage generator for GNH61; the GNN75 system is powered by the DAG75/ DAG75EX high voltage generator. The power supply for charging and discharging and the control electronics are housed in a compact enclosure. Thanks to the CAN bus concept, as many as 20 generators can be connected with a minimum of wiring, and operated via remote control.



#### The charging component

In the **GNN61 system**, the necessary nip voltage builds up via the R130A/EXR130A impression roller bar – a safe and service-friendly bar.



#### The discharging bars

Any printing substrate has a naturally occurring electric charge. Before running into the nip, the web must first be discharged this is accomplished by the discharge bar R50/EXR50. The web is then charged up at the outlet; another discharge bar neutralizes the charges at this point. This means that two discharge bars are needed for each printing unit.

The **GNN71 system** builds up the necessary nip voltage via the rotor/stator-principle.



The **GNN75 system** operates without impression roller bars. Voltage is supplied to the impression roller running on electrically isolated bearings via the ball spring contact and the impression roller bearing. Bar cleaning is not required, maintenance work is reduced to a minimum. This means cost savings and a high degree of intrinsic safety.



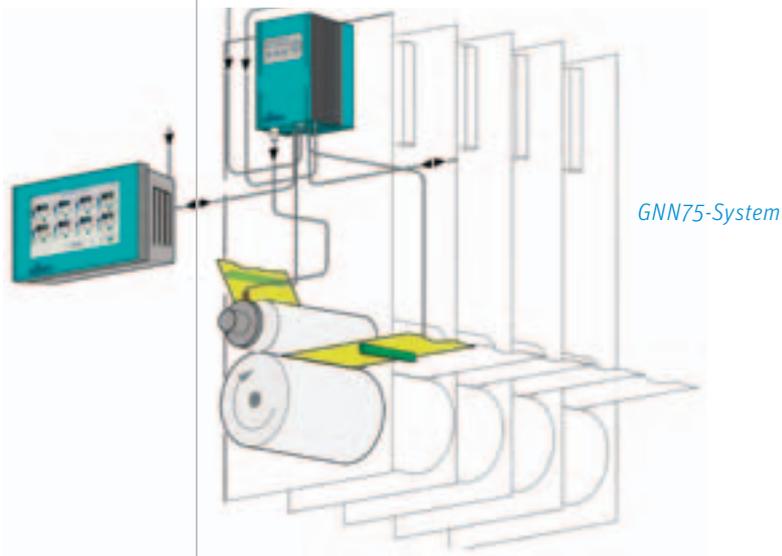
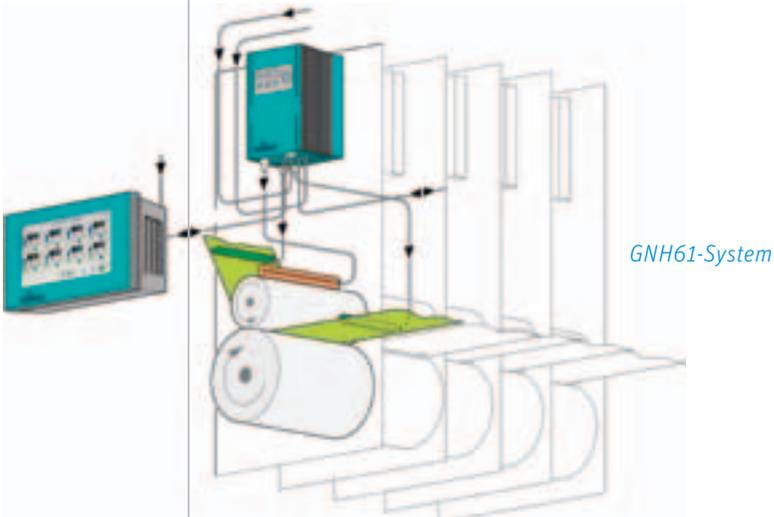
## 8

## CONTROL

# Is the remote control actually required or can I operate the ESA without it?

*With ESC remote Control*

*Without remote control*



The remote control allows the operator to keep control of all parameters and functions at a glance. Each ESA can be operated fully without remote control. Though it has no impact on the performance and capability of the system, the user without remote control foregoes valuable monitoring and operability functions.

However, the safety of the ESA system is guaranteed, even without a remote control.



## 9

**EASY OPERATION**

Do I have to train my operating personnel or is ESA more or less self-explanatory?

The touch screen menu assistance of the Eltex Static Control (ESC) with its integrated help functions allows the operating personnel to quickly familiarize themselves with the system.

With no Eltex Static Control fitted, the ESA unit must be switched on and off and offers no monitoring and no parameter control.



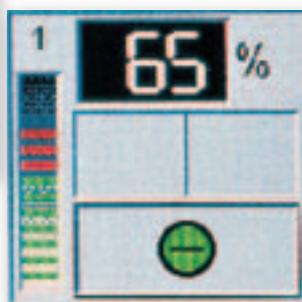
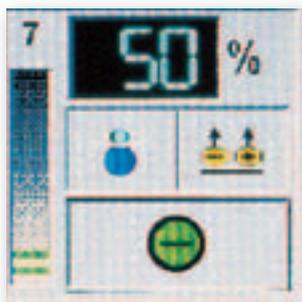
## 10 SIMPLICITY

# How easy is it to handle the ESA?



When operating the unit via the Eltex Static Control (ESC), all functions and parameters are permanently under control. If you observe the recommendations given for the remote control, your printing assist system will always be in top condition. Information on the causes of malfunctions and how to rectify these can be retrieved via the service key.

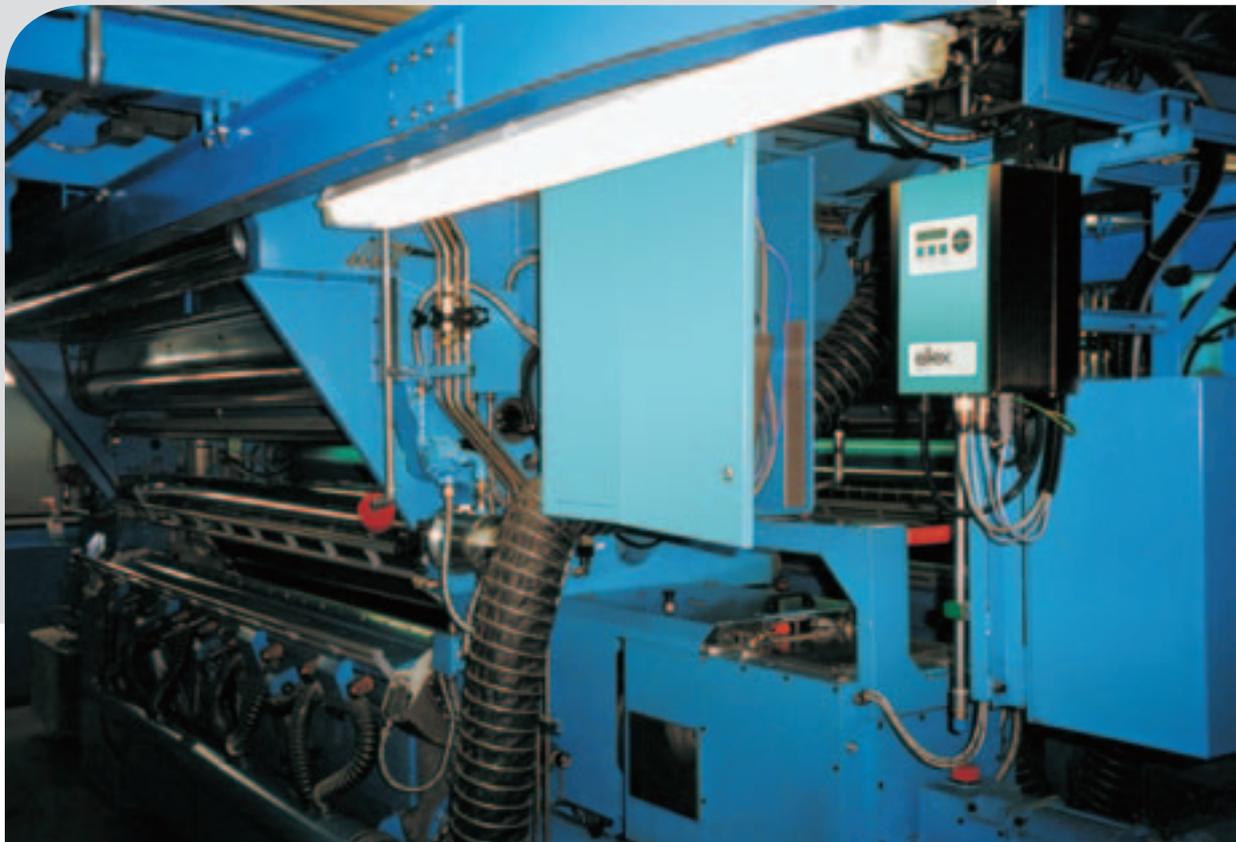
For example, when running the GNH61 system in paper operation, a status bar on the remote control indicates the level of pollution on the impression roller bar. As soil accumulates on the bar, the ESA system automatically increases the required voltage.





## 11 MONITORING

# Isn't high voltage dangerous?



Two safety considerations must be noted. First is the safety of the system when used in potentially explosive atmospheres. A safety certificate is available for this case. Also, wiring of the ESA must be routed as specified in the safety circuit diagrams. Proper installation of these circuits will guarantee optimum safety.

The Eltex high-voltage generator supplies targeted and controlled high voltage. This guarantees the highest level of safety.



## 12 COMPATIBILITY

# Can the ESA system be installed in any gravure printing unit?

**The GNN75 system** can be installed only in close cooperation with the manufacturers of printing presses – preferably in new presses. If the system is retrofitted into existing presses, the press manufacturer must ensure that the impression roller bearing is properly insulated.



**The GNH61-System** is designed for installation in any gravure printing press. The work involved includes installing the charging and discharging bars, installing and connecting the generators, installing the remote control and wiring the system. Typically, a packaging gravure printing press with six or eight printing units can be fully ESA-equipped and ready for operation within one weekend.

A decorative printing press with three or four printing units can be completely print-optimized in a day and a half. Retrofitting a publication printing press having eight printing units typically takes two or three days.



13 INNOVATIVE POWER

# Does Eltex coat the impression rollers?

No.

Eltex are world-wide leaders in the field of electrostatic print optimization, which includes a large number of different systems. This is made possible because Eltex is engaged in basic research and therefore have remarkable potential to innovate.

Also, Eltex often cooperates closely with universities and users in the launch of new developments. That is why Eltex was the first to cooperate with impression roller manufactures to jointly develop the coating values required for the ESA.

The coatings used for the ESA systems are all manufactured by renowned impression roller manufactures using our specifications.

The GNH75 Core-Charging system uses a single-layer impression roller, the GNH61 Top-Loading system uses a two-layer impression roller and a three-layer impression roller is required for the GNN71 Side-Loading system.



## 14 FLEXIBILITY

As a packaging printer, I have to alternate between paper and film, such as PVC and polyethylene. Can I do that?

Yes!



The electrostatic printing assist works equally well for paper as well as film. Simply use the appropriate key on the remote control panel to switch over manually to film operation.



## 15 ADAPTABILITY



Can the ESA systems  
be used both for ink systems  
containing solvents  
and water-based inks?

Yes!

Each of Eltex's electrostatic printing assists, Top-Loading, Side-Loading and Core-Charging, can be used for both applications. Explosion-protected bars are used for inks containing solvents; non-ex bars are used for water-based inks.

## 16 ANSWERS

# Any questions left unanswered?

If so, please do not hesitate to contact us. Would you like information on other Eltex print optimization systems. Please contact your nearest Eltex consultant, the product manager in charge, or the Eltex parent company in Weil am Rhein directly. You'll also find the latest information on our website [www.eltex.com](http://www.eltex.com).





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## 17 SOLUTIONS

# What can we do for you?



Knowing the needs and concerns of our customers and finding ever-better solutions is the driving force that motivates Eltex.

The know-how and innovative engineering that results can then be applied to a wide variety of industrial electrostatic applications and can be used to the full benefit of all our customers.

Advanced production systems allow us to guarantee quick deliveries. With the conclusion of a maintenance agreement, we look after the “fully automated monitoring” of your Eltex print optimization system.

Let us know if you think anything is missing in our range of services. We look forward to your ideas and suggestions for improvements.



[www.eltex.com](http://www.eltex.com)