

Enulec – 40 years of innovations in the field of electrostatics

Armin Karl Geiger

Founded in 1981 and headquartered in Trittau, Germany, Enulec GmbH has established a leading market position in the field of electrostatic printing assist systems (ESA) with quality-enhancing products for gravure package printing.

*„Wir registrieren weltweit eine steigende Nachfrage nach ESA- und Entladesystemen.“
– Christoph Dettke,
Leiter Vertrieb und Marketing bei Enulec –*

Enulec's success story is an almost classic example of how an urgent technical problem can be solved through dedicated creativity and often with quite few resources. During an internship in a then market-leading print shop at the beginning of the 1980s, the student and later company founder Hubertus Dettke experienced the deficits of the common printing processes at that time. These included the often poor print quality caused by failure-prone and technically inadequate methods of ink transfer. In addition, there were repeated fires in the printing units of the gravure presses caused by electrostatic charges. The corresponding safety precautions were only rudimentary and often consisted of adventurous auxiliary constructions.

Against this background, in 1981 Hubertus Dettke began working in his garage on the first designs and prototypes of electrostatic print assist systems (ESA) and systems for dissipating hazardous electrostatic charges in gravure printing presses. From the very beginning, he was assisted by his fellow student and later wife Christa. As a consequence of their efforts, together they found-

ed Enulec GmbH in the same year. Hubertus Dettke was responsible for technology, research and development, while Christa Dettke took over the finance department. To ensure the future of the company, in 2006 their son Christoph joined as sales manager in charge of international marketing and the worldwide distribution network.

The path to global market leadership

What is the secret of a company that started out as a small family business in the 1980s and has since become a global market leader in the manufacture of ESA systems as well as discharging solutions for gravure and flexo printing presses and converting equipment? On the one hand, it is probably the focus on a manageable range of high-quality products that are continuously improved. On the other hand, over the years Enulec has built up a dense global sales and service network. In addition to its headquarters in Trittau, the company has subsidiaries in Lugano (Switzerland), St. Louis (USA), Wuxi City (China) and Kuala Lumpur (Malaysia).

Beyond this, a worldwide network of 12 service centres and 47 distribution partners consolidates the company's leading market position and ensures its closeness to the customers. The Lugano-based subsidiary Enulec Electrostatic Sagl, founded in 2005, contributes a large part of the international success with a focus on product marketing for the Italian package printers. In addition to European markets, Enulec has identified an increase in demand for ESA and discharging systems in the BRIC countries, where a large proportion of new presses are now being shipped. The Middle East, with its growing demand for high-quality flexible packaging, is also of great importance to Enulec, as every second ESA system produced is supplied to these markets. The export share for gravure package printing is currently at 70% and proves the increasing worldwide demand for ESA and discharging systems. Therefore, Enulec expects further growth in the years to come.

A preferred supplier

Enulec is the preferred OEM supplier for renowned press manufacturers such as Bobst, Windmüller & Hölscher, Allstein, Uteco, KBA Flexotecnica, DCM/ATM and Kohli Industries. The respective products are fully equipped with Enulec systems and offered to printers as turnkey solutions. This configuration offers extremely safe and highly effective ESA and discharging systems, designed for even the toughest production conditions and available for both new and existing presses. In addition, new technologies are constantly being developed in close collaboration with research institutes such as the Stuttgart Media University, Western Michigan University in the USA and the College of Engineering and Technology in Pune, India. This not



Source: Enulec

The Enulec management team: Company founder Hubertus Dettke with wife Christa and son Christoph

only improves the efficiency and user-friendliness of the presses but also results in new international patents. The success of such a creative approach is evident not least by the fact, that several Enulec products received international awards.

Improving print quality

For 40 years, Enulec has been developing innovative ESA and discharging systems for the global gravure and packaging industry. The company holds several international patents that have laid the foundation for its leading market position. As with all printing processes, also in gravure printing there is a constant need to improve and refine product quality. To support such efforts, ESA has been developed to optimise ink transfer in order to achieve consistently high quality particularly over long print runs without the need to change press settings. Regardless of factors such as impression roller characteristics, viscosity and press speed, Enulec systems ensure high product quality.

What is ESA?

Electrostatic printing assist systems were developed to support the ink transfer from the cells of the grounded gravure printing cy-

linder to the substrate. Notably when printing on substrates like films, cardboard and paper, ESA systems have become the worldwide standard to ensure maximum print quality with different press configurations. In order to achieve optimum product quality in gravure printing, the impression roller is loaded in a controlled manner with a DC voltage, which generates an electric field in the nip to the grounded printing cylinder. The electric field results in a force that acts on the ink in the cells of the cylinder in such a way that it is pulled almost complete out of the cells and straight onto the substrate in a controlled manner.

Air-assisted charging bars

The technical innovation of the patented Enulec Top Loading system includes a virtually maintenance-free air-assisted charging bar for the impression roller that has never been seen before in package printing. Compared to a standard charging bar with open needle tips, it does not need to be cleaned regularly. This is achieved by a special design in which the needle tips are completely embedded in a small tube. The very low air overpressure of about 0.5 - 1.5 bar applied to the ionisation tips (needle tips) avoids any contami-

nation of the needle tips by particles or substrate dust. In addition, all Enulec products comply with the latest ATEX directives for use in hazardous areas.

For this unique development, special emphasis was put on eliminating all disadvantages and particularly safety-relevant weak points of conventional ESA Top Loading systems. These include undesirable machine downtimes caused by frequent and regular cleaning of the open needle tips of the impression roller charging bars.

In addition, these systems suffer from considerable performance losses caused by ink deposits on the open ionisation tips of the charging bar. In addition to performance losses of the ESA, lack of maintenance or cleaning of the open needle electrode results in increased safety risks due to sparking at the open needle tips, which noticeably increases the risk potential for printing unit fires. When using solvent-based inks in gravure printing, safety is paramount and no compromises should be made in this respect.

The core of the ESA

The core element of Enulec's ESA systems (Top Loading - Direct Charging) is the capacitance-free high-voltage generator. Due to its

higher internal resistance it offers optimum power matching with the limited resistance ESA impression roller, which considerably increases the efficiency of the system. To achieve this, Enulec does not utilise the usual cascade circuit (voltage multiplier circuit) to generate high voltage. This ensures that the electrodes of the Enulec ESA are immediately voltage-free when switched off and show no residual charge. This in turn means that when the ESA is switched on, the necessary high voltage is immediately applied to the charging electrodes and the ESA can be used without any delay.

This specially developed capacitance-free high-voltage genera-



The ESA systems Roto-Film and Roto-Film Pro are designed for the requirements in package printing in mind, especially when using film substrates, and are worldwide patent protected.

tor facilitates the use of ESA-compatible impression rollers that offer high surface resistances. This means that the service life of ESA-suitable impression rollers is significantly increased in terms of electrical values.

ESA for packaging printing

The ESA systems Roto-Film and Roto-Film Pro (Top Loading – Direct Charging) are designed for the requirements in package printing in mind, especially when using film substrates, and are worldwide patent protected.

The Top Loading ESA system works with a reduced distance between the charging electrode and the impression roller. This results in good ESA effects even at low power. Another special feature of the Enulec ESA systems is the “Dynamically Balanced Charging”. This patented process balances the loading of the impression rollers of the gravure press, which in turn noticeably reduces the charging of the foils. The use of this system has proven to increase safety and its high efficiency has been confirmed by various European gravure press manufacturers and their customers. If jobs are printed with fewer colours than the number of ESA units integrated in the press, the systems not needed can be switched off and prepared for the next job.

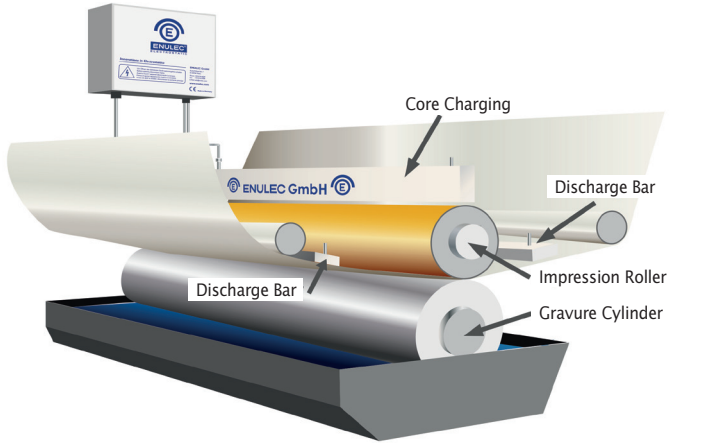
For such applications, Enulec developed the Roto-Film Pro system, which automatically ensures improved charge balancing on the substrates. According to Enulec, the ability of Roto-Film and Roto-Film Pro to increase production reliability in printing has been proven by comparison with other

ESA systems as well as by customer feedback. In addition, Roto-Film Pro counteracts the effect of undesired charge increase with the capacity-increasing high-voltage generator and the higher-frequency voltage superposition. This ensures constant system performance even under difficult printing conditions and with most different film substrates.

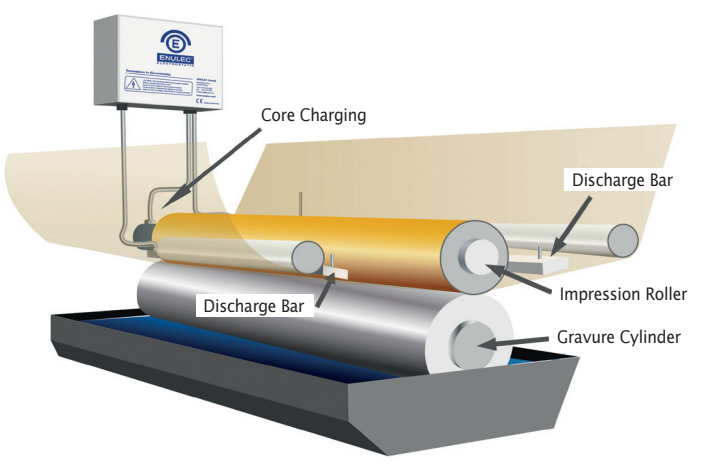
In conjunction with the impression rollers, this achieves optimum print quality and significantly reduces make-ready times and waste rates. Particularly the latter aspect is of increasing importance due to the ever growing demand for sustainability and resource saving. Compared to other ESA systems, Roto-Film Pro “neutralizes” the electrostatic charges on the film and reduces charges trapped in the film substrate. The air-assisted charging electrode as well as the possibility of direct charging make Enulec’s ESA systems the safest of their kind.

Static charges

The ability of Enulec ESA systems for efficient static charge reduction is proven by permanent measurements carried out by the Static Inline Control system. As a supplement to Roto-Film, it enables the monitoring and documentation of static charges and is used in printing as well as on laminating machines and winders. The system measures the static charge on the substrate web and triggers a traffic light alarm if predefined warning levels are exceeded. Roto-Film also avoids the negative



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The Enulec ESA Direct Charging is an innovation in ESA impression roller charging for gravure printing. The already high print quality in gravure printing has been further improved by the ESA Direct Charging – Side Loading system.

effect known as charge accumulation and ensures effective ESA with lowest power input even at the last printing unit of the gravure press. The unloading systems of the EST product family supports print shops as well as plastics processing companies to successfully eliminate electrostatic charges on devices such as slitter/rewinders or laminators to ensure safe production processes.

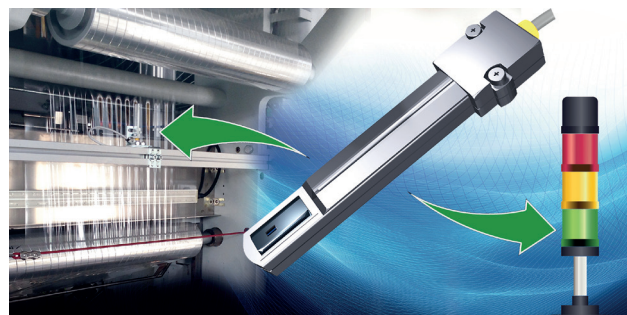
The EST-DC-LDS discharging system

In addition to the ESA system with air-flushed ionisation needles, Enulec has also developed the EST-DC product family of powerful discharging systems. Firmly established in the market, they prevent disruptive electrostatic charges on slitter/rewinders and laminators. The DC voltage discharging enables free charge carriers to be transferred onto the film even at very high running

speed. In the process, the positive charge carriers on the film recombine with the very high accelerated negative charge carriers from the DC discharge bar. EST-DC-LDS has a functional range of about 20 mm to 800 mm and does not require any additional system adjustments for different statically charged films. Due to the special DC voltage technology, this unloading system eliminates all combinations of electrostatic charges. Thus there is no need for additional AC voltage discharging systems at the rewriter.

A promising future

The Enulec concept offers gravure print shops a successfully tried-and-tested all-in-one solution comprising of ESA, discharging and charge control systems to meet the increased demands in contemporary printing and converting. Thanks to the modular structure, the respective single



Source: Enulec

The Static Inline Control system enables the monitoring and documentation of static charges and triggers a traffic light alarm if predefined warning levels are exceeded.

components can be individually expanded according to actual requirements while all of these components are in the focus of the operator at the touch control screen. For more than 40 years Enulec makes important contribution to increase operational reliability and improve product quality in gravure package printing. Against this background and also in view of the impressive creativeness in the development of new solutions, the company is well placed to continue its success story in the future. ■

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