

CI FLEXO PRINTING



F4 FLEXO Efficiency[®]

 **comexi**

OPEN YOUR MIND

COMEXI GROUP, ALWAYS AT YOUR SIDE

Comexi and its holding company COMEXI GROUP are guided by a spirit of excellence.

Our roots as a family business shape our values, and the legacy of the company's founder reminds us of the importance of a long-term sustainable path. As a leading global supplier of machinery and services to the flexible package printing sector, our strategy is to offer a high degree of specialization in every product line – printing, laminating, slitting and rewinding, in addition to logistics and environmental solutions – creating products that complement each other and offer global solutions with maximum synergy.

The continuous search for excellence is our path to customer satisfaction.

Our philosophy embraces constant adaptation to the demands of our clients. In 1989 we developed the first 8-colour CNC flexographic press, because you needed it. That same press provided a new level of quality and created new business opportunities for our flexographic converting clients.

In 2000, we launched the world's first 10-colour gearless machine, which represented a quantum leap for the industry. Once again we listened to you, learned from you, and created what you needed. In 2006, Comexi Group again shocked the market with the debut of

EB (electron beam) Flexo printing. Because you needed a differential process, high printing quality and minimum environmental impact, we created EB Flexo for you.

And we continued to listen when we created the new F4 FLEXOEfficiency® press. This newly developed technology addresses, on the one hand, the needs of traditional converters, who desire efficiency improvements for short jobs, and on the other hand also addresses the needs of label manufacturers who desire productivity improvements and the elimination of photoinitiators through eCOMEXI® solutions which utilize EB Flexo technology in high performance flexographic printing.

Our customers are well-supported through our extensive sales network that includes branch offices in five countries, a manufacturing facility in Brazil and sales representatives in more than 65 countries.

For more than 50 years we have been at your side, participating in the growth of your business. Your future growth is in your hands.

COMEXI GROUP,
ready for the future



EFFICIENCY IN FLEXO

At Comexi, we understand that efficiency means more than just productivity. Efficiency is something more. For Comexi, efficiency is a philosophy – a philosophy of creating solutions that help our

clients, a philosophy of developing new technologically integrated products that deliver competitive advantages to you.

WHAT DO OUR CLIENTS HAVE TO SAY ABOUT THE PRINTING INDUSTRY? WE ASKED, WE LISTENED AND THIS IS WHAT WE HEARD:

- These days, many industries view printing as a “commodity”, a view which requires the development of new markets in order to escape from price wars.
- There is a trend towards reducing the length of runs.
- Customers demand easier operation of flexographic presses, an ongoing process of improvement and perpetual challenge in our line of business.
- Customers must establish sustainable processes that reduce carbon footprint impacts.
- Customers want standardization of the flexographic printing processes, making them more predictable.

MARKET

Efficiency in Flexo means guaranteeing solutions and providing answers to these real-world issues.

DEVELOPING NEW MARKETS

The **F4 FLEXOEfficiency®** press offers the capability of printing in high line screens, which opens the door to markets previously considered out of reach and which can compete with rotogravure printing with costs no higher per square meter than for your current conventional printing system.

EXTRA SHORT RUNS

But this is not enough. The systematic reduction of run lengths is a reality in the majority of the market. Efficiency in Flexo must mean reduced costs with machinery best suited to this short form, which requires ingenious solutions that reduce downtime and maintenance time. These solutions must come with a high degree of automation, while also reducing job change times and increasing profit margins on the final product.

The **F4 FLEXOEfficiency®** press helps you face these challenges, featuring a new doctor blade chamber support design that reduces change times dramatically and increases accessibility, a design that simplifies maintenance and changeovers, and a width of 670mm/26.3” (up to 870mm/34.2”) with minimum repetition of 240mm/9.4”, creating plate savings for a direct impact on the per-square-meter cost of your product.

SUSTAINABILITY

The **F4 FLEXOEfficiency®** press incorporates eCOMEXI® solutions, specifically in flexographic printing with electron beam inks. Zero emissions. No environmental impact. A step towards sustainability.

Flexo efficiency is here





F4 FLEXO Efficiency[®]

CI FLEXO PRINTING



ERGONOMICS

EASY MAINTENANCE

NEW MARKETS

PRINT QUALITY

COST REDUCTION

PRINTING BODY: A HEART OF STRENGTH

The printing body is the heart of the machine. The F4 FLEXOEfficiency® printing body is built on two cast frames each 80mm/3.1" thick, stabilized to eliminate internal stress. The frame holds devices for driving 8 printing decks in a horizontal arrangement, occupying the minimum space for a truly compact machine.

Comexi's technological innovation and development offer you the most cutting-edge technologies in flexographic press design, such as our MONOBLOCK® frame concept – a technology that permits integration of the printing decks in the resilient frame for a complete integration of components, minimizing vibration and consequently improving print quality.



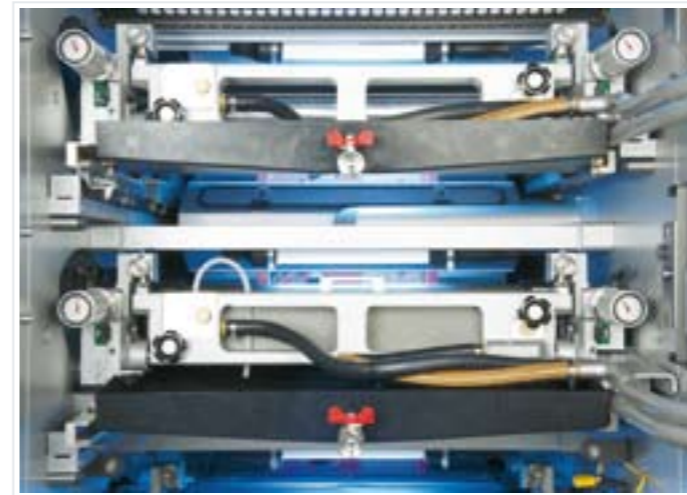
Monoblock frame

MONOBLOCK®

PRINTING BODY: PRINTING DECKS

The F4 FLEXOEfficiency® utilizes 8 printing decks adapted for front-side or surface printing, horizontally mounted in a radial pattern situated in the central drum, arranged compactly with easy access to the printing decks.

The design has been modified for easy maintenance access and daily operational needs through the F4 FLEXOEfficiency® concept that allows the most regular operations to be completed rapidly and easily. The grids can be moved aside without difficulty, remaining inside the machine. In addition, a new doctor blade support has been designed, which can be removed without having to disconnect the inking system lines.

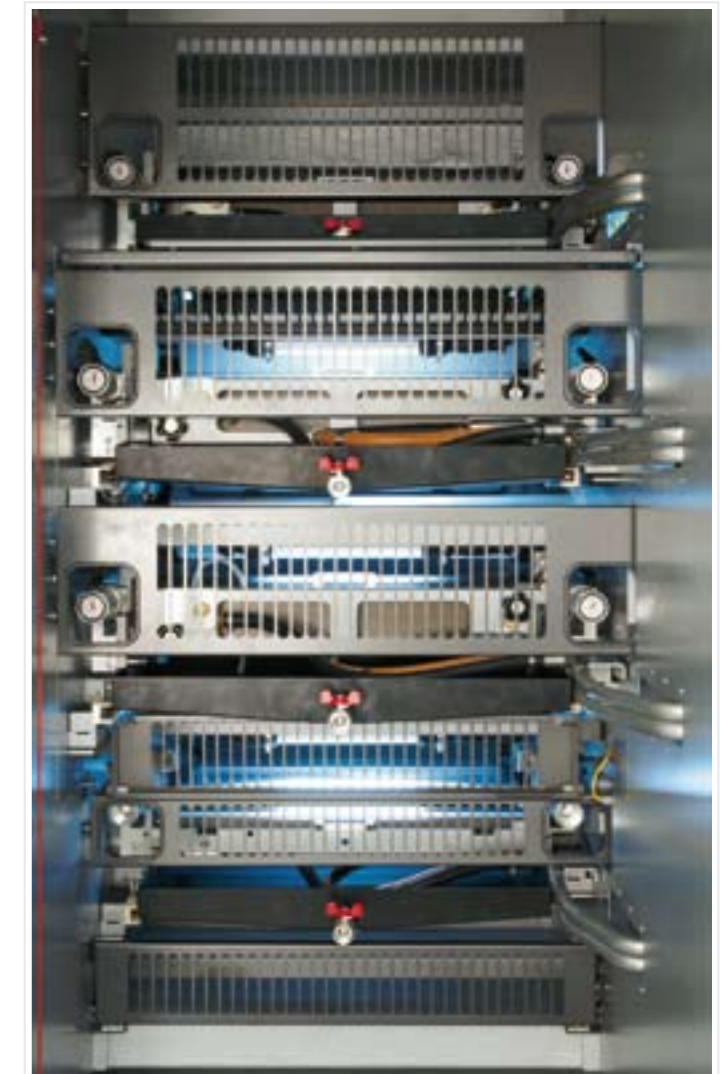


New doctor blade chamber support

FLEXO Efficiency®



Printing decks in detail



Printing decks

Every printing deck's contact/separation movement is controlled via servomotors through a new preloaded ball screw system specially designed to withstand the most adverse industrial conditions. The highest precision electronics are incorporated in the unit with encoders used on each motor. Additionally, the structure's strength has been enhanced with preloaded linear guides.

These design enhancements improve the pressure control on the plate and result in the highest quality print possible.

CENTRAL DRUM: THE STRATEGIC ELEMENT

No other flexographic press manufacturer so strictly controls the manufacturing process of this highly important component. Comexi dedicates part of its industrial process to the manufacture and quality control of the central drum, as part of our policy to internally manufacture the key components of our flexographic presses.

During this industrial process, the drum is stabilized, balanced and adjusted to the tightest tolerances in the market. These adjustments are conducted at working temperature maintained via an internal temperature stabilization circuit. Stabilization is conducted at 30°C/86°F via an automatic system integrated into the press. Additionally, an anti-corrosive Hastalloy coating is applied to the central drum to protect it against oxidation.

Actuation is another key area in which Comexi relies on the most sophisticated technology. In a joint effort with Siemens, we have integrated the DDDrive® Gearless, CNC and servomotors into the only technology platform in the market based on the SIMOTION control system. This "direct-drive" system is the most advanced in the market, reaching the highest levels of precision and eliminating all types of mechanical transfer (e.g., belts or gears).

The DDDrive® controls the motor via a high-resolution hollow shaft encoder, directly coupled to the drum axle. The encoder is designed for easy access, which makes maintenance easy.

DDDrive®



Access to the encoder of the central drum

VIRTUALMASTER®: THE ORCHESTRA CONDUCTOR

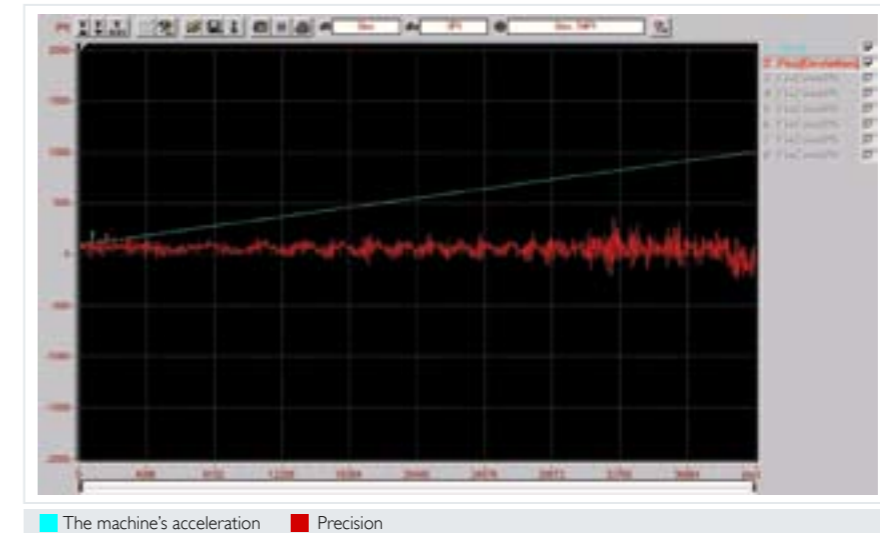
Not all "gearless" systems are created equal. The VIRTUALMaster® technology – used by Comexi throughout the entire product range – unites all motors electronically and controls them via a common virtual signal that ensures register even during the machine's acceleration and braking stages.

In a typical system, the motor position adjustment requires a reference signal obtained from an encoder located on a reference shaft (Real Master). This type of system has two principal disadvantages. First, any reading error from the reference signal is transmitted to the rest of the shafts that are synchronized to it. Second, the true signals include a set of delays in the readings and retransmission of the

signals, which imply deviations between the master shaft and the synchronized shafts. The consequence of these two disadvantages is variation in machine speed.

These two disadvantages are resolved with the patented VIRTUALMaster® system, which generates a virtual signal created digitally by the Motion Control Processor (MCP). The virtual signal is transmitted to all the shafts simultaneously, thereby eliminating the concept of a "master" shaft. In this way, the signal is generated without errors and consequently without affecting the rest of the synchronized shafts.

VIRTUALMaster®



VIRTUALMASTER® ALSO PROVIDES THE FOLLOWING ADVANTAGES:

- Perfectly aligns the material's surface speeds, plate cylinder and the anilox, **improving print quality.**
- Can slightly vary the plate cylinder and anilox speeds in relation to the material, **for the purpose of adapting specifically and exactly to the printing development tolerances.**
- Performs direct, automatic and rapid positioning of longitudinal register between printing decks, **decreasing waste generated in adjustment.**

ADVANTAGES

CHANGING SLEEVES HAS NEVER BEEN EASIER

Changing anilox and plate cylinder sleeves takes a matter of minutes. The clamps are opened manually, simply and quickly.



Plate sleeve changeover

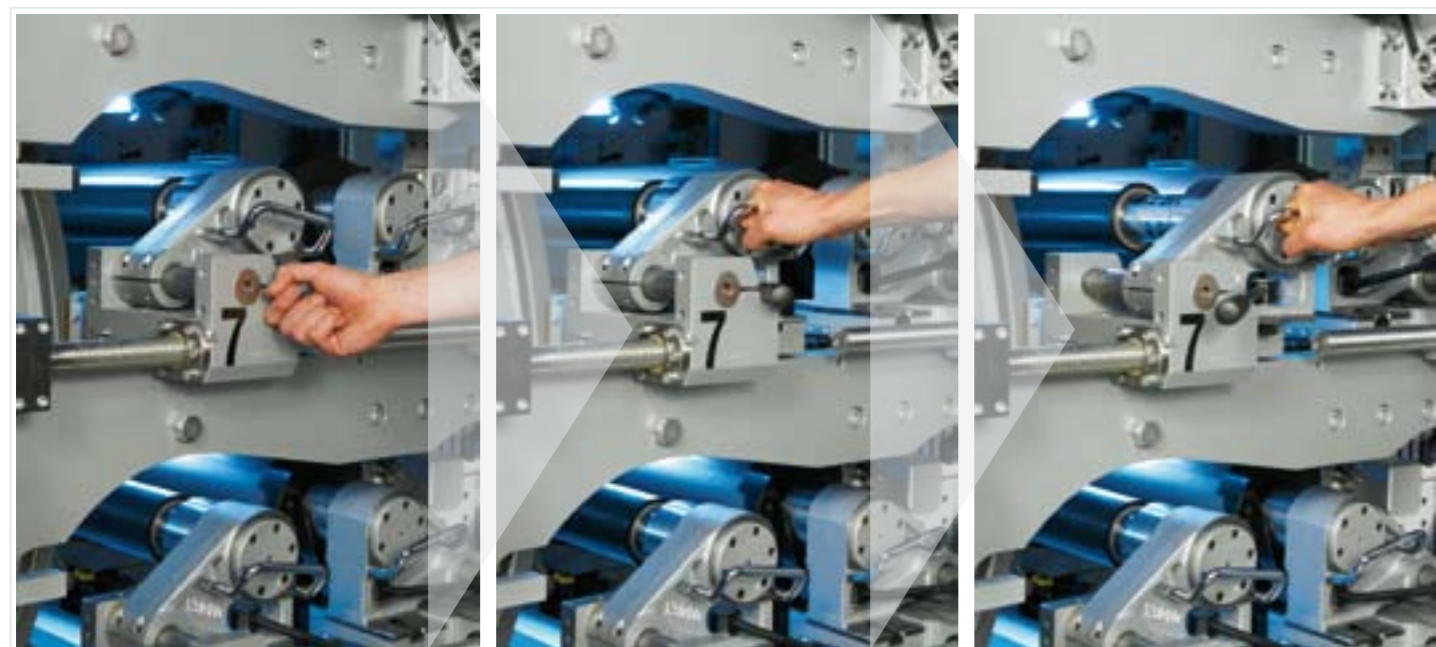
Rather than reducing the durability of the system, this simple and easy-change design has increased durability. The plate cylinder mandrels and anilox are held in place by needle bearings specially sized to allow overhanging suspension and pneumatic supply that forms an air barrier, elements required for sleeve changes.

This bearing positioning ensures a high stiffness while permitting transverse movement of the plate cylinder roller for transverse register between colours.

Comexi also utilizes the technology for shaft actuation via alternating current motors with no mechanical transfer, controlled by absolute encoders also directly coupled to the shafts. These technological advancements improve register and therefore the quality of printing.



Anilox sleeve changeover



Sequence of plate sleeve changeover



New clamp seal

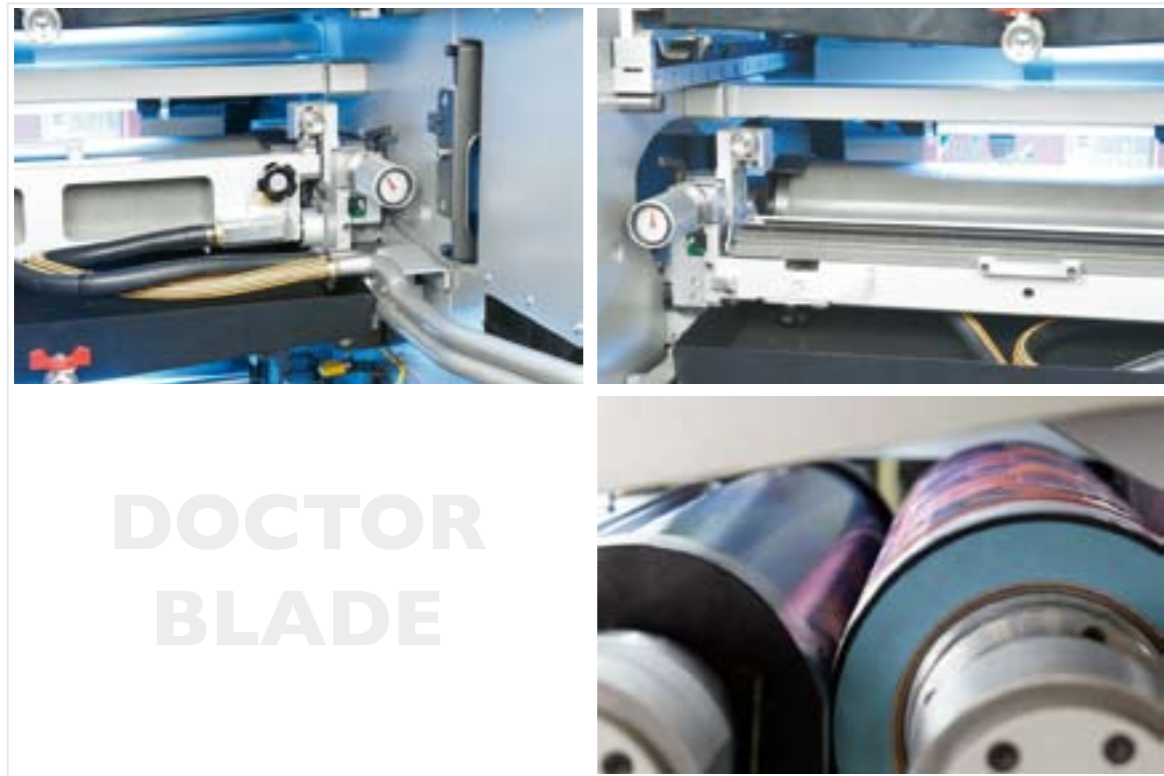
DOCTOR BLADE: COMEXI'S NEW DOCTOR BLADE SUPPORT SYSTEM

The doctor blade is assembled in a closed swinging chamber mounted on linear guides, with horizontal movement across and fine manual adjustment against the anilox. The system has been specially designed to maintain the inking position with the minimum blade pressure against the anilox.

The disassembly of the system is easily achieved without any need

to disconnect the inking lines, greatly simplifying all cleaning and changing tasks.

Additionally, the doctor blade chamber is Teflon-coated for improved cleaning, and its weight is less than 7 kg (in the 670mm-width model), which makes changing easy and minimizes the risk of injury for the operator.



DOCTOR BLADE

Doctor blade chamber about to be disassembled



Doctor blade disassembling

MAGNETBlade®

Changing the blade is fast and safe thanks to the patented MAGNETBlade® technology consisting of a tool-free magnetic changing system. Changing the shutters is conducted also without tools, so that changes can be completed quickly, on the machine or outside of it.

PLATFORM: EXTREME USER-FRIENDLINESS AND ERGONOMICS

The F4 FLEXOEfficiency® represents an enormously important leap forward in terms of ergonomics and usability. The press is equipped with an overhead platform that allows access to all elements requiring maintenance, with the purpose of simplifying parts replacement, maintenance and cleaning in areas such as the

central drum, refrigeration and drying systems maintenance, and many others.

The press can be configured with an optional automatic drum cleaning system.



Video threading



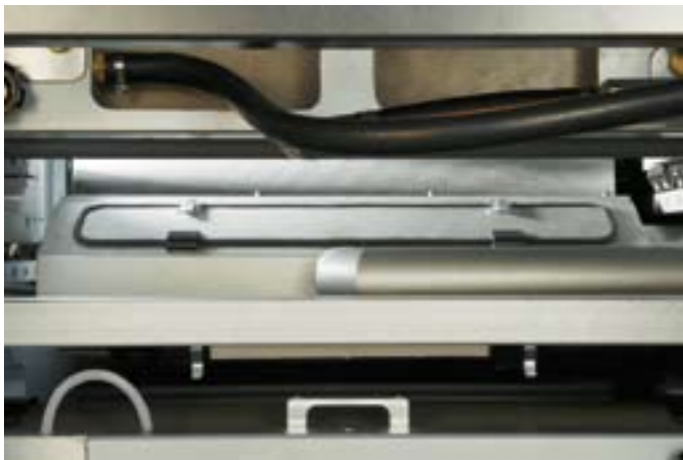
Access to central drum for cleaning



Overhead platform

DRYING: POWER AND ACCESSIBILITY

Drying equipment is comprised of two circuits that, with hot air blown at high speed, evaporate the solvent or water content of the ink (other types of viscous inks such as EB or UV can also use this type of equipment with appropriate modifications).



Inspection port for the intercolour dryers

The first circuit is used for drying between printing groups. The screen lip can be withdrawn from the side of the machine and the casing includes an inspection port, two important additions resulting in convenient and simple maintenance.



Disassembling of the intercolour dryers

The second circuit corresponds to the 4m-long drying tunnel, coated with a thick insulating material to reduce heat loss and made of twelve drying screens each with a blower lip. The screens can be easily disassembled for cleaning without tools. Also, a specific access point has been design to allow rapid threading of the machine.

The entire drying system rests on a platform, allowing convenient access for maintenance tasks.

DRYING



Dryer tunnel

UNWINDERS AND REWINDERS: FROM THE MOST SIMPLE TO THE MOST SOPHISTICATED

The configuration of the **F4 FLEXOEfficiency®** press offers you the choice between different types of unwinders and rewinders that best match your production system.

The simplest systems are composed of a "shaftless-type" unwinding/rewinding system for reels with a 1000mm maximum diameter driven by a regenerative motor reducer that acts as a brake. The "shaftless" system can work without shafts, limiting the inconvenience of handling these heavy components.

The web/film tension is automatically controlled via a pneumatic



Shaftless unwind and rewind

compensator:

Reel changes are done manually, rapidly and easily.

The unwinder/rewinder duplex system is comprised of a turret that enables automatic winder changes as well as automatic splicing at production speed.



Duplex unwind and rewind

SIMOTION AND THE CONTROL CONSOLE: THE BRAIN OF THE MACHINE

The **F4 FLEXOEfficiency®** press is designed so that the majority of functions can be controlled from the control console. Similarly, the SIMOTION platform creates a high degree of electronic integration, eliminating electronic equipment containers and simplifying maintenance tasks.

The control system is totally integrated in a graphical environment that simplifies operation and understanding.



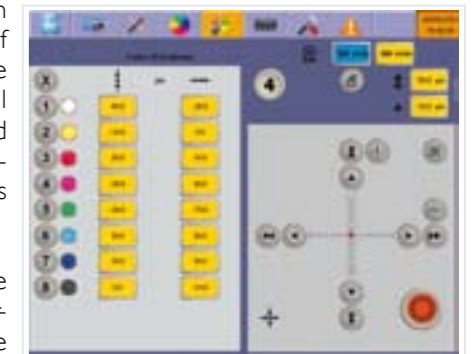
Control console

Many operations can be conducted through the display, such as advancing/reversing the printing decks, placing all accessories in operation, tension selection, machine speed and temperatures, inserting change orders at a pre-established footage, operations, etc.

Additionally, production data can be obtained for later analysis, such as the quantity of quality footage, the quantity of lost footage, work time, downtime, printing time, average real speed, and more.

By assigning the reasons for downtime by the operator, statistics can be gathered on the distinct causes of stoppages and the times for each one. All the data can be stored in the computer memory and/or on discs as necessary.

Also job tickets can be created for the purpose of increasing the efficiency of job changes, enabling the operator to later recover these job tickets.



Register control



Print deck control

EXCITINK®: SELF-CLEANING AND INKING SYSTEM

Excitink® technology is essential for controlling the inks (viscosity, temperature and, optionally, pH) so that the selfcleaning system remains efficient during job changes. The technology maintains a balance between supply ink and return ink that permits printing with an optimal pressure in the inking chamber.

The inking system comes in 3 versions: LITE, PREMIUM, and EXCEL, which match to diverse viscosity and temperature control needs. Each version comes with various levels of automation.

The structure is completely integrated into the machine's cowl and the ink tanks are located on the exterior. These tanks utilize NATURALMixing® technology, which eliminates air consumption from pneumatic agitators (pneumatic agitation is an option).

The selfcleaning process is fast and easy, with a complete wash cycle taking a little as 4 minutes (*).

(* in the 8-colour PREMIUM version with options.

NATURALMixing®



Inking system and selfcleaning



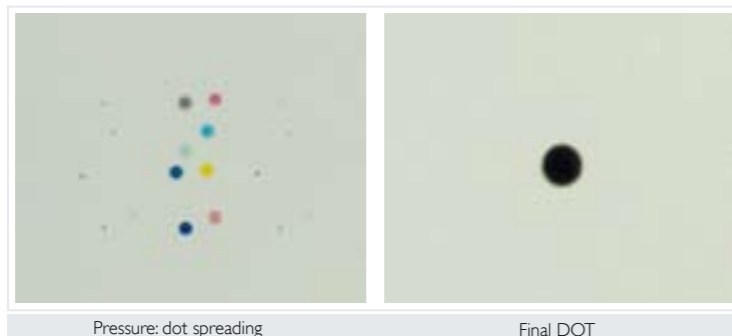
Ink tanks

CINGULAR DOT® SERIES: PRESSURE AND REGISTER ADJUSTMENT

The **F4 FLEXOEfficiency®** press incorporates Comexi's latest technology for totally automatic pressure and register adjustment. CINGULAR DOT² offers adjustment based on the true print of one 1.5mm dot in less than 90 meters / 296 ft.

Also available is the iREG system developed exclusively for Comexi by AVT, which enables semi-manual register adjustment in less than 30 meters / 99 ft.

CingularDOT²



Pressure: dot spreading

Final DOT

eCOMEXI: ENERGY EFFICIENCY AND ENVIRONMENTAL IMPACT, THE BEST RETURN ON INVESTMENT

We understand the ever-changing and globalized marketplace. That's why Comexi designs presses that adapt to these changes. Changes that generate greater efficiency in printing processes and, at the same time, reduce the environmental impact. Changes such as the new eCOMEXI concept.

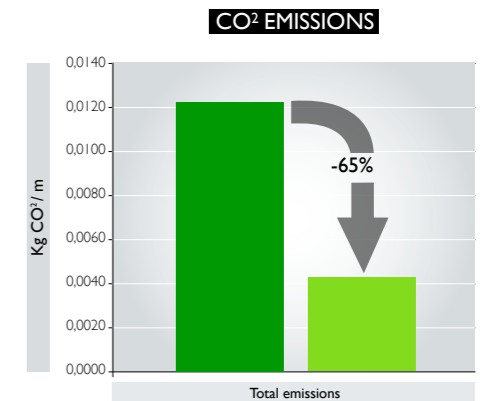
The technological improvements incorporated into our presses have greatly reduced the power consumption, gas and compressed air. The new Siemens-Comexi technology and the continuous bus configurations reduce emissions from electricity consumption by 58%. In addition, concepts such as recirculation, improvements to thermal insulation and electronic fan control reduce the impact of gas consumption by an incredible 72%. Compressed air consumption has a large impact on emissions; however, the innovative NATURALMixing® technology and the installation of more efficient technology have achieved an 80% reduction in emissions.

Regarding solvent-based printing, Comexi has taken the initiative to find answers to the increasingly strict regulations on VOC emissions and the reduction of greenhouse gases. In the near future, solvent-based printing will face an increasing demand to tackle these issues.

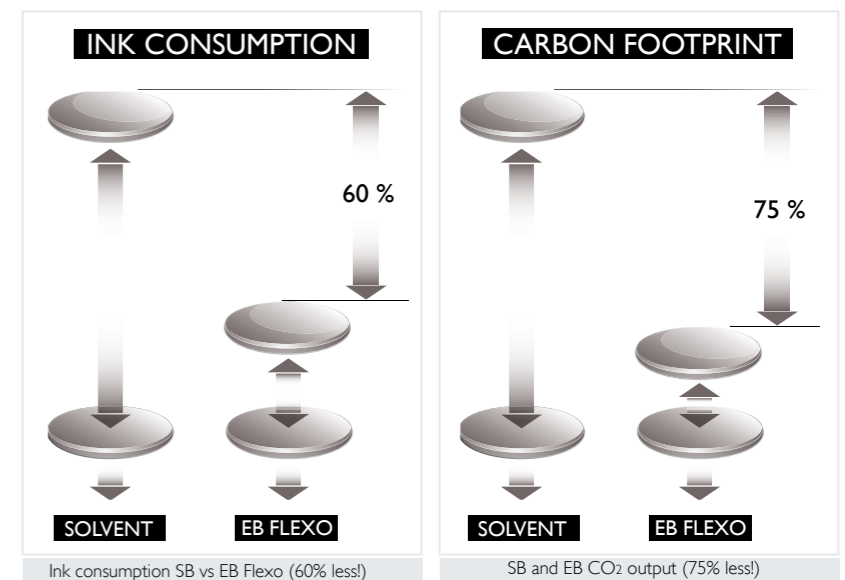
The alternative is electron beam technology (EB). After 5 years dedicated to research and developing this process until it reached industrial performance, COMEXI has achieved radical changes in printing technology. It not only offers a printing system that is 100% solventless and VOC free, but also prints with the highest printing quality possible today without adding extra costs.

If you need to change in the face of increasingly strict regulations on your carbon footprint, we offer eCOMEXI (www.ecomexi.com) solutions that improve print quality while reducing greenhouse gas emissions, thus minimizing the overall environmental impact of your industrial process.

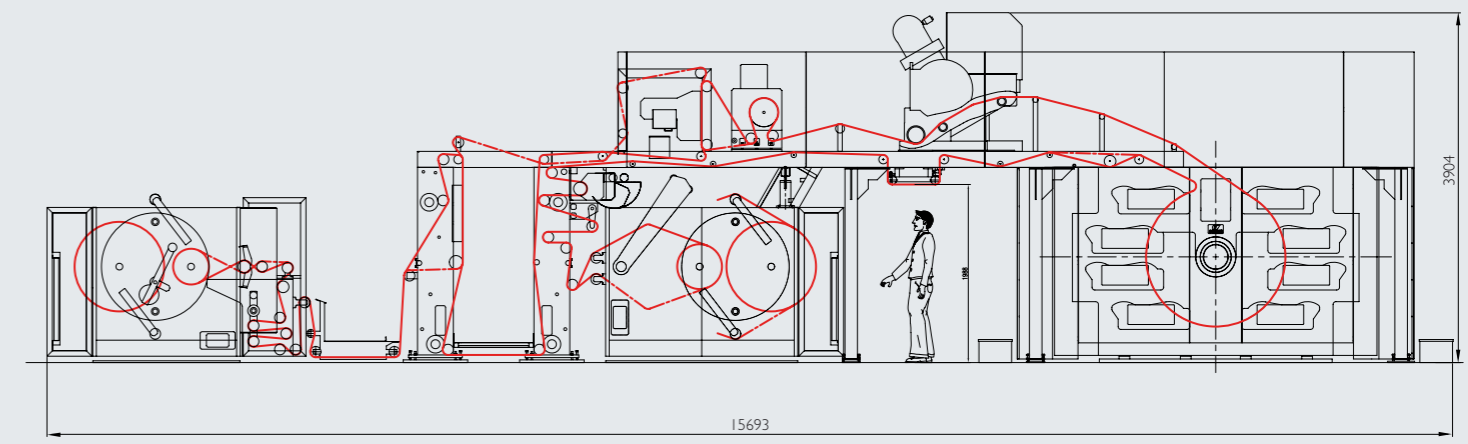
Finally, we achieve an average global impact of a 65% reduction as well as the resulting improved economic performance and a better return on investment ratio.



We can also help you integrate on-line sections for application of coatings which add value to your finished product.



F4 FLEXOEfficiency® EB Series



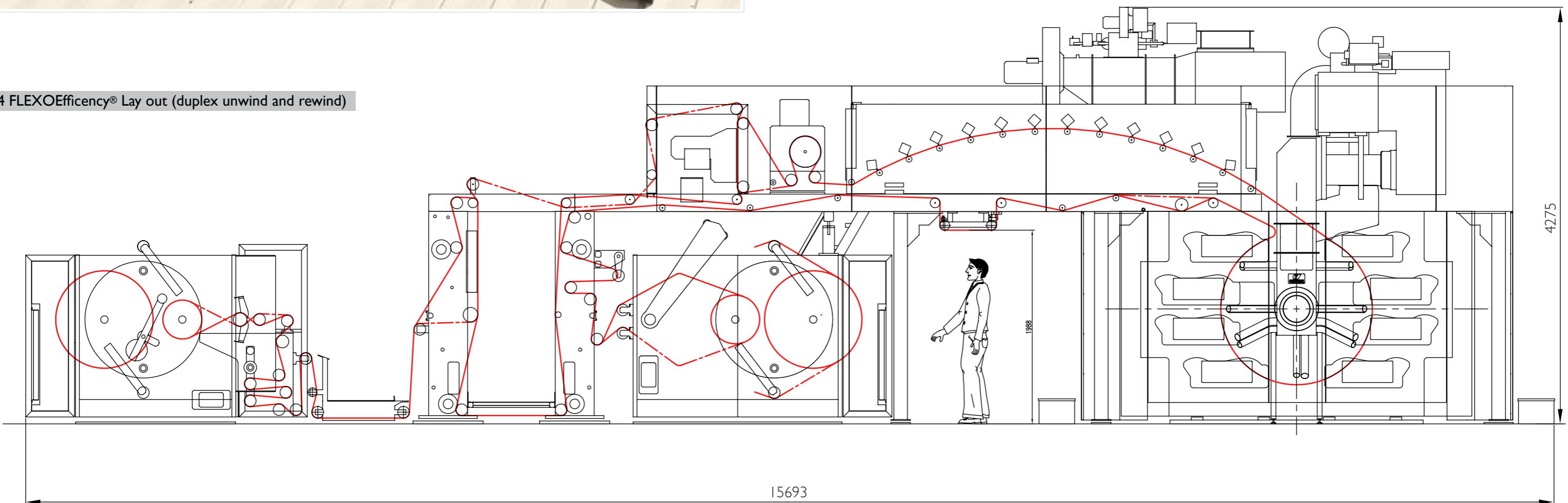
TECHNICAL SPECIFICATIONS



F4 FLEXOEfficiency®	
Type	GEARLESS
Colours	8
Printing width (mm / inches)	670 / 26.3 - 870 / 34.2 (with shaftless rw and uw)
Material width (mm/inches)	720 - 920 / 28.3 - 36.2
Minimum print repeat (mm/inches)	240 to 260 / 9.4 to 10.2 depending on width
Maximum print repeat (mm/inches)	600 / 23.6
Maximum speed (m/min / ft/m)	300 / 984
Dimensions	9.78 x 5.62 x 4.28 m / 32 x 18.4 x 14 ft (standard machine, 870 mm / 34.2" with shaftless unwind and rewind)

The technical characteristics are subject to change depending on configuration chosen.
The cover photo is for 8-colour F4 FLEXOEfficiency® CI flexo press with options.
The final image may not correspond to the machine offered.

F4 FLEXOEfficiency® Lay out (duplex unwind and rewind)





 FLEXO PRINTING FI, FW, FPLUS, F4 FLEXOEfficiency®

 LAMINATING OPTIMA, POWER, DUAL, EVO, ONE

 SLITTING EIKON, E-TURRET, DUO2, COMPACT2, BLADE, GUIDE

 ENVIRONMENT & LOGISTICS SELF-CLEANING, AUTOMATIC SLEEVE STORAGE, ECODISTIL, AUTOMATIC ROLL UNLOADER, WASHING UNIT

 COMEXI GROUP

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