

Watch the Step to Wider Roll Widths

Ultra Wide Web Offset - UWWO

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Introduction

Ultra Wide Web Offset (UWVO) is the next step to extending commercial heatset web offset productivity with web widths over 2 m wide that are now being extended to nearly 3 m. These presses allow production of 80 pages A4 long grain or 96 pages long grain or short grain.

The move to very large format offset presses began in the late 1990s with sheetfed offset, newspaper presses with 2211 mm web width, and High Volume Offset (HVO) heatset presses up to 1980 mm. The first UWVO presses were delivered in 2007, and in 2010 there are around 50 presses installed. Publication gravure has used wide web widths for some time and in recent years most recent new investment has been at widths around 3,8 m and wider, while there has been a significant decline in widths below 3 m.

Heatset offset's share (by paper tonnage) of the publishing market against gravure grew from 55% in 1998 to nearly 70% by 2008. This change in process share is attributable to a combination of changes in principal market segments and technical-economic developments. Many gravure printers are also using heatset web offset — seven of the top 10 European publication printers use both processes.

Key UWVO questions

UWVO presses are breaking new ground in terms of productivity, enabling the offset process to compete successfully in areas previously dominated by gravure. At the same time, they pose new challenges in press design, material science and operational skills to all concerned in building, equipping and running them.

The 11 companies participating in this unique cross-industry project represent the “who's who” of the web offset printing supply chain. By sharing their expertise they are able to examine more thoroughly system issues to gain a better understanding of them and provide more effective solutions. The UWVO press is more than the sum of its parts.

The purpose of PrintCity's “Watch the Step to Wider Web Widths” is to review some of the technical and economic implications of the complete process chain featuring heatset offset presses with wide web widths. The report focuses on some of the key UWVO questions:

- What will be the applications for this new press class?
- How will the larger offset press capacity compete with publishing gravure?
- What are the key investment decision criteria?
- What will be the key factors for successful operation?

PrintCity's Ultra Wide Web Offset Project is a follow-on from “Watch the Step to Larger Roll Diameters”. This report is the industry's definitive evaluation of the advantages and disadvantages of moving from 1250 to 1500 mm diameter paper rolls (the report is available from www.printcity.de).

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Executive Summary

Ultra Wide Web Offset (UWWO) defines heatset offset presses with a web width between 2000 mm and 2860 mm. Four press configurations are possible — one in short grain and three in long grain in four web widths.

These presses will allow production from 80-96 pages A4 long grain, or 96 pages short grain per cylinder revolution. The first UWWO presses were delivered in 2007, and in 2010 there are around 50 presses installed.

Market applications of UWWO

UWWO is used in three publishing market segments – magazines, catalogues and advertising inserts. In the last decade there has been significant changes in these markets that has tended to favour heatset offset production over publishing gravure. These can be summarised as:

Magazines: Multi-million print run magazine titles have declined; there has been an increase in new titles but these are mostly of low to medium run lengths; production turnaround times have been reduced.

- UWWO offers: High page output per cylinder revolution + High output per hour + Low printing waste by automation + Short to long print run cost efficiency.

Catalogues: Traditional large pagination mail-order catalogues have been significantly eroded by the influence of the Internet. These catalogues have stagnated since 2000 and some have disappeared. Printed catalogues now tend to be smaller, more frequent, and require faster delivery times.

- UWWO offers: High page output per cylinder revolution + Short makeready time + Low printing waste by automation + Economic edition changes for target groups or part range catalogues + Small to medium print run cost efficiency.

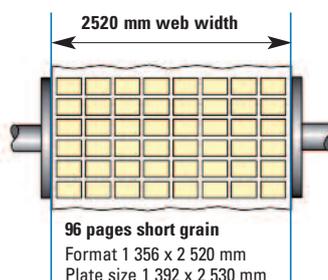
Inserts: Low page count and long print runs of consumer advertising inserts of 4 to 48 pages, distributed by newspapers or mail — a relatively robust media with high frequency. The key trends are ultra rapid turnaround of 24-48 hours with highly efficient delivery logistics.

- UWWO offers: Highest output of copies per hour from multiple copies (2-4-6-8) per cylinder revolution and high press speed + Inline finishing + Short makeready time + Low printing waste by automation + Short to long print run cost efficiency.

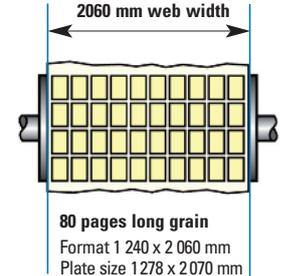
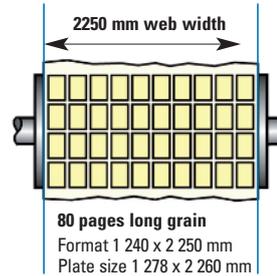
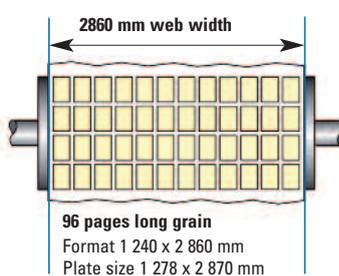
The underlying trends of these market segments help explain the significant growth of heatset web offset during the last decade and which should continue into the foreseeable future.

UWWO formats

SHORT GRAIN



LONG GRAIN



Which Ultra Wide Web process?

The other major heatset offset growth driver against gravure has been its faster technical-economic developments, including:

- Advances in prepress technology benefit offset significantly more than gravure. Offset has comparatively very short lead times and low investment costs.
- Intense competition between several large manufacturers of offset press and prepress systems has stimulated technology development, whereas publication gravure has only a single press manufacturer and limited prepress competition.
- Over 300 new heatset 48-72 page presses installed in the last decade has made it difficult for gravure printers with older and narrow presses to compete.
- Both heatset and gravure can print at up to 17 m/s.
- The former qualitative difference between web offset and gravure printing is diminishing and is no longer the significant sales argument that it once was.
- Both processes have made considerable improvements to their environmental performance, but in different ways because the processes are different.

The selection of the most appropriate process for a given print job will continue to depend upon the combination of several attributes such as run length, pagination, paper, format, delivery time, and the total production cost.

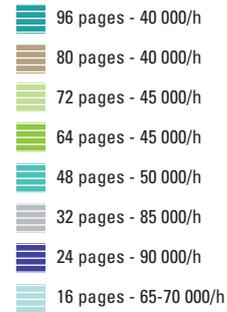
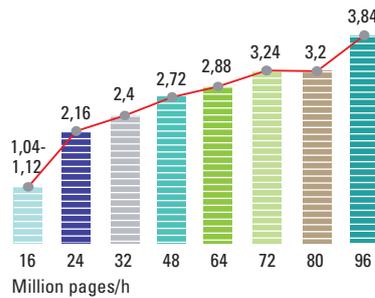
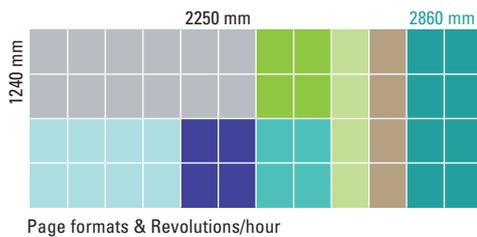
The on-going dream of many printers is the combination of the best of both worlds — the simplicity and stability of gravure printing combined with the ease of imaging from offset — but this remains a dream.

UWVO production output

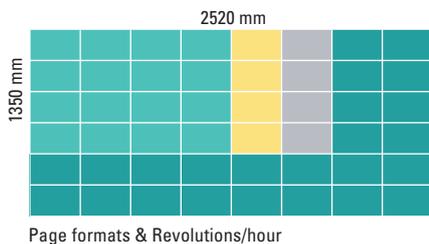
The comparative output of web offset formats in A4 pages per hour.

Source manroland.

LONG GRAIN formats and production output



SHORT GRAIN formats and production output



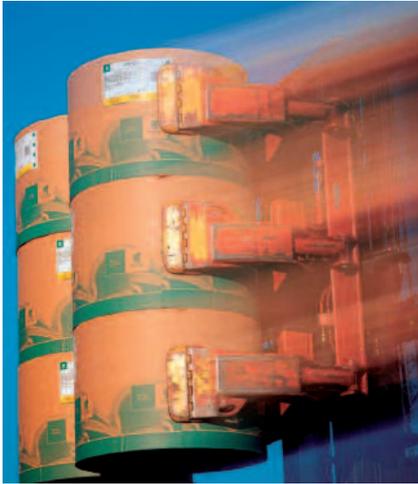


Photo UPM.

Lean manufacturing — faster & cheaper

The trend to larger web widths is primarily driven by competition to reduce total production costs. In this sense, UWWO can often provide leaner production solutions. A press is more than the sum of its parts and a holistic approach is essential when investing on this scale. Some of the key issues include:

System approach: Automated logistics and materials handling needs to be scaled to handle the high hourly press output and the physical size and volume of consumables (paper, ink, plates, rollers, blankets).

Plate systems: Large format offset presses use both Thermal CTP and UV-imaged conventional plates processed by CTP and both provide a comparable level of printing quality. Each system has different attributes and their total cost impact should be calculated on the specific needs of each print plant. Consideration needs to be made on how they will be handled within the plant because of their dimensions.

Paper & logistics: Most offset paper mills have production limitations in the finishing process and, unless the mill is already dimensioned for higher widths, weights and diameters, a large capital investment will be required. It is essential that printers and publishers ascertain if large offset rolls are available to them in their geographic area. The roll core is the essential link in the production chain between the paper mill and the press and they should be treated as a machine part rather than as packaging material.

Roll handling: Systems will need to be dimensioned to safely handle larger and heavier rolls. Pastors need a robust construction to handle the substantial increased roll weight inertia at an E-stop, and require more powerful acceleration motors.

Printing units: The selection of either sleeve or flat blankets is a fundamental printing unit design step. Sleeves are used on 96-page presses because of their ratio of cylinder width-to-circumference. Flat blankets are preferred for other configurations because they are cheaper to purchase, change, store and handle.

Lightweight carbon fibre cores reduce ink roller weight by 80% in comparison to steel, while providing higher temperature stability and an adjustable high bending stiffness. UWWO rubber roller coverings are less tolerant to inadequate quality — particularly if running a high proportion of partial webs. It is, therefore, essential to use roller coverings with excellent shrink resistance and dimensional stability.

Heatsset system: Dryers with integrated Regenerative Thermal Oxidation (RTO) have completely redefined heatset dryer performance for low energy consumption, environmental compliance, high product quality and minimal lifetime operating costs. The 95% efficiency heat exchanger makes it the most fuel-efficient and environmentally friendly technology available, and the most suitable for high speed UWWO production.

Folders: Experience from UWWO installations shows that the key investment decision centres on the selection of folder type and web width because this determines the range of products that can be run. In many cases, printers take a customised approach to the folder and its superstructure to create a competitive advantage in a specific product area.

Press delivery: Efficient systems are the essential interface between the press and finishing inline or offline. Reliable and careful transport of printed products is a high priority, particularly where space is limited and for linking between buildings or floors. The optimisation of intermediate signature storage (bundle, log or roll) can improve binding productivity by 25-30%. Inline finished products can be glued or stitched in the folder, trimmed on three sides in a rotary trimmer, then fully automatically packed and palletised according to distribution instructions.

Process control automation: The large paper surface per revolution and high speed running makes closed loop process control systems essential to minimise changeover time and waste, and to maintain good colour in register. High-speed camera monitoring is an additional control tool used by many web printers to help increase press runability and efficiency.

UWWO leaders

In 2010 there are around 50 UWWO presses installed, mostly for 2060 and 2250 mm web widths. Among the leading printers using this technology are:

80 pages A4 per cylinder revolution

The world's first LITHOMAN to print 80 pages A4 per cylinder revolution — a web width of 2250 mm — was successfully started up at the J. Fink printing company in 2007. *"I think this press heralds a new era in the area of high volume printing,"* says J. Fink's Production Manager *"We are incredibly proud of the achievement. As cutting-edge technology leader in the printing industry, it is always exciting to set new standards...Internet and printing do not substitute one another, globalisation and fragmentation demand catalogues and other products that can be optimally produced on an 80-page press. Today, we can assure our customers that the technology used is both proven as well as constantly advanced step by step. A unique folder configuration allows us to achieve an infinite number of folder variations including production of 2x40, 4x20, 8x10, 6x12, 4x16, 2x32 or 1x80-page signatures."* Inline finishing can produce supplements with special effects as well as intermittent binding for stitched-in supplement production. The finished products are automatically bundled and palletised.



Photo UPM.

3 x 80-page presses in six months

Jungfer Druckerei und Verlag GmbH is one of Europe's leading commercial printers and specialises in the production of retail and business advertising catalogues with extremely fast turnarounds. The company is located in Herzberg in northern Germany, and serves markets that stretch north to Scandinavia and south to Austria and Switzerland. In 2008 Jungfer installed three 80-page LITHOMANs, each with a maximum web width of 2060 mm and speed of 42 500 cylinder revolutions/hour. The press crew of only four people is made possible from the high level of automation that Jungfer describe as *"essential"* on a press of this size. The folders of each of the presses have different configurations to allow them to produce the widest range of multiples of different formats using the maximum web width. All presses are equipped with inline finishing and robotic palletising of the finished products.

Product portfolio expansion

Mohn media Mohndruck GmbH in Gütersloh invested in an 80-page LITHOMAN to expand its product range with inserts. The press has a web width of 2250 mm and a maximum output of 3.2 million 4-colour DIN A4 pages per hour. Its flexible production possibilities permit efficient printing of both high and low pagination, while producing a variety of folds and page counts that until now were not possible on low-pagination presses. *"We intend to set the standards in insert production right from the start. The decision to purchase an 80-page press means our customers can benefit from high flexibility and print quality,"* explains Roland Witte, Plant Manager and member of the Mohn media Executive Board. The press is scheduled to start production in the middle of 2010.

Swiss printer replaces gravure by offset

Swiss Printers AG has reinforced its position in offset printing with its investment in a LITHOMAN press that will replace the gravure printing system at the company's Zofingen location by early 2011. *"Expanding our capacities in web offset helps us to strengthen our position on the market and among our competitors in the field. The LITHOMAN convinced us across the board. Technically speaking, modern equipment provides greater flexibility for our company and allows us to meet our customers' needs more fully,"* says Rudolf Lisibach, Managing Director of Swiss Printers AG, explaining the company's decision to acquire an additional press. With 1100 employees, Swiss Printers AG is the largest corporation in the Swiss printing industry and is composed of four printing companies: Ringier Print Zofingen AG, Zollikofer AG in St. Gallen, NZZ Fretz AG in Schlieren and Imprimeries Réunies Lausanne S.A. The company also uses a 32-page and six 16-page presses from manroland.

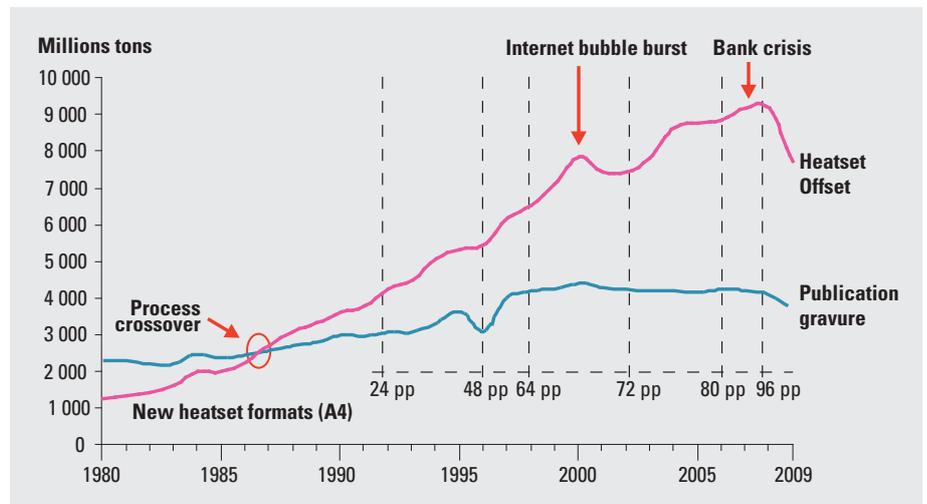
The changing dynamic... of Ultra Wide Web Printing

Heatset offset and publication gravure had an almost equal market share in 1987 (in tonnes of paper printed) and this changed only marginally by 1998 to around 55% for heatset. However, heatset's share has grown in the last decade to almost 70%. The driving forces behind this accelerating change are:

1. Evolution in principal market segments — magazines, catalogues and inserts,
2. Technical-economic developments

This chart shows the relative evolution of papers printed by process and the dates when new generation heatset web offset formats became available. During the last decade, the tonnage printed by web offset printed has increased by 42%, while publication gravure has only grown 8%. The 2009 estimate shows the deceleration in paper demand since the banking crisis of September 2008. Note that paper tonnage as a measurement understates the area of paper printed because the reduction in average basis weight is not visible.

Source EMGE.



Reasons for the migration to heatset include:

- Advances in prepress technology favouring offset.
- Significant growth of heatset web widths during the last 10 years with over 300 new presses of 48- to 72-pages. In the same period only 56 new gravure presses were installed and over 70% were for web widths between 3081 and 4320 mm.
- Gravure printers with older and narrower presses have increasing difficulty in competing with offset.
- Heatset over 2000 mm now extends into publication gravure web width/page capacity with around 50 presses sold from 2007-2009 — only 13 gravure lines of up to 3000 mm width were sold in the previous 10 years.
- Growth of hybrid newspaper presses with dryers (around 400 are installed worldwide) that print magazines and inserts and which are now a part of the publication market. The largest has four double-width towers capable of printing 256 magazine pages in a single run.
- Intense competition between several large manufacturers of offset press and prepress systems has stimulated technology development, whereas publication gravure has only a single press manufacturer and limited prepress competition.

Consolidation

Gravure printer consolidation increased from the late 1990s and resulted in capacity rationalisation combined with new investment into extra wide webs. Some of the larger printers have reduced their gravure printing capacity by 20% or more as a result of the current economic downturn. Gravure printers are also users of heatset offset — 7 of the 10 largest European printers operate both processes. The exception to this trend was the French heatset printer Lenglet, who added four 3,68 m gravure presses to six existing heatset lines in the early 2000s. Recent publication gravure installations outside of Europe are limited to an exceptional installation in Japan in 2009; while the 50-50 joint venture between Burda and HT Media commissioned a 50 000 tonnes per year plant in New Delhi by transferring two presses from Germany in 2009.

1: Changes in principal market segments



Photos: Müller Martini

The last decade has seen accelerated changes in the magazine, catalogue and insert markets that tend to favour heatset production. These have been identified by multiple industry sources* and can be summarised as:

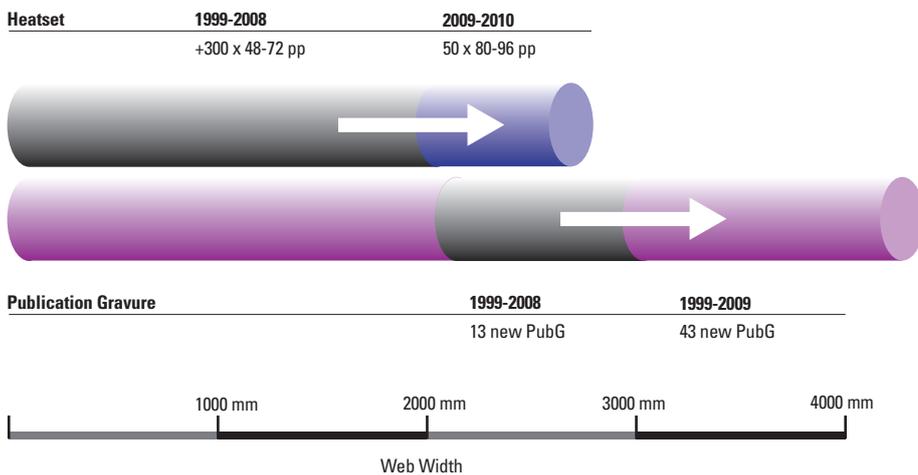
Magazines: Multi-million print run magazine titles have declined; there has been an increase in new titles but these are mostly of low to medium run lengths; production turnaround times have been reduced.

Catalogues: Traditional large pagination mail-order catalogues have been significantly eroded by the influence of the Internet. These catalogues have mostly stagnated since 2000 and some have disappeared. Printed catalogues now tend to be smaller, more frequent, and require faster delivery times.

Inserts: Consumer advertising inserts of 4 to 48 pages, distributed by newspapers or mail, have remained a relatively robust media with a high frequency. The key trends are ultra rapid turnaround of 24-48 hours with highly efficient delivery logistics.

The underlying trends of these market segments — which should continue into the foreseeable future — help explain the significant growth of heatset web offset during the last decade.

*Sources include EGME, ERA, FIPP, manroland, Sun Chemical, UPM, WOCG.



Comparative process evolution during the last 10 years shows that new gravure press installations have been mostly over 3 m wide, with low investment in 2-3 m, which is the area where heatset is now active.

Sources: PrintCity/ERA/manroland/UPM.



The slow and expensive processing of gravure cylinders compares unfavourably with offset plates.

Photo UPM.

2: Technical-economic developments

Comparisons between publication gravure and heatset web offset processes are often confused. For this reason, PrintCity analysed the current Best Available Technologies (BAT) to provide a balanced view of the two processes. Some of the key findings include:

PREPRESS

While premedia and proofing costs are approximately the same for both processes, the same is not the case for imaging, which is probably the single most significant source of performance difference between them.

- Advances in prepress technologies have benefited offset far more than gravure. CTP (Computer to Plate) combined with long run plates (more than 1 million copies) became from the late 1990s a faster, simpler and more cost efficient imaging technique than gravure cylinder processing.
- Investment cost of gravure cylinder processing is about four times higher than a similar capacity offset system.
- Offset has lead times as short as one hour to make 8 plates, whereas even using 2-3 gravure engraving systems in parallel requires 4-10 hours (depending on technology used) to image 8 cylinders.

Offset platemaking: The accuracy of CTP plates has also reduced press makeready time and waste, and allows the use of AM/FM hybrid screens for high fidelity colour reproduction. Low process plates are further simplifying platemaking, while reducing chemical and water waste.

Gravure cylinder processing: Direct digital mechanical engraving has undergone only incremental improvements since the 1980s. Direct laser engraving is faster with a better control of the cell structure to optimise quality, but is used by few European publication printers.

Prepress supply dynamic: Offset plate and CTP manufacturing is led by three global suppliers and there are many other players. The publishing gravure cylinder processing market was dominated by only two players who merged in 2009.

PRESSES AND PRINTING

Fixed vs. variable cut-off: Gravure's cylinder circumference is variable and can be changed to a different cut-off(s) by investing in new sets of cylinders. This can be the single determining factor to use gravure. However, this advantage becomes limited on standardised format magazines and catalogues (a significant proportion of print demand). Publication offset presses have a fixed cut-off.

Printing speed and substrates: Both heatset and gravure can print at up to 17 m/s and on paper weights down to 36 gsm. Normally, each printing process requires adapted paper. Heatset can print on a broader range of substrates and does not need as smooth a surface as publishing gravure.

Folding: A wider range of folder formats is available for commercial heatset than gravure. New offset designs with grippers (that emulate the gravure folder) can reduce paper trim waste margins and make it possible to print at higher speeds. Most gravure printers prefer short grain (landscape) folding except when using a former-cutter for covers or low pagination products.

Quality considerations: Gravure is a technically simple printing method, it has no chemistry and fewer moving press parts, and a more stable print quality with lower waste than offset. However, significant improvements in heatset prepress, press control, automation and consumables have narrowed the previous print quality differences to a very low level. For example, CTP provides accurate plates that rarely require diagonal register adjustment; fan-out is compensated in prepress; tone value increase is counteracted by characteristic curves; integrated process control systems and closed-loop colour control reduce ink and dampening variations; and pre-set profiles minimise drying issues.

Press supply dynamic: There are several large manufacturers of web offset presses and the competition between them is fierce. In contrast, there is now only one manufacturer of publication gravure presses and the lack of competition and low order volumes tends to impede development.

"The former qualitative difference between web offset and gravure printing is diminishing and no longer a sales argument."

Dr. Wolfgang Jeschke, GC Graphic Consult GmbH, at ERA Annual Meeting in 2003.

GREEN & LEAN MANUFACTURING

Economics and environmental performance can be considered together because they are closely related under a “Green and Lean Manufacturing” perspective. Both processes have made considerable improvements to the environmental performance for presses and their ancillary systems but in different ways because the processes are different. Economic and environmental performance is significantly related to the annual mix of print run length and relative utilisation of web width. Only a complete audit can establish truly comparable performance on similar printed products.

Prepress: Gravure cylinder imaging, multiple sets of cylinders per cut-off, resurfacing, storage and transport is a complex high cost installation. Cylinders are reused and consume copper, chrome, and sulphuric acid — hazardous substances requiring air and water emission control. Offset imaging requires a much lower capital investment than gravure. Single-use aluminium offset plates consume a high level of energy to smelt and convert virgin aluminium into plates — but around 99% of plates are recycled and when re-smelted require 90% less energy than virgin aluminium. The in-plant environmental impact of offset from CTP devices and lightweight plate handling, minimum chemistry, emissions and waste water is low.

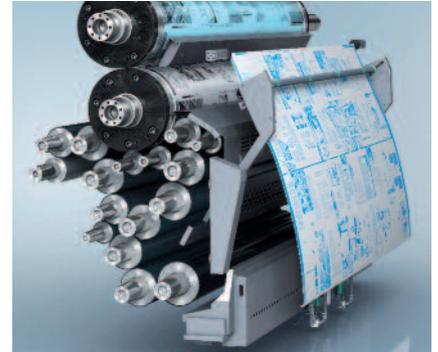
Inks and solvents: Heatset inks use high boiling point mineral or vegetable oils that do not evaporate as VOCs at ambient air temperature. During printing they become VOCs and over 80% are evaporated using an integrated dryer-oxidizer where the solvent’s calorific content is recycled to reduce gas consumption. Regenerative Thermal Oxidation (RTO) can almost eliminate external gas, except during standby. Fugitive VOC emissions are higher for offset than for gravure. They mostly come from dampening and cleaning operations and their impact is reduced through best practices such as: changing to low IPA (from 10-15% to 0-3%) or using IPA substitutes; hydrophilic rollers and conditioning of water; automated low-solvent blanket and roller washing systems; and automated closed ink supply. Publication gravure uses low boiling point toluene VOC solvent that evaporates rapidly with a small amount of dryer energy. The solvent laden air is collected and pumped through a series of carbon beds to recover the solvent and exhaust the cleaned air — an energy intensive process. Integrated CHP (Combined Heat Power) systems can increase energy efficiency. Around 95% of gravure’s toluene can be collected for reuse. EU regulations make equipment used in gravure more costly, and there are employee exposure limits to toluene.

Energy: From the late 1990s heatset energy consumption per printed page has been reduced by using wider webs and new offset technologies (direct drives, integrated dryer-RTO oxidizers, evaporative process cooling, rollers and blankets) that can reduce overall press line energy consumption by 30-40% (Energy Efficiency for Web Offset Printers, PrintCity, 2008).

Paper waste: Gravure is a simpler, more consistent process with low start-up and running waste. However, new offset press technologies have lowered waste level differences considerably (independent drives, closed-loop automation and control systems). Gravure has no plate lock-up gaps and therefore no ‘structural’ waste every cylinder revolution of around 0,05 to 0,08% — this waste does not apply on certain types of retail catalogues/inserts where there is no trimming and the non-printing gap white area becomes part of the product’s border.

Total print production costs for print runs: Comparative economic performance between offset and gravure has traditionally seen as short vs. long run lengths. However, costs are also strongly influenced by the use of the maximum web width, the type of folder product, changes to image for different editions, etc. Gravure tends to economically outperform offset only when its wider web can be fully utilised to print a job in a single pass, and/or for long uninterrupted runs close to, or over, a million revolutions.

Investment cost of press and supporting infrastructure: While the capital investment for presses of the same web width would be similar (slightly less for an offset line), a gravure press will incur much higher costs for additional cylinders, cylinder handling and storage, engraving systems, and solvent recovery.



Advances in prepress technologies have benefited offset far more than gravure.

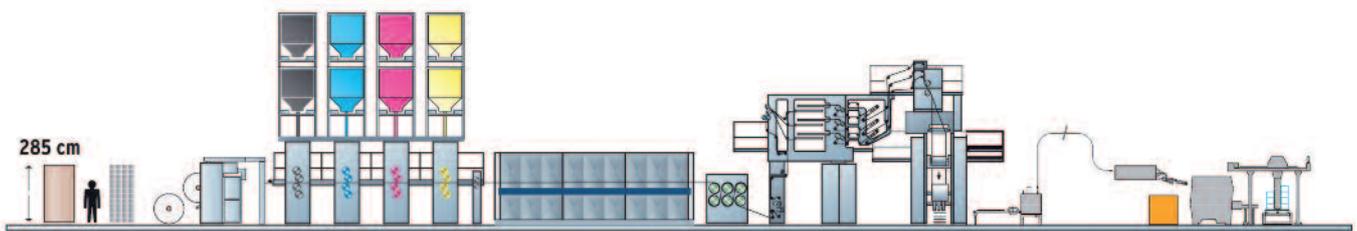
Photo manroland.

Some conclusions

There is no ‘winning’ process because the selection of the most appropriate process for an individual printing job depends upon the relative importance of a combination of criteria — run length, pagination, paper, format, quality, delivery time, and the total production cost. Both processes retain their different advantages and disadvantages, but the relative importance of many of these has been reduced in recent years.

Technology-process overview

UWVO presses are breaking new ground in terms of productivity, enabling the offset process to compete successfully in areas previously dominated by gravure. At the same time, they pose new challenges in press design, material science and operational skills to all concerned in building, equipping and running them. Awareness of these new challenges across all the groups involved helps create an environment conducive both to running these presses at their optimum performance potential and improving the whole process in terms of printability, runability and viability. A press is more than the sum of its parts and a holistic approach is essential to successful UWVO investment. Some of the important system issues include:



1: Requirements for total integrated system

UWVO should be considered as an ultra high performance industrial production system — not as separate pieces of hardware, software and consumables. The incorrect dimension or underperformance of any single item can have a disproportional impact on productivity and quality. System optimisation requires that prepress, press, postpress, logistics and ancillaries are defined as a whole.

The operating environment and layout is also critical. Controlled temperature and relative humidity are important for UWVO runability. Optimum printing performance requires that temperatures of all moving surfaces (rollers, plates, and blankets) as well as the ink storage, ink ducts and ink rollers should all be regulated and controlled for the right printing conditions. Surfaces that are too cold give poor quality and transfer, whilst surfaces that are too hot cause inks to become lower in viscosity, increasing the risk of early piling and web breaks.

Soundproof enclosures around printing units require appropriate ventilation/air treatment systems, and special consideration is needed to allow access for the large plates and rollers used.

Blankets and rollers for UWVO should be regarded as consumable spare parts that need to be correctly selected and tested as “fit for purpose” before a decision is made to change to another product or brand.

Press unit logistics automation includes

- 1 - Automated ink supply and agitators,
- 2 - Automatic plate loading,
- 3 - Roller mounting equipment.

Source manroland.

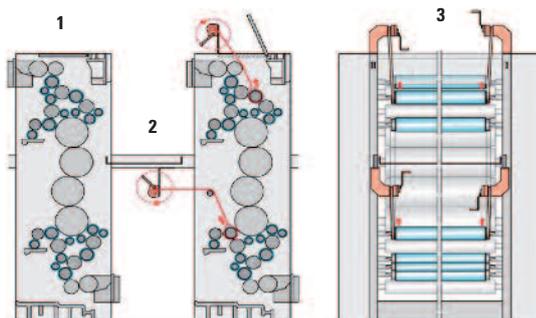
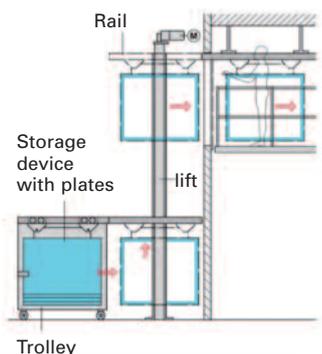


Plate transport: Rail



Ink requirements for UWWO are good printability, good transfer properties and good press stability. Heatset inks that are produced in controlled ultra large batch sizes for all colours help maintain consistency from batch to batch allowing ink press profiles to be reliably set for continuous production. Integrated RTO dryer-oxidizers provide extremely high energy efficiency and exemplary environmental compliance on large format presses.

2: Process automation

The large paper area per cylinder revolution and high speed of UWWO make closed loop systems essential to minimise time and waste at changeover and to maintain good colour in register. These systems need to be extremely fast and designed for UWWO.

3: Automated logistics & materials handling

The combined huge hourly press output and the physical size of consumables (paper, plates, rollers, blankets) require a logistics approach similar to gravure. The very high level of automation of heatset offset presses has been one of the key reasons for their increased productivity.

This starts with handling of plates because they can no longer be easily manually moved. This requires consideration as to how the plate will be delivered, handled, transported and loaded onto the platesetter and then transferred to the pressroom, along with intermediate storage. The same applies with printing rollers and to moving paper rolls of up to 6 tonnes.

Ink delivery logistics is an important consideration for UWWO printers. An 80-page machine running at full production can consume around 10-12 tonnes per week. Therefore, ink logistics are a key part of installation planning. This includes the location of the ink storage area and container sizes used in a multi-press plant. A bulk ink tank installation can simplify logistics and handling and also allows ink usage to be monitored by the supplier to ensure on-time deliveries. The size, power and efficiency of ink pumps, the ink pipe diameter to the press have to be considered for optimum operation — these specifications are different to those currently being used in most plants.

4: Supply chain management

UWWO presses require consumables beyond current dimensions. These may not all be immediately locally available. It is therefore essential to verify availability with manufacturers of paper, plates, blankets, and roller re-covering.

5: Rapid reaction of production staff

Printing with an UWWO press is like flying a large supersonic aircraft. It needs expert control by trained staff with fast reactions to running issues.



High volume ink manufacturing and efficient delivery systems are essential for UWWO printing.

Photo Technotrans.

Temperature (side column box)
Best practice system operating temperatures are:

Paper — Storage	@ 20-25°C
Inks — Storage	@ 23-25°C
Rollers — Set Up	@ 26-28°C
Founts — Running	@ 10-15°C
Rollers — Running	@ 26-32°C
Blankets — Running	@ 26-34°C
Plates — Running	@ 26-34°C
Air Temp	@ 24-26°C
Air Humidity	50% - 55% RH

It is important to be aware of temperature variables and to keep records of settings and readings.

Source Sun Chemical.

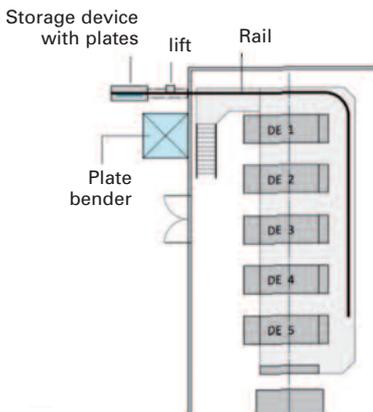
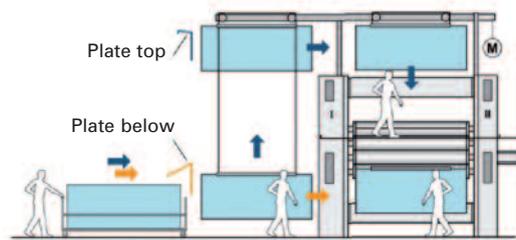


Plate transport: Printing Unit Lift



Different concepts of transporting imaged plates to the press and lifting into upper printing units

Source manroland.

Prepress: Plates & Platesetters



One of the reasons that thermal plates were developed for CTP was the availability of the 830 nm thermal laser and no suitable laser was available for conventional UV plates. Blue-ray technology with a wave length of 405 nm has since become available in either standard or high power levels. Lüscher offers platesetters for both thermal and conventional plates.

Plate systems

There is a growing demand for all plate systems to have a minimum environmental impact from reduced waste, energy, carbon footprint, water and chemicals. These aspects become more important in UWWO, for example, a daily test plate production is more cost and waste intensive because of the dimensions. Plate processing needs to be highly stable to minimise waste; and the use of low chemistry solutions allows longer bath life with reduced maintenance and operator intervention.

A highly sensitive plate is needed to optimise productivity because UWWO plates require longer exposure. As a generalisation, short runs need a plate with extremely fast exposure, high productivity and reliability, while longer runs need a reliable plate on press that may require baking. UWWO plates have a standard 0,4 mm thickness.

The dominant plate types for large format offset presses are:

- Thermal CTP plates specifically developed for CTP; these react to a laser wave length of 800-830 nm.
- UV-imaged conventional plates processed by CTP; these react to wave lengths of 360-450 or 405 nm.

Comparative plate characteristics

According to FOGRA and UGRA, the resolution and reproduction of both plate types made in Europe provide a comparable level of printing quality. UV-imaged conventional plates tend to be more robust against marks and scratches.

Some printers find that UV-imaged conventional plates may reduce makeready time and waste because they obtain a faster ink/water balance; however, others have not experienced this effect. Some thermal plate users report a more flexible control of ink/water balance — these variations may be due to chemicals and other parameters.

There is an economic elasticity of plate types over run lengths from 30 000 to 3 million revolutions. The run length of both UV-imaged conventional plates and thermal CTP plates is almost equal in both baked and non-baked states; negative conventional plates have a higher run length and therefore may not require baking. UWWO thermal CTP plates may offer a more flexible selection from many plate types than UV-imaged conventional plates.

Two major factors that may affect plate run length are the type of paper and dampening (fountain) solution. Newsprint and similar abrasive papers can severely reduce run length compared to printing on coated papers. The chemistry of both dampening solution and plates has changed significantly in recent years. Low or no alcohol replacements of IPA work well on baked plates; however, they may reduce the life of unbaked and/or low chemistry plates — it is highly recommended to ensure chemical compatibility between plates and dampening solution. (FujiFilm will be able to supply both suitable plates & press chemicals.)

Most thermal CTP and UV-imaged conventional plates should attain a run length of more than 1 million for normal heatset printing if baked at a temperature around 240-260°C, a temperature range that is generally recommended to achieve correct plate polymerisation. Baking at a lower temperature will save a little energy but can lead to process instability from incomplete polymerisation (except LH-NI3 developed for high run lengths with lower baking temperature); temperatures above 270°C may negatively affect the properties of the aluminium (distortion, waves).



The dimensions of UWWO plates are significant.
Photo: FujiFilm.

Plate life

Normal expected Heatset plate run lengths

Plate type	Fuji example	Unbaked	Low temp Baked 230°	Mid temp Baked 260°C
		Run length	Run length	Run length
Thermal CTP — positive plate	LH-PJE	200 000	250 000	300 000
Thermal CTP — positive plate	LH-PLE	300 000	400 000	500 000
Thermal CTP — positive plate	LH-PCE	200 000	500 000	> 1 000 000
Thermal CTP plate — negative plate	LH-NI3	200 000	> 1 000 000	> 1 000 000
UV-imaged conventional positive plate	VPS-E	200 000	500 000	> 1 000 000

These examples from Fuji show the approximate relationships between the expected run lengths and the different types of baked and unbaked plates when printed with heatset inks on coated paper. Not necessarily all plate types will be available in all UWWO plate sizes. (LH-PJE, LH-PLE are also suitable for UV ink or hybrid ink without baking but the run lengths may not always be the same.)

Source: FujiFilm.

A range of plate types is available for different needs:

- For lower temperature baking: *Example Fuji LH-NI3*
- For run lengths up to 300 000 without baking: *Example Fuji LH-PLE*
- To reduce chemical consumption up to 75%: *Example Fuji LH-PJE, LH-PLE, LH-NI3*

The latest generation of ecologically friendly plate systems simplifies plate production and reduces chemistry consumption and waste, allowing users to reduce costs and resources used when producing plates. Manufacturing constraints from UWWO plate dimensions may narrow the range of plate types available. Therefore, it is essential to check with plate suppliers which types of plates will be available in very large formats. As a generalisation, there are more suppliers of thermal positive plates than thermal negative. Fujifilm will be able to supply the projected sizes of both CTP thermal positive and UV-imaged plates.

Platesetter

There are only a few suppliers of very large format (VLF) platesetters; they mostly use external drum machines that rotate the plate around a fixed thermal exposure head. The exception is Lüscher's internal drum machine where the exposure head rotates over a fixed plate. Both systems avoid the vibration problem of flat bed machines to ensure higher resolution production. It is essential to check the availability and productivity of platesetters for the different UWWO formats.

VLF platesetters are available with automated loading and offer a variable number and power of lasers or exposing heads to match to the required output speed from 15-22 plates/hour. The plate output also depends on plate format and sensitivity, developer chemicals and temperature, plate handling system, and run length (for negative plates).

Comparative costs

The increased production volume of thermal plates along with continuing competition from conventional plates has led to a price reduction in Europe. However, European UV-imaged conventional plates are around 20% cheaper than thermal plates per m².

While UV platesetters may have a 30% higher investment cost than thermal systems, this can be offset against lower conventional plate costs. Their relative Return on Investment (ROI) should be based on:

- Run length range to select plate type(s) that minimises re-plating (costs of duplicate plates, press stop and restart waste);
- Annual volume of plates required (including waste);
- Total annual costs of plate types in m² and plate price per m², including their relative costs of processing (energy, chemicals, energy for baking if required);
- Platesetter investment/amortisation and maintenance cost.

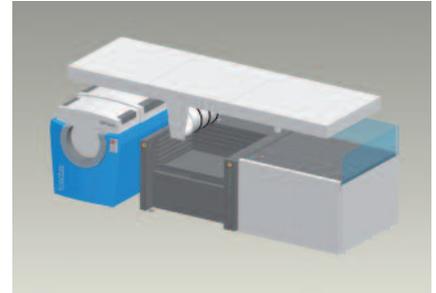
Plate handling

Manual handling of UWWO plates is difficult and generally requires two people; there is also a higher risk of plate damage. It is therefore recommended to use assisted or automated plate transport. Consideration needs to be made on how the plate will be delivered, handled, transported and loaded onto the platesetter and then transferred to the pressroom, along with intermediate storage.

The type of delivery packing for plates, its weight and dimensions (for doorways, etc) depend on the customer's specific requirements and it is recommended that printers discuss this with their suppliers. Plates are generally delivered as either sleeve packs of 10 – 30 plates or bulk packaging of up to 500 plates on a pallet — the quantity depends upon plate size and weight limits.

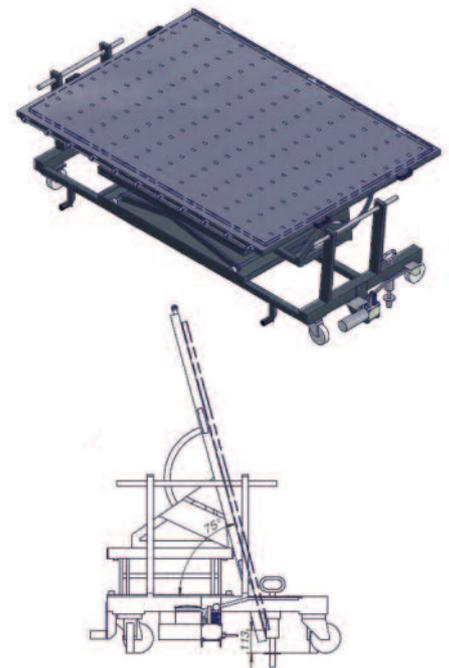
After bulk storage and intermediate transport, the handling logistics begin with getting the plates into the platesetter's autoloader. Solutions include a plate trolley for sleeve packaging or a bulk system to handle large pallets.

Plates should have automated handling from the platesetter to the bending systems. It is then recommended to consider mechanically assisted plate transfer to press units.



Bulk-module located next to the plate handling system allows direct loading of up to 500 plates on a pallet. The plate handling system is then fully automatic. This system allows reduction of packaging material, is fast and simple with long cycles between loadings.

Source: Lüscher.



A trolley for up to 50 plates is placed in a vertical position for comfortable loading. The protective plate packaging must be manually removed but the CTP and plate handling systems work in parallel. The trolley is docked with the plate handling system and the plates are slid on wheels into the magazine.

Source: Lüscher.

Paper & Logistics



Roll winding line.
Photo UPM.

Rolls widths of 2250 mm were introduced on offset presses in 2007 and increased to 2860 mm in 2009. This is in some cases accompanied by an increase of the maximum possible roll diameter size from 1250 to 1500 mm and printing speeds of up to 17 m/s. Web widths of 2450 to 3800 mm have been a common standard for publication gravure but only a few paper mills can supply the widest rolls up to 4320 mm. While gravure uses larger width rolls than heatset offset, there are limitations in paper production that need to be considered.

- In general, most offset paper mills have production limitations for roll widths exceeding 2000 to 2500 mm, particularly in the finishing process (winding, wrapping, roll handling).
- Production of offset widths of 2250 to 2860 mm may require large capital investment unless the mill is already dimensioned for higher widths, weights and diameters.

The paper production challenges and principal investment areas to produce UWWO rolls include:

Paper production machines

Winding: The 150 mm (6" inside diameter) roll core may be required for some UWWO presses because of the increased roll dimensions and weights. However, offset paper mills today do not use 150 mm cores and not all older winders can handle this size or combine them with the smaller 76 mm (3") cores. Implications will be higher core costs for the production and a limitation to mills able to process the larger cores.

Roll weight: A 2860 mm wide roll weighs between 4000 kg (1250 mm Ø) to 6500 kg (1500 mm Ø) depending on the paper quality and substance. These high weight dimensions challenge and exceed the equipment and infrastructure of many mills (conveyors, roll bumpers, roll lifts/kickers, motors at the winders, wrapping line dimensions, or clamp trucks) and may require new investment.

Trimming: The trim of the paper machine with UWWO roll dimensions is the most critical issue — because trimming efficiency is much more challenging as the roll width increases. Trimming means the best possible fit of printers' rolls to the jumbo roll (tambour). A 1% increase of trim loss means 5 - 10 tonnes/day reduced output and consequently higher production costs. Many mills may find it difficult to find a good combination for an order in 2860 mm, even in combination of established widths for 16-, 32-, 48- and 64-page presses. (Trimming is easier for newspaper printers because they usually require fractional rolls. Gravure paper is also difficult to trim but is helped by the variety of magazine formats and roll widths compared to more standardised heatset formats.)

Roll diameter: An additional trimming efficiency factor is the larger 1500 mm roll diameter. A winder cannot produce different diameters at the same time. Rolls with a diameter of 1500 mm need to be produced as a full set of rolls. A possible consequence may be that the order volume for 1500 mm Ø rolls in a given web width and grade may need to be determined by the paper machine's trimming efficiency. Almost all new winders at paper mills are technically capable of making a roll with 1500 mm Ø, but older two-drum winder installations cannot. Before press investment the availability of UWVO rolls and large diameters needs to be ascertained with the paper supplier to identify mill-by-mill trimming efficiency.

Paper quality parameters

The paper making process will require even more attention to maintain good profiles across the web to ensure that rolls unwind correctly at very high speeds. The friction properties of different papers play a role that becomes more critical as roll diameters and weights increase. This will also be the case with introducing the higher core diameter because this will influence the winding parameters. Achieving optimal profiles is more difficult on older machines and an upgrade investment may be needed. The influence of increased roll weights, different cores and roll chucks on the (un)winding quality close to the core will need to be monitored.

In-mill logistics

Large diameter UWVO roll weights can exceed 6000 kg. Therefore, all transport equipment inside and outside the mill and the printing company needs to be dimensioned accordingly. As a consequence, investment into new handling equipment might be needed, for example clamp trucks that can lift the weight fitted with "intelligent" clamps to automatically adjust the clamp pressure and have the right angle to open up for the larger diameter. If 1500 mm Ø rolls are used then the warehouse will need more floor space per pile for storage; larger clamp trucks needs a bigger turning radius and more space between the roll piles to operate and prevent damage. These factors need to be taken into consideration throughout the whole transport chain.

Logistic considerations

The transport of wider rolls and larger diameters is an issue and truck deliveries are less flexible than for smaller rolls. Web widths of 2250 mm and 1500 mm Ø may still be able to be loaded in standing position, and Joloda unloading equipment from the back can still be used if the roll weight does not exceed the 3500 kg limit. Web widths of 2520 and 2860 mm have to be loaded in lying position ("shotgun" or "cannon" style) and have to be unloaded from the side.

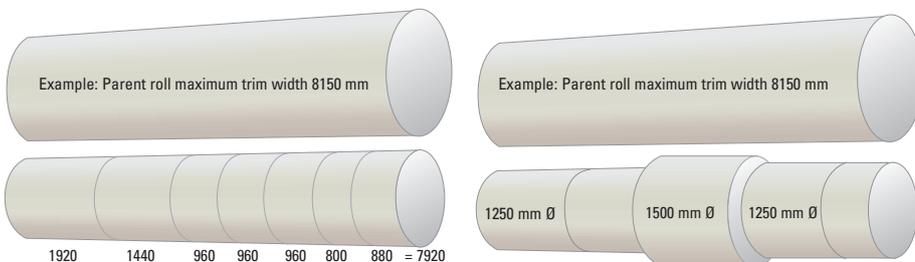
In some cases, the transport of larger rolls can cause a payload loss of up to 30% compared to smaller sizes. This does not make sense for both economical and ecological reasons (increased carbon footprint). As payloads vary from country to country, this needs to be checked case by case. The same issues apply to rail transportation and the implications established.



Photo UPM.



Photo UPM.



1, Customer roll widths when combined must make a set that is as close as possible to 100 % of the width of the parent roll. The width of paper making machines varies from 4 to 10 m wide.

2, Only one diameter can be wound at a time - mixing 1500 and 1250 mm rolls is not possible.

Roll core qualities



Paster chuck torque transmission is not proportional with length - both the type of design and expansion pressure have variable influences.

Photo Sonoco-Alcore.

The roll core is the essential link in the production chain between the paper mill (winding and rewinding) and the paster and press (acceleration, braking and unwinding). There are some differences in performance between wide web offset and gravure presses that can impact on core selection. In gravure 150 mm Ø cores are standard for roll widths over 2750 mm.

Normally, it is the paper supplier's responsibility to ensure that the cores on which paper is supplied conform to the printer's needs. These are determined by the web width, roll diameter and weight, and speed of each press — core performance criteria become critical as these parameters become larger — it is essential that the printers communicate these key specifications to suppliers.

Cores should be thought of as a machine part (rather than as packaging material) that must perform according to specifications of all relevant parameters:

1. Roll weight capacity
2. Torque transmission capability
3. Critical frequency & E-modulus
4. Straightness & roundness
5. Moisture content

1: Roll weight capacity: A dynamic strength test (rather than a flat crush test) should be used to assess the maximum roll weight that the core can carry. In this test a core sample is subjected to winding and unwinding loads. Normal 76 mm Ø heatset offset chucks have 3500 kg roll weight capacity.

2: Torque transmission capability: The torque that chucks can transmit to the core without slipping is more important for core driven offset pasters than for gravure pasters (that use belts for assisted acceleration, tension control and deceleration). With a core drive and breaking paster the a peak load during an E-stop of a full roll is handled only by the chucks. Torque transmission capability depends on the chuck type, the best 76 mm Ø chucks transmit over 2000 Nm before they start to slip inside the core.

3: Critical frequency: The printing speed of some UWWO presses is near the natural frequency of the roll, depending on the web width, speed and remaining paper thickness. When the roll rotation speed is near its natural frequency it may start to vibrate and, just prior to splicing, this may cause a web break and possibly a core break — which releases a lot of energy and can cause serious injury. If this risk exists, pasters should have a safety cage, or curtain.

- The E-modulus divided by density of the core and the residual paper are the key factors in the first natural (or critical frequency equation). Manufacturers like Sonoco Alcore specify core longitudinal E-modulus [Mpa] divided by density [kg/m³] named as a Speed Factor in cases where this effect might occur.
- The most reliable way to improve critical frequency is to increase the diameter of the core — in gravure 150 mm Ø cores are standard for roll widths over 2750 mm.

4: Straightness and roundness: These are key enablers of smooth running down to the splicing diameter. During the splice the roll vibration level should not be more than +- 3 mm depending on web width. For UWWO, where straightness and roundness are vital, it is recommended that cores have a 0,5 mm/m maximum straightness deviation.

5: Moisture content: This has a major effect on a core's geometry and strength properties. A moist core has lower strength. Moisture has a twofold impact on critical frequency: an increase of moisture decreases E-modulus, and the density of the core increases. The core can shrink inside the paper roll if the moisture content of the core is higher than the moisture of the paper wrapped around it and will lead to a loss of web tension in the roll centre, as well as a loss of E-modulus of the residual paper. Appropriate core properties are important to safely run the winder and printing press. Only paster manufacturers in cooperation with core and paper suppliers can give accurate information about safe unwinding speed for roll width, weight and speed combinations.



RFID roll tags that are read on the paster with software that ensures that the core type is correct for the maximum speed, web width and weight offers a foolproof safety enhancement. Sonoco Alcore has developed Intellicore using a low cost passive UHF RF-tag. These cores are for single use and fully recyclable.

Photo: Sonoco Alcore.

Minimum requirements for 76mm (3") cores used on manroland paster E-modules/density

[MPa(kg/m ³)]	Maximum machine speed m/s, splicing diameter 120 mm				
	< 13 m/s	< 14 m/s	< 15 m/s	< 16 m/s	< 17 m/s
Max Web Width	[MPa(kg/m ³)]	[MPa(kg/m ³)]	[MPa(kg/m ³)]	[MPa(kg/m ³)]	[MPa(kg/m ³)]
(1) - 2060 mm	4,5	4,5	4,5	5,5	7
(2) - 2250 mm	4,5	4,5	4,5	5,5	7
(3) - 2520 mm	7	150 x 13 mm			
(4) - 2860 mm	150 x 13 mm	150 x 13 mm	150 x 13 mm	150 x 13 mm	150 x 13 mm

(1) 2060 mm: Conventional high grade cores enough if 200 mm long chucks

(2) 2250 mm: Special core grades required even with 200 mm chucks

(3) 2520 mm: Use of 76 mm core only possible by using splice diameter of 150 mm core or low speed

(4) 2860 mm: Use of 76 mm core only possible by using splice diameter of 150 mm core

(A). The table shows the Speed Factor of 76 mm Ø cores for all chuck types used on manroland heatset presses. The standard 150 mm Ø core can be used in all speed and width combinations. This prediction model has a 20% safety margin. Paper properties have been estimated conservatively at 3500 MPa and 1250 kg/m³. Value 4,5 represents generally used conventional high grade paper board core, specially designed cores are needed above this value. If a paper supplier does not know these values they should request them from their core supplier.

Source: Sonoco Alcore.

Core diameter 76 or 150 mm diameter?

The simplest solution for UWVO is to use cores with a 150 mm inside Ø. However, some UWVO applications can continue to use 76 mm Ø for certain specifications under conditions mentioned in the table (A). Printers should specify the core grade that fulfils the required Speed Factor given by the press supplier. Paper and core suppliers can then choose the optimum core grade to fulfil safety requirements and improve efficiency. Active and open communication throughout the whole logistics chain is a key item to guarantee safety and efficiency.

- Current width limit for 76 mm Ø core is 2250 mm / 3,5 t for coated; 2400 mm newsprint
- Availability of rolls for UWVO becomes much simpler for 1250 mm Ø roll

Web width mm	Paper gsm/grade	Density to/m3	1250 dia Roll weight kg	Core dia 76 or 150	1500 dia Roll weight kg	Core dia 76 or 150
2060	80 gsm MWC	1,28	3224	76	4613	150
	48 gsm INP	0,80	2015	76	2883	76
	60 gsm LWC	1,20	3023	76	4325	150
	56 gsm SCB	1,17	2947	76	4217	150
2250	80 gsm MWC	1,28	3521	76	5038	150
	48 gsm INP	0,80	2201	76	3149	76
	60 gsm LWC	1,20	3301	76	4723	150
	56 gsm SCB	1,17	3219	76	4605	150
2520	80 gsm MWC	1,28	3901	150	5644	150
	48 gsm INP	0,80	2438	150	3527	150
	60 gsm LWC	1,20	3658	150	5291	150
	56 gsm SCB	1,17	3566	150	5159	150
2860	80 gsm MWC	1,28	4428	150	6404	150
	48 gsm INP	0,80	2767	150	4002	150
	60 gsm LWC	1,20	4151	150	6004	150
	56 gsm SCB	1,17	4047	150	5854	150

Roll weight and diameter for large rolls. *It is possible to order rolls at intermediate diameters or at maximum roll weight if the trim efficiency is good.

Source UPM/MEGTEC.



Roll handling in the printing plant

Roll diameter – 1250 or 1500 mm?



Webline Special Report N° 1
"Watch the Step to Larger Roll Diameters"
is available from www.printcity.de.

Note: Europe uses a roll diameter of 1500 mm (59") but in North America the diameter is 60" (1524mm); and internal core diameter of 76 mm (3") and 150 mm (6") Ø.

The principal advantages are:

Potentially lower operating costs from reduced paper waste, lower splice tape consumption, more efficient press time utilisation and possibly reduced manning.

- 31% fewer rolls to handle, store and strip.
- 31% fewer splices to prepare.
- 31% fewer roll changes, associated waste and web break risk.

Principal constraints: Higher investment costs because all related equipment must be sized for the larger dimension and 44% greater roll weight:

- Paper mill trimming efficiency, handling, rewinding and wrapping lines may need to be substantially upgraded to allow widespread availability of larger roll sizes.
- Logistics to handle and store rolls at paper mill, in transit and at printer.
- More robust pasters with larger dimensions and automated roll loading.
- In some cases, more expensive or larger cores will be required.

Existing installed equipment might not be able to handle the larger dimensions and weight of bigger rolls and investment may be needed to safely increase capacity limits. The dimensions of conveyors, corners and turning radius will need to be assessed and local area floor loading weight needs to be checked to confirm if it can withstand an increase weight load.

When 1500 mm diameter rolls are used, there will be 31% fewer movement of rolls. This also allows pre-storage areas in front of the press to be reduced. Internal roll transport systems will need to be dimensioned to safely handle rolls of up to 6 000 kg. This includes higher capacity roll lift trucks/AGVs and clamps, adapted paper store and driveway layout, and automated roll loading at the paster.

When 1500 mm diameter rolls are used, the centre of gravity is further outside of the roll lift truck (than for 1250 mm) and this has to be taken in account when choosing the roll lift truck — a consequence may be an increased turning radius for trucks, which will then require wider alleys. Larger capacity roll clamps will also be more expensive. On the other hand, when 1500 mm rolls are used there are 31% less rolls to be handled, which should reduce the number of trucks and drivers/AGVs required. Roll clamp forces will need to be set and monitored regularly, but experience to date shows no other difficulties in this area. Larger rolls will need a longer climate adjustment period, particularly if they are cold.

A number of pasters with 1500 mm roll diameter capacity of have been installed during the last five years on some double and triple wide newspaper presses, and some wide width heatset presses. Operational experience shows that relatively few jobs are run with 1500 mm rolls because of the limited availability of the papers in this diameter. However, for certain long run productions it makes sense to use 1500 mm rolls if they are available because of the benefits available. Long run insert productions on INP, SC and LWC, production of directories as well as catalogues should be targeted for large diameter rolls. The general trend to lighter paper weight for these products make it reasonable to limit the costly efforts in roll and web handling equipment to fit all applications.



Conveyors will need to be able to handle increased roll weight and width, whilst turns require more space.

Photo manroland.



Intermediate transport systems will need a larger capacity to handle increased weight but fewer units may be needed to handle 31% fewer rolls.

Photo manroland.

Pasters



The new DLC 6000 Match Speed Splicer has been specifically developed for UWWO applications for web widths up to 2900 mm running 1524 mm (60") diameter rolls at speeds up to 18 m/s. A new infeed unit with 290 daN maximum web tension is integrated along with a tilt box high precision web guide.

Source MEGTEC.

Pasters for wider web widths and/or larger roll diameters need to be of a much more robust construction to handle the substantial increased roll weight inertia at an E-stop and requires the paster torque to be considerably increased.

The higher inertia also requires more powerful acceleration motors. New chuck designs are needed to handle the higher torque from the rolls, and, in certain cases, quick changeover chucks are required to handle 76 and 150 mm Ø cores. New paster designs for this size use a highly compact turret configuration to support the paster arms that allow 1500 mm Ø rolls to be handled in almost the same space taken by 1250 mm Ø models. Benefits from new paster designs such as the DLC 6000 Match Speed Splicer include:

- Lower overall operating costs due to reduced paper waste and splice tape consumption.
- 31% fewer roll changes reduce the risk of web breaks, for more efficient press utilisation.
- Fewer roll changes also reduce handling, storing and stripping requirements.
- Virtual elimination of splicer caused web breaks, for increased press availability.
- Rapid web tension control reduces waste.
- Better handling of lower grade papers, lightweight stocks, and damaged and out-of-round rolls.
- Fast makeready due to motorised and low-tension web-up system.

The optimum technical solution for very heavy roll weights is for them to be supplied with 150 mm Ø cores. There are no safety issues with the larger core size and the cost impact is minimal. In addition, the residual paper left on the core after splice-out can be shorter than for 76 mm Ø. Normally the impact on paper manufacturing is minimal (depending on the winder capacity). This requires that pasters for these applications should be fitted with quick change chucks to switch between 76 and 150 mm Ø cores. These chucks weight 35 kg and require two people to handle them, which, for safety reasons, is normally done by maintenance staff.

Ideally, pasters for UWWO applications should have a 6000 kg roll weight capacity to allow the typical paper grades for long print runs with large diameter rolls to be run. Many printers select 1500 mm roll diameter when investing in a high volume press because of the improved operational efficiencies of running larger rolls that require fewer splices and help reduce paper waste and manning. Rolls are loaded on to the paster by automatic roll-handling systems that have an adjustable automation level up to "100% no-operator presence" roll changing. Split-arms reduce changeover time when changing web width.

Ink & supply system



High volume manufacture and bulk ink transport delivers important quality and logistics benefits.

Photo Sun Chemical.

Successful UWWO operation requires inks that are formulated to meet the specifications for high speed printing. They need to give good ink/water balance, stability and resistance to misting, while still providing excellent transfer properties at the required viscosity to feed ink pumps and ensure good flow in the ink ducts. Inks need very high roller stability that prevents piling and drying on the ends of rollers, avoiding excessive blanket washing and press stops. Modern resin technologies allow ink suppliers to balance their ink formulation to achieve good ink roller performance while still achieving good ink film drying properties on different web offset papers.

High levels of consistency are required to ensure that ink press profiles can be set and maintained for continuous production. This can only be achieved from high volume manufacture of ultra large batch sizes for all colours within a controlled environment that ensures a continuous batch-to-batch supply of robust product.

Ink logistics

Ink delivery logistics, including the location of the ink storage area and container sizes used in a multi-press plant, is an important consideration for UWWO printers and a key part of installation planning. A bulk ink tank installation can simplify logistics and handling as usage can be monitored by the supplier to allow on-time deliveries. It is recommended to avoid outside storage and place ink tanks inside, maintaining them at room temperature (cold ink has very poor flow and is more difficult to pump). Pipes should be lagged for better temperature control; this is particularly useful to maintain optimum ink flow in the winter.

Ink supply to press

UWWO ink supply systems need more powerful pumps, wider ink pipes with an increased rating for higher air pressures. It is recommended to use 2 inch (DN 50 = 60,3 mm) x 4 mm pipes resistant up to 160 bar. The longer the pipe line to the press, the more the pressure will drop. (Caution, it is easy to under specify the configuration of the ink pumps supply system for a UWWO press, leading to supply problems in full production. Standard ink pump systems have 42 x 2 mm pipes pressure resistant only up to 120 bar that is impractical for UWWO; pumping and pipes of 42 x 3 mm resistant up to 180 bar is at the very limit of being adequate.)

Multi-press sites usually have 2 inch pipes to allow double the volume to be run at the same time and with the same pressure. A printer wanting to run several UWWO presses would have to split the ink supply into several pump stations, possibly doing this out of the same tanks.

Ideally, a large scale pumping system will give the best supply for one or more UWWO lines. An example is the Technotrans TCH 200/16 P that feeds 2 litres per double stroke at 160 bar pressure, and is designed for large heatset and newspaper production lines.



In-fed connections for Bulk ink tanks.

Photo: Technotrans.

Ink supply systems need to be correctly dimensioned for UWWO and inks stored inside the plant building because ink left outside in the winter can take 5-6 days to return to normal temperature.

Photo Technotrans.



Printing units – Blankets

The selection of the type of blanket is one of the first steps in the design of a UWWO printing unit.

The three kinds printing blankets used for commercial offset are:

- Tissue-rubber composite materials (soft blankets) fixed to the press with metal bars.
- Metal back blankets (MBB mini-gap).
- Sleeves (mini-gap or gapless).

Soft blankets have been the industry standard for decades and remain the most popular system for all offset printing segments. Soft Blankets are available up to web widths of around 2600 mm.

The metal back blanket (MBB) technology is more difficult to handle when its size exceeds 1500 mm. Therefore, most applications are on newspaper presses with multiple blankets per blanket cylinder. Commercial presses normally need to print across their full width without interruption and that is why MBB technology is not commonly used for presses larger than 32 pages. Making an MBB up to 2 meters wide is possible but they will not be easy to handle.

Sleeve technology is used for some commercial presses for widths slightly exceeding 2000 mm with a single sleeve. Sleeves have no mounting gap and can help solve quality problems when the relation of the cylinder width to its diameter does not give adequate mechanical stability, which can lead to lines across the print area originating from the cylinder.

Blankets – flat or sleeves?

There are some disadvantages for sleeves including: higher cost (several times that of a conventional blanket); the printing unit needs to be opened to change sleeves; they are also more expensive to handle, transport and store. Printers with sleeve presses have to carefully manage their supply chain and expenditure for sleeves.

Therefore, it is only appropriate to use sleeves where they are technically needed — determined by ratio of cylinder width/circumference — for example on a 96-page long grain press. There are two sleeve technologies available, gapless or mini-gap.

Gapless sleeves allow a full print area across and around the cylinder and there is no need to position and lock the blanket sleeve to correspond with the gap of the plates. The disadvantage is that each sleeve is manufactured individually, which tends to cause inconsistency from sleeve to sleeve.

Mini-gap sleeves are manufactured from a long belt of conventional blankets to provide high quality consistency and the blanket is then glued to a metal cylinder and sealed at the gap. The disadvantage is that there is a non-printing area of about 2 mm that must correspond to the plate lock-up gap. The difficult task for both sleeve technologies is to build a single sleeve up to 3000 mm wide with a perfect geometric profile. The cost per sleeve will become higher as dimensions increase. The UWWO sleeve is technically possible but all implications have to be evaluated with the press manufacturers. The performance of the sleeve is critical to consistent printing quality and runability, and therefore must be considered as a specific component of the press — not just as a variable consumable.

Cooling of the blankets is essential to avoid the creation of hot spots on UWWO presses.

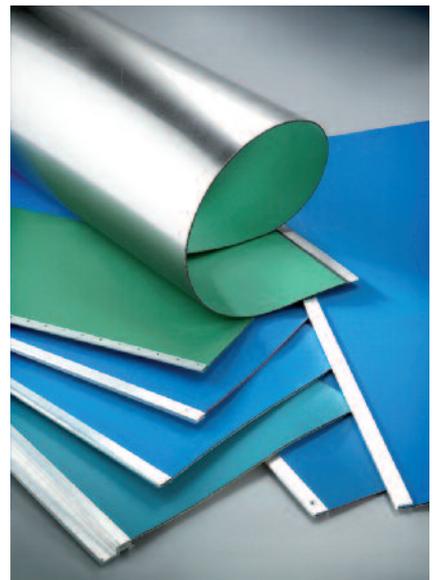
Fan-out

Fan-out does not incrementally increase with web width — this means that the effect is the same on a 96-page press as on a 48-page. It requires the same prepress compensation techniques already in use. The faster the press runs the lower the fan-out.



Sleeves have compared to soft blankets no bars.

Photo Trelleborg.

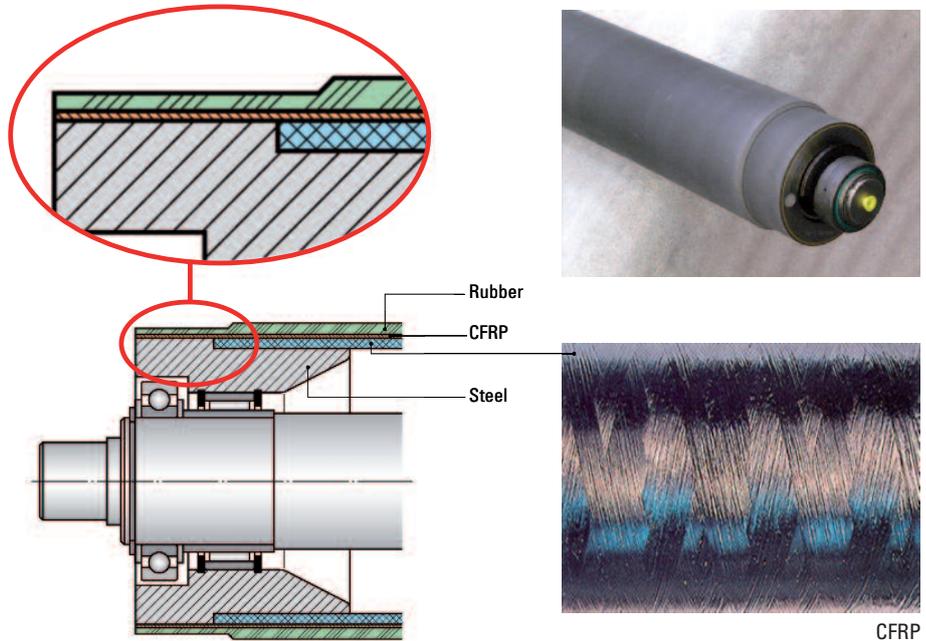


Metal Back Blankets are compared to soft blankets with various kind of bars.

Photo Trelleborg.

Printing units – inking and dampening roller systems

Carbon Fibre Reinforced Plastics (CFRP) allows a reduction of weight by 80% in comparison to steel, provide high temperature stability, and an adjustable high bending stiffness.
Source manroland/Boettcher.



The 'anatomy' of rollers is a critical factor for successful UWVO printing. This includes both the 'flesh' of roller coverings, and the 'bones' of the mechanical and logistical environment in which they perform.

Carbon fibre roller cores

Rollers over two meters wide exceed the limits of traditional steel core construction for both energy and ergonomic performance. Therefore, lightweight Carbon Fibre Reinforced Plastics (CFRP) is used for roller cores and, in some cases, shafts.

The bundling of thousands of carbon fibres (each about 0,05 mm) makes it possible to produce mechanical components with the same strength as steel but with a fraction of the weight — a conventional steel core roller 2000 mm wide would weigh around 150 kg, while in CFRP it can weigh as little as 40 kg.

The properties of multilayered laminate constructions depend both on the material and on a number of engineering design and processing parameters. The secret of carbon fibre processing is to transfer the high tensile strength of the fibre to the finished product in spite of the inherent brittleness of the fibres (it is difficult to avoid individual fibres breaking during winding making the finished product less stable than theoretically calculated).

Fibres are drawn through an epoxy resin bath and wound around a mandrel to build up a tube layer by layer. The angle at which fibres are wound is a crucial factor since their strength is predominantly along their length — the flatter the angle, the greater the stiffness. The bending resistance of the construction is improved by incorporating '0° layers' (fibres parallel to the axis) to reduce the quantity of fibres needed to attain a given strength, and by using high modulus fibres. Both techniques offset their higher costs by reducing material and processing expenses. Combining high modulus fibres with the flattest possible winding produces lightweight rollers that can be safely manually handled.

The energy benefits of composite rollers should not be overestimated, since their mass only plays a role during acceleration and deceleration, and is immaterial at constant speed. However, there are energy benefits if the design of the laminate structure ensures little or no radial expansion when the roller becomes warm during a long print run. When the contact nips have been set in presses where the rollers are held in a fixed position, any radial expansion from heat build-up increases the pressure in the roller nips and requires more energy to drive the unit.

Composite cores differ significantly in their thermal behaviour from metallic materials. While the fibres are good heat conductors, the resin in which they are embedded is an insulator. Therefore, the overall design needs to ensure that heat generated in the bearings is dissipated fast enough to avoid the formation of localised “hotspots” which may cause delamination of the rubber covering at high running speeds. If the resin is not sufficiently heat resistant, it will soften and weaken the fibre-resin bond, which can result in large rubber fragments breaking away from the core.

The slight deflection of composite rollers may be automatically offset by the supporting function of other rollers or cylinders. It is common for some UWVO rubber rollers to be produced with a crown — where the diameter of the covered roller is about 0,1-0,2 mm larger in the centre than at the edges. The crown helps offset any deflection of the core when the roller is set. In critical roller positions, grinding the rubber covering to a precise cylindrical form would result in a narrower contact nip in the centre of the roller. The excess material provided by the crown helps compensate for this effect and keep the roller stripes parallel. Most press manufacturers define an acceptable difference in the contact stripe between the middle and the ends as no more than 2 mm.

Re-covering composite rollers

Composite rubber rollers require specific techniques to avoid faulty processing that can damage the core or destroy the roller. The original roller manufacturer should be consulted on the best procedure for the rollers and press concerned. It is essential that printers’ maintenance staff and their suppliers are familiar with these issues and are correctly equipped to handle, transport, and re-cover composite rollers.

Removal of the old rubber covering is a critical operation because composite roller walls are only a few millimeters thick and can easily be damaged causing proportionally greater weakening of the roller than would be the case with a steel core. Because roller diameter contributes exponentially (by a factor of four) to the bending strength of the roller, any weakening of the load-bearing construction in the outer area of the diameter can severely weaken the overall stability of the roller.

The bond between the rubber and the core has to be both chemically and mechanically strong to resist the high shear forces exerted during printing. Therefore, a certain amount of directed force must be used to remove the rubber and this cannot be done without touching and slightly abrading the core surface. It is essential to minimise the effects of this by only using tools and methods specifically designed for the re-covering of composite cores. The same applies to the priming and bonding agents used to bond the rubber covering to the core: these must also be specifically formulated to achieve optimum adhesion on composite surfaces.

Many composite rollers were delivered with a 1,5-2 mm underlayer of hard rubber around the core. The old covering is removed down to this layer only and the new covering is applied to the existing hard rubber base — it is essential for the re-corer to be aware if the roller was produced this way and to adhere to this procedure. More recently, many composite cores have been designed to incorporate a ‘sacrificial layer’ to protect the composite tube surface. However, the hard rubber underlayer and an externally applied sacrificial layer use up some of the functional thickness available for the soft rubber covering, which decreases the ability of the top rubber to accommodate the stresses incurred during printing.

Re-covering crowned rollers within the tolerances prescribed by the press manufacturers requires relatively complex equipment — users are advised to ensure that their supplier is suitably equipped. If an end fitting has become loose, consult the manufacturer to see if and how it can be repaired. Routine repairs of bearing seats pose specific challenges as many traditional repair methods, such as welding, may destroy either the adhesive or even the tube itself.

Elastomer roller covering

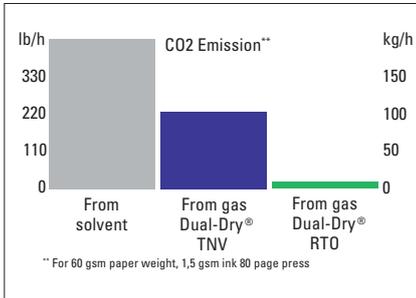
The demands that UWVO presses place on rubber roller coverings are not fundamentally different from those of smaller presses. However, their dimensions make them less tolerant of inadequate roller quality — particularly if running a high proportion of partial webs. It is, therefore, essential to ensure the compatibility of roller coverings and contact media (inks, dampening solution, and washes) and to use roller coverings with excellent shrink resistance and dimensional stability.

Press width is not the only reason why UWVO presses are sensitive to changes in the diameter or shape of the rollers. Ink rollers tend to have larger diameters than on smaller presses in order to carry and transfer sufficient ink to the large plate cylinders. The larger the cylinder and the rubber roller set against it, the lower the engagement between them to achieve the specified contact stripe and the less they will deflect. This makes larger rollers and cylinders much more sensitive to changes in their geometry from swelling and shrinkage that occurs unevenly across the width of the press, making ink and water transfer difficult to control.

Roller swelling tends to be an acute short-term problem leading to excessive heat build-up that can destabilise the printing process from over-emulsification; the increased pressure on the plate can cause tinting and toning and leads to increased plate wear and shorter run life.

Shrinkage is irreversible as the roller compound hardens well beyond the original operating specification. When roller diameters decrease under exposure to ink, the width of the contact stripes is also reduced. On presses that frequently run partial webs, the central portion of the rollers have more exposure to the inks than the edge areas, leading to disproportionate diameter loss and a corresponding impairment of ink transfer and loss of density in the printed product. Simply resetting the rollers will inadvertently create over-pressure in the edge areas, leading to overheating. This causes the ink to become tacky and pick particles out of the rubber surface — in extreme cases the rubber can be torn off the core at the edges.

Heatset system



The Dual-Dry® RTO dryer has a tiny carbon footprint compared to any other technology.

Source MEGTEC.

The combination of high energy prices, more stringent environmental requirements, and wider and faster presses requires new technologies for the profitable and ecological operation of UWWO printing.

The demand for ecological production systems has never been higher and energy saving is the central focus. Therefore, there is an increasing demand for more efficient new technologies where the evolution of existing systems cannot provide the answer to these requirements. The essential performance factors for an UWWO heatset system are:

- Low energy consumption
- Environmental performance
- Exemplary web handling.

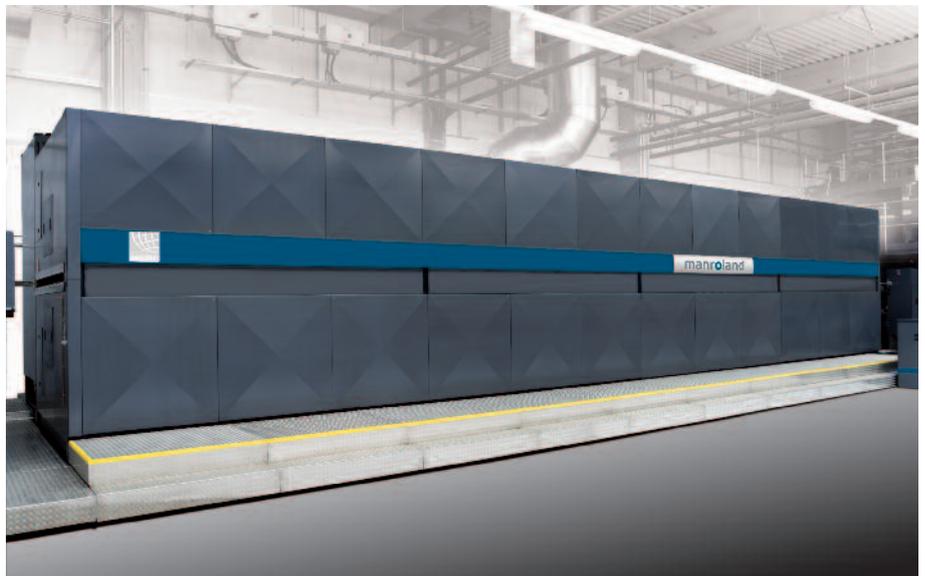
In addition, the dryer should be easy to transport, assemble and commission.

New technology for UWWO

Since the 1990s, independent regenerative pollution control systems have replaced recuperative technology in web offset printing. At the same time, dryers with integrated oxidizers were developed for high volume commercial offset printing. However, a new dryer technology generation using integrated Regenerative Thermal Oxidation (RTO) has now been introduced and is particularly suited for UWWO. This technology completely redefines heatset dryer performance standards for low energy consumption, the smallest environmental footprint, high product quality and minimal life-time operating costs. The integration of RTO for air pollution compliance, combined with an ultra high 95% efficiency heat exchanger, make it the most fuel-efficient and environmentally friendly print dryer technology in the world.

MEGTEC has combined lowering energy costs with increasing ecological considerations in the new Dual-Dry® RTO dryer. Engineered to meet the growing demand for wider web formats, the Dual-Dry® RTO is designed for high volume offset presses of 48-, 64-, 72-, 80- and 96-pages and is available in two different lengths – with 15.7 m and 17.5 m – for different speeds of up to 18 m/s.

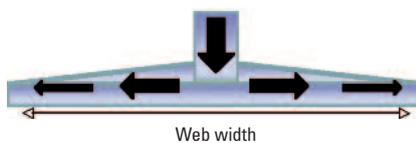
Photo MEGTEC.



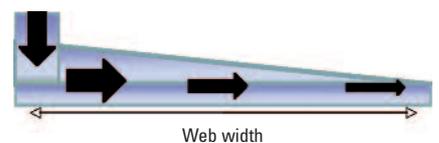
Centre fed airbar reduces flow through airbar by 50% compared to end fed bars to offer better performance.

Source MEGTEC.

New center fed air bar



Conventional end fed air bar



Energy & Environment

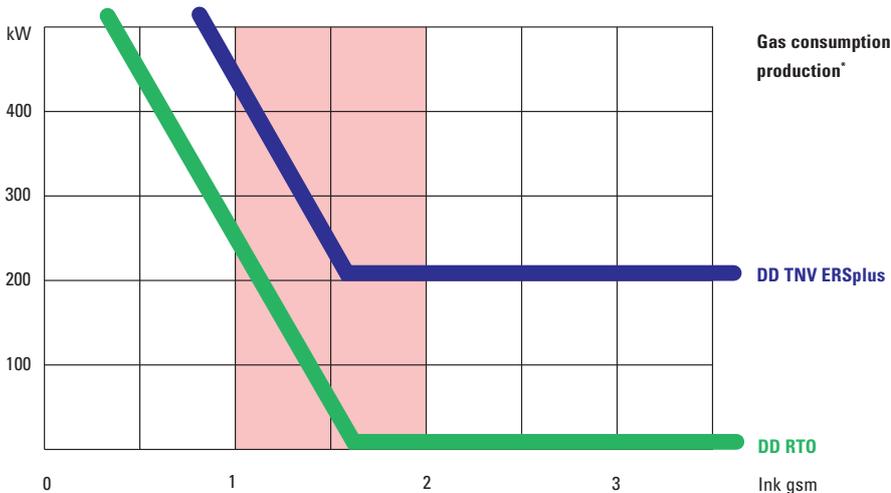
Under many production conditions, the RTO dryer waste air emission supplies all the energy required for both oxidation and drying, leading to zero fuel consumption. This low energy consumption has been proven in operation on the fastest and widest UWWO presses in operation. RTO systems burn ink solvent at a combustion temperature about 100°C higher than the temperature of recuperative systems. The result is a 50% reduction of noX and CO guaranteed emissions without a negative impact on the lifetime of the dryer. CO₂ emissions are also reduced and the system has the smallest carbon footprint, making RTO the most environmentally friendly technology available.

Web handling

Centre-fed airbars reduces flow through the airbar by 50% compared to end-fed bars to offer better performance from a more even flow at lower pressure. This reduces electrical consumption and provides better web handling regarding touching and web shift.

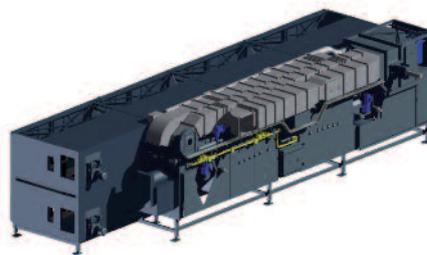
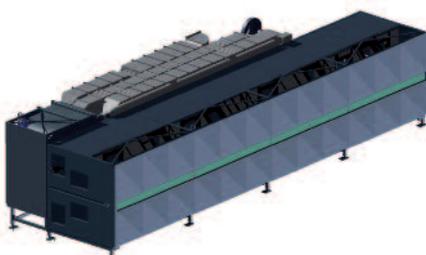
Transportation

UWWO dryers can pose significant delivery issues because their physical size requires oversize trucks, route authorisation and convoy accompaniment. An innovative solution is to split the dryer and oxidizer into two compact units of about the same weight that can be delivered using standard trucks. All supply fan motors are already fitted and wired onto the dryer and the dryer is simply connected to the oxidizer onsite to guarantee quick and easy installation.



The new Dual-Dry® RTO dryer has proven lowest gas consumptions in average production conditions in many cases gas consumption can be zero.

Source MEGTEC.



MEGTEC's novel solution to the challenge of delivery and installation of dryers for web widths up to 2860 mm is to split the dryer and oxidizer into two compact units of about the same weight.

Source MEGTEC.

Folders & Products

	LONG GRAIN				SHORT GRAIN	
	80 Pages LG		96 pages LG		96 Pages SG	
Web width mm	2060 or 2250		2870		2520	
Cut-off mm	1240		1240		1356	
N° Formers	1 former	2 formers	1 former	2 formers	1 former	2 formers
Ouput for full web	1 x 80 pages		1 x 96 pages		1 x 96 pages	
	2 x 40 pages	4 x 10 pages	2 x 48 pages	4 x 12 pages	3 x 32 pages	6 x 16 pages
In-line stitch	NO		NO		YES	
In-line glue	YES		YES		NO	

LITHOMAN LONG GRAIN PRODUCTS



Broadsheet
Jumbo- Insert
in DIN-A2
to DIN-A3 folded



Tabloid
Finished Product
in DIN-A3



Magazine
Magazine
in DIN-A4



Insert
Headfolded
in DIN-A4

— Crossfold

⊥ Chopper Fold

Common short and long grain products, most of which require only a crossfold.

Source manroland

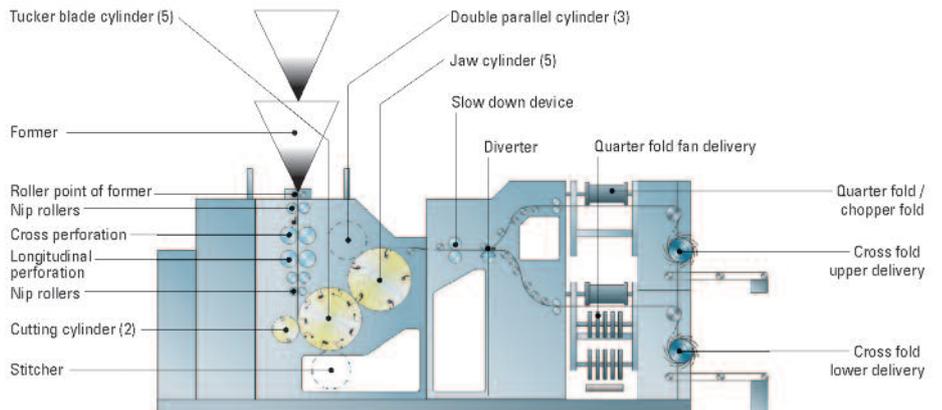
Experience from sales of around 50 UWWO presses demonstrates that the key decision criteria is the selection of folder type and superstructure, grain direction and web width because these determine the range of products that can be run.

In many cases, printers take a customised approach to the folder and its superstructure design to create a competitive advantage in a specific product area, in some cases two folders may be specified.

Long grain

Two 80-page UWWO long grain press formats are available and these tend to be used for different applications. The 2060 mm web width tends to be mostly used for inserts that are slightly smaller than A4, at an ultra high speed of around 50 000 sph. The 2250 mm width is more commonly used for high quality publication production with speeds up to 45 000 copies/h.

The core production on a 96-page long grain press is 1x96 pages or 2x48 pages (A4). A single signature of 96 pages is limited to a 50gsm paper weight to avoid wrinkles. The 2x48 page output substitutes two 48-page presses and allows a reduction of waste and crewing costs. With 2 formers it is possible to fold 4x12 pages. Narrow web widths allow a broad range of product options.



Long grain folder equipped with a second former.

Source manroland.



Short grain

Short grain presses are used mostly for inserts, booklets and brochures. The folders use the cross fold and products are delivered straight into the delivery fan at extremely high speed (there is no chopper folder). Short grain products are seldom used with perfect binding because of the fan out tendency in the spine direction.

The main production possibilities for a short grain 96-page press are 1x96 pages (A4) or 3x32 (A4) pages. This requires a folder using a 3-part cutting cylinder, followed by a 5-part tucker blade cylinder that collects 2 times (3 layers). An inline folder stitcher combined with inline trimming allows production of a finished product. There are multiple paginations possible with part webs — three-quarter web width for 1x72 pages or 3x24 pages; half web for 1x48 pages or 3x16 pages, all of which are possible from a single former. An interesting output is 6x16 pages— the output of 6x16-page presses — that can be produced with 2 formers and a deserting device.

It is also possible to have a short grain folder with a 2 part cutting cylinder, which means that there are 4 pages around the printing cylinder (except 96-pages 6-around presses). The smaller diameter blanket and plate cylinders combined with wide web width are a challenge to avoid vibration and deflection.

Folder types

Around 95% of UWWO presses use combination folders — these are used with or without a chopper fold — and may use either gripper or pin systems.

It is generally acknowledged that pin systems provide the highest accuracy, facilitate collect production and run at the same speed as the printing unit. Pinfolders do not need as many guidance belts as a gripper folder.

The speed, reliability, accuracy and consistency of gripper folders are less than pin systems. A gripper folder only makes sense in combination with blanket sleeve printing to access possible paper savings as the non-printing area of a sleeve is 2,8 mm, compared to around 7 mm for flat blanket. The gripper folder needs 7 mm to clamp the product and this area is only useable if the paper/ink does not mark.

The gripper folding unit must run slightly faster than the printing units because between each cut-off product there has to be time for the gripper to open and close. It is necessary to accelerate the product after cut-off to deliver it at the right time to the gripper clamp — this can cause marking of the product and has high wear on the belt. Running collect is difficult because when the gripper opens for the second product, the first clamped product may move.

Some magazine printers use a former-less folder with a dedicated ribbon superstructure. This is very efficient for publication printing of standard product sizes, but format flexibility for other applications is limited.

LITHOMAN SHORT GRAIN PRODUCTS



Broadsheet
Newspaper-Insert
in DIN-A3



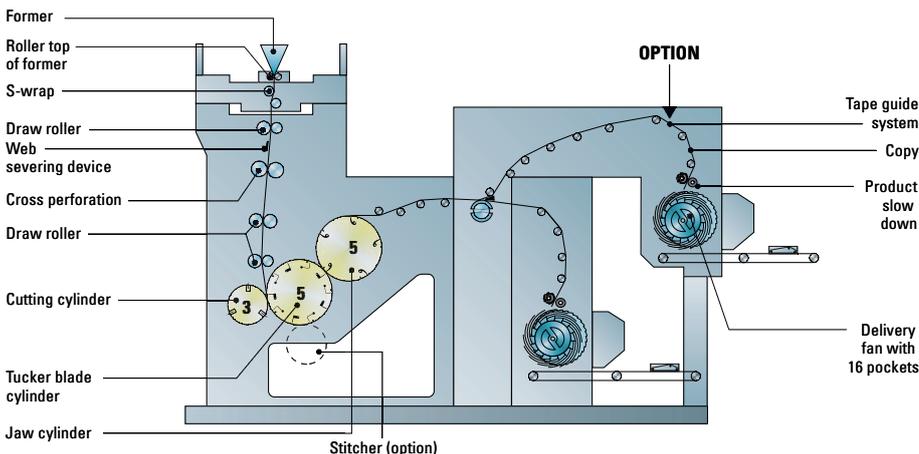
Tabloid
Finished Product
in DIN-A4



Magazine
Pocket-Magazine
in DIN-A5



Pocket
Headfolded
in DIN-A5



Short grain pin folder PFI-5 System 3:5:5. This model is equipped with a second delivery system to increase maximum production speed.

Source manroland.



Postpress

From the folder to the finished product

Efficient processes are essential in press delivery systems that are the interface between the press and finishing. UWWO presses require fully automated systems that accelerate and optimise processes, guarantee short distances and generate savings.

High performance systems needed for UWWO are used daily by publication gravure. However, there are some differences, for example, gravure signatures are normally open on all three sides making them easy to handle, as is heatset short grain, but long grain closed head signatures are sometimes more difficult to process. There are also occasional printing problems that can cause postpress difficulties if signatures stick together, fold cracking on certain paper types that shows up in saddle stitching, or minor changes in paper profile thickness from roll to roll that can change log size.

All press delivery systems are different and therefore require specialist personalised advice for planning, installation, and commissioning. Three important points must be taken into consideration: detailed planning of the overall concept, high level of production reliability, and the right level of automation. Solutions must be designed for individual requirements based on the available space, and adapted to specific production needs. During the concept phase a broad range of criteria must be clarified, such as the kind of print products. Press-finished products, partially finished products, or a mix of both require different system solutions. Other important factors include workflow, disposal of waste, back-up plan, and the interfaces to the downstream processes in finishing.

Reliable paper transport

Reliable and careful transport of printed products is the highest priority with UWWO. Other important criteria are the accessibility of both the press and the press delivery system, and the optimum paper workflow. The right overhead conveyor system allows flexible arrangement of the press delivery system machines — this is particularly important where space is limited and for linking across large distances between buildings or floors. UWWO uses a significantly larger amount of paper than conventional web widths so there is a much thicker shingle stream. Some systems can handle up to three shingle streams together to transport a larger number of copies per running metre and thus have lower costs than single-gripper systems.

Intermediate signature storage

Correctly stored printed signatures can improve saddle stitching and perfect binding productivity by 25-30%. Therefore, a high priority needs to be placed on optimising intermediate storage of signatures because it is the only way to ensure that the print products are reliably and efficiently processed. Three ways of storage are possible, each suited for different requirements: Roll and log storage are suitable for partially finished products; while bundles are more suitable for press finished products. If the products are to be finished in-house then a roll system provides the best performance because of its large capacity and its loading independence. Logs are more suitable for external finishing.

Rolls — storage independent of time: PrintRoll roll systems efficiently decouple printing from finishing and are very flexible. Their high level of automation is ideal for time-independent feeding of high output saddle stitchers; they are also suitable for inserting machines in the mailroom and can be used as a fully automatic back-up system.

Logs — provide high net output: Integrated automation is decisive for log formation. Systems with quick set up and changeover times have the clear advantage when it comes to perfect log formation for UWWO. Horizontal log formation is preferable because signatures can be fed flawlessly into saddle stitcher or perfect binder feeders. The signature overlap is not used to align the signatures and therefore cannot be damaged. With closed-head signatures, a constant pressure is exerted on the head and back fold to guarantee that the log retains its stability even during storage and that signatures are not damaged. First class log quality is a prerequisite both for significantly reducing waste and increasing net output in finishing.



The overhead transport system Newsveyor can handle up to three shingle streams together to transport a larger number of copies per running metre and thus has lower costs than single-gripper systems.

Photo Muller Martini.



The horizontal log formation principle delivers perfect logs – even at the highest production speed.

Photo Muller Martini.



Buffer system comparison

	Stacks	Logs	Rolls
Capacity LWC 54–56 gsm	480 000 pages/pallet	610 000 pages/pallet	500 000 pages/roll
Rotary press	Manual:	Semi-automatic:	Rewind:
45 000 copies/h	4 persons	1–2 persons/delivery	1 person/8 twin winding
96 pages	Automatic palletizer:	Automatic palletizer:	stations
	1 person/3 palletizers	1 person/3 log stackers	
Cycle time	< 5 sec/stack	< 1 min/log	8 min/PrintRoll
Saddle Stitching/	Manual:	from log	from roll
Perfect Binding – Example:	5–6 persons	2 persons	1 fork-lift driver/
8 feeders, 14 000 copies/h			4–5 saddle stitching lines

The diagram shows a buffer system comparison: Bundles – Logs – Rolls. Muller Martini's enormous experience in web offset and gravure printing provides essential expertise for UWVO applications.

Source Muller Martini.

The paper weight and page count of the signature defines when UWVO production can be run collect or straight. This is important because it is possible to prevent wrinkles in the fold when using heavy paper and/or a large page count.

Depending on the process at the finishing stage (saddle stitching or perfect binding), a significant amount of the loading work can be reduced when the log is rotated 180° by the pallet clamp before stacking off. Rotating the log laterally by 90° ensures the overlap is not damaged by a log stacked over it during storage.

The pallet type and its condition are important factors for correct temporary storage. The choice of pallet type is important, for example a Euro pallet with a length of 1200 mm and a width of 800 mm can be loaded lengthwise or crosswise with corresponding selected log lengths to increase the utilisation of the pallet. The choice of pallet type plays a role at the planning stage for automatic logistics systems with pallet dispensers; these should be designed according to the pallet types to be used to ensure a flawless operation.

Inline press finished products

Printed products that are glued or stitched in the press folder can be reliably finished by the press delivery system at full press speed. A rotary trimmer can trim three sides of the product that can then be automatically packed and palletised according to distribution requirements.

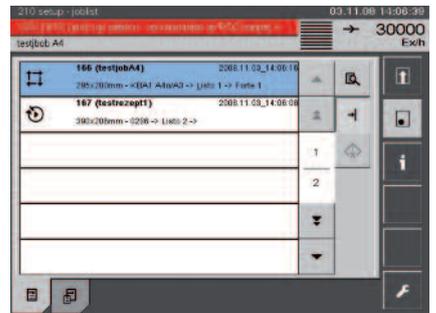
High level of automation

Automated press delivery systems provide faster makeready, optimisation of production, and lower production costs. Although UWVO increases the number of pages produced, the run lengths tend to decrease, which results in ever shorter processing times. In turn, this requires quicker makeready and changeover times for the press delivery systems.

Automatic presetting systems (like Amrys — Automatic makeready system) can simply import production data and parameters and transfer them to the machine settings. A job management system assists the machine operator during production planning and makes it possible to access the data for repeat jobs at any time. This allows the machines to be set up more quickly and be ready for the next job in a very short time.

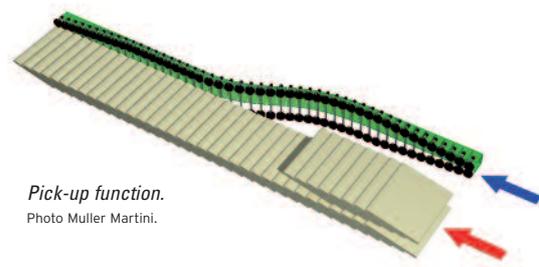
Press delivery system machines can be easily integrated into higher level system controls. Production planning is made considerably easier through real time production monitoring to visualise the complete press delivery system graphically. It can also be used as an interface to the press and the press delivery equipment. Optionally, a connection to the in-house network is possible through a workflow controller that complies with the CIP4 standard (JDF/JMF).

Professional project assistance is crucial when so many different processes are interconnected. The specialist's experience is needed not only for planning but also during installation and commissioning. A final key to success is comprehensive training for employees to ensure the smooth running of the system.



Pre defined jobs can be downloaded from the press console directly to the press delivery system for an automatic set-up.

Photo Muller Martini.



Pick-up function.

Photo Muller Martini.

Process control & automation



Inline Density Control is more than 10 times faster than other density control systems, it has no moving parts, and captures the entire control strip by one shot per colour.

Source manroland.

UWVO's large paper surface per cylinder revolution and high speed make rapid closed loop process control systems essential to minimise changeover time and waste, and to achieve and maintain good colour in register. An overall press management system, printnet PECOM, integrates preparation and presetting, press monitoring, job control and provides remote service connections. Some of the process control functions are: closed 100p automation.

Start-up: A single integrated system (such as the patented Quick-Start) manages the entire start-up process so that saleable copies are available after only a few cylinder revolutions — even with a job of low area ink coverage. The system includes inking unit wash-up, automatic pre-inking, and throw-on and throw-off sequences. The control of dampening acceleration curves means conventional offset can operate almost without any manual correction of the dampening feed while retaining all water-related advantages like standard plates, standard inks, long wash-up intervals, etc.

Inline Density Control (IDC): Closed loop colour control is a proven method to achieve faster makeready with less waste, to maintain colour within tolerances during the print run, and to provide statistical quality reports over the entire job. Wider webs make this control even more important and the essential requirement is rapid response. This is the reason behind the IDC system that covers the complete web width and is extremely rapid — after only 9 revolutions there is enough data to begin to make control adjustments that become effective after another 30 revolutions. IDC has no moving camera or moving parts and is 10 times faster than other density control systems. It reads the entire control strip by one shot per colour. IDC integration means that once the printer has made the colour presetting it is not necessary to do anything else as all the density control is then completely automatic.



CutCon plus can reduce waste by up to 450 signatures per hour — or 3-4 million signatures per year in continuous operation — to provide a significant annual cost saving and a short amortisation time of 1-2 years.

Source manroland.

CutCon plus: Register controls face multiple challenges. The cameras must recognise the cut-off register marks on both the full-width printed web and on the slit ribbons. The linear compensator must control the lengths of the individual ribbons to the point that the partial webs register exactly on top of each other on the former in order to be accurately cut by the folder's cutting cylinder. In addition, printing conditions during production are rarely constant. Interference factors that impact on cut-off register behaviour include roll changing, blanket washing, silicone and remoistening application, former air pressure, and changes of speed. Until now, conventional cut-off register controls have only had limited ability to dynamically control these interference factors because of the slow linear compensators used by them.

Press mounted cameras help improve press efficiency by monitoring and recording events.

Source PROCEMEX-PRINT.



The new CutCon plus ensures a highly dynamic cut-off register control that also controls the full width draw roller and the folder's cutting cylinder. Roll changing disturbs the press tension during the splice cycle and usually wastes 100 to 140 signatures. CutCon plus reacts significantly faster to these changing conditions and saves up to 80 copies per roll change. Blanket washing to remove ink build-up occurs at least after every three rolls — depending on ink and paper used. The reduction of press speed during blanket washing means that the mass inertia of the guide rollers has an effect on the paper length that cause fluctuations in the cut-off register. After blanket washing and trim mark recognition, CutCon plus controls the cut-off register more rapidly and reliably during the acceleration phase to save up to 200 waste signatures.

Camera monitoring

Five years ago leading gravure and web offset printers started developing web monitoring technology with Procemex. This uses high-speed cameras fitted to different parts of the press to help increase press runability and overall efficiency. Central to this approach is an easy-to-use interface combined with a networked client-server architecture to access video based events at the press, or at any linked production office. The system is focused on solving problems with web breaks, roll changes, mill splices, blanket wash sequences and paper defects

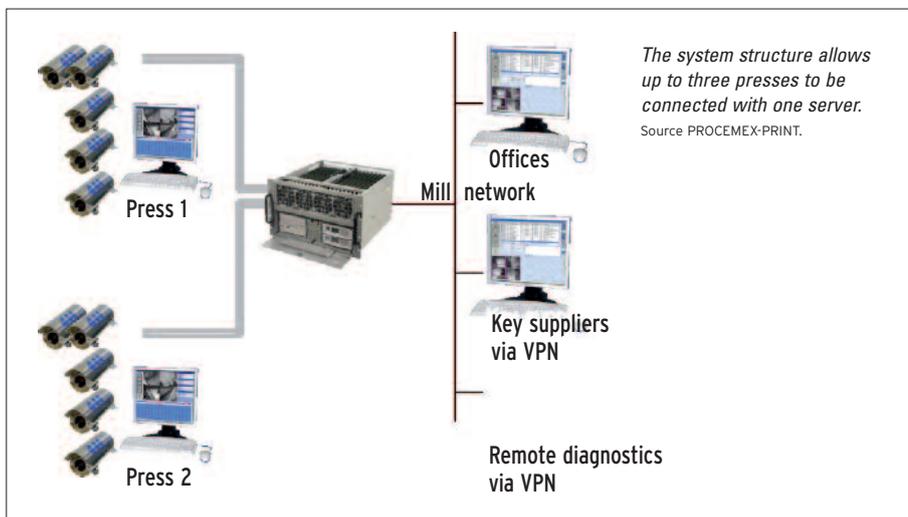
The experience from over 100 presses equipped with the system shows that it is necessary to focus on three areas to gain higher overall press efficiency: paper, press performance and operators. Improving only one of these areas will not lead to optimum results.

The system structure allows up to three presses to be connected with one server. Each press has a database of its own and is handled separately by the software. The server itself is connected with the plant information network to allow recorded video sequences to be viewed anywhere in the plant.

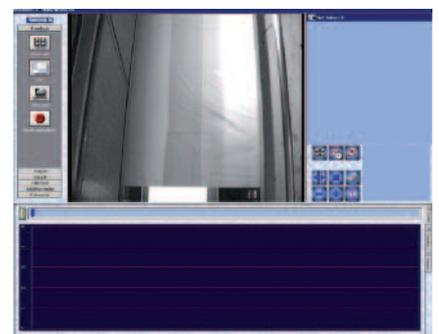
Paper quality control

Paper procurement has network access to the Procemex database. Paper related issues can be searched, sorted and reviewed by the type of event and/or by paper manufacturer. Selected events can be printed out, or exported into an Excel spreadsheet, or HTML-page, or simply sent with photos by email. It is also possible to periodically make a DVD.

Procemex software also offers a unique way for light video data transfer and provides a way to communicate with paper mills in real time. Printers can publish selected sequences and allow paper mills to access recordings only related to their events — the mills can view these to help establish the root cause of a web break or other event.



The system structure allows up to three presses to be connected with one server.
Source PROCEMEX-PRINT.



Splice after the paster leading to a web break.
Source PROCEMEX-PRINT



PROJECT PARTNER

www.boettcher.de

Böttcher GmbH & Co. KG is the world's number one manufacturer of rubber covered rollers for the printing industry. Böttcher-developed washes, cleaning pastes, dampening solution additives as well as the BöttcherTop blanket series complete the product range for printing applications. Its presence in more than 80 countries, with 17 production facilities as well as 30 sales and service units, makes Böttcher a global player. As OEM supplier for many press manufacturers Böttcher underlines its leading position as technology partner and system supplier.



PROJECT PARTNER

www.fujifilmholdings.com

Fujifilm Corporation, since its foundation in 1934, brings continuous innovation and leading edge products to a broad spectrum of imaging industries including medical, life sciences, consumer electronic, graphic systems, photography and office products based on its vast portfolio of digital, optical, fine chemical and thin filmcoating technologies. The company employs more than 76.000 people worldwide. It is active in R&D, production, marketing and service in 230 consolidated subsidiaries. In the year ended March 31. 2009, global turnover was EUR 17 billion.



PROJECT PARTNER

www.luescher.com

Lüscher AG has offered top class performance for over 60 years from their innovative technical solutions and outstanding services that reflect the very latest state of technology. The company specialises in the development and manufacture of high quality mechanical and electronic prepress solutions for offset, flexo and letterpress. Lüscher is focussed on the specific problems of its customers to provide them the right modular and market oriented solutions to ensure that they benefit from reliable and economic solutions they can really use. International sales are handled by a network of selected dealers in 60 countries.



MEMBER

www.manroland.com

manroland AG is the world's second largest printing systems manufacturer and the world's market leader in web offset. manroland employs almost 8,000 people and has annual sales of some Euro 1,7 billion with an export share of app. 80% (2008). Web and sheetfed presses provide solutions for publishing, commercial and packaging printing.



MEMBER

www.megtec.com

MEGTEC Systems is the world's largest supplier of weblines and environmental technologies for web offset printing. The company is a specialised system supplier for roll and web handling (loading systems, pasters, infeeds) and web drying and conditioning (hot air dryers, oxidizers, chill rolls). MEGTEC combines these technologies with in-depth process knowledge and experience in coldset and heatset printing. MEGTEC has manufacturing and R&D facilities in the US, France, Sweden and Germany, China and India along with regional sales, service and parts centres. MEGTEC also provides energy and efficiency consulting and machine upgrades.

MÜLLER MARTINI



PROJECT PARTNER

www.mullermartini.com

Müller Martini is a globally active Swiss-based group of companies who are leaders in the development, manufacture and marketing of a broad range of print finishing systems. Since its foundation in 1946, the family-owned business has created innovative products exclusively tailored to the demanding needs of the graphic arts industry. Today, the company has seven business sectors: Web offset printing presses; Press delivery (conveying, trimming, bundle and log forming, palletising, roll systems); Saddle stitching systems (saddle stitching, inserting, packaging); Soft cover production (perfect binding); Hard cover production; Newspaper mailroom systems; Book on Demand (industry-first solution networking all digital processing components).

MEMBER

www.procemex.com**PROCEMEX**

Procemex is the leading supplier of camera based web monitoring and inspection systems for the printing industry to help solve press runability and efficiency problems relating to paper, printing process and machinery. Since 1990, Procemex has been continuously providing leading-edge image processing innovations for troubleshooting paper related processes. This technology is now being used by leading web offset and gravure printers. The company's experience in combining innovative camera based technology to improve printing press efficiency and inspecting paper quality is a valuable strength to expand its activities into printing.

PROJECT PARTNER

www.sonoco.com**SONOCO
ALCORE™**

Sonoco Alcore, a wholly owned subsidiary of Sonoco (NYSE: SON), is a \$4 billion global manufacturer of consumer and industrial products and provider of packaging services, with 334 operations in 35 countries, serving customers in 85 nations. In the Industrial Products Division, Sonoco is renowned as the leading supplier of engineered paperboard cores to the global paper industry. As an integrated organisation, the company has complete control over the board used in its cores, enabling the development of a highly specialised board which, combined with its unique manufacturing process, allows Sonoco to produce the highest quality paperboard cores for the printing industry. Sonoco will continue to meet the safety needs of the printing industry through first class technology and new product development.

MEMBER

www.sunchemical.com**SunChemical®**
a member of the DIC group 

Sun Chemical, the world's largest producer of printing inks and pigments, is a leading provider of materials to packaging, publication, coatings, plastics, cosmetics, and other industrial markets. With annual sales over \$4 billion, Sun Chemical has more than 11 000 employees supporting customers around the world. The Sun Chemical Group of companies includes such established names as Coates, Hartmann, Kohl & Madden, and US Ink. Sun Chemical Corporation is a subsidiary of Sun Chemical Group B.V., the Netherlands, and is headquartered in Parsippany, New Jersey, USA.

MEMBER

www.trelleborg.com/printing
TRELLEBORG

Trelleborg Printing Blankets is a product area within Trelleborg Coated Systems. The Trelleborg Group is a world industrial leader in advanced polymer technology for high performance solutions to seal, damp and protect in demanding environments. Over 50 years' printing industry experience - more than any other blanket producer - is combined with innovative technology, patented processes, vertical integration and total quality management. Servicing 60 countries on five continents, Rollin® (formerly MacDermid Printing Blankets) and Vulcan® are brand leaders, providing offset printing blankets for the web, sheet-fed, newspaper, business forms, metal decorating and packaging markets.

MEMBER

www.upm-kymmene.comThe Biofore Company 
UPM

UPM - Paper touches the lives of hundreds of millions of people in many forms, including magazines, newspapers, catalogues, books, envelopes, labels, bags, sacks or office papers. UPM contributes to this with its exceptionally wide range of papers manufactured of sustainable fibres. The company's know-how and use of advanced technology combined with the desire to find the best solutions for each customer, create superior products with low environmental impact. Across continents, UPM sales and distribution companies are working locally with customers to build strong and lasting relationships.

UWWWO

Ultra Wide Web Offset



connection of competence

