TECHNICAL REPORT

Agfaprint System
for automatic sheet paper processing

Jessop of Leicester,
sole UK distributors of
Agfaprint BW Processors.
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In August 1978, we installed in our studio's colour darkroom a processor box that was placed on a benchtop, connected and set up in a matter of an hour or so, and fifteen minutes later was capable of producing a 24" x 32" colour print.

As such the installation was a temporary one, because on this occasion our brief was to give the processor as much hammer as we wanted, to use it with the minimum of maintenance and care, to expect more from it than was strictly offered, and to prepare a full report on it. In the course of any use it with the minimum of maintenance and related fields needing extensive hand printing and very little package work.

This is why we were asked to write this report, impartially, from the standpoint of a genuine prospective buyer. Here is the result.

David Kilpatrick

THE REPORT

There are four Agfaprint processors available from Jessop's, sharing a common styling and concept, comprising two colour processors for the Agfa-color Type 5 paper, and two monochrome processors for all resin-coated or PE based papers. In each field the processor widths are 66cm (26") or 37cm (14") — in each case, the processor may be either dry-to-wet inclusive of wash, or dry-to-dry, using an attachable hot air roller dryer.

All these processors have auto replenishment, requiring only single power source supply from a 13 amp socket and single connection to a cold water supply, with one drain outlet. All are benchtop processors with some flexibility in configuration and positioning.

Extremely straightforward

The basic Agfa design is extremely straightforward. The main processor box is only 61.5cm long in both 66cm and 37cm sizes, which are respectively 100cm and 70cm wide. The total height, including replenisher tanks and dryer, never exceeds 56cm. There are only two controls on the processor itself — the ON switch, and a manual replenisher press switch beside it. The only other controls to operate are the heater adjustment on the drier, and to turn on the water supply, if a tap is utilized. All other settings — thermostats, replenishment rates — are preset on the electronic circuitry, and should not need to be touched after being precisely set on manufacture and installation by Jessop's.

No wiring or complex plumbing

Nearly all the parts of the Agfaprint machines are made of plastic. There is no sign of exposed metal apart from the stainless steel feed platen. No chemicals are exposed to view, and in practice the machines run entirely dry if the dryer is used, so that operators never touch solutions. All electrical connections between various parts of the machine are self-contained, supplying power or control circuits together, and apart from the main power supply no further connections are needed other than for the extractor (supplied with the colour modules), and no wiring or complex plumbing is called for.

The colour machines use three replenisher tanks — dev, stop and blix but the monochrome processors rely on a running water stop bath rather than an acid one, reducing the chemistry to dev and fix. The colour machines are intended solely for use with the Agfacolor 90 process chemicals and Type 5 colour paper, and unlike Kodak-chemistry machines there is at present no satisfactory alternative source of commercial chemistry for the Agfa process generally available.

The suggested combination for the black and white machines is Ilfospool 2000 chemistry with Kenthene, Ilfospool (standard or multigrade) or Veribrom papers. Other replenishable chemistry may be used with similar rapid process times.

All the Agfa processors, as supplied by Jessop's, are intended for in-darkroom use, without provision for light tight shields or covers on the entry area, but it is possible to build them through walls using flexible light trap materials, and to design and fit light proof covers for the entry end to allow normal illumination in the darkroom for negative changing after loading the machine.

The processing speed for colour paper is 3.3" per minute or a total process time of 8 minutes 55 seconds dry to dry (reduced to 6 minutes 35 seconds dry to wet). The Black and White machines take 1 minute 40 seconds dry to dry (1 minute 6 seconds dry to wet) a speed of 19½" per minute.

The major features of the Agfaprint machines are the extremely low chemical consumption, small charging requirements, low power and water consumption, minimal maintenance requirements, and the use of microprocessor control circuitry for main functions.

Since any weakness in design or function will more readily be apparent and identified with exacting colour work, and because our volume requirement is mainly colour we have chosen to major on the C66 Processor for test purposes. However, such is the degree of similarity between colour and black and white, 14" and 25" models, with almost total compatibility of components throughout, the majority of our report on the model C66 will be of general interest, and relevant to the other models in the range.

OUR REQUIREMENTS FROM A COLOUR PROCESSOR

What should a processor do? Many photographers do not think hard enough about this question before installing their first machine. It's prime role must be to increase capacity and take on as much of the work previously farmed out to labs as possible, without any question of lowering quality, and with no greater overall cost.

Our requirements for a colour processor were worked out by a quick analysis of normal colour print orders. They were:

- Enough capacity to produce moderate runs of 10 x 8 prints quickly - from 1 to 10 prints being a typical order from any one negative.

- Absolutely reliable colour balance and density consistency day-to-day, week-to-week, month-to-month, so that reorders should be printable immediately on the basis of our data records.

- The ability to take on all our routine hand printing work - mainly from 'repro scale' (postage stamp upwards!) to 24 x 36".

- Moderate chemical usage and ability to run with a small throughput as successfully as with a large one.

- Minimum time spent getting the machine ready, cleaning it down, and so on - preferably a 'switch on, switch off' situation. Must be ready to operate at a few minutes' notice at any time of day or night.
Introduction

Sooner or later, it is almost inevitable that the demand on the Photographer/Darkroom Technician with a reputation for quality and meeting delivery promises exceeds their ability to print it all. Unless action is taken to make provision for dealing with the increased volume, standards could deteriorate and deadlines may be broken.

Farming out some work means loss of control and increased cost. Extra staff is expensive and has to be paid during the quiet periods as well as the busy ones. There is, of course, another alternative.

THE AUTOMATIC PROCESSOR

Contrary to popular belief, not all processors require large volumes of chemicals, lengthy "warm up period" and massive daily throughput in order to operate economically.

An Agfa Colour or Black and White Processor, taking paper to a maximum width of twenty five inches can simply and economically produce a handful or hundreds of consistent prints daily—is ready to go only fifteen minutes after switching on and utilises only 2.2 litres of working developer (and even less stop bath and bleach fix) which is precisely and fully automatically replenished.

JESSOP OF LEICESTER LTD is the World’s Greatest Photographic Store with huge £2 million stocks. Products are stocked in great depth and even unusual and rare items are available to offer an unrivalled service to professional photographers.

There is a unique Photo Activity/Exhibition Complex with individual displays covering virtually every aspect of photographic merchandise, including a fully equipped professional darkroom. In addition to the service offered by the division marketing Agfa Processors, the company also has a separate Industrial Division which gives a fully comprehensive service to professional photographers.

David Kilpatrick

When we asked David Kilpatrick and Steve Lister to write an objective report on the Agfaprint processors, we knew that the combination was right—David has been writing test reports in the photographic press for several years, and Steve has been at the ‘sharp end’ of commercial photography, invariably with in-house colour processing, for a similar period.

Lister Kilpatrick Associates*, the company formed by David and Steve early in 1979 after two years of planned build-up, is also exactly the kind of photographic business likely to install an Agfaprint machine. LKA’s work is varied—anything from editorial coverage for the Radio Times to colour brochures—and it includes a strong demand for colour prints, often to exact scale and colour matching, to beat tight deadlines.

DAVID KILPATRICK is 27 years old, a qualified newspaper journalist and editor, and also an Incorporated Photographer. He has been totally involved in photography since the age of 14 or so, but decided to learn purely by practical experience, taking professional training in journalism instead. He started writing regularly for the photographic press at 19, and has been the technical and test report writer for PHOTOGRAPHY, PHOTO TECHNIQUE and CAMERA (in that order) as well as being Editor of THE PHOTOGRAPHER in 1976/7. Currently, as well as running LKA with Steve, he is contributing editor of Camera, assistant editor of The Video Handbook editor of Sheffield Topic magazine, and a regular contributor to You and Your Camera. His photographs and writing have been commissioned or used by many companies including Kodak Limited, the Minolta Camera Company Limited, Rank Photographic, and Ilford Limited. David has written the text for this report using notes (and conclusions from a running discussion) prepared with Steve.

STEVE LISTER is also 27, an Associate of the Institute of Incorporated Photographers, and came into photography through the established examinations of the Institute, followed by experience as an assistant and freelance working in London. At a short period that David was leaving a newspaper post to freelance, Steve moved from London to the North, and worked for a short period for the British Steel Corporation before becoming manager of the busy commercial studio then run by the Linney Group, publishers of the Mansfield Chronicle newspaper series and owners of a major colour printing house. As manager of Photo Linney Steve developed increased Colour businesses and in-house processing, using successively tank lines and a roller processor, which played a very important part in this. In 1979, Steve left Photo Linney to form Lister Kilpatrick Associates. In addition to concentrating on studio and catalogue photography, Steve has supervised the practical and technical aspects of the colour darkroom and staff training.

Finally, we should include LKA’s colour printer PETE CLEGG, who contributed many comments, kept the test machines charged and clean, and finally refused to part with the Agfaprint C66!
Taking the analysis further, most of our work was clearly below 20x 16" and a great deal of it proved to be short deadline, precise-scale, precise-colour reproductions from transparencies or artwork. However, the range of sizes between 24x36" and 24x36" is theoretically very profitable, as normal prices had to be based on laboratory hand printing charges plus a mark-up. Once it became possible to do this range of sizes in-house, profits of £60 for a single print are practical. The main reason for the 24x36" size being the cut-off point in most work turned out, on camera, was to be a result of the use of plastic encapsulation for nearly all display prints. This is limited to 24" width. Anything bigger than this tended to be very big indeed—like four feet by five feet—and we were, presumably, tending to 'sell down' to 24x36" because of the speed, cost and impressive results of encapsulation. The C66 takes type 5 paper available from 5"x7" to 24"x32".

Our policy before the installation of the Agfa C66 processor was to run a 16" bench-top roller processor, giving wet-to-wet prints using Kodak chemistry and paper, requiring a wash tray and a separate air dryer. Although cutting of film off at 20x16" is a processor, inherited from a previous company, seemed to have no competition in its class. The major problem with all other processors was either type (one-shot rotary, hand line, and so on) or capacity—most roller processors require not only many litres of chemistry to charge them, but demand a throughput of ten or more prints per day to prevent the chemistry from stagnating.

Our previous processor

The previous roller processor we used required only a few litres to charge it, and by modifying the maker's recommendations and manually replenishing the system, economy comparable to a larger processor was achieved. This, however, came at a high price. Kodak chemistry is fairly powerful stuff, and in the course of the two years it has required two sets of new magnetic circulating pumps and two foam rollers from the stop bath. The pumps become totally clogged with deposits from the developer. The machine also had to be drained religiously each evening and washed out—a 30-minute procedure—and thoroughly cleaned through with hydrochloric acid solution every weekend. We have no idea how many pumps and rollers could have been needed had this procedure not been followed meticulously.

So life with our previous processor was not ideal. Kodak E2 chemistry may be easily obtained, but it is not intended for this type of machine. The recommended Ektaprint 300, which matches the short development times of roller processors, is a non-replenishment rotary discard chemistry; Ektaprint 2, which also has a longer effective development times, can be replenished but also leaves heavy deposits. Compared with a 10x8 hand line, running simultaneously on the same chemistry, the previous roller processor produced prints considerably softer and less saturated even with the latest Type 78 Kodak paper. Attempts to increase developer concentration and running temperature work to a degree, but just as things begin to look better, fog sets in.

Throughput

Advertisements for other machines capable of running any chemistry were appealing, but the recurring problem was throughput—big tanks of chemistry, making a big throughput necessary. We did not want massive throughput cuts; earnings from bulk are a lab's business, not a photographer's. We wanted immediate access to reliable colour processing throughout the day, and used the contractor's recommendations and putting us in full control. Our existing processor gave this only at the cost of ultimate quality, our time in commissioning and stripping down each day, and replacement parts.

When the Agfa C66 processor arrived the immediate question was "will it use Kodak chemistry?". The answer was a firm 'yes but don't!' No explanation was needed as to why using other chemistry invalidates the Agfa guarantees on the processor! Accepting Agfa chemistry as part of the deal, a number of things became clear right from the start:

a) The chemicals, especially the developer, do not deposit heavily or corrode, and the machine can be left loaded, static or running, continuously.

b) The developer time is shorter than the Agfa process, matching the roller processor's transit time, giving full contrast and saturation.

c) Agfa paper is a commercial-contrast material giving acknowledged brighter prints than Kodak—more critical in filtration and exposure as a result, but capable of a punchier image.

Spot-on results

Once the Agfa machine was in position and running, many blessings arrived which we hadn't guessed at. For a start, the 25" Agfa processor turned out to need much less paper in the trays than our 16"; and the 10 litre replenishment bottles metered out exactly the right amounts as print were fed through. The machine, once filled, could be run for several weeks with no more attention than a daily wipe over of some rollers, morning routine of replenishment top-up (taking no more than half a minute) to replace evaporation loss. Confronted with any other 'standing' problems with weekend clean out. Turned on fifteen minutes before printing, it gave spot-on results from recorded filtrations every time, so that repeat prints could be made without any need for repeated grading tests.

In addition, the machine tested was fitted with the air dryer, so that prints emerged dry after roughly nine minutes. The elimination of any need to wash and dry prints before passing them greatly speeded work. The whole assembly also runs from a single power point and can be plumbed easily into any cold water supply or connected to a spare tap. In our small colour room, an extra width of benching was all that was needed to site it temporarily. Most 25" processors would have demanded an architect.

The biggest bonus was in the quality of the prints. The extra 'snap' given by the Agfa process determined within hours that even if we returned to our original processor afterwards, it would be to Agfa paper and chemistry despite the large stocks of Kodak material held.

Is this too eulogistic? Perhaps. But you must bear in mind the needs of the average quality-minded studio considering a processor. Nothing we could find on the market matched the Agfa's small chemical requirements, ease of day-to-day running, the ability to accept a throughput of a handful of prints a day or hundreds, if needed.

The remaining sections of this test report deal with the actual use of the processor and raise some of the problems we did encounter, and the improvements we found would be useful.

INSTALLATION

Jessop's technicians carry out installation and all pre-checks, leaving the processors charged and ready to go. All that customers are required to provide is a suitable bench area with mains water tap, 13 amp power point and waste pipe alongside.

The AGFAPRINT processor, either in its 37cm or 66cm size, can be installed easily in almost any commercial darkroom. We found at first that the idea of finding a bench area about one metre by one and a half daunted us, but in practice we were able to make our first temporary installation by placing a suitable benchtop on our standard 27" worksurface. The Agfa C66, although substantial, is not massive, and has very evenly distributed weight. Setting it level is simple as the machine has a full set of spirit levels visible from the top with its cover removed, and adjustable screw feet at each corner.

The water economiser is fitted to a wall using the clips provided and two plugs and screws. The hoses supplied are of ample length and after cutting with a Stanley knife the main feed hose is connected to a cold water tap using jubilee-clips. Normally you would make an extra T out of the cold supply and fit a secondary tap. A secondary hose is then connected to the machine from the economiser, and the electrical control circuit completed by plugging the economiser's solenoid into a socket on the C66.

Illustration shows Black & White machine with water economiser connected.
Underneath the C66, the four drain hoses—developer, stop, blix and wash—were fitted into the appropriate holes and allowed to run into the sink directly. A single mixer drain outlet is provided and can be fitted if they are to drain permanently, and to recover chemicals or comply with anti-pollution by-laws each can be collected separately for disposal or recycling. Another item included but not utilised in our installation is an extractor pump and flexible hose, for connection to the colour processor hood to remove fumes (although much less noxious than many used without this facility!).

The dryer was connected by removing the processor's nearside cover (the side which accepts the replenisher bottles) and fitting a synthetic drive belt, toothed, to drive wheels. Electrical connections are made by simple spades. The dryer is finally aligned accurately with the processor's outlet, which takes a few seconds.

Illustration shows the waste pipe system beneath the processor.

Illustration shows the extractor assembly provided with colour machines.

Examination of the mechanical links between the processor and dryer was enough to convince us that the design was sound. It may seem odd to make the dryer a separate unit and design it so that even if you chose it could not be run without the processor, but this is how the system works. The physical drive and power supply come from the processor, and the drying system is activated by the same circuits which control replenishment. It can only operate when a print is fed through the machine. The use of plastic drive belts with teeth is a very strong point in the Agfaprint's favour. Rubber belts, friction drives, or fixed drives all have or jamming. The toothed flexible plastic drive belt fed over toothed gears is a compromise giving firm, rigid drive not dependent on friction, but enough 'give' to avoid burn-outs or other disasters should anything happen to go wrong.

The waste pipe system

After the trays are filled from the replenisher tanks the machine is switched on and all functions checked by Jessops technicians.

FIRST IMPRESSION

We hate colour analysers—it's more or less a habit of Steve, who prints colour the way most people print black and white, to look at a negative, assess and dial in a filtration and exposure which turns out to be within first off analyser tolerances. This is a skill, however, which you can only cultivate when you know your paper and chemistry. The Agfa paper and the Agfa machine were totally unfamiliar, and obviously everyone was rather pleased when the first 10x8 came through looking just as good as it would have with the most familiar system.

Agfa Type 5 colour paper is different from Kodak-process papers in possessing fairly high (commercial) contrast, bright saturation, and being a little more critical in filtration and exposure settings as a result. It is in other respects similar, needing much the same filtration settings and exposures over a wide range of surfaces and sizes. The glossy paper was easier to handle before processing than Kodak, as it had less tendency to pick up fingerprints, but after drying we found it conversely more prone to marking. The white lustre paper was very durable, permitting much handling and was ideal for social subjects. The semi-matt paper would be hard to use without a safelight because the emulsion didn't feel all that different from the base side, but the finish was ideal for exhibition prints of commercial subjects.

Designed for great ease

What can we say about 'using' the Agfaprint machine? The entire 'using' process consisted of feeding prints in! There was nothing more to do until they arrived, dry, some nine minutes later. The feed platen and slot on the Agfa machine are ideal for great ease of use, with the curved stainless steel plate picking up highlights from the safelight, being reflective, so that you can easily see it. The paper is simply placed on the platen and pushed gently until it butts up against the feed rollers, which gently take it up.

At each end of the platen there are two paper guides which allow you to feed paper underneath. We tried a whole range of sizes and only found it conversely more prone to pick up marks and misalignments. The Agfa Type 5 colour paper, for instance, is more critical in contrast, brightness, and being a little more critical in filtration and exposure settings as a result. The Agfa Type 5 colour paper is different from Kodak-process papers in possessing fairly high (commercial) contrast, bright saturation, and being a little more critical in filtration and exposure settings as a result. It is in other respects similar, needing much the same filtration settings and exposures over a wide range of surfaces and sizes.

Greatest economy

This means that if you feed one ten by eight print in, you feed it longways on, not the other way, as this gives the greatest economy - 10" of print going in would give replenishment for a print size 10x12" but gives enough for one 8x12" only. Feed two 10x8s in, and you do the same, one at each end. Three go in on their 8" edges, with the outer two covering the sensors and the third one between. Two 12x16s go in on their 12" edges and there is just 3/4" clearance between them when they are fully buttied up to each edge guide. A 20x16" goes in on its 20" edge, a 20x24" on its 24" edge, and a 24x32" naturally goes in on the 24" edge as this is the only possibility.

Dryer and Processor interlinks and drive mechanism

The last stage of the operation involves fitting and filling the three replenisher tanks. These are ten-litre rectangular tanks which can be shelf mounted above the processor or stand along side on the bases supplied to give them a gravity feed action. Each tank has two outlet pipes—one manual, for priming the trays, and one solenoid operated and fitted with a back-pressure controlling filter acting as metering device. Cables from the processor are connected to the solenoid valves.

Feeding prints into the Agfaprint machine.
The smallest acceptable print length which can be fed through is a 3½"x3½", which should be inserted diagonally. A 5x4" test can be put in either way. Obviously it pays to insert several 5x4" tests at once, not just one. We also adopted a slightly risky way of working out our best economy by alternating methods. If we fed in two 10x8s once using both ends of the feed platen properly, then we reckoned that enough surplus replenishment was being given for another 10x8 every couple of feeds, and also the third pair in covering only one sensor. You should never feed in a print without covering a sensor, as the wash and dryer will not be activated.

THE CHEMISTRY

Chemical mixing was more than simple. The Agfacolor 90 process for Type 5 paper is very advanced bit of chemistry, and it is all-liquid. Each pack makes two ten litre batches, and in our experience one ten litre unit of blix or stop lasted a fortnight, with developer being used at twice the rate, so you might need to buy double the number of developer packs.

Our first excursion into mixing involved the darkroom mixing bucket (you can actually buy graduated ten litre polythene buckets at supermarkets) and our mixing rod, which happens to be a Durst processor roller shaft, a standing joke in the studio as the most expensive mixing rod in history at £23. Our previous chemistry contrived to turn one foam-covered mixing rod into one stainless steel mixing rod every six months regardless of efforts to clean and preserve the rollers in the past.

Chemistry can however be mixed in the graduated tanks themselves. This procedure involves pouring water in to start with as opposed to centring chemicals in the feed pipes could be disastrous; in fact, chemistry is always added just before the last batch is finished. Using this method you need to be very careful in the tanks and add the correct amount of water. As the Agfa bottles are fully graduated this is simple. We kept all the Agfa bottles because we reckoned that a two-litre polythene chemical bottle, well made and marked in graduations, would cost anything up to £3 in a shop, and we use plenty of other chemicals which need good bottles.

The manual priming hoses from the replenisher tanks are used to fill the trays. Incredibly, the C66 with its 25" capacity needs only 2.21 litres of developer, 1.5 litres of stop bath, and 1.3 litres of blix. In this respect we think the Agfa machines are the most economical to load ever designed. Even if a disaster occurs and the whole set of trays is contaminated, the chemistry can be discarded with scarcely a thought for cost.

The priming level for the trays is found simply enough by filling until they overflow. Then a packet of developer starter powder is sprinkled in the activity to stimulate that of used developer properly replenished. Then the cover is placed on the machine, the water is switched on at the tap, and the 'on' switch flipped. The pumps and heaters now start working. To activate the water supply, priming and setting up the wash tray also allows you to check the replenishing action) you simply cover one of the two infra-red sensors in the feed platen.

The economiser device's pressure check should stand at 5, and the gauge for pressure between the economiser and the machine around 1 - 1.5 on its dial. Replenishment is easily checked as you hear a click of the solenoids and see bubbles rising in the tanks or moving in the feed pipes. If in doubt you can lift the actual feed connections to the processor and see the liquids running into the receptacles in the trays beneath.

After re-filling the tanks any airlocks in the tubes can be removed by operating the manual replenishment switch, bending and squeezing the tubes if necessary.

ECONOMY, CONSISTENCY, CAPACITY

IN THE long term there are two aspects which matter very much in a colour processor. The first of these is day-to-day month-to-month consistency of results, and the second is the economy achieved in solution use. Chemistry is much cheaper than paper, and you save more by getting perfect repeat results than you do by using the minimum chemistry. It is not only accepted that you require roughly 50ml of developer to produce a 10x8 print (this is the figure achieved by most drum processors) but many automatic processors do considerably worse than this.

The least economical systems tend to be rotary discard processors, which may not only require a greater rate per print when fully loaded, but often need to be filled to capacity with chemistry just to process one single print. The most economical system is the hand-line using deep tanks, which may give economy as good as 20ml per 10x8 print, and has additional advantages of being ready for use at any time of day or night without maintenance problems. However, hand processing demands the attention of the operator during the entire 9 minutes or so of the procedure, and as a result it tends to be appropriate only in the same circumstances as rotary discard processors when a batch of prints has to be processed together (i.e. 28 prints at one go).

In terms of consistency, the worst results are obtained using single print development in a drum. Here you are totally dependent on your accuracy in temperature, feed rate, and solution level and activity are maintained at constant levels. This is fairly easy with deep tank roller machines requiring a hundred litres of solution per bath or more, but the question of long-term repeatability must be asked critically when dealing with a processor using such small bath volumes as the Agfa. Only by a precisely metered replenishment and thorough mixing can a processor with such small baths expect to maintain a perfect standard. The Agfa print's infra-red sensor device and print-by-print replenishment system does seem to work remarkably well, and the greatest risk is that too much rather than too little replenishment will be given. As we found when the replenishment system was suffering from a blockage, it would take a great deal too little replenishment to affect results noticeably.

By the time we had counted our sheets of paper and the amount of chemistry mixed, we emerged with the magic figure of about 50ml of developer per 10x8 print at the best and 60ml when working inefficiently (making small tests, and so on). This is how we know it is the kind of economy we would hope for in a sophisticated machine. As far as consistency went, regardless of the length of a colour print run, the last print was invariably identical to the first. Prints made one week and the next were also identical. The only variation which occurred was when the machine had been allowed to foul up due to deliberate neglect. So good is the consistency that any variation observed provides a pointer to immediate investigation of possible problems in the machine.

We are talking, here, about filtration balances worked out to within the bargain every time.

In theory the continuous feed roller processor of the Agfaprint type gives the best overall consistency as long as the temperature, feed rate, and chemistry mixed, we emerged with the magic figure of about 50ml of developer per 10x8 print at the best and 60ml when working inefficiently (making small tests, and so on). This is how we know it is the kind of economy we would hope for in a sophisticated machine. As far as consistency went, regardless of the length of a colour print run, the last print was invariably identical to the first. Prints made one week and the next were also identical. The only variation which occurred was when the machine had been allowed to foul up due to deliberate neglect. So good is the consistency that any variation observed provides a pointer to immediate investigation of possible problems in the machine.

We are talking, here, about filtration balances worked out to within +2 Durst units (or roughly 3cc). The usual 5cc accepted on machine prints. Obviously there is little point noting down, as we do, the precise column height, lens, aperture, filtration, paper details and exposure time, if the processor does not repeat its side of the bargain every time.

Economy extends beyond this. While we were testing our processor, our regular lab experienced a loss of some £250-worth of chemicals when someone elsewhere in the building turned off the main water supply. Exactly the same thing happened in the processor in the same week, coincidentally, but we lost nothing apart from an hour or two
of printing time. In fact, I once failed to turn on the water supply. and I had been printing for an hour before signs of unwashed prints became apparent. Similarly, when any solution is contaminated or considered to be too far gone to continue in use, just a little more or less than 2 litres must be discarded. Even though our most thorough session, only this need be lost if any. This is real economy. Moreover the solutions in the plastic replenisher bottles keep for many weeks without coagulation, and the developer can easily be sprayed over with inert gas for additional protection.

Economy includes running repairs as well. In your average processor, small magnetic pumps have been used to circulate the developer through pipes. Due to the chemistry involved, these pumps became heavily clogged up with hard deposits every six months, necessitating a replacement set with delays in supply. Being situated below the trays, any residual solution after washing naturally gravitated to the pumps and pipes and did its worst.

We were delighted to find that the Agfaprint use no pumps! There are no pipes or ducts carrying used developer or blix, except to drain it off. The trays themselves have small 'pots' with rotors in where the fresh solution enters, and these act as simple circulation pumps, keeping the solution moving. The drive is direct, not magnetic, via a fixed coupling with no need for collars or alignment. The blades of the circulators rotate freely with plenty of space, in fresh, fairly deep solution, and are far simpler than the separate motor and magnetic pumps of the former machine.

**Capacity**

You know your required printing capacity better than anyone else before you consider buying a processor. It must be of great importance to ensure that the Agfaprint purchased can cope with your needs. The machine we tested was the 25" C66, and it can also do larger work. The other problems we encountered were mainly due to failure to circulate the developer through pipes.

Clearly the biggest advantage of the C66 are in making 10x8 prints and in sizes larger than 12x16. In practical use, we make our 5x7 prints by working two up on 10x8 paper, and take advantage of this to produce full frame 5x7 prints from 35mm or 6x9cm negatives. This would not work well with the C37, where it would be quicker to use cut sheets of 5x7 paper. Tests of real working rate produced figures within about 20% of those quoted by our table from our run printing, because in practice you risk inserting a print without allowing some leeway for the last one to enter the machine fully, and you can not insert the prints simultaneously, so they are slightly stepped due to the few seconds' delay between locating each one. Printing a roll of 35mm with minor filtration adjustments, we managed 24 prints in 45 minutes on 10x8 paper, with two discarded test prints. As a realistic guide, one operator working with a quick enlarger, un负荷 negative strips, and a good analyser and exposure meter, could print a roll of 36 or three rolls of 12 on 120 or 10x8 or 8x8 prints within an hour to dry, with leeway for two or three reprints.

If you are printing a difficult negative, impossible to analyse, or working to exact colour reproduction as we very often do, then each single test takes a full 9 minutes, and in this kind of work you can easily lose an hour just grading a few nags for big enlargements.

The only very useful improvement we can think of which would speed up processing and increase confidence would be a small LED warning light which would come on once the prints had entered the machine enough to allow the insertion of the next set, with perhaps a second phase which would extinguish it when it was safe to turn on the room lighting.

**Routine Maintenance**

Agfa suggest daily rinsing of 3 rollers and one guide under running water only. Other than this a thorough clean of all rollers and trays is recommended with a sponge and Luke warm water about every 3 weeks.

**This involves removing the processor lid and sliding complete trays across the unit to disengage drive. The 4 top guide rollers, 6 sets of transport rollers, 4 stainless steel paper guides and heater units are lifted out. If necessary, the 4 trays can then be drained and removed, and all parts rinsed, wiped over and re-assembled.**

There is little need to explain this because all the parts of the C66 are beautifully labelled. Even a beginner can dismantle and clean and reassemble an Agfaprint machine; each tray and roller has its unique fit, its number and colour code, and a very neat method for engaging the drive mechanisms which needs no collars, tooth matching or belts. It probably takes a whole 30 seconds to slot every element into place, and the only part to be careful about is ensuring that each tray is fully pressed home towards the replenisher side of the machine to engage the drive properly.

**Long Term Use and Misuse**

During our test period we encountered several self-induced problems. For a start, we deliberately neglected routine maintenance procedures entirely, leaving the machine uncleaned, the wash unemptied, and so on. It took two weeks for the first signs of this neglect to emerge—stained dev rollers, which left a few grey marks on prints run through at first. This was cured by simply wiping over the entry and developer rollers. At the end of three weeks, prints began to appear with serious degradation of the highlights, which then deepened—magenta and with dark grey streaks. At this stage we opened up the works to see what had developed.

The wash bottle to which Agfa recommend you drain each night, was clear. Whether or not it might develop algae in some areas, it showed no signs of furring, algae or anything else in Mansfield. The bake also performed—unstained, clean rollers. The stop was quite disgusting—it was almost black, crusted, with filthy rollers. The developer was clear and clean, with slightly filmed rollers, but nothing serious.

So in our area the real culprit was the stop bath. We promptly discarded it, thoroughly cleaned all the parts with Tetenal cleaning solution, allowed it to be drained and followed the recommended washing and wiping programme for the dev rollers and the rest of the machine, which takes about half an hour to complete. We then re-primed the processor, switched on, and half an hour later we had bright, clean, unmarked prints again. We would therefore suggest particular attention to the daily cleaning of Developer and Stop Bath exit rollers as recommended by Agfa, and also the "drip channel" beneath them.

Later on, in conversation with a laboratory owner, I heard of how Agfa chemistry had been tried with a processor using no stop bath (many commercial machines do not) and of the eventual appearance of degradation of exactly the kind we had experienced. Maintained correctly, the Agfaprint C machine gives the sequence for the paper and chemistry, which should never happen. We induced it to do so by deliberate neglect as part of a test programme.

**Problems**

The other problems we encountered were mainly due to failure to check functions and setting up regularly enough. During one week, the developer seemed to last for ever, although it was replenishing. Finally we investigated and found that an obstruction in the special tank top with its air inlet had slowed down the maximum rate of feed. Once cleared, normal replenishment resumed.

Interestingly, we noted absolutely no change in the prints despite serious under-replenishment.

Apart from this, the machine showed no gremlins, which is very unusual in any new equipment as sophisticated as this. During the initial setting-up a circuit card was found to be faulty but that was easily replaced on the spot by Jessops engineers as part of the installation procedure. As the electronics are all designed using the standard modules, replacement of dubious circuits and checking of
functions is more than rapid. You could virtually rebuild an Agfaprint's control circuitry in twenty minutes and tracing a fault can take as little time as it involves to open the casing and plug in a replacement board.

On one occasion, we purchased some ordinary type 4 Agfa paper for a rush job and put it through the processor. The results were perfect, if it were not for the fact that type 4 paper is slightly heavier we may not have noticed. Although we understand type 5 paper has an improved emulsion, none of the type 4 emulsion characteristics seem to make it unsuitable for use with process 90 chemistry in the Agfaprint machine.

Even when we fed prints in emulsion side down, rather than correctly with the emulsion side up, the results were perfect. Occasionally I pulled a print out of the feed rollers after it was taken up, aware that I might have inserted it askew, no damage. Several times we fed prints on room lighting before two minutes were up after the print had entered the machine, and fogged the paper trailing edge.

Our only real niggle with the Agfa machine, was the lack of a light-tight entry cover to allow you to insert the prints and instantly turn on all the lights to set up your next neg. Apart from speeding up the whole business the risk of accidentally lighting up before the prints had had two minutes in the machine was great. It is easy to tell if a print is still feeding in, but when you're busy it is very hard to remember how long ago it finished feeding in and was 'swallowed'!

FOOTNOTE
The possibility of manufacturing and marketing a light-tight feed box as described by David Kilpatrick is being actively investigated by Jessop's. At this time this report goes to press a working prototype has been built, Subject to production costs making it a viable proposition it should be available as an optional accessory.

Also in advanced stages of research and design are benches with optional replenisher tank shelf (to minimize size) and on casters to allow access all around, even when installed against a wall.

A blueprint for permanent installation
After one month we had decided where the machine would go for permanent use. It would, in fact, be almost entirely in the workroom, with only the feed platen and switch control section inside the darkroom. Mounted on a bench at a fairly low level, the machine would fit into a light-tight aperture cut through the studded wall of the darkroom. The final sealing for light would be done using a heavy foam-backed black nylopon material which we use for window blackouts. On the workroom side, full access would be enabled all round.

On the darkroom side, we would build a hinged light-trap box over the feed area, properly sealed but as light as possible for lifting, and probably add a simple dowel to act as a rollfeed so that 24x32" prints could be carefully rolled and inserted into the feed area. We do not anticipate using rollhead paper and the Agfaprint machine does not strike as ideal for rollhead work, which tends to be ultra-high output stuff and commercial printing. However, from our experience it would appear that type 4 rolls could certainly be used and the machine would accept four 5" or three 8" rolls side by side (type 5 paper is not marketed in rolls at present).

This kind of installation, with the machine mainly in a daylight area, is quite practical with the Agfaprint system. This is perhaps not so many to mention, and not least the is the freeing of considerable darkroom space. Dry prints are delivered ready for trimming, spotting and referencing or mounting direct to the final print edge.

If organisation is good enough, a secondary light-trap hatch can be used to allow a grader to return reject prints, properly assessed outside the darkroom by correct lighting or filtration adjustment comments. Any heat escaping from the machine and not extracted by the fan unit would generally be lost in a workroom where people come and go and perhaps open doors often, whereas in a darkroom even an enlarger colour head can raise the temperature to much for comfort.

From our experience, we would advise anyone installing an Agfa processor to allow access to both sides of the machine, if possible whilst also ensuring that some convenient print feed at the front.

This is not essential but very desirable for easy access to one side for cleaning and the other to fill the replenishment tanks—see footnote.

Agfa recommend 21mm thick worktops for sitting the machines, but any proprietary laminated finish chipboard should be adequate with proper battening and supports beneath. During our trial installation, our 'worktop' surface consisted of the most unlikely item, a disused 1mx2m fabric covered display panel. To give some idea of the sheer cleanliness of the Agfa processor, not a single drop of water or chemistry ever touched the surface of that panel. No cleaner or dryer lay of processing prints could be imagined.

This in turn gives great advantages. A printer who never has to handle wet prints at any stage can do without cotton gloves when working with Agfa paper. With three people handling the paper without gloves, we never once encountered a single fingerprint, in many hundreds of prints. Only after cleaning the machine did we need to dry hands very carefully. The working conditions of the dry-towet system are very different indeed from that with a dry-to-wet one. Not only can you handle prints more easily, but negatives as well. Anyone who has worked dry-to-dry would find it very hard to return to dry-to-wet.

BLACK & WHITE MACHINES
So what specifically, of the black and white machines? They are extremely rapid. A print emerges from the machine and with an excellent surface finish in less than the time it normally takes just to dev stop and fix a sheet of paper in rapid chemistry. Yet this is not a stabilized print, but a true permanent, fixed, washed RC or PE print.

Unlike the colour machine, you are working in red safelighting for most papers, and the room lights can also be switched on for inspection immediately after inserting the print. Feed is extremely fast and if you are working with exposures of ten to fifteen seconds and sheets of 10x8" you will even be able to 'beat' the machines unless an assistant loads them up.

We felt that the biggest advantage of machine processing had to be sheer quality. Despite every care, bulk processing of RC prints is a messy business in dishes. They stick together, spring apart and splash the room, fail to fix, float, pick up fingerprints, get abrasion fogging marks on the emulsion and score easily if tongs are used. Though it hurts to admit it, we frequently run into problems with marks on black and white prints, and no amount of care seems to avoid a few spoiled prints out of a run of over twenty done in a hurry.

As a result you either have to make a few to spare or do a re-run at the end to replace poor prints. Another dish process problem with RC papers is development consistency—though a timer can provide perfect exposures, developing judgment to go gradually astray or make false comparisons with prints under used fixer! The chemistry is always at the same concentration and temperature, and today very few darkroom workers do more than try the temp. of print dev. solution with their finger, as a range from 65 F to 85 F is quite acceptable with most RC materials. The result is poor quality control and a lower standard of optimum development time. Full development is required, but not so full as to degrade the paper's tonal range.

The Agfa black and white machines give a consistency to prints which you rapidly learn to appreciate. A run of fifty 10x8s can be literally developed from first to last very few darkroom workers do more than try the temp. of print dev. solution with their finger, as a range from 65 F to 85 F is quite acceptable with most RC materials. The result is poor quality control and a lower standard of routine b/w printing than we have ever seen before.

On test, the Agfa BW66-50 was used with Ilfossed 2000 chemistry, the machine line replenisher version of
were surprisingly good and made us think hard about stocking Kenthene as it switches on with the machine, plus two operation of the Black and White machines is a little more expensive since it has an 'idler' heater that slightly lowers maximum density, which we prefer but some people hate. The glaze of glossy was superior.

Kenthene gave results which were surprisingly good and made us think hard about stocking Kenthene as an alternative paper.

Ilfospeed and Multigrade gave a slightly lower maximum density, mainly on account of a visible warmer image tone, which we prefer but some people hate. The glaze of glossy was superior.

The dryer for the Black and White machines is a little more expensive since it has an 'idler' heater that switches on with the machine, plus two boosters activated by the paper sensors. This is due to the higher speed operation of the Black and White models.

find it perfect. Naturally the b/w processors do not need as much maintenance as the colour machines, and the chemistry is much cheaper.

A photographer who purchases one of these machines would, we feel, see a dramatic improvement in the sheer quality and consistency of RC prints, bringing back the standard of the conventional fibre-based processing which once used to be found in this country.

| Model BW 37-50 | 550 | 610 | 400 | 230 | 115 | 70 |
| Model BW 66-50 | 900 | 1220 | 610 | 340 | 230 | 140 | 56 |

AGFAPRINT C: Hourly print capacity

| Model | 90 | 100 | 65 | 38 | 19 | 11 |
| Model C 66 | 150 | 200 | 100 | 57 | 38 | 22 | 9 |

PAPER AND CHEMICAL AVAILABILITY

AGFACOLOUR PAPER

Type SPE for use with process 90 chemicals in Agfaprint table top processor

<table>
<thead>
<tr>
<th>Type SPE for use with process 90 chemicals in Agfaprint table top processor (or with Process P kit in Drum processors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCN 310/5</td>
</tr>
<tr>
<td>Glossy</td>
</tr>
<tr>
<td>12.7x17.8 cm (5x7)</td>
</tr>
<tr>
<td>20.3x25.4 (8x10)</td>
</tr>
<tr>
<td>24x30.5 (9x12)</td>
</tr>
<tr>
<td>30.5x40.6 (12x16)</td>
</tr>
<tr>
<td>40.6x50.8 (16x20)</td>
</tr>
<tr>
<td>50.8x61.0 (20x24)</td>
</tr>
<tr>
<td>61.0x81.3 (24x32)</td>
</tr>
</tbody>
</table>

Agfaprint process 90 chemicals.

For processing Agfacolour TYPE 5 paper in Agfaprint processors.

| Colour Developer | 90CD (2x10 Litre) |
| Stop Bath | 90ST (2x10 Litre) |
| Bleach Fix | 90BX (2x10 Litre) |

Process P Kit

For processing Agfacolour Type 5 paper in Drum Processor 1 Litre.
## Specification of AGFAPRINT COLOUR PROCESSORS

<table>
<thead>
<tr>
<th>Processor dimensions (L, W, H) in cm</th>
<th>C37</th>
<th>C66</th>
</tr>
</thead>
<tbody>
<tr>
<td>without dryer</td>
<td>96 x 80 x 56</td>
<td>126 x 80 x 56</td>
</tr>
<tr>
<td>with dryer</td>
<td>96 x 110 x 56</td>
<td>126 x 110 x 56</td>
</tr>
<tr>
<td>Weight</td>
<td>40 kg</td>
<td>46 kg</td>
</tr>
<tr>
<td>without dryer</td>
<td>71 kg</td>
<td>109 kg</td>
</tr>
<tr>
<td>with dryer</td>
<td>2300 watts</td>
<td>3400 watts</td>
</tr>
<tr>
<td>Electric supply</td>
<td>220V/50 c/s*</td>
<td>220V/50 c/s*</td>
</tr>
<tr>
<td>Max. power consumption</td>
<td>800 watts</td>
<td>800 watts</td>
</tr>
<tr>
<td>Operating speed</td>
<td>8 cm/min.</td>
<td>8 cm/min.</td>
</tr>
<tr>
<td>Storage tanks, capacity</td>
<td>12 litres</td>
<td>12 litres</td>
</tr>
<tr>
<td>Max. paper width</td>
<td>37 cm</td>
<td>66 cm</td>
</tr>
<tr>
<td>Min. paper length</td>
<td>12.7 cm</td>
<td>12.7 cm</td>
</tr>
</tbody>
</table>

**Note:** We reserve the right to make alterations to this equipment resulting from its further development.

## Ref. numbers and order particulars for AGFAPRINT C processors

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Order particulars</th>
</tr>
</thead>
<tbody>
<tr>
<td>8896/200</td>
<td><strong>AGFAPRINT C 37</strong> Table-top processor for development of AGFACOLOR Paper TYPE 5 by Process 90, with automatic replenishment, temperature-control and circulation of baths, including storage tanks. Max. paper width 37 cm.</td>
</tr>
<tr>
<td>8846/100</td>
<td><strong>AGFAPRINT Dryer C 37 TR</strong> for synchronized operation with the AGFAPRINT C 37.</td>
</tr>
<tr>
<td>8896/100</td>
<td><strong>AGFAPRINT C 66</strong> Same features as the AGFAPRINT C 37 but maximum paper width 66 cm.</td>
</tr>
<tr>
<td>8846/200</td>
<td><strong>AGFAPRINT Dryer C 66 TR</strong> for synchronized operation with the AGFAPRINT C 66.</td>
</tr>
<tr>
<td>8889/100</td>
<td>Water economizer with flowmeter and pressure reducer. Switches off the wash water when there is no paper in the AGFAPRINT processor.</td>
</tr>
</tbody>
</table>

## Specification of AGFAPRINT BLACK & WHITE PROCESSORS

<table>
<thead>
<tr>
<th>Processor dimensions (L, W, H) in cm</th>
<th>BW 37-50</th>
<th>BW 66-50</th>
</tr>
</thead>
<tbody>
<tr>
<td>without dryer</td>
<td>96 x 80 x 56</td>
<td>126 x 80 x 56</td>
</tr>
<tr>
<td>with dryer</td>
<td>96 x 110 x 56</td>
<td>126 x 110 x 56</td>
</tr>
<tr>
<td>Weight</td>
<td>36.5 kg</td>
<td>42.5 kg</td>
</tr>
<tr>
<td>without dryer</td>
<td>61.5 kg</td>
<td>82.5 kg</td>
</tr>
<tr>
<td>with dryer</td>
<td>800 watts</td>
<td>800 watts</td>
</tr>
<tr>
<td>Electric supply</td>
<td>220V/50 c/s*</td>
<td>220V/50 c/s*</td>
</tr>
<tr>
<td>Max. power consumption</td>
<td>2300 watts</td>
<td>3400 watts</td>
</tr>
<tr>
<td>Operating speed</td>
<td>50 cm/min.</td>
<td>50 cm/min.</td>
</tr>
<tr>
<td>Developer through capacity</td>
<td>1.7 litres</td>
<td>2.2 litres</td>
</tr>
<tr>
<td>Fixing bath through capacity</td>
<td>0.85 litre</td>
<td>1.1 litres</td>
</tr>
<tr>
<td>Capacity of storage tanks</td>
<td>12 litres</td>
<td>12 litres</td>
</tr>
<tr>
<td>Max. paper width</td>
<td>37 cm</td>
<td>66 cm</td>
</tr>
<tr>
<td>Min. paper length</td>
<td>12.7 cm</td>
<td>12.7 cm</td>
</tr>
</tbody>
</table>

**Note:** We reserve the right to make alterations to this equipment resulting from its further development.

## Ref. Nos. and order particulars for AGFAPRINT BW processors

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Order particulars</th>
</tr>
</thead>
<tbody>
<tr>
<td>8897/201</td>
<td><strong>AGFAPRINT BW 37-50</strong> Table-top processor for development of PE AND RC RESIN coated paper by a rapid process, with automatic replenishment, temperature-control and circulation of solutions, including storage tanks; maximum paper width 37 cm.</td>
</tr>
<tr>
<td>8845/100</td>
<td><strong>AGFAPRINT Dryer BW 37 TR</strong> for synchronized operation with the AGFAPRINT BW 37-50.</td>
</tr>
<tr>
<td>8897/101</td>
<td><strong>AGFAPRINT BW 66-50</strong> Same features as for AGFAPRINT BW 37-50 but maximum paper width 66 cm.</td>
</tr>
<tr>
<td>8845/200</td>
<td><strong>AGFAPRINT Dryer BW 66 TR</strong> for synchronized operation with the AGFAPRINT BW 66-50.</td>
</tr>
<tr>
<td>8889/100</td>
<td>Water economizer with flowmeter and pressure reducer. Switches off the wash water when there is no paper in the AGFAPRINT processor.</td>
</tr>
</tbody>
</table>
"FLYING DOCTOR" MAINTENANCE SERVICE

All Jessop's Agfaprint machines are fully guaranteed for 12 months. There are no hidden extras—the price of the machine includes its installation in your premises by Jessops qualified service personnel. A fully comprehensive after-sales-service back the machines. Because the last thing you want is a lengthy delay in the unlikely event of a breakdown. Our service division will get you back into action quickly and efficiently.

OUR PROFESSIONAL DARKROOM

A fully equipped Professional Darkroom with working Processors has been installed at Jessops' Hinckley Road, Photo Centre, in Leicester, in order to give customers the opportunity of seeing the quality of work that the Agfaprint system is capable of producing.

Half day sessions are held every week consisting of a brief demonstration followed by ample opportunity for customers to use the equipment themselves and compare notes. A less formal demonstration can normally be provided for individual customers from 9am to 6pm Monday to Friday or, by prior arrangement only, 9am to 5pm Saturday.

For those unable to visit Leicester, Jessops' Representatives are pleased to call at a convenient time, by arrangement.

OUR PROFESSIONAL DEPARTMENT

Contact Jessop's Industrial and Professional Department for all your photographic requirements. Huge and comprehensive stocks of equipment, system accessories and materials with a well stocked Hire Department catering for the needs of the professional. Jessop's special telephone number for Professional, Industrial and Educational customers is Leicester (0533) 24274. General Enquiries Extension 26, Agfaprint Distribution Division extension 39.