Little things make a big difference...

Alfred Doppler, Spengler Electronic AG, inventor and executive director

A ground-breaking development in the area of ELECTROSTATIC PRINTING ASSIST SYSTEMS (ESA) printing systems from Spengler has gone into service at Gascogne Laminates Germany GmbH in Linnich on a new 9-colour rotogravure printing press in the area of package printing.

Figure 1 9-colour Rotomec rotogravure printing press

General information: ELECTROSTATIC PRINTING ASSIST SYSTEMS ensure the correct transfer of ink from the ink fountain on the deep-drawing form cylinder to the print substrate, paper web or film web. The formation of so-called “missing dots” is avoided.
Missing dots are areas that are not printed due to ink not being transferred onto the paper or film web from the ink fountain on the form cylinder.
Missing dots form primarily on rough or uneven substrate surfaces or on high-speed rotogravure printing presses.
ELECTROSTATIC PRINTING ASSIST SYSTEMS are presently the most advanced technology in rotogravure printing presses for illustration and package printing and a must for all quality printing.

The Florentil…

The unique, maintenance-free and very powerful Florentil direct charging system for impression roller sleeves, in addition to possessing proven Spengler quality, is distinguished as a new premium product in the following ways:

- The charging unit is attached at the front on the impression roller core and does not affect the usual changing of the impression roller sleeves.
- The bearings of the impression rollers do not have to be subject to elaborate electrical isolation. The bearings of the impression rollers designed by the machine manufacturer are not changed.
- The printing unit is not obstructed by electrodes and their mounting devices.
- Installation, including retrofit on existing machines, is possible at any time.
- With an operating voltage of 3000 V and a current of 15 mA, the Florentil is the most powerful direct charging system in the world.
- The large voltage window enables flawless printing even with the high electrical conductance tolerances of the impression roller sleeve coating and very wide printing webs.
- Improved effectiveness and more uniform printing quality due to the 3-layer design of the impression roller sleeve.
- When the system is shut off, the impression roller sleeve functions as an anti-static impression roller and removes active electrostatic charges at all times. Separation charges between paper or film web and the impression roller surface are prevented, even when the impression roller is raised.
- Dangerous electrostatic charges can no longer arise in the printing unit. This is a considerable advantage over all indirect systems, such as corona discharge electrodes.
- The Florentil system is based on the tried and tested Spengler direct charging system ESA-2000, which is primarily used on high-speed rotogravure printing presses for printing illustrations.
- Explosion protection fulfilled according to ATEX guideline.
- Modern, self-checking control system designed for quality assurance. Stands out for its modular design and plug-and-play concept.

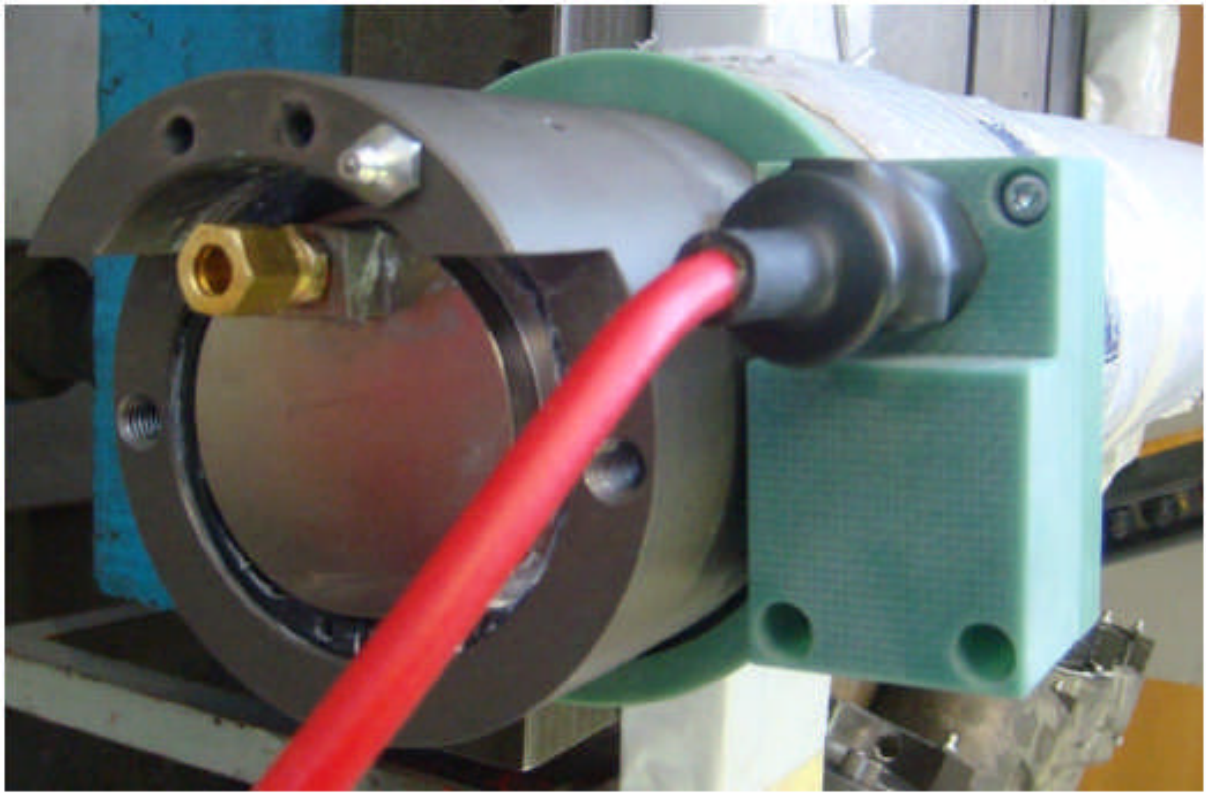

Figure 2 The charging unit is mounted outside the printing unit on the impression roller core.

Figure 3 Simple installation

Figure 4 Installed in the printing unit

Creation of the Florentil...

The Florentil charging unit was first introduced for the first time at the Drupa 2008.

It is the standard technical solution for an electrostatic printing assist system (ESA) with direct charging for rotogravure printing presses with impression roller sleeve systems which do not need any bearing isolation.

Figure 5 Spengler Team at the Drupa 2008

Previously, in order not to interfere with the quick impression roller sleeve change, the entire impression roller core was charged and the required current was transferred using a so-called anti-static impression roller (1-layer construction). To prevent the charge from leaking to earth, it was necessary to electrically isolate the impression roller core from the movable yoke. With regard to technical norms, this solution is critical and not very popular with mechanical engineers.

The goal was to develop a direct charging system which encroached as little as possible on the existing, tried and tested printing unit designs and did not interfere with the sleeve change.

One uses a standard ESA 3-layer impression roller sleeve and applies the embedded, highly conductive layer to a defined contact surface in the inner tube. This connection type is state-of-the-art and is used in all the anti-static impression roller sleeves of the leading ESA impression roller manufacturers (Emilio Rossini, Felix Boettcher, Hannecard and Mitex). In the impression roller core (mandrel), an isolation ring with a defined contact ring is integrated on the drive side, which is able to electrically connect the interior contact surface of the impression roller sleeve with the Florentil charging unit attached on the drive side. The electricity is fed in directly without loss via the attached side charging device. The impression roller cores and their bearings are no longer tensioned and are thus restored to their original function.

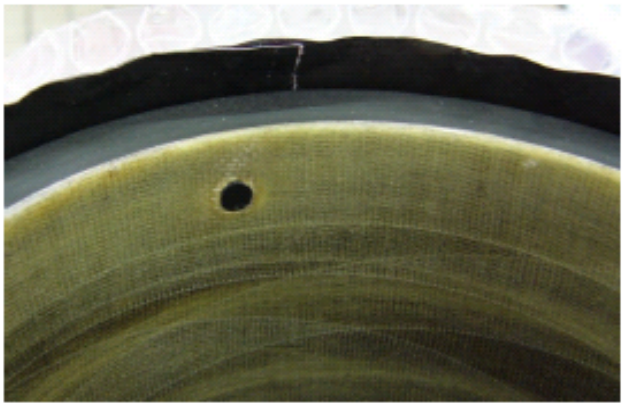

Figure 6 Typical contact point on the interior of the impression roller sleeve

How does the direct charging system work?

The current is fed directly, without loss, onto a highly conductive layer embedded in the impression roller, and evenly distributed over the entire printing width.

The current required for the ESA effect is conducted by the highly conductive layer through the exterior semi-conductive layer, through the printing substrate to the grounded gravure cylinder.

The total resistance of the impression roller is determined by the conductive rubber or polyurethane mixture of the exterior semi-conductive layer and has a contact resistance range of approx. 0.5 to 10 M'Ohm.

When a system is shut off, one attains optimal discharge behaviour from the impression roller for printing unit security in the reverse manner.

The impression roller sleeve functions as a low-resistance, passive anti-static impression roller.

Figure 7 Fast sleeve change guaranteed

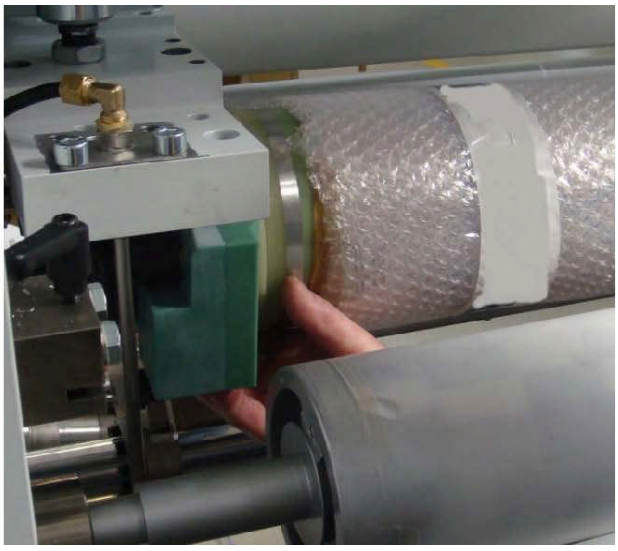

Figure 8 Contact surface with drawn sleeve

How does an indirect charging system work?

With classical indirect charging systems, the impression roller surface is generally charged without contact via corona discharge electrodes.

In order to compensate for greater contact resistances, a higher operating voltage must be used than is used with direct charging systems.

Depending on the interior resistance of the electrodes, this will be between 10 and 25,000 V.

Even current distribution is attained by means of a long corona discharge electrode arranged over the entire printing width.

This ensures a correct print, even at reduced web widths.

These charging systems require a two- or three-layer ESA impression roller.

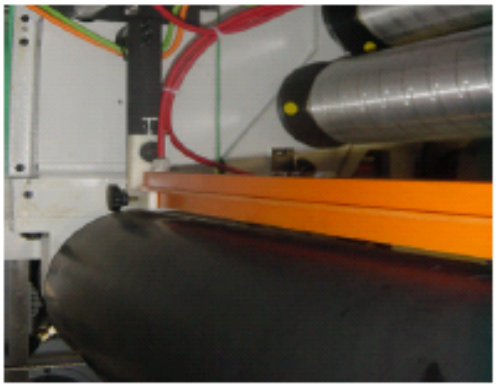

Figure 9 Corona discharge electrode

Indirect charging with long electrodes has the advantage of being both simple and reliable. The disadvantage of this process is that the long electrodes become dirty (especially around the edges), meaning that they must be cleaned regularly.

The outer layer of the impression roller must be charged to a significantly higher voltage than it would with direct charging systems, due to the longer current path.

This can cause additional contamination on the impression roller surface through electrostatic attractive force.

Extremely dirty impression roller surfaces can change the electrical conductance and influence the evenness of the current distribution over the entire print area, thereby impairing the print.

In contrast to the direct charging system, the classic two- or three-layer impression roller has no anti-static characteristics when the system is shut off.

The conductive layers are electrically isolated from the grounded steel core of the impression roller.

As a compromise, the leading ESA impression roller manufacturers offer impression rollers a leak resistor (bleeder resistance against the machine ground) in order to ensure the discharge of friction energy, especially when the impression roller is raised.

The leak resistors are generally attached at intervals and must demonstrate a resistance value of over 500 M'Ohm to avoid interfering with the effect during operation of the electrostatic print assist.

According to the Kirchhoff law of current distribution, this measure can negatively influence the sought-after even current distribution on the impression roller surface.

Generally, from a current standpoint, direct charging systems like the ESA-2000 are superior to conventional impression rollers or the Florentil system with impression roller sleeves with regard to printing quality and safety.

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