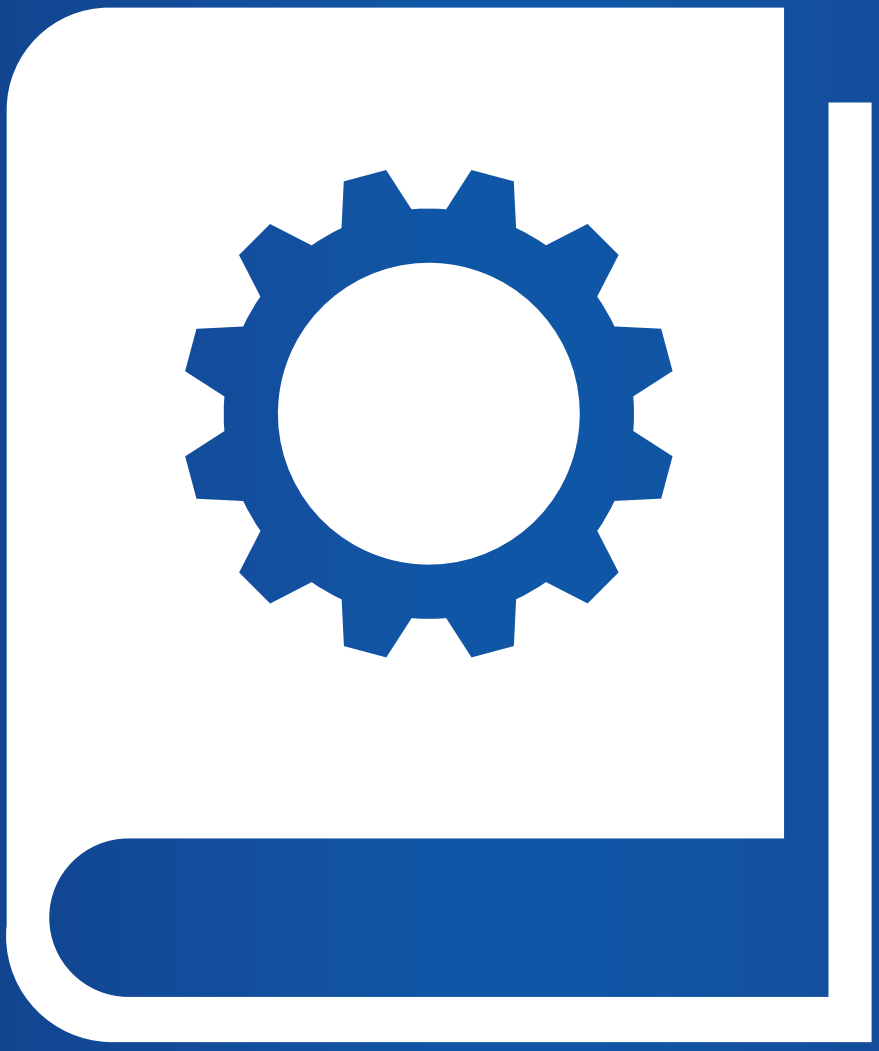
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HiTec Paper.



Technical Handbook

Carbonless Papers

giroform

MITSUBISHI PAPER MILLS LIMITED

Technical Handbook

giroform

A technical handbook for the printing and processing of Giroform, the carbonless paper from Mitsubishi HiTec Paper Europe GmbH.

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Foreword

This technical handbook for Giroform is intended to give help and information to forms manufacturers, our distributors and to forms users.

In addition to explanations of the construction, properties and processing of Giroform, we have therefore also dealt with questions of forms usage.

We have endeavoured to compile a detailed product handbook, with which most questions concerning the use and application of Giroform can be answered.

Many of the explanations, recommendations and limitations are not only applicable to Giroform, but also to carbonless papers of a similar technical construction.

Should you require any further information please contact us – our distributors and technical advisers will always be pleased to help.

The information given in the handbook is based on our many years of experience. It does not, however, relieve



the forms manufacturer or user of his duty of ordinary care and control.

Because the processing and use of Giroform takes place beyond our control, no possible product guarantee claims can be derived from the contents of this handbook.

Changes and new developments in the forms market as well as technical progress and innovation may necessitate or lead to product modifications. We, therefore, reserve the right to modify the product. We will, however, endeavour to inform our customers as soon as possible of any changes likely to affect the use of our product.

Mitsubishi HiTec Paper Europe GmbH,
April 2017







External Impressions



Giroform has everything going for it!

Mitsubishi HiTec Paper Europe is a company with great tradition – yet still at the forefront of technological development – this demands a continuing readiness to invest in the future. New standards have been set for the production of carbonless paper by the construction of the largest and most efficient paper machine for carbonless production in Europe, combined with the expansion of the coating and finishing plant in our Bielefeld Mill.

ISO 9001

The certification of the Bielefeld mill according to the ISO 9001 standard can be seen as a consequence of the further development of the quality system. The Bielefeld plant was awarded this coveted and internationally recognized certificate establishing it as the world‘s foremost production facility for carbonless paper.

ISO 14001

Mitsubishi HiTec Paper Europe is certified according to ISO 14001 for its environmental management system. For many years now Mitsubishi HiTec Paper Europe GmbH has been manufacturing its high quality speciality papers in an environmentally friendly and sustainable way.

ISO 50001

A further step has been taken with its energy management system being certified according to ISO 50001.







Internal Impressions



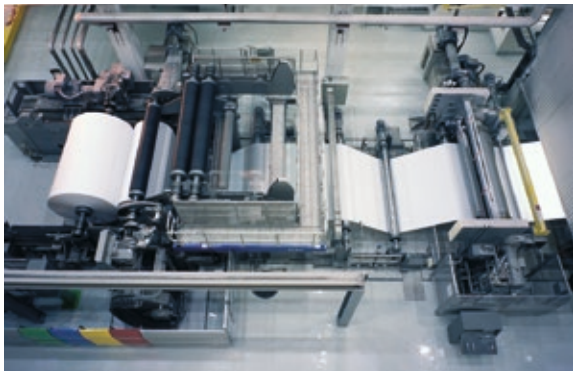
Production Plants

The state-of-the-art production plant at the Bielefeld mill of Mitsubishi HiTec Paper Europe sets the standard. It is operated by a skilled workforce, whose experience and knowledge are the basis for the high quality of the firm's speciality papers.



Paper machine 3

- Type: twin-wire paper machine
- Working width: 5.80 m
- On-line coater: film press (for surface sizing and functional coating)



Coating machine 1

- Coater for capsule coating
- Working width: 2.90 m

Coating machine 2

- Coater for capsule coating
- Working width: 2.90 m

Coating machine 3

- Coater for multiple coating
- Working width: 2.90 m

Finishing and packing lines for reels and sheets

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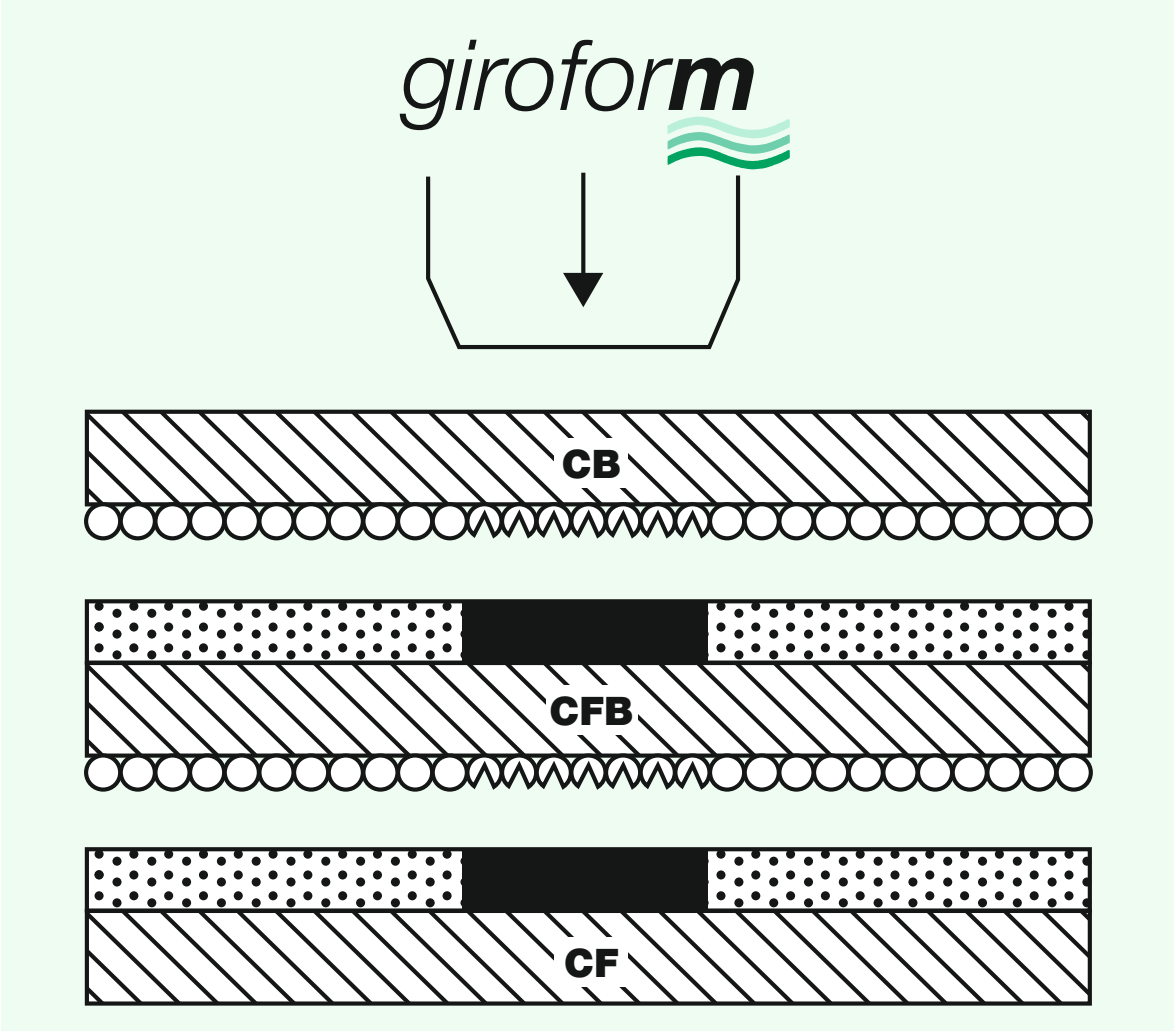
Product Description

Functioning Principle and Sheet Grades

Giroform is the carbonless paper developed by Mitsubishi HiTec Paper Europe in black copy.

The copy is produced by the action of impact or writing pressure, which causes a reaction to take place between the two coatings present; on the front and reverse side of the sheet respectively.

For the production of forms sets, therefore, a minimum of two sheet types are required. Forms sets with more than two parts require the use of a middle sheet type.

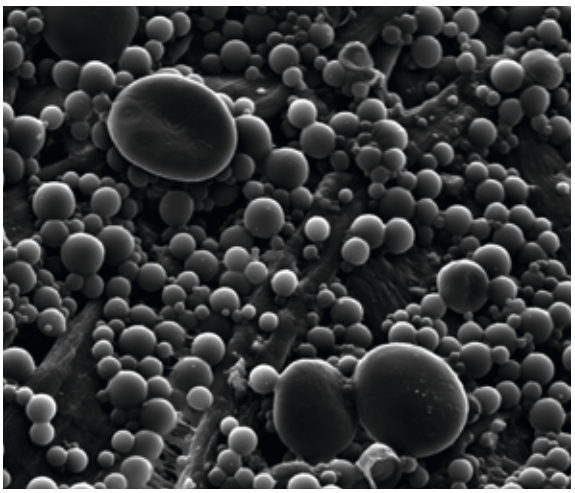


The main principle

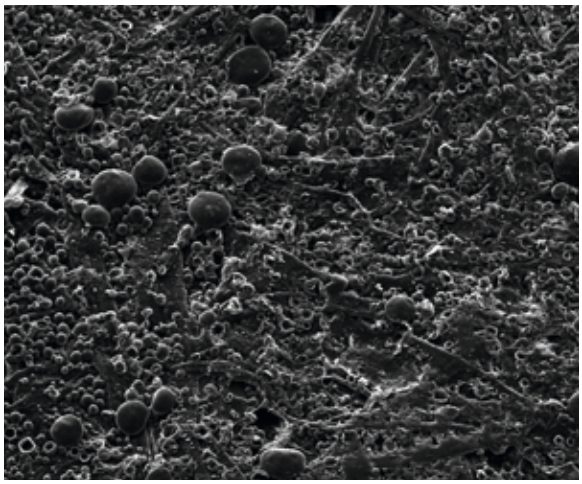
CB (coated back) - this sheet grade serves as the top sheet and original copy of the form set. The donor coating on the reverse side consists of microcapsules containing dissolved colourless colour formers.
The wall material of the microcapsules is impermeable - containing the dissolved colour formers securely and durably.

It is the action of pressure during imaging of the forms, which ruptures the microcapsules and releases the colour formers.

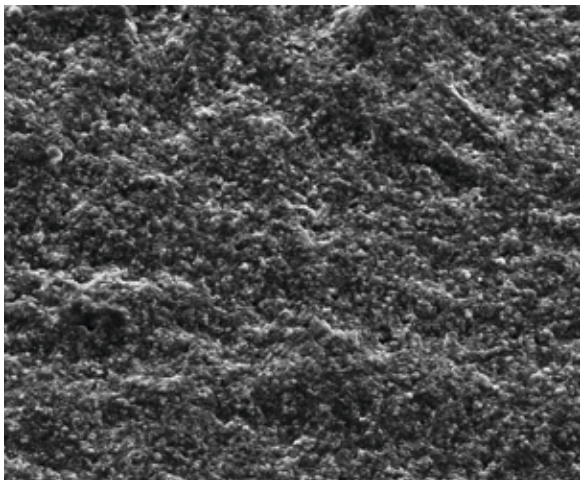
This sheet grade is, therefore, sensitive to pressure or impacts and requires correct handling.



CB (coated back)



Microcapsules ruptured by imaging pressure



CF (coated front)

CFB (coated front and back) – this sheet grade serves as the middle or as intermediate sheet in the form set. It is coated on the front side with recipient coating.
When imaged, an immediate reaction takes place due to absorption of the colour formers released from the CB sheet grade. The colourless colour-formers change into a high-contrast, non-smearing black copy.

The reverse side is coated with the same donor coating as the CB sheet grade. The CFB sheet grade is also pressure-sensitive and must be correctly handled.

Incorrect handling can lead to discoloration in sheet and reel stocks as the CB and CF coatings lie on top of each other.

CF (coated front) – is used as the final sheet in the form set. Its front side is coated with the same recipient coating as the CFB sheet grade.

This sheet grade is not pressure sensitive and can be handled like standard coated papers.

General Information

Product Labelling

The products are described by labels which detail the most important information about the paper: product name, sheet grade, colour, size and weight.

Furthermore one or several mill making numbers may be shown – your reference to these numbers enables us to investigate complaints quickly and correctly.

Grain Direction, Reel Finishing, Joins

Grain direction is indicated by the manner in which the size is written and also by the additional letters SB (long grain) or BB (short grain). The second size shown indicates the grain direction. Thus, the second size is the longest for long grain; for short grain the second size is the shortest.

The description would be for example:
- 43 x 61 SB – long grain
- 61 x 43 BB – short grain

Reels are always wound with the top side facing outward. The winding direction is indicated by an arrow stamped near to the core. The sheet grade is also stamped at this location.

Joins in standard and Ultra reels are not marked. They are made in such a way as to reduce the copying function of the paper only slightly.

The frequency of joins is clearly lower than prescribed by the German Industry Standard DIN 6721 Part 2.



Outer box

Thus, for example, 99% of our 7,000 metre reels are produced with a maximum of only 1 join, the majority being joins free. For CB 90 OCR, CF 90 OCR, CF 130 and CF 170 the joins are made with a red adhesive tape which can be seen on the face of the reel. The paper webs are butted together in such a manner as to avoid damage in the rewinder or printing press.

Reel Lengths

The reel lengths have been chosen to give the forms manufacturer practical run lengths of 12“ forms from a single reel. A 7.000 metre length reel, for example, would allow for the production of approximately 20,000 12“ forms.

Independent investigations have shown that avoidance of part used reel stocks can lead to substantial cost savings.

Packaging Sheets

Our carbonless papers are ream wrapped in water-vapour proof kraft wrapping paper. Further protection



Sheet Packaging A4



Sheet Packaging SRA3



Reel Packaging



Sheet Packaging

of the paper is achieved by the use of strong grey board on the top of CF and on the top and bottom of the ream prior to wrapping of all CB and CFB sheets.

The reams are stacked on pallets and the stack is further stretch wrapped with polyethylene film. The full pallet is compressed by a precisely controlled amount to eliminate any trapped air between the reams. This ensures a compact unit can be dispatched to the customer in optimal condition.

Reels

Our reels are protected in the reel stack against climatic influences and dirt by several layers of PE stretch film. Intermediate card discs are located between the reels.

The order is finished on pallets with a top board and banding. Experience has shown that pallets can be stacked on top of each other.

We reserve the right to amend our packaging specification at our discretion.

Equilibrium Moisture Content

The mill specification for equilibrium moisture content is in the range of 45% R. H. (± 7.5%) at 21 °C. In our experience this range has proved to be perfectly suitable for the climatic conditions in print shops, for end users and for paper storage rooms.

Paper can readily accept or release moisture if unsuitable climatic conditions prevail.

As you can see from the following table (produced by the FOGRA Institute in Munich), the absolute moisture content and thus the equilibrium moisture content of a paper can change very quickly and significantly.

A dry paper having an absolute moisture content of 3% can, for example, after only 30 seconds demonstrate a moisture increase of 1.5%.

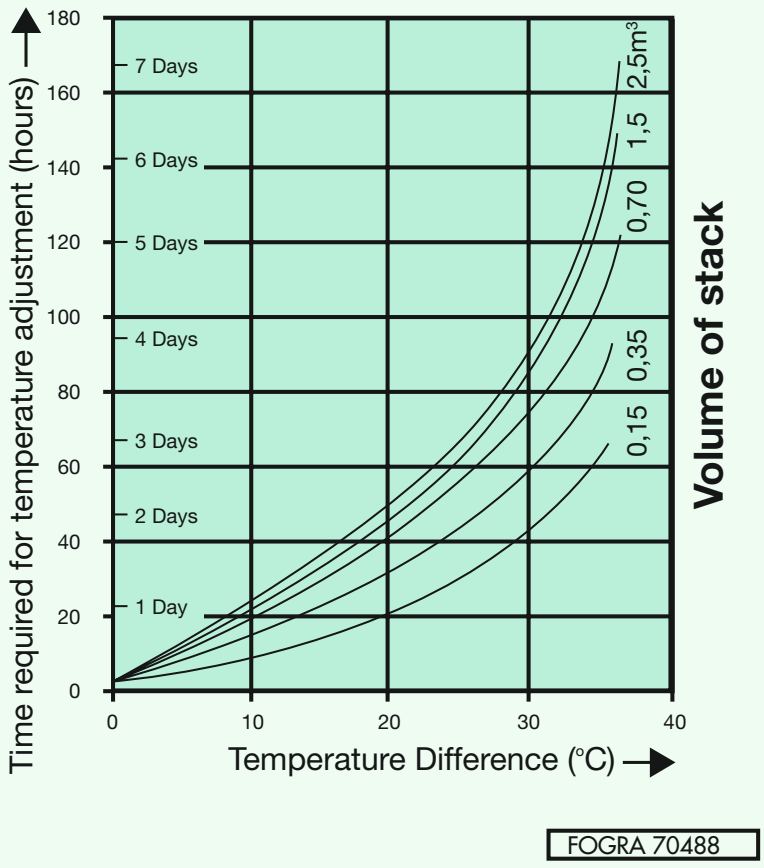
These figures demonstrate how correct climatic conditions during processing and storage can greatly contribute to the avoidance of problems related to moisture. Such problems are: runnability impaired by static electricity, impaired folding properties, reduced flatness, dimensional variations, paper dusting and delayed ink drying.

Despite careful wrapping by the mill, moisture exchange will occur between reel and sheet papers and the surrounding air.

An absolutely waterproof packaging material cannot be economically produced today.

Temperature additionally affects equilibrium moisture content which sinks with lowering temperature and increases with rising temperature. Therefore when conditions prevail with low temperature and high relative humidity, serious moisture content related problems may arise.

The necessity of good storage conditions is reinforced by the above facts.



The dependence of the acclimatization time of paper stacks with respect to the temperature difference and the volume of the stack

Storage

Giroform should be stored only in rooms suitable for correct paper storage. Giroform should not be stored: near to radiators, water pipes, ventilators, open windows in direct sunlight, lying directly on the floor or against walls.

Climatic conditions should not be subject to large fluctuations. We recommend storing Giroform under the following condition: 18-24° C at 40-60% relative humidity – these values should not be exceeded if possible.

In order to avoid processing problems we recommend that the paper be stored in the original wrappers until shortly before printing.

The paper temperature should be equal to that of the print room. During the colder months special attention should be paid to temperature equalisation.
The table below and the accompanying diagram (FOGRA 70488) details the period of time required for the adjustment of temperature of cold paper stacks.

The preceding recommendations apply equally to the packaging and storage of printed forms.

It is important to ensure that packaging materials:

- have similar moisture content values as the printed forms that is 40-50% relative humidity
- offer sufficient protection against climatic variation and possible impact damage, for example, cartons having a polythene or shrink-wrapped covering
- have sufficient stability to allow several cartons to be safely stacked on top of each other

It is also important that forms are packed in cartons to the full carton height to avoid movement in the carton and reduction in the flatness of the forms.

Significant moisture differences (> 10% RH) can lead to wavy edges in the forms which in most cases results in irretrievable runnability problems in the output printer. This naturally leads to complaints from the end user.

Time required for the adjustment of temperature of cold paper stacks

Volume of paper stack in m3	Difference in °C between the paper and print shop						
	5 °C	7 °C	10 °C	15 °C	20 °C	25 °C	30 °C
0.2 m³	6 hrs.	8 hrs.	11 hrs.	16 hrs.	22 hrs.	27 hrs.	40 hrs.
0.3 m³	7 hrs.	9 hrs.	13 hrs.	19 hrs.	27 hrs.	36 hrs.	49 hrs.
0.4 m³	8 hrs.	10 hrs.	15 hrs.	23 hrs.	33 hrs.	43 hrs.	57 hrs.
0.5 m³	9 hrs.	11 hrs.	18 hrs.	26 hrs.	39 hrs.	53 hrs.	70 hrs.
0.6 m³	10 hrs.	12 hrs.	20 hrs.	28 hrs.	45 hrs.	64 hrs.	83 hrs.
1.0 m³	11 hrs.	13 hrs.	22 hrs.	32 hrs.	52 hrs.	77 hrs.	103 hrs.
2.0 m³	12 hrs.	14 hrs.	24 hrs.	36 hrs.	60 hrs.	100 hrs.	140 hrs.



Jumbo Reel Storage

Guidelines for Handling

As the CB and CFB sheet grades are coated with microcapsules, they are pressure-sensitive and require correct handling.

The following guidelines should be followed in order to avoid impairment of the copying performance and bruising of the CFB sheet grade: These sheet grades should be protected from impact or any extraordinary pressure loads. Reels should be stored “on end“.

We recommend the use of reel lifting devices having grasps which act against the inside of the reel core or having a vacuum attachment for moving and positioning reels.

If trucks with clamping devices are used for moving reels, it is possible that severe bruising may occur due to the clamping pressure.

We cannot, therefore, recommend this method of operation – if clamps are used they should be fitted with a rubber lining to reduce damage.

Reels should not be turned, deposited or moved on uneven or ordinary floors. In particular reels should not be set down on an edge. If heavy CFB reels are stood upright by rotating them over a reel edge, severe bruising will take place.

We recommend the use of approx. 8 cm thick rubber mats at the operating unit.

When storing sheets the stack height should not exceed 2 metres.

The microcapsule coating on the reverse of the CB and CFB sheet grades is light-sensitive. The influence of light impairs copyability and also leads to discoloration. Giroform must, therefore, be protected against the direct influence of light when stored.

Giroform may not be suitable for processing in rooms where work is performed with chemicals and where chemical fumes develop. We recommend trials are carried out to assess suitability.

Furthermore the paper must be protected against excessive moisture, extremes of temperature, fat, oil based substances and materials containing plasticizers such as PVC folders and plastic sleeves. Further recommendations are to be found under the heading “Use of Forms“.



Cutting machine (sheets)

Printing and Processing

Cutting Sheets

When the paper is cut, the copying properties of the CB coating can be impaired by the rupture of the microcapsules if the clamping bar pressure is too high. This will lead to discoloration of the CFB sheet grade and collated forms, as the CB and CF coatings lie directly on top of each other in the form stack. This is why there is an unavoidable discoloration of the cutting edge of CFB sheets – a distinguishing feature of this sheet grade.

To prevent the clamping bar from making any marks we recommend taking the following steps:

- use minimal clamping bar pressure (pressure should be just sufficient to avoid slipping of the paper stack)
- attach a layer of expanded foam rubber approximately 2 cm thick to the clamping bar using double-sided adhesive tape
- cut the paper with sheets of protective cardboard at the top and bottom of the stack
- cut several paper stacks simultaneously for better distribution of, and reduction in pressure
- for final cutting, three reams may be cut simultaneously in the following sequence: CF-CFB-CB (from top to bottom). In this arrangement the pressure sensitive sheet grades CFB and CB are protected by the CF sheet grade

To minimise discoloration of the cutting edges of the CFB sheet grade and completed form sets, we recommend the following:

- the use of knives which should be as sharp as possible
- the use of knives having a bevel angle of 19 –21°
- keeping the paper stack height low in order to avoid movement of the stack during cutting

The CF sheet grade may be cut in the same way as standard coated paper.

If blunt knives are used blocking may occur at the cutting edge. Therefore, it is important with this sheet grade to use only very sharp knives and to fan the sheets apart thoroughly prior to stacking in the machine feed.

Reel Slitting

Due to the pressure sensitivity of the CB and CFB sheet grades, slitting should only be carried out with machines having drive on the winding shaft. Therefore, so called “free winders“ are suitable.

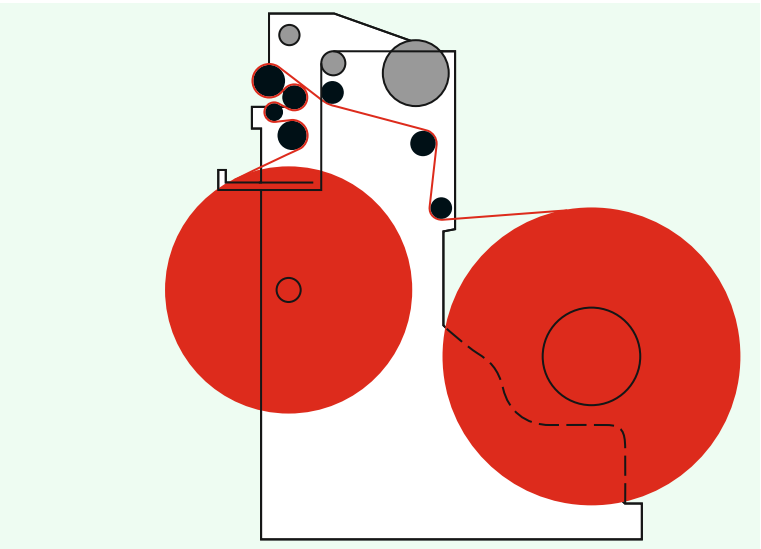
Pressure rollers may be used, but only with minimum pressure setting.



Cross Cutter

Drum reel slitters and also reel slitters having drive on the reel, are unsuitable. They can only be used for the CF sheet grade, which is not pressure sensitive. The winding tension must be evenly set for the complete reel.

The winding tension should be kept to a minimum, consistent with perfect processing. Under no circumstances should the CB and CFB sheet grades be wound “knock“ hard, or excessively tightly. Friction or impacting of the reels must be avoided as this will cause bruising and discoloration of the paper.



Joins should be made with suitable two-sided self-adhesive tape. Unsuitable tape can cause desensitisation of the CF coating – this can affect several layers of the reel.

If reels have to be separated following slitting in block fashion, this must be done with great caution.

Waterproof paper should be used for the packaging of reels. The area surrounding the slitter should be covered with expanded foam rubber mats.

When the reels are transported or turned, suitable reel handling devices should be used.

Running Characteristics

The running characteristics of the most used sheet grades – Giroform CLASSIC CB (52g), CFB (51g) and CF (53g) – are comparable with those of a 50 g/m^2 woodfree continuous quality for the CB and CF sheet grade. For special requirements it is advisable to use the heavier substances: Giroform ULTRA CB 60 or 80, CFB 60 in reels or sheets, and CF (58-60g) in sheets.

When processing with multi-web machines problems may arise with set-up, and constant maintenance of longitudinal, and possibly cross register. In addition to differences between the sheet grades demanded by the carbonless system (substance, caliper,



Paper machine

smoothness, etc.), press conditions and characteristics can be of great influence.

Special consideration should be given to the varying web guidance conditions for individual webs, and also the guidance of the combined webs at the end of the machine.

It is not possible to adjust the running conditions of one web without affecting the running conditions of the other webs.

For small offset printing machines, grain direction should correspond to the passage of the paper through the machine. This applies particularly to machines which do not have a chain delivery system. Similarly this is advisable for machines which have “highly inclined“ feed lays. The greater stiffness of the paper in this direction ensures better running.

When assessing running characteristics, one must also consider that, apart from the characteristics of the paper itself (e.g. stiffness, flatness and general strength properties), the processing conditions are also of decisive importance. In particular, the following are important: the climatic conditions, the general condition of the machine and machine setting, as well as the use of suitable printing inks, rubber blankets and additives.

Guidelines for Printing

When compared to standard papers, carbonless papers require the recommendations in the following section to be observed, mainly due to 2 factors:

- The pressure sensitivity of the CB and CFB sheet grades
- The impairment of the CF (and, to a lesser extent, the CB) coating reactivity due to the application of an ink film

Letterpress Printing

Printing solid areas greatly reduces the reactivity of the CF coating. Thus, they should only be printed in areas where no copies are required. When printing the CB and CFB sheet grades it is necessary to use soft rubber or plastic printing blocks; otherwise the CB coating will be completely “destroyed“ by the high printing pressure of the standard “hard“ blocks (such as Zinc or Nyloprint).

This leads to a reduction of the copying performance, and in the case of the CFB sheet grade, to discoloration of the ink shade in the printed area, as the ruptured CB coating is in direct contact with the underlying CF sheet grade in the sheet delivery. Furthermore, the colour formers released are pressed into the base paper and penetrate the CF coating. Printing inks may have a desensitising effect which can produce varying degrees of discoloration.

Pressure adjustment can be checked by laying a CF sheet under the printed sheet and then drawing lines across the full surface area with a ball-point pen. The copy should possess the same intensity as in non-print



Printing machine – Offset printing

areas. If a copy is not produced within the printed areas, the printing pressure is too high. This is particularly valid when printing solids, screen areas and on the reverse.

Further specific recommendations are also given for printing by the offset process.

Blind embossing cannot be carried out on the CB sheet grade. The total rupturing of the microcapsule coating leads to a discoloration of the base paper.

Screen reproduction requires the use of soft rubber or plastic printing blocks for the same reasons. Area coverage should not exceed 30% in order to avoid loss of copy intensity. We recommend that screens having a width in excess of 48 (lines/cm) should not be used.

Printing on the Reverse

Whenever possible the reverse of the CB and CFB sheet grades should be printed using soft rubber or plastic printing blocks to avoid rupturing of the microcapsules. When printed with composition or metal blocks the printed areas appear as a reverse image within the copy.

To minimise this effect, open-faced or light type should be used, composition should not be close, the amount of ink used should be minimal.

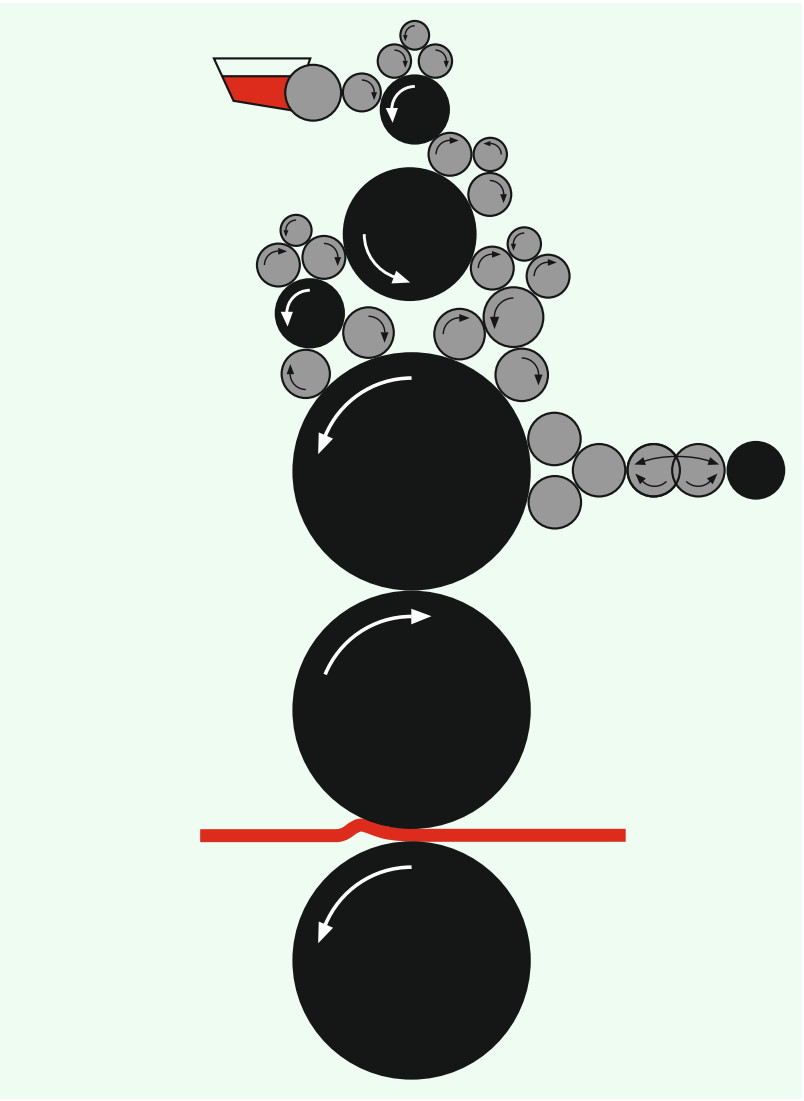
If too much ink is applied, the oils and solvents contained in the printing ink can reduce the reactivity of the CF coating on the front side of the CFB and CF sheet grades. For this reason the reverse of the CF sheet grade should never be completely overprinted. Caution is also advisable for printed images covering a large area.

Offset Printing

When printing solid areas, half tones and on the reverse, the offset process is more suitable than letterpress, as the printing pressure is very much lighter. The guidelines given for letterpress printing are also applicable for printing offset: solid areas should only be printed where copies are not required. Screen areas should be produced with an area coverage not exceeding 30%. Printing on the reverse should be carried out with fine or normal type (not closely set) using minimum ink flow. Solids or printed images having a large area coverage should not be printed on the reverse.

Printing Plates

With respect to the choice of printing plates for printing on Giroform, there are no limitations or special criteria of significance which are known to us. Negative printing plates have a tried and tested record of success for higher production runs. Due to their development processes that are harmful to the environment, multimetal plates are no longer used today. Due to the construction of the desensitising ink, special characteristics need to be taken into account – these are described later.



Wet offset printing process

Rubber Blankets

We recommend the use of compressible rubber blankets as they generally have “quick release“ properties, eliminate “bulging“ at the point of compression and achieve better printing quality with a lower printing pressure. This, above all, is important in reel to reel continuous printing, as bruising of the CFB sheet grade by the rupturing of the micro-capsules is minimised and better forms quality is achieved.

As extensive examinations have substantiated, the type of rubber blanket used has a considerable influence on the printing quality. In addition, selection of the correct rubber blanket can distinctly reduce the occurrence of disruptions in the printing process. This applies particularly to the formation of troublesome deposits, i.e. dusting. There is an accumulation of fillers, coating components and fibre residue, which are detached and collected due to the surface of a rubber blanket with a high tack value. Recently, this problem has been exacerbated by the use of natural calcium carbonate as a filler substance as well as the ever increasing proportion of paper containing recycled fibres.

Used rubber blankets, whose compressibility varies from area to area, should not be used.

The higher printing pressure required can lead to bruising, especially when printing from reel to reel.

Damping Solution

To start with there is water. Detailed knowledge of the makeup and nature of the water available is imperative to ensure smooth operation of the offset printing process. The most important properties are conductivity and hardness. These properties are easy to measure or the corresponding values can be obtained from the water provider. Water with a dH ≤ 8° is unsuitable for offset printing. We recommend to use the technical service provided by the ink manufacturer.

In general, work should be carried out with minimum water flow in order to achieve the best possible print quality and to avoid influencing the flatness and dimensional stability of the paper. Several damping solution additives affect the reactivity of the CF coating when used in concentrated form. The use of such additives is, however, unproblematic in our experience, providing



that the manufacturer‘s recommendations are followed. When using alcohol damping units, e.g., “Dahlgren“, alcohol may be added in the normal quantities without any adverse effects. We would, however, recommend limiting such alcohol additions to approximately 8-10%. Higher concentrations used in several tests, have not proved to be of substantial benefit.

Should scumming occur during printing we recommend thorough cleaning of the inking and damping systems, checking the position of the ink applicator roller and the use of unblended printing inks. Furthermore, one can consider a significant reduction in alcohol addition to the damping solution and an addition of a suitable print oil to the ink.

The use of a fount additive which eliminates the need for alcohol in the damping solution has been shown by our experience to give no specific problems with carbonless papers. With certain fount application systems it can, however, result in general printability problems. We recommend that a complete “in house“ test is carried out prior to general introduction of such a system. In relation to this we would like to stress that substitution of the alcohol must only be made using a fount additive recommended for this purpose by the ink or printing plate manufacturer. Other fount additives can affect the ink absorption, and lead to ghosting and other printing problems.

The pH value of the damping solution should be within the ideal range of 4.8-5.3.

We can recommend the use of pH stabilisers providing the manufacturer‘s instructions are followed.

The use of alkaline fount solutions, which give a pH value of 8-9, have been shown by our experience to present no problems.

When printing by the dry offset process, other than the previously mentioned general requirements, it is the selection and condition of the rubber blanket, combined with correct pressure setting, which are vital for producing the best results.

Flexographic Printing

In our experience no special adjustments are required for this printing process.

The guidelines previously given for the printing of solid areas, halftone screens and the reverse of the sheet are equally applicable.

We recommend using only standard Flexographic inks which the manufacturer has recommended for use with carbonless paper.

Flexographic inks generally show less stability when overprinted with desensitising ink by the web offset, dry offset or letterpress printing process. The Flexographic printing ink will, with great probability, tend to “bleed“ or to fade in the course of time.



Printing inks

Printing Inks

Giroform is recommended for printing using the normal printing inks used for the production of business forms, provided the ink is suitable for use with carbonless papers. By using unsuitable inks, severe impairment of the quality can result.

During the ink drying time, and subsequently, discoloration or "ghosting" can occur. With certain inks the constituent binder and/or pigments can destroy the microcapsules and release the colour forming chemicals. This particular effect is, however, only observed in connection with incorrect press conditions – i.e., excessive impression pressure.

The printing characteristics of the CB sheet grades frontside and the CF sheet grades reverse side are those of woodfree writing and continuous stationery qualities.

The CB coating also has similar characteristics, although the ink absorption rate is higher in comparison. The front side of the CFB and CF sheet grades are distinctly smoother due to their CF coating. They also have an increased ink absorption rate. This produces a better print result, but can lead to slight colour variations. In some cases inks with excessive tack may give problems.

Although generally problems should not arise, the use of additives may be required in borderline cases.

The ink manufacturer's recommendations should be followed for the selection and amount of the additive.

The problem of set-off from the front side to the reverse of the CB sheet grade when printing from reel to reel is known, in particular, when printing form elements at high speed which have a large surface area of ink coverage. In these circumstances set-off from the front side to the reverse side cannot be fully avoided should drying units not be available and there be insufficient time for the ink to dry before winding.

In order to limit this problem we recommend:

- Ink and damping solution should be set to a minimum
- Desired ink shades should be achieved by more intensive ink mixing as opposed to increased ink application
- The use of special printing inks having a high pigment content

When printing forms required to be secure against forgery, special inks which are sensitive to solvents are sometimes used to print the background area.

These special inks normally possess a strong desensitising action. When printing the CB and CFB sheet grades, area coverage should be kept to a minimum. If not, copyability will be greatly reduced.

Please note that changes in ink shade and “bleeding“ may occur in desensitised areas of the form when overprinting desensitising ink on inks which are not sufficiently stable (Fanal-pigments). Such problems can be avoided by using alkaline-fast inks.

UV Drying

Today, UV drying is virtually a standard feature on modern web-fed printing presses. Modern machines are used in many different applications for a highly diverse range of products.

Web printing is involved to a considerable extent in the production of so-called direct mails that are printed on coated graphic paper grades. It is necessary to dry the ink in order to achieve perfect quality in this printing process. If the technical facilities are available, this process is also used for forms.

Pre-printed forms also serve as advertising media and many customers attach great importance to intensive colours in the results.

Giroform is fundamentally suitable for UV printing. However, there are several rules that need to be observed in order to achieve perfect results.

The colour formers contained in the micro-capsules are in principle photosensitive. We therefore recommend, also during their use, not to subject the reverse side of capsule-coated paper to direct sunlight. After some time, a reddish discoloration will become visible. During the UV printing process, the paper web is subject to intensive radiation that results in the cross-linking of binding agents in conjunction with the incorporated photo initiators. It is therefore important when printing the capsule-coated side to select the dwell time of the paper under the radiation source as short as possible in order to avoid the described colour reaction.

It is recommended to operate the press at the maximum printing speed and to reduce the lamp intensity as far as possible. These measures must, of course, not influence the drying of the ink. This process is often carried out with excessively high energy because the process parameters are no longer correct.

A fundamental requirement is that several components are constantly monitored:

Lamp Output (Active UV Radiation)

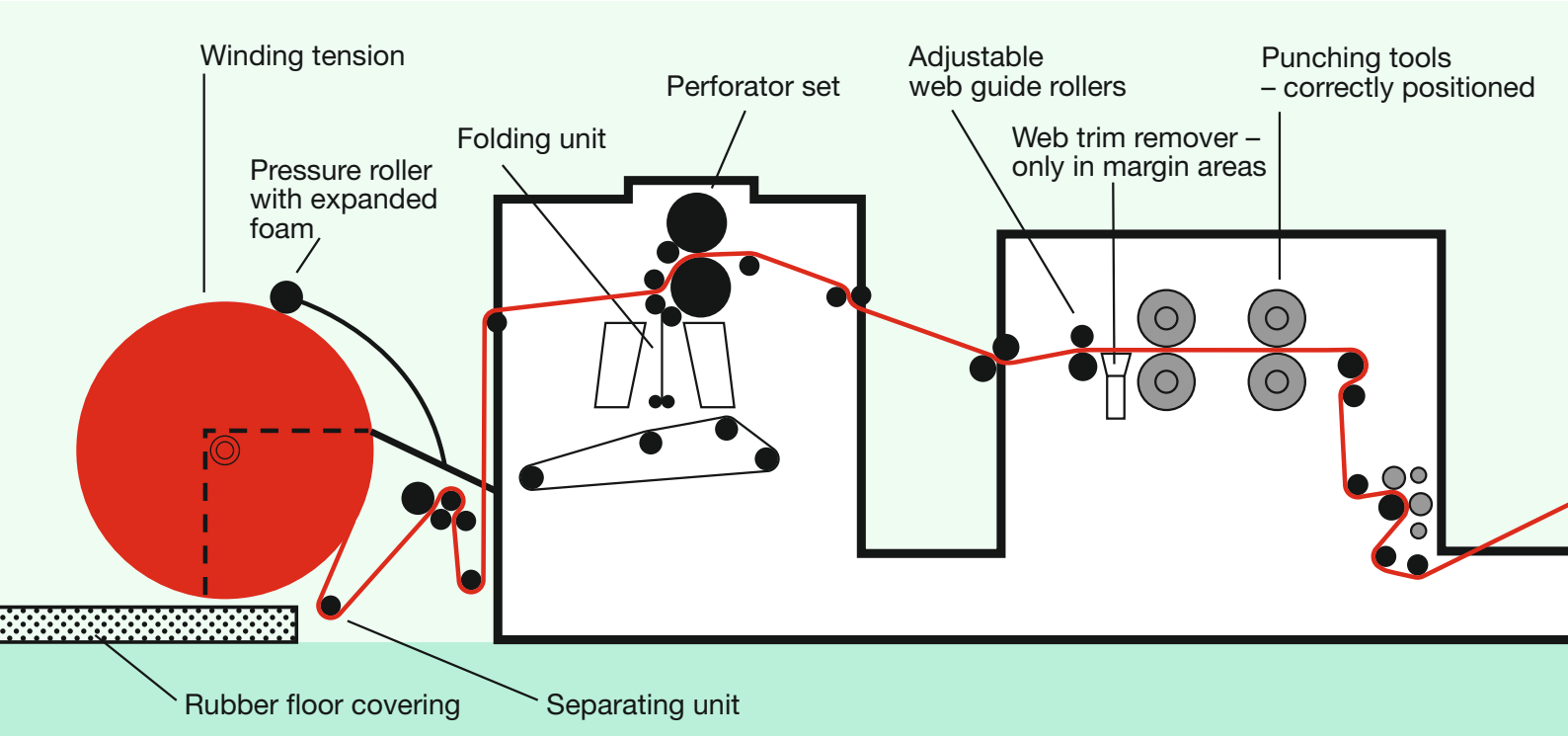
We have achieved good results with test strips (e.g. Green Detex). These strips, supplied on reels, can be adhered to the paper web and then passed through the dryer. A colour reaction indicates the proportion of active UV radiation. Measuring instruments that are considerably more accurate are also available on the market. However, this is an expensive solution. Replacing the light sources every 1000 hours of operation has proven to be quite effective in practical applications.

Reflectors

The condition of the reflectors is of decisive significance to the process. As little as 1% soiling reduces the active radiation by 10%! Particular importance should therefore be attached to ensuring cleanliness at all times. The majority of manufacturers recommend cleaning at weekly intervals. This requirement applies to air-cooled systems that draw in the ambient air through the lamp box.

UV Inks and Damping

Radiation adsorption is particularly high in the case of darker colours (e.g. black). A great deal of energy is required for the drying process. In order to achieve crosslinking with a reduced power intake, photoinitiators can be added to the ink at the proportion recommended by the ink manufacturer. In the case of offset printing it is important to set the ink-water balance as low as possible as UV inks tend to absorb water at a distinctly higher rate than standard printing inks. The necessary water hardness is also of decisive significance in this context. On no account should it be below 8° dH. Otherwise the risk of it emulsifying with the printing ink is extremely high.



Machine setting process – Web printing

Machine Setting – Sheet Printing

The pressure sensitivity of the CB and CFB sheet grades and their relatively light substance must be considered when the machine is set up. Sheet feeding devices should be adjusted accordingly for these lighter substances. Special attention should be given to ensure single sheet feeding. We recommend that all sheet grades are thoroughly fanned-apart before stacking in the machine feed – in particular the CF sheet grade whose edges may block following guillotining.

All machine parts exerting pressure onto the paper must be carefully set in order to avoid rupturing the microcapsules in the CB coating and discoloration of the CFB sheet.

These machine parts are the guide rollers of sheet feeders, the double sheet feed checking device, the drawing-in and ejection rollers of small offset and collating machines, the side lays and push guides.

The most vital process in offset printing is the minimal and correct adjustment of pressure to limit to an absolute minimum the rupturing of the microcapsules coated on the CB and CFB sheet grades.

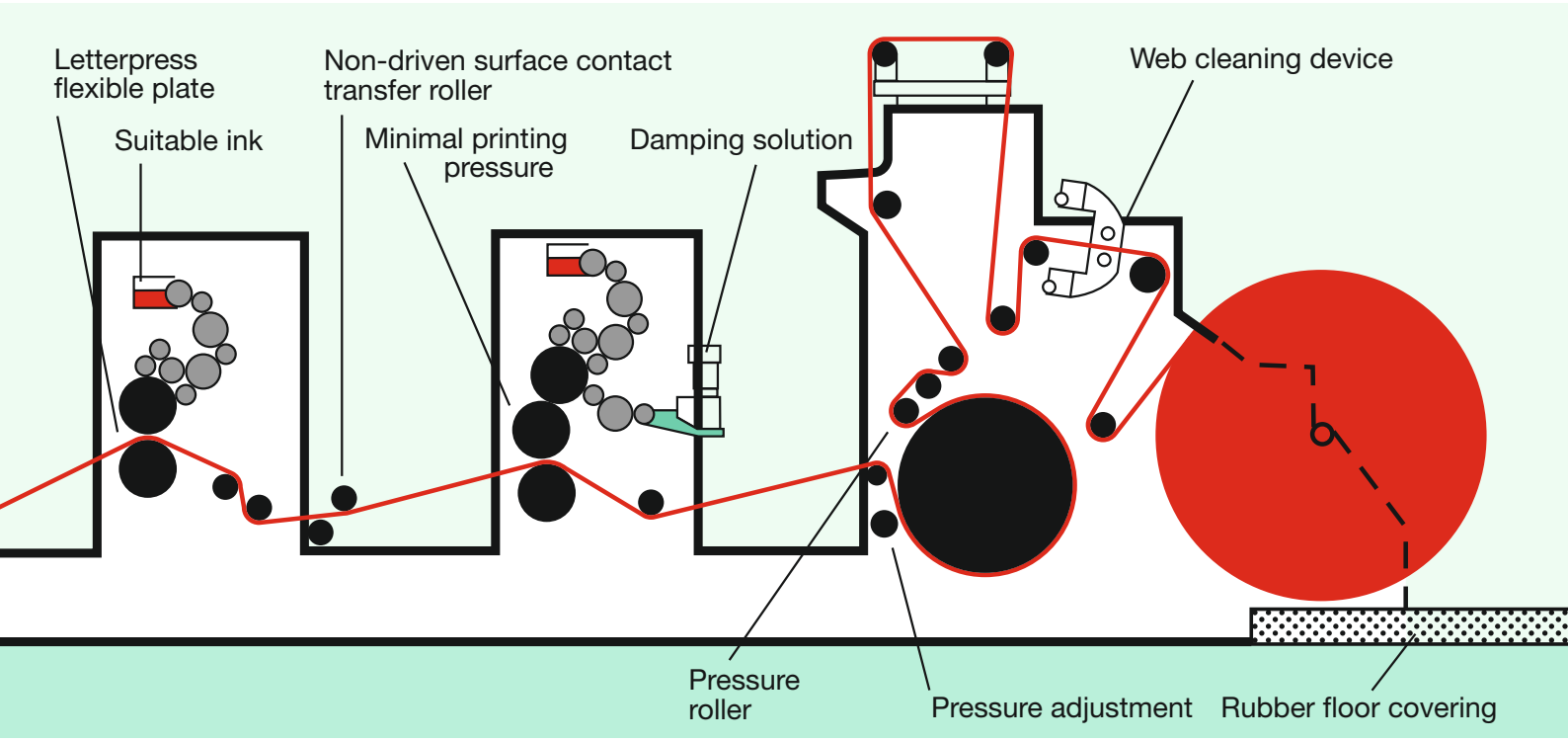
Machine Setting – Web Printing

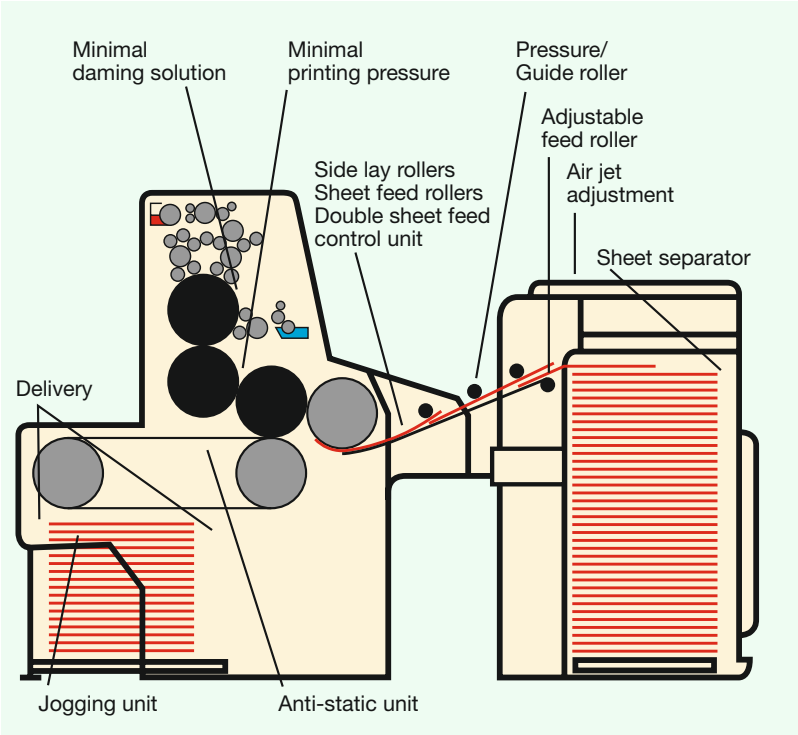
All machine parts that subject the paper to a friction or pressure load must be carefully set. These critical machine parts are: pressure cylinders and wide drawing-in rollers in the reel feed area, guide rollers (which must be able to rotate freely), bars over which the reverse side of the sheet should, if possible, not travel (breaking device). The surface of guide rollers, and any guide roller covering material, must be kept as smooth as possible.

The surfaces of drawing-in rollers, guide rollers, turning bars and pressure cylinders must also be kept free from ink remnants, or any other residues, to avoid damage to the CB coating.

Narrow drawing-in rollers for paper feeding should only be used on the margin areas of the form where possible discoloration is not important.

It is also important to ensure that trim removers or any other machine parts that may come into contact with the web, or that may damage it (web length management devices such as variator systems, web break devices) are in even contact with the top side of the web under the slightest possible pressure.





Machine setting process – Sheet printing

It is of particular importance that the minimum printing pressure necessary to obtain good printing is used. In this connection we recommend, once again, the use of compressible rubber blankets.

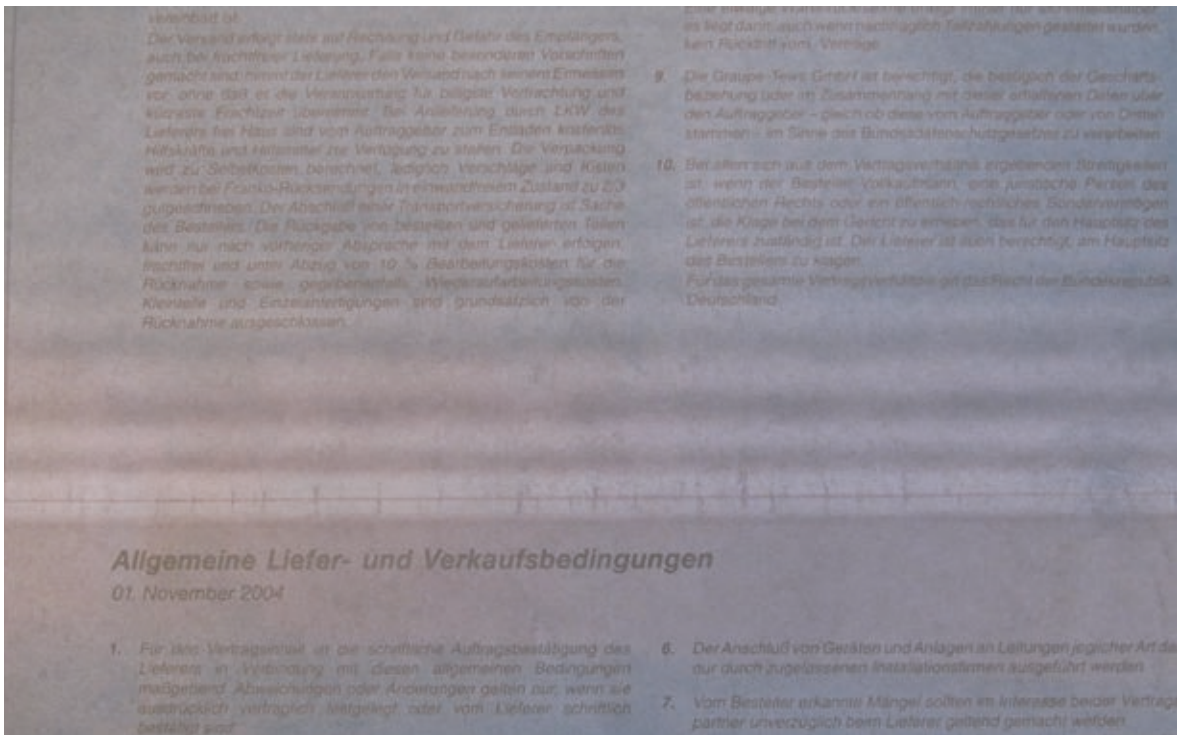
The aim of all these measures is to avoid, as far as possible, the rupturing of microcapsules which leads to discoloration and poor form quality when printing from reel to reel.

Great care should also be taken when printing from reel to fanfold stack, as in extreme cases discoloration may occur in the finished forms following collation if microcapsules have been ruptured.

Generally speaking, pressure rollers which are applied onto longitudinal perforations will lead to discoloration in reel to reel printing. It is advisable to use self adhesive foam rubber strips to cushion this applied pressure.

To ensure that optimum form quality is produced, and to check the machine setting, we recommend running a CB or CFB sheet through the printing unit in combination with a CFB or CF sheet. Any resulting discoloration should be minimal.
When printing from reel to reel, the winding tension must not exceed that of the reels supplied. Pressure rollers in the winding section must only be allowed to exert minimum pressure.

With new installations we recommend that the optimum conditions are determined by comparative trials.


Allgemeine Liefer- und Verkaufsbedingungen
01. November 2004

Printed sheet treated with CB test spray

CB Test Spray

As a valuable tool for the machine operator we offer a CB test spray, which allows the examination of the damage of micro-capsules through pressure and friction.

The use is very simple. The spray should be applied on the capsule coated side of a printed and an unprinted paper.

After the evaporation of the solvent the intensity of the blue shade shows the degree of capsule damage.

Particularly the visible appearance of the plate gap as a light strip across the web indicates an excessive pressure, which should be reduced.

Perforation, Microperforation, Sprocket-hole Punching

Giroform has similar processing characteristics to those of standard woodfree continuous printing qualities when perforating or sprocket-hole punching. However, one must consider that the pressure sensitive CB and CFB sheet grades have a lower density due to the technical construction of the carbonless system.

Furthermore, the fibre content is less than in standard uncoated woodfree qualities of the same substance due to the coating applied.

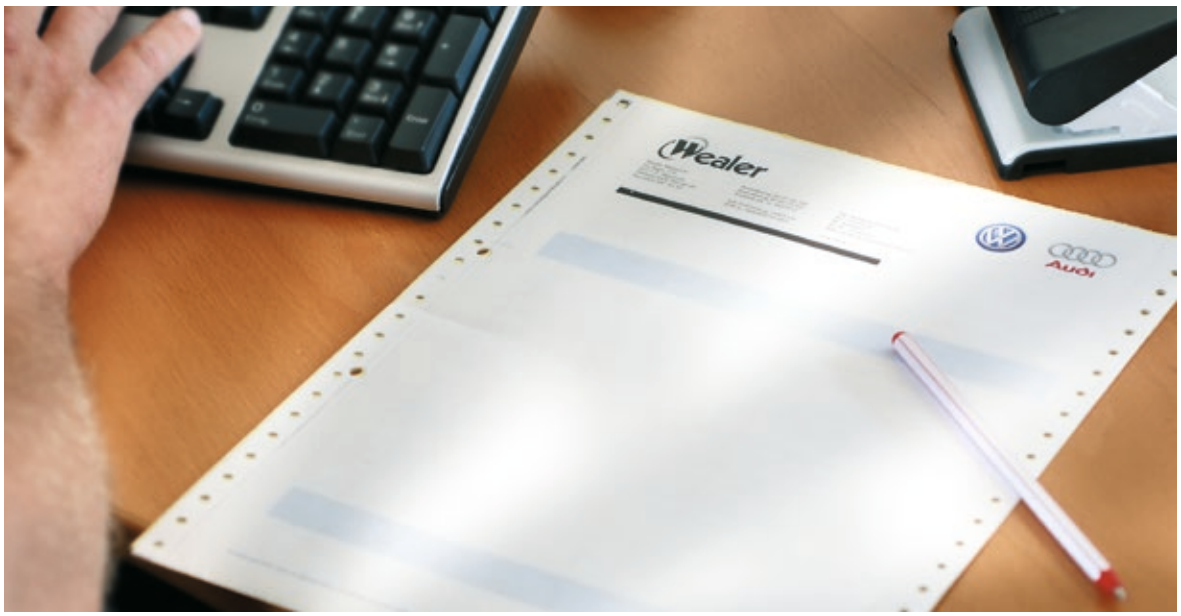
The strength values of Giroform are nevertheless greater than those required or recommended by standard specifications.

The cut/tie ratio for perforations should be selected accordingly. The ratio 4:1 has proved to be generally suitable for cross perforation.

In order to ensure the best possible performance we suggest the use of cross perf blades made from higher quality metal with a higher degree of abrasion resisitance. It is technically unavoidable to see a higher degree of abrasion using a pigment such as clay for the formulation of the developer.

In the case of microperforation, which is becoming increasingly common, the mechanical demands on the anvil and perforation cylinders is extremely high.

The anvil cylinder must be free from burrs in the region of the microperforation in order to avoid uneven pressure causing the perforating blade to “jump“. Too much pressure on the circular knife can ruin the perforation after only a few cylinder revolutions.



To ensure a good microperforation, a fault free perforator, which gives virtually no vibration, is necessary. Careful running in of the perforation is also essential in this regard.

In our experience a ratio of 50 teeth/inch should not be exceeded. A tooth depth of approximately 0.6 mm, particularly with heavier paper substances, is recommended. With substantially lower tooth depths the danger of “cutting through“ arises due to the thickness of the paper being greater than the cutting blade shoulder depth.

As with standard continuous qualities, good perforation and punching can only be guaranteed by using sharp tools. Good results can also be obtained with round or toothed perforating pins. The use of round pins has, in our experience, been found to offer certain advantages. The most successful are the “long life“ systems using extremely hard punch tools and discs. Run lengths of several months are not uncommon.

The wear of tools whilst processing the CFB and CF sheet grades is somewhat higher in comparison to uncoated standard qualities due to the CF coating.

Web Length and Dimensional Variations

Continuous rotary printing machines determine web length by intentionally establishing a speed differential between the paper web and the rotary tools for sprocket-hole punching the guide holes on the feed edges. The following factors are also of major influence in this connection: web tension, differing top surfaces and friction values of the paper, differences in caliper, the subsequent balancing of mechanical tension, as well as the prevailing climatic conditions.

It is, therefore, important to measure the web length achieved at the correct printing speed for each individual reel, without web tension. We recommend this procedure particularly when printing from reel to fanfold stack. When printing from reel to reel, we recommend that the webs be measured under light web tension, as this is more similar to conditions at the reel collator. As a matter of course, all test parameters (length of measurement, time of measurement) should remain constant.

It has been found to be favourable to increase the web length by 0.5 mm in comparison with the required length (related to a measuring length of 72 inch).

We recommend to fix the first measured web length of a set with a adhesive tape in order to avoid climatic influenced dimensional changes after time. Variations in size caused by varying climatic conditions within the range of 40% – 60% relative humidity are found to be approximately 0.01% – 0.02% longitudinally and 0.1% - 0.15% transversely, relative to a 10% change in relative humidity.

When the form contains exact longitudinal divisions for imaging without any tolerance, the lack of tolerance may prove problematic in the transverse direction should climatic conditions vary (especially with webs exceeding 30 cms in width). This should be taken into account when designing the forms.

Special Printing Applications

Tinting

Tinting units are available which are able to tint one or both sides of the paper web. The main aim of using this process is to reduce stock holdings.

We do know that this process has been successfully used with carbonless paper. However, we regret that we are unable to give any guarantee for the suitability of our paper for this process as all of the processing parameters are not within our area of responsibility.

The following usage limitations are known to us:

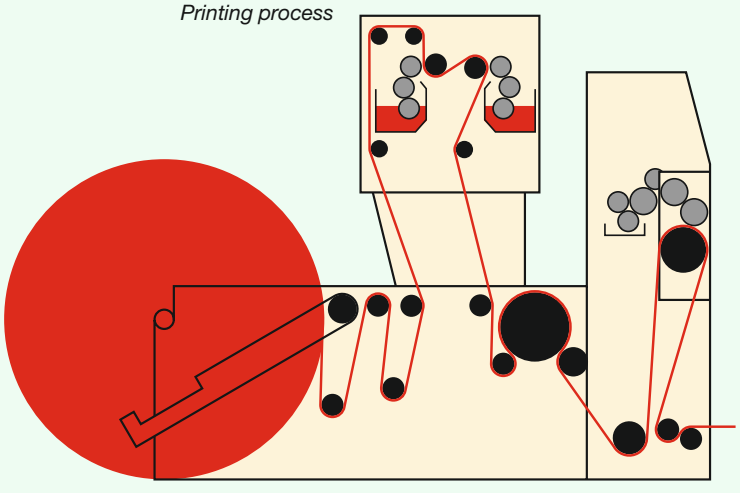
The reactivity of the CF coating and the resistance of the copy to ageing can be impaired by the tinting process.

In order to achieve good ink shade, ink application must usually be relatively high. This can lead to insufficient drying before the web enters the printing unit, which can impair printability. When printing wet offset a tendency to scumming may be found.

When using the tinting process it is necessary to significantly reduce the printing speed, or to incorporate a drying unit onto the printing machine.

Variation in ink shade may occur on the different sheet grades. This is caused by the differing paper surfaces required for the carbonless system. Furthermore, coating particles may become dissociated during the tinting process.

Printing process



This is especially applicable for the CB coating. This alone, or in conjunction with possible non-uniform ink absorption, can produce a mottled and gritty coloration.

Fanapart gluing may also be adversely affected, due to impairment of adhesive penetration into the gluing edge – this may reduce the effectiveness of the gluing operation.

CF “Spot“ Process

For special form applications in which a copy is only required to be produced in small areas (e.g. an address field), printing a CF “spot“ ink may help to solve certain problems in the construction of the form.

Such specialised printing inks are available as flexographic inks, or as inks for letterpress/dry offset from certain ink manufacturers or specialist suppliers.

On request we can provide a CF spot ink specifically manufactured to be compatible with our paper. It cannot, however, generally be expected that an equally high standard of copyability be obtained as with coated carbonless papers.

The development of the carbonless image is slower than with pre-coated carbonless papers. The light stability and ageing characteristics are also different.

If the front side of the CB sheet grade is printed, it is probable that strong discoloration will occur due to long term chemical reactions.

For this reason, only standard uncoated continuous qualities should be used for the CF “spot“ application process. Dependant on the paper quality used, colour reactions of greater or lesser intensity may occur on the top surface of standard uncoated woodfree qualities.

Finally we would like to point out that we are not able to give any warranty for the application of the CF Spot methode due to the high numbers of uncertain influencing parameters such as paper used, condition of production ect.

Crash Printing and Copy Numbering

Collated or glued sets may, with the use of high printing pressure and suitable hard printing type or numbering units, be “crash“ printed in one pass through a sheet fed letterpress or a collator. This is a method of copying by use of the printing block. Although copy numbering is a widely used process because of rationalisation and the certainty that all sheets will have the same number, crash printing is otherwise only used in special cases.

We recommend using standard or light and open-faced type.

It should be known to the user of the form that the appearance of the number equals the image shade of the paper. If real black is required a numbering of the individual sheets is unavoidable.

Carbonising and Combination with Carbonised Papers

For certain form applications, continuous stationery paper carbonised on the reverse is combined with Giroform. This combination with hot carbon inks has, in our experience, proved to be trouble-free. It is important to state that the forms must be stored correctly.
We do not recommend the use of cold carbon inks for this purpose. In particular black cold carbon inks may produce a discoloration of the CF sheet grade which may have an adverse effect on its reactivity – this problem may occur to a greater or lesser degree and is dependant on the storage period of the forms.

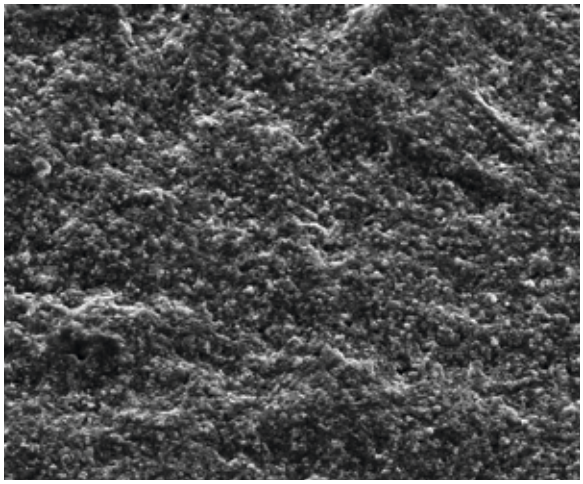
The first CB sheet in direct contact with the carbon will not adequately protect the following CFB and CF sheets against this reaction. In some circumstances even several sheets will not give sufficient protection. Coloured cold carbon inks have proven to perform better in respect of discoloration of the CF coating.
In certain applications carbonisation of the reverse side of the CF sheet grade may appear to be practical. We strongly advise against this. The chemicals and waxes contained in the carbon ink can penetrate the sheet and adversely affect the CF coating. Again this is more applicable for cold carbon inks than hot carbon inks.

Combination with One Time Carbon Paper

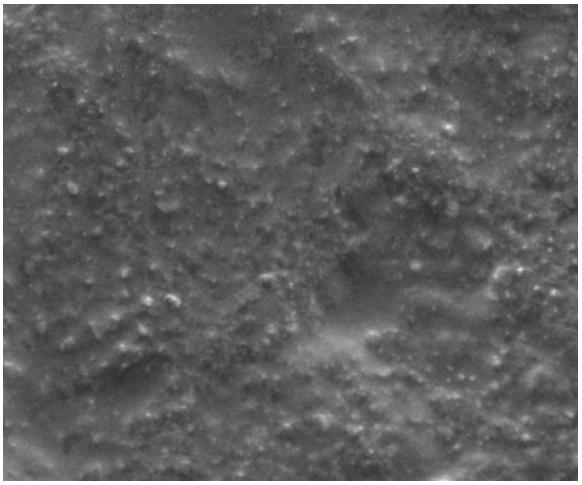
In general the combination of Giroform with one time carbon paper cannot be recommended for the same reasons as those given for carbonisation. The waxes, paraffin, oils and chemicals contained in the carbon coating can adversely affect the reaction of the CF coating and cause discoloration. These reservations are also supported by the relatively small temperature resistance of these papers. If, however, combination is unavoidable due to the purpose of application, we recommend the following:

- Design forms so that the carbon coating does not come into direct contact with the CF coating. Forms should preferably be produced with the following sequence: standard uncoated paper/one-time carbon paper/CB, CFB...CF, or CB, CFB..., CF/ one-time carbon paper/standard uncoated paper.
- Only use one-time carbon papers which are recommended by the manufacturer for combination with carbonless paper.
- Should carbon paper be inserted between sheets of carbonless paper we recommend making trial sets for testing under operational conditions before producing the forms.
- Furthermore, accelerated ageing tests should be carried out. Copies produced by one-time carbon on CB coatings are inferior to those produced on uncoated papers.
- In order to avoid long term reactions the forms should be used within 12 months following production. Correct storage is vital.

For special form applications we would be pleased to help you by conducting compatibility tests with the one-time carbon paper which is to be combined with Giroform.



Non-desensitised CF-Coating



Desensitised CF-Coating

Desensitisation

Functioning Principle

If there are certain areas in a form where a copy is not to be produced this can be achieved by overprinting the CF coating with our desensitising ink. The effectiveness of the ink is based on a chemical reaction which inhibits the CF coating‘s ability to produce a colour reaction. It is important to understand that the nature of the desensitising process is a chemical change of the CF coating and not just a coverage of a specific area. The use of a lack would be not successful because of a migration of the colour former through the layer and a development of the image.

A desensitising ink is available for the wet offset printing process. This ink can also be used when printing letterpress or by the dry offset printing process. The ink is available through our distributors. We recommend only the exclusive use of our desensitising ink when printing Giroform.

We cannot give a guarantee that any imaging in desensitised areas will be indecipherable. The compression of the paper due to writing or printing pressure, or special processes may enable information in desensitised areas to be deciphered.

When there are high demands for security we recommend that the desensitised area be overprinted with a “scramble“ design and that the CF sheet grade should only be used to fulfil these requirements. Overprinted designs are the simplest method to make the copies produced illegible. Normally a “scramble“ design or designs consisting of characters and/or numbers are printed onto the CF coating.

It is important that a very dark or black printing ink is used to ensure that there is no colour contrast to the copy.

Regular shaped solids and designs should be avoided as the ink film laid down does not completely block the transfer of the colour formers, and due to the low difference in contrast on the regular background, characters can be recognised.

Forms produced with overprinted designs are usually less attractive and, in comparison to forms produced using the desensitising system, have a further disadvantage in that such overprinted areas cannot be used for printing or writing information.

Form Design

Problems with the desensitisation process can be avoided by correct form design. The areas to be desensitised should be kept as small as possible. In order to avoid partial desensitisation caused by undesired ink transfer via the guide rollers and to ensure uniform ink application we recommend that small



Desensitising on last print unit

rectangular areas be desensitised. Areas producing a copy that are surrounded by large desensitised areas should be avoided. Desensitising ink should not be printed in form areas where the sets are to be bonded together by gluing.

This is applicable for the gluing of sets with Giroform Fanapart Adhesive as well as the standard cold and hot melt adhesives.

Procedure for Use

The desensitising ink must always be printed on the CF coating during the last printing pass, and on the last printing unit. Therefore, form divisions and text are overprinted.

The incorrect printing sequence will lead to poor ink acceptance and drying problems. In the case of rotary printing, the ink may split and build up on the following printing units. Letterpress and wet offset inks may be overprinted without difficulty. Colour variation, caused by the ink bleeding due to low resistance to the desensitising ink, is a problem we have not encountered for a long time. We would nevertheless draw your attention to the fact that printing inks containing “Fanal“ pigments could give rise to this problem.

The desensitising ink contains a small amount of white pigment and an optical brightener. Although the ink is nearly transparent it is possible that a slight colour variation of the overprinted inks may occur.

Desensitising inks generally have an intensive cleaning action. It is, therefore, necessary to clean the inking unit thoroughly before printing in order to avoid tinting caused by residual ink deposits.

The desensitising ink must be used in its original form. Additives, such as printing pastes or oils and drying agents, should not be used. However, the addition of a small quantity of ink for tinting is possible to check the application of the desensitising ink.

The combined use of desensitisation and UV drying is not possible. The cross-linking of the UV dye prevents the desensitising ink from fully reaching all CF pigments, thus hindering optimum desensitisation.

A desensitising ink suitable for UV application is not available. It is desirable that the ink film never dries out completely in order to keep the desensitising effect. The printing speed must always be adjusted to suit the construction of the desensitising ink. It is possible to operate within a speed range of approx. 130 to 230 m/min in web printing. Should higher printing speeds be used, “spitting“ or “misting“ may occur.

When printing large areas with desensitising ink it is advantageous to use two inking units for desensitisation. This guarantees sufficient ink application and enables higher printing speeds to be used without the occurrence of “spitting“ or “misting“.

We recommend that regular and frequent tests should be carried out during the print run to check the effectiveness of the desensitisation.

In particular, check for toning and undesired ink transfer to other parts of the machine. In particular one should give special attention to the constant and even application of ink. Therefore ink in the duct and the appearance of ink on applicator rollers should be constantly observed in order to react quickly to any variation. When printing on a rotary press (reel to reel) this is of particular importance as the possibilities for testing are limited. The area printed should appear slightly brilliant by visual observation. The installation of a simple spotlight greatly simplifies the monitoring of the web.

The inking units can be cleaned with the usual cleaning agents.





After printing, the form stack or printed reels should be further processed as quickly as possible. The danger of set-off or penetration of the desensitising ink through the sheet leading to undesired desensitisation can thereby be reduced. For this reason any high pressure on a particular area should be avoided when printing reel to fanfold stack. High stacks of fanfold forms should be avoided. When printing reel to reel the setting of winding tension should not exceed that of the minimum tension required for winding.

The ink should be stored at room temperature. Extremes of temperature must be avoided. There is no limitation to the storage period of unopened tins of ink. Opened tins should be used as soon as possible.

Wet Offset Printing

Although desensitising ink was conceived for the wet offset printing process, certain guidelines for its use must be followed as a result of the ink‘s formulation and the active substances used.

The choice of printing plates is limited. Paper offset masters and direct photo plates are not suitable.

Positive plates or CTP plates should be thermic threated in order to improve the resistance characteristic.

Experience has shown that negative plates are more suitable as they have proved to have sufficient resistance.

The suitability of printing plates can be tested by the application of desensitising ink onto the developed printing plate. If the coating changes visibly within 24 hours, problems may occur when printing. This can, however, also have been caused by an ink imbalance which has no influence on printing suitability. In such cases we would ask you to seek the advice of your plate supplier.

Wet offset desensitising inks can be printed with standard damping units (Conventional, Hydrocolor, Dahlgren, spray damping units, etc.). The pH value of the damping solution should be in the range of approximately 4.8 – 5.5.

Additions of alcohol to the damping solution should not exceed 12%. The use of stabilisers to keep the pH value of the damping solution constant is beneficial when carried out in accordance with the manufacturer‘s instructions.

Scumming can lead to undesired desensitisation in areas where copies may be required – this is a problem area which can lead to serious complaints. Therefore, we would advise you to be particularly careful when printing. The damping solution flow should be kept constant. We recommend that the rubber blanket should be kept under observation and that tests be regularly carried out with the CF test spray or test pen.

Letterpress and Dry Offset Printing

The desensitising ink can, as previously mentioned, be used when printing with the letterpress or dry offset printing processes. In comparison with the wet offset process these processes are simpler and more secure. Problems associated with wet offset (e.g., scumming, excessive water absorption by the ink) may be disregarded. However, the printing process may lead to an excessive piling of the ink on the blanket or picking on the printing blocks. An addition 1 – 3% of mineral oil based printing oil or a tack reducer is recommended.

When desensitising the CFB sheet grade with the letterpress process, work should be carried out with rubber or similarly soft printing blocks. This will ensure minimal printing pressure, uniform ink application and avoids rupturing of the microcapsules contained in the CB coating. Desensitisation is otherwise more difficult as copies on the following sheets can be less intense and desensitisation is possible if the following sheet is not desensitised in the same area. When desensitising the CF sheet grade, printing pressure is of secondary importance.

Flexographic Printing

We do not distribute desensitising ink for this printing process. If it is required, we recommend contacting the manufacturer Sensient Imaging Technologies in Morges/Switzerland directly. We further recommend strict compliance with the manufacturer‘s instructions, and application of the maximum amount of ink possible. In particular, the possibility of “bleeding“ or colour variation should be investigated when overprinting is required.

Experience has shown that Flexographic printing is particularly suitable for desensitising CF-OCR grades, as the specified reflection values are not reduced if inking units are kept perfectly clean. Maximum print contrast can be obtained by printing codes on desensitised areas.

It is possible, especially with a high application of varnish, that the code ink be poorly accepted by the desensitised top surface of the paper. We, therefore, recommend tests to establish the ability to print the ink coding correctly onto the CF coating in relationship to the amount of desensitising varnish applied.

Methods for Testing Desensitisation

Regular testing of the desensitising effect and the even flow of ink during the print run are essential for the desensitising process.

Insufficient ink application results in poor desensitisation – excessive ink application may result in undesired desensitisation. This is especially the case with rotary printing where ink deposits on the guide rollers or in the fanfold delivery can transfer onto the paper web. When printing sheets, the ink can penetrate the paper and affect the CF coating of the following sheet.

The ink application quantity of 1.5 – 2 g/m^2 required to produce good desensitisation can be best achieved by starting with minimal ink flow and increasing gradually until tests indicate a good result.

Tests can be conducted almost immediately after printing. However, it is recommended to conduct a reliable assessment of the correct ink application quantity after approx. 30 minutes. This additional test serves as a backup check and, under certain circumstances, may make it possible to reduce the quantity of ink.

Due to the large specific surface of the development pigment on the CF side (approx. 280 m^2/g) the ink requires a certain period of time to sensitise the entire surface area. While it may still be possible to discern traces of a copy when the test is conducted immediately after printing, the test conducted after 15 minutes no longer shows any reaction whatsoever.

Based on our long experience with this technology we can confirm, that we have seen the majority of problems based on an excessive volume of ink used producing problems like scumming or migration. Thus it is very essential to avoid excessive volume of ink.



Testing with a CF Test Pen

Several methods are used for testing desensitisation:

Copy Testing

This test should always be carried out. The sheet to be tested should be overlaid with a CB or CFB sheet. It should then be inscribed with a ball-point pen, typewriter or special test device. When CFB sheets are tested an additional sheet of CF should be placed underneath to ensure that the colour formers released are not pressed into the test sheet but, as in a form set, produce a copy. There should not be any colour reaction visible in the desensitised areas. To make the best judgement, we recommend examining the sheet on a light table, or looking directly through it, as compression of the paper due to writing pressure may affect judgement. Examination with a magnifier on a light table is the most reliable method of assessment.

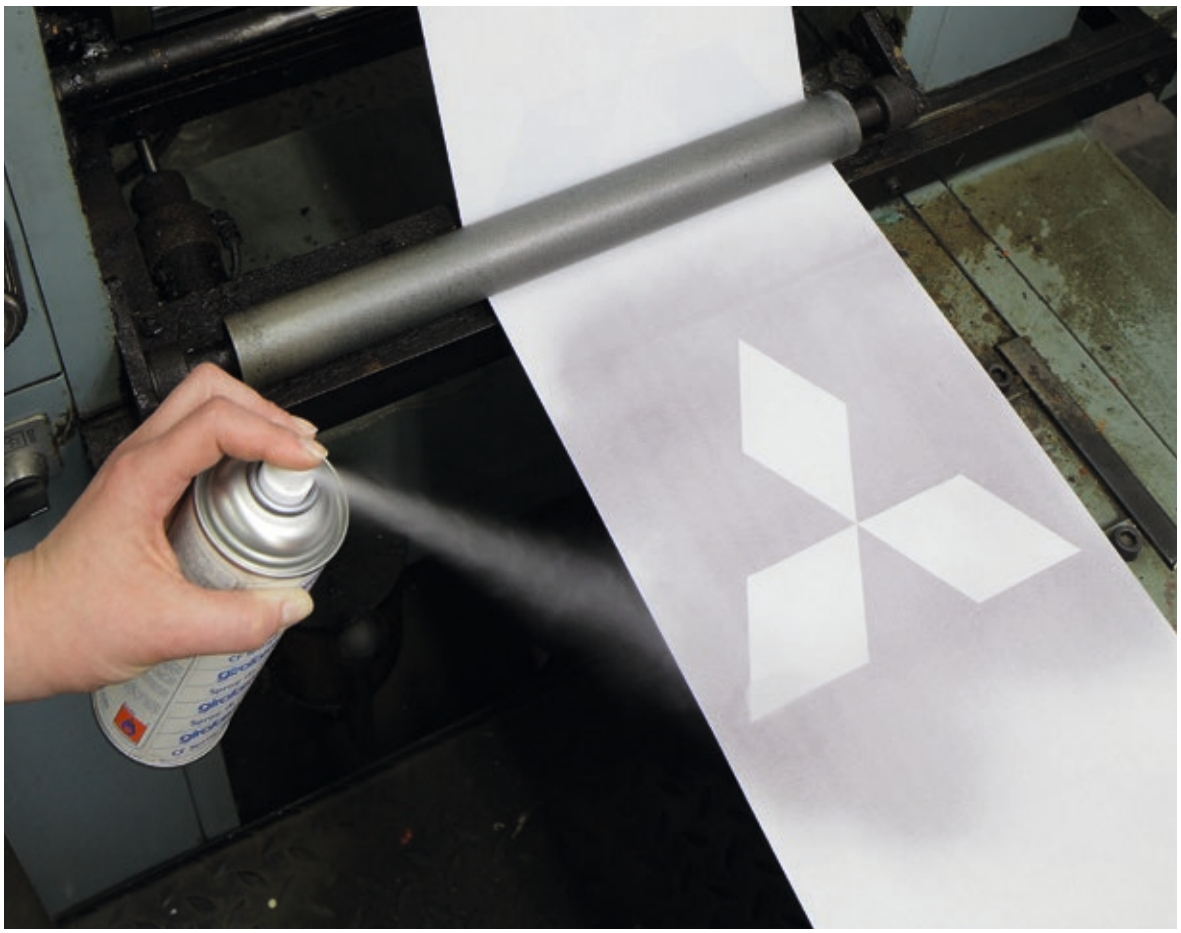
This also applies to the transparent image of the copy which initially appears with all transfer system carbonless papers and which cannot be prevented as the oily substances contained in the microcapsules are released.

Testing with a CF Test Pen

CF test pens are particularly suitable for testing for scumming when printing by wet offset and for uniform ink application with letterpress printing.

A colour reaction should not be visible in any desensitised area. Undesired desensitisation caused by scumming or unintentional ink transfer can be recognised by bright areas on the CF coating. The reliability of the test is limited as the reactive medium used in the pen is different to the contents of the microcapsules. Therefore, this test should only be considered to be complimentary to the above mentioned test.

CB test pens are also available to identify which is the capsule coated side of the CB and CFB paper.



Testing with a CF Test Spray

CF Test Spray

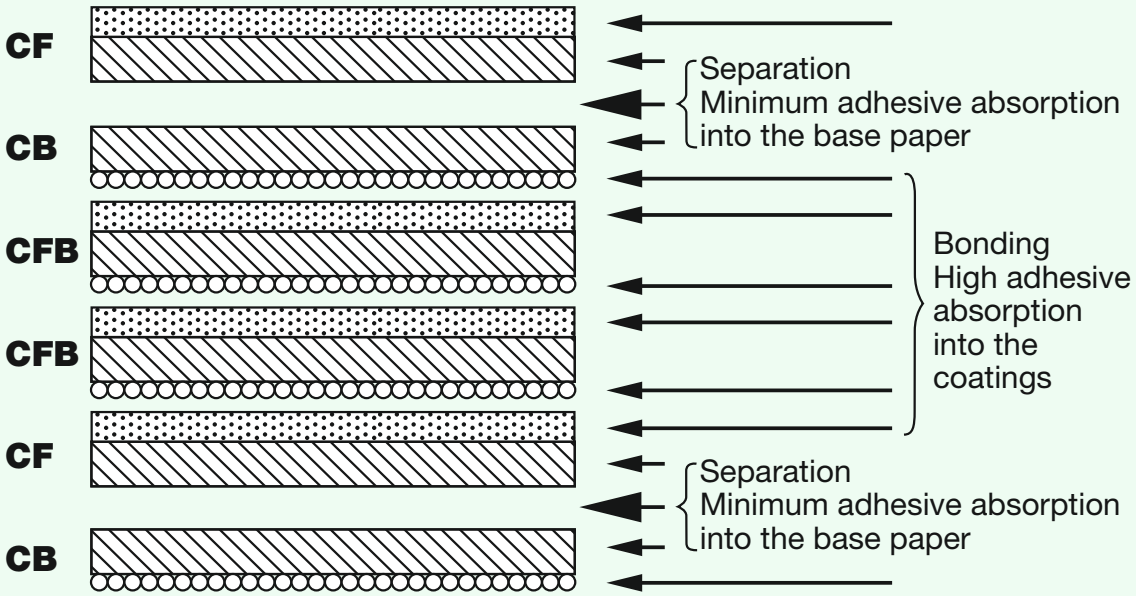
This product is intended to be used as an additional test to the copy test. It is available from our distributors. The test spray contains a colour former which reacts with the CF coating. This colour former is dissolved in an environmentally friendly solvent (Acetone), and the aerosol is pressurised with compressed air. Irregular running, uneven ink flow or other printing errors are shown by a corresponding colour reaction.

Undesired ink transfer by the guide rollers or other machine parts are also shown by a characteristic colour reaction.

The test sample should be well sprayed from a distance of 20-30 cms. Because the solvent is relatively slow to evaporate, allowance should be made for a short reaction time after spraying. There should be no immediate colour reaction visible within the desensitised areas. The surrounding area should show a uniform coloration without blemishes. If too much spray is used, or spray be applied too close to the sample sheet, this may cause a slight discoloration in desensitised areas.

A slight discoloration may also appear in desensitised areas after a prolonged period of time – this is, however, insignificant. We particularly recommend using the test spray for testing for scumming when desensitising by the wet offset process, and testing for undesired ink transfer when desensitising on a rotary printing press.

As is usual with spray cans, please store in a cool place. Do not expose the can to temperatures exceeding 50°C or open by force as it is pressurised. The can should not be discarded unless completely empty. Do not spray into open flames. When the spray is used correctly, in accordance with the instructions provided, it is completely safe.



Giroform fanapart gluing process - The principle

Gluing

Fanapart Gluing

Individual form sets can be produced easily and economically with Giroform fanapart adhesive, eliminating the uneconomical process of separating the sets with a knife.

Functioning Principle

The adhesive functions because the CB and CF coatings have a higher adsorptive capacity than the base paper – the fanapart adhesive penetrates further into these coatings and bonds them together. Thus the surfaces of the CB and CF coatings bond to each other after the adhesive has dried in the stack of collated forms.

The sets may then be easily separated between the uncoated top surface of the CB sheet grade and the reverse side of the CF sheet grade.

The functioning principle of this process requires that the first sheet of the set is always a CB sheet grade, and that the last is always a CF sheet grade.

The adsorptive capacity of the CB and CF coatings must not be impaired by printing or desensitising inks. Therefore, printed areas are not possible in the gluing areas of the CFB and CF sheet grades – the ink free margin at the gluing edge should be at least 1 mm. This is, however, not of importance with the top side of the CB sheet grade – although it is necessary to ensure that the CB coating on the reverse side is not ruptured by printing pressure.

The grain direction of paper used within form sets should always be constant.

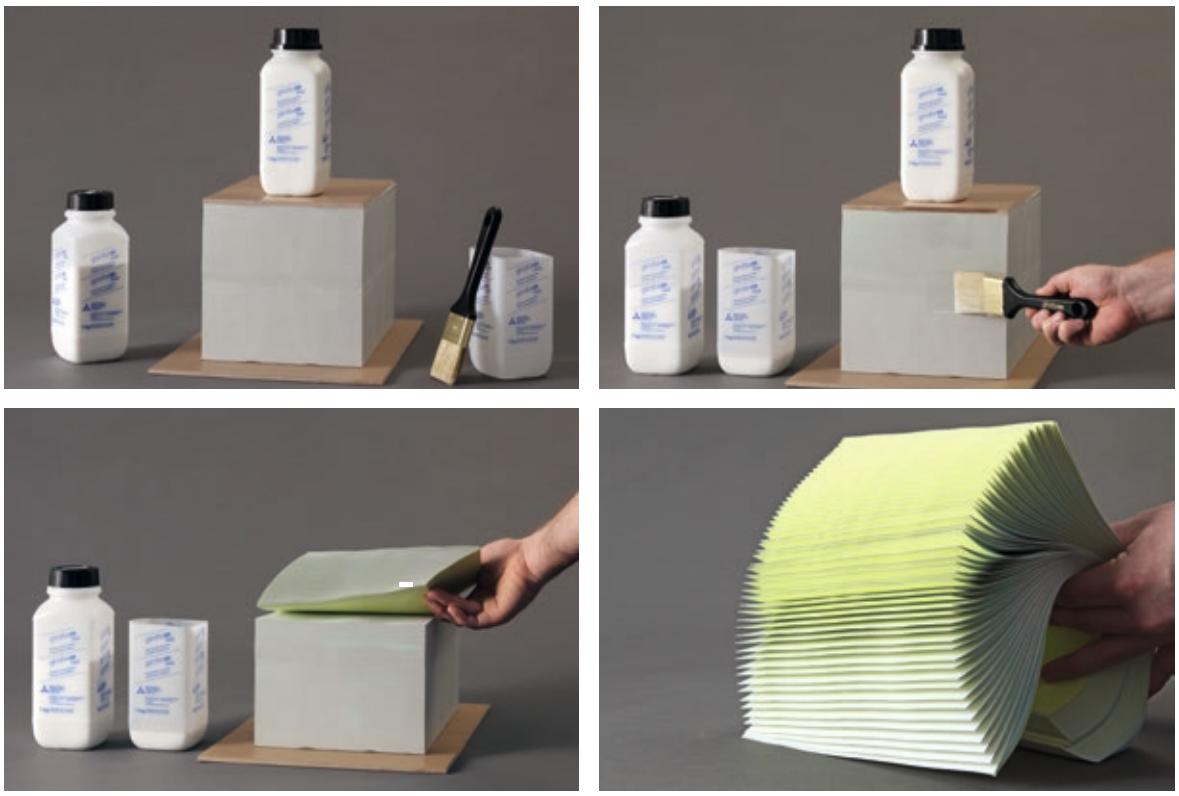
Corrugated gluing edges can be avoided when the grain direction is kept parallel to the gluing edge.

Procedure for Use

Collated sets should be carefully jogged to ensure that the gluing edge is perfectly smooth and allows even adhesive penetration of the coatings.

We strongly recommend “skim“ cutting the gluing edge before adhesive application, as an absolutely smooth gluing edge helps to guarantee success of this process. It is important that this “skim“ cut be correctly carried out – i.e., with minimum rupturing of the microcapsules at the cutting edge.

The form stack should be glued as soon as possible after cutting. This will help the reliability of the process as the capsules released by cutting at the gluing edge can slightly reduce the adsorption of the adhesive after full penetration into the coatings.



Giroform fanapart gluing process – The separation of the fanapart sets

The amount of adhesive required, of course, depends on individual working practices. As a reference value for estimation, our experience has shown that a glue consumption rate of 350 g/m^2 can be assumed.

When gluing, a form stack height of approx. 30 cms has proven to be ideal. It should be weighted uniformly with a top board and weights of approx. 1-2 kgs. The gluing edge should be perfectly smooth and even for the complete stack height.

Giroform fanapart adhesive should be shaken well before use. Apply the adhesive with horizontal strokes from the centre of the form stack outwards until the whole gluing surface appears to be evenly moist. Use a clean, soft brush (recommended width 4-5 cms) for this purpose only.

It is important to apply as much adhesive as possible with the first strokes – this ensures maximum adhesive penetration into the coatings. For this reason the adhesive brush should be able to accept a good quantity of adhesive and should not be hardened. The glued edge should appear shiny and should not accept more adhesive. There is no chance to use too much of glue but a risk when too little volume is used. This will lead to problems like bad separation and bad bonding as well.

This is particularly applicable for form sets which contain a CB or CF sheet grade of a high substance. These form sets require increased adhesive application.

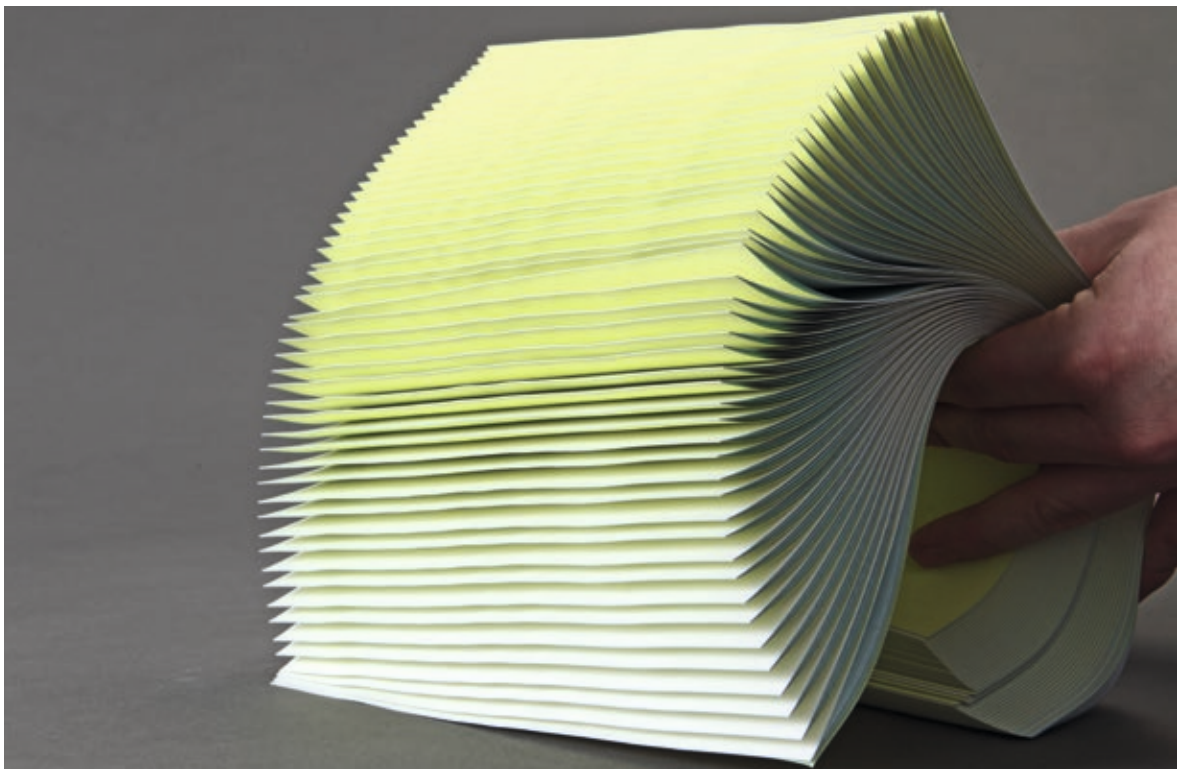
The sets can be fanned apart after a drying time of 20-30 minutes. This process should be carried out by lateral sliding of the forms. This method produces the best results – even with sets that have a tendency towards blocking.

Complete drying of the adhesive takes about 1-2 hours. This is, however, dependant on the climatic conditions in the work room.

It is important that separation be carried out by laterally sliding the form stack apart, as this produces less mechanical stress on the gluing edge than separating the stack vertically.

We do not recommend using heating devices to increase the speed of drying. Our experience has shown that they will adversely affect the reliability of this process.

Ensure that the adhesive bottle is tightly closed after use. The adhesive should not be left to stand in the bottle or in containers (which should only be used for this specific adhesive) for prolonged periods of time. The brushes should be cleaned with water immediately after use.



The fanapart adhesive should be stored at room temperature. Adhesive that has been exposed to frost can no longer be used reliably.

In order to avoid ageing, excessive stocks of adhesive should not be kept. Our experience has shown that adhesive in its original packing and stored correctly can remain fully functional for several years.

We cannot guarantee the effectiveness of this process if:

- Giroform is combined with carbonless paper from another manufacturer, or
- Giroform sets are glued with fanapart adhesive from another manufacturer

Padding, Spot, Edge and Surface Gluing

Giroform can be glued with all standard padding adhesives. Giroform can also be spot glued in gathering machines, or strip glued on printing machines or collators.

A few manufacturers offer special glues designed to be compatible with carbonless papers. Such glues can be recommended for problem free processing of carbonless papers.

Edge gluing is possible on gathering machines used for producing single sets. It is important that the adhesive is applied evenly and in sufficient quantity to ensure adequate bonding of the sheets. The best results are, however, normally achieved with fan-apart adhesive.

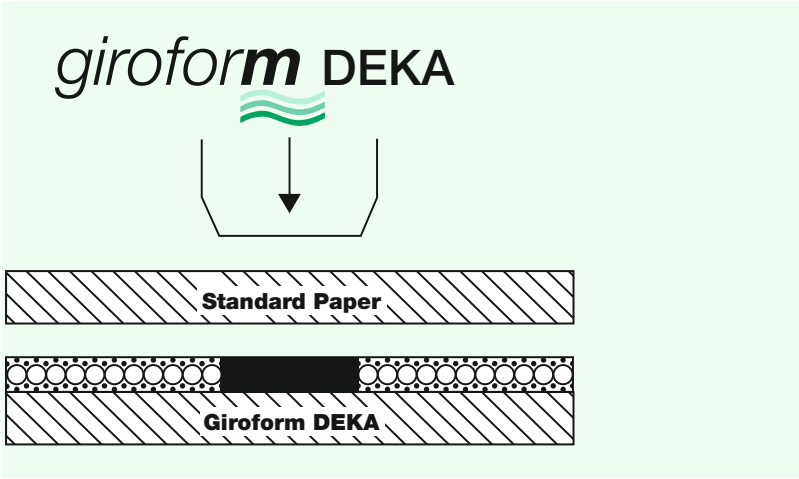
Giroform can be surfaced glued for special applications such as discrete wage envelopes, data mailers on printing units or other adhesive application machines.

This is generally only successful if the adhesive is formulated for use with carbonless paper and specifically recommended for this purpose by the manufacturer. Special care must be taken, as these adhesives may contain substances such as glycol, or softeners which can adversely affect the CF coating in the areas surrounding the adhesive during drying.

We recommend using proven adhesive products only. If new adhesive products are used, thorough testing should be carried out before use in production.

As processing conditions are varied and adhesives may change their formulations under circumstances beyond our control, guarantees for successful processing cannot be taken from the preceding information. We can state, however, that our carbonless paper is suitable for the gluing processes mentioned when gluing is carried out within the usual guidelines laid down by the adhesive manufacturer.

giroform DEKA



Giroform DEKA working principle

Functioning Principle and Sheet Grades

Giroform DEKA is a carbonless paper product developed by Mitsubishi HiTec Paper Europe, which reacts within itself to produce a black copy. Papers using this technology are known as “self-contained“ grades.

Giroform DEKA consists of a woodfree base paper which has a single combined coating consisting of the microcapsules and the developer which acts as the colour developer.

The Giroform DEKA sheet independently produces a copy by the action of pressure. The microcapsules rupture and release the colour formers contained within them – these colour formers are then absorbed by the surrounding developer.

This technical construction guarantees the production of an intense, high contrast copy.

The microcapsule and recipient coatings are of a similar construction to those of Giroform. Giroform DEKA has, therefore, similar properties to the CFB sheet grade. The pressure sensitivity of the top surface should be taken into special consideration as the copy is produced independently on each sheet, and not as with Giroform by the transfer of colour formers between two coatings on two different sheet grades.

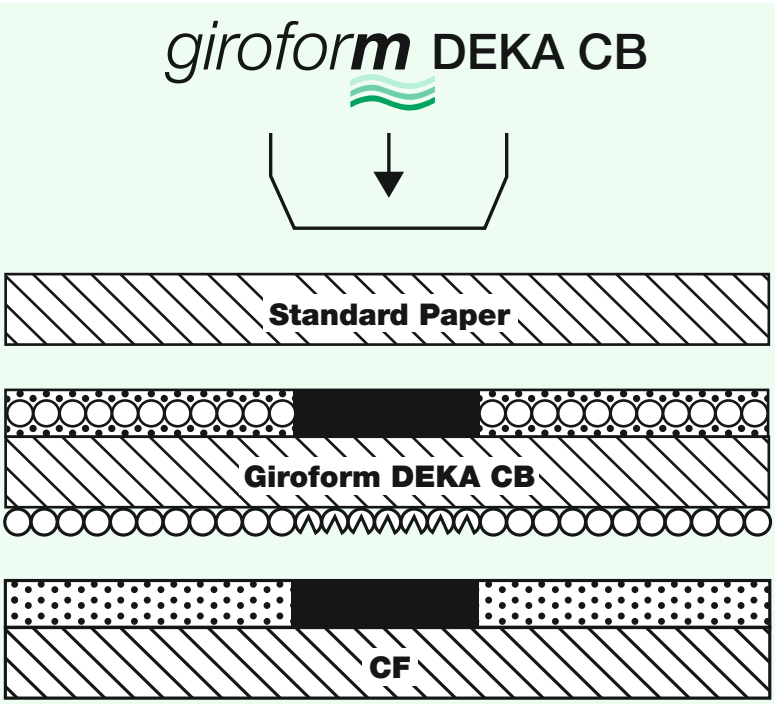
Self-contained papers are generally characterised by their top surface pressure sensitivity, non scratch proof copies (due to the functioning principle), possible undesired copying or discoloration caused by impact or other pressure loads on the paper, folding or creasing.

Giroform DEKA enables form sets to be produced using any desired quality of standard paper for the top sheet. For example: high quality writing paper; water-marked papers; papers with specially processed top surfaces, e.g., sandgrain embossed papers; papers with a mottle effect, etc.; papers suitable for OCR work; security papers, self-adhesive papers; dry gummed papers, etc. It is imperative that sufficient pressure is applied to the Giroform DEKA surface and that coatings are not transferred which could have an adverse effect on the colour reaction.

Furthermore, Giroform DEKA is suitable for ribbonless printing, e.g., credit card vouchers and forms for registering measuring devices such as weighing machines or through-put measuring devices and also for insert sheets in data mailers.

Typical forms construction for self contained papers:

Imaging		**Imaging without ribbon**
any desired	any desired	
Standard paper	Standard paper	
Giroform DEKA	Giroform DEKA CB	Giroform DEKA CB
Giroform DEKA	Giroform CFB	Giroform CFB
Giroform DEKA	Giroform CF	Giroform CF



Giroform DEKA CB working principle

Giroform DEKA CB

Giroform DEKA CB is additionally coated on the reverse side with a CB coating and can, therefore, be integrated into the Giroform system. It is always combined with a Giroform CFB or CF sheet grade. This permits the use of any desired top sheet or makes ribbonless printing possible, e.g., credit card and weighing card forms, if it is used as the top sheet.

As Giroform DEKA CB has two microcapsule coatings, it is important that the increased pressure sensitivity is always considered when handling and processing.

Special Recommendations for Handling, Printing and Processing

In our description of this product we have established that Giroform DEKA has, in principle, the same characteristics as the Giroform CFB sheet grade. Due to the arrangement of microcapsules and the developer on one side of the sheet, there are further characteristics which should be considered (other than the pressure sensitivity of the top surface). Only these characteristics will now be dealt with.

We would ask you once again to refer to our previous statements, in particular with reference to Giroform CFB.

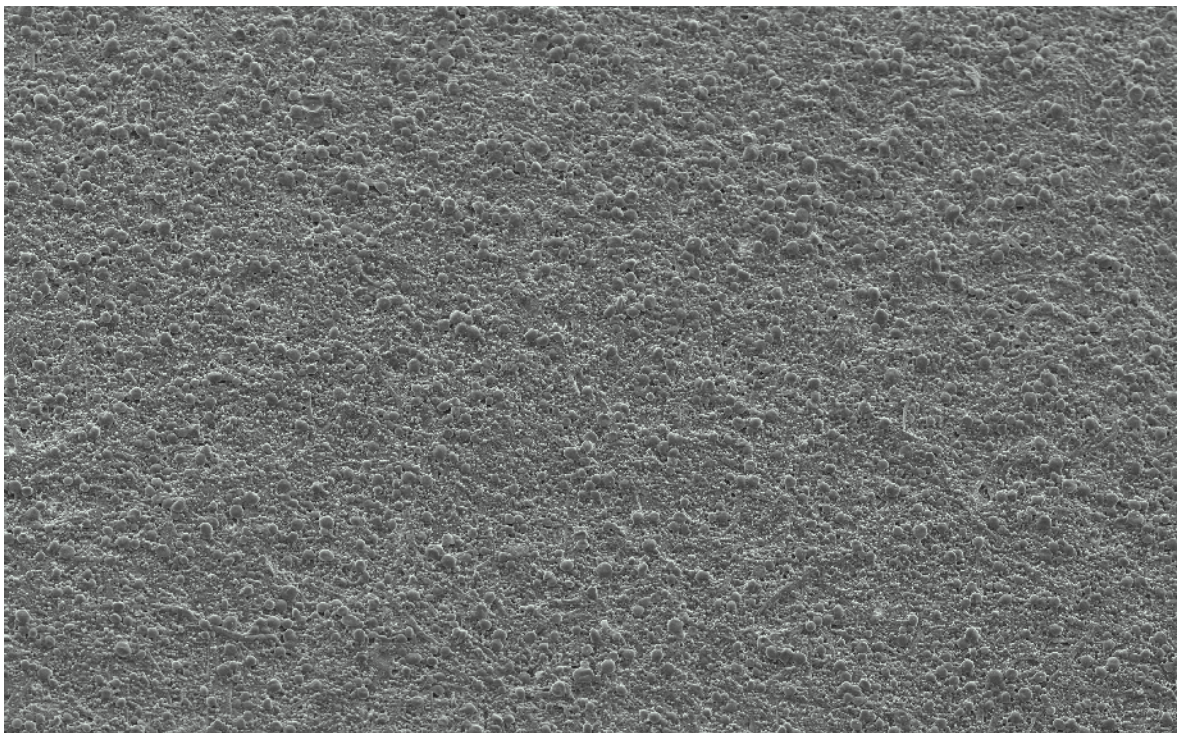
Storage and Climatic Conditions

Giroform DEKA is a one-sided, dual coated carbonless paper. Due to this system of coating, there is a tendency for poor flatness of the sheets because of the “one-sided“ acceptance or release of moisture.

Good paper storage conditions, adequate adjustment time to temperature variations before printing (whilst in original wrappers) and avoidance of extreme climatic conditions are of even greater importance for Giroform DEKA than Giroform.

Handling and Top Surface Pressure-Sensitivity

As with all self-contained papers, Giroform DEKA is pressure-sensitive on the top surface due to the direct contact of the microcapsule and developer coatings. The rupturing of the microcapsules by the application of any kind of pressure – writing implements, machine parts, printing blocks, finger nails, etc., – will lead to visible bruising. Giroform DEKA is not, therefore, suitable for forms which are subjected to intensive handling as the copy is not scratch-proof, and may be impaired by creasing or folding. Furthermore, undesired copying or bruising is possible by impact or stamping. Therefore, these criteria must be especially taken into account (even more than with Giroform) when setting up, printing and processing.



Giroform DEKA surface coating

Letterpress Printing

When printing by the letterpress process all areas printed will produce a “copy“. When using a black or dark ink this is not important as the “copy“ will be covered. However, when using light ink shades, a visible colour change may occur. The use of “softer“ blocks (rubber or synthetic material) offers no guarantee in this case. Printing on the reverse side is equally critical for the above mentioned reasons – a corresponding colour reaction on the front side of the sheet will occur. Letterpress printing can, therefore, only be recommended in a very limited fashion.

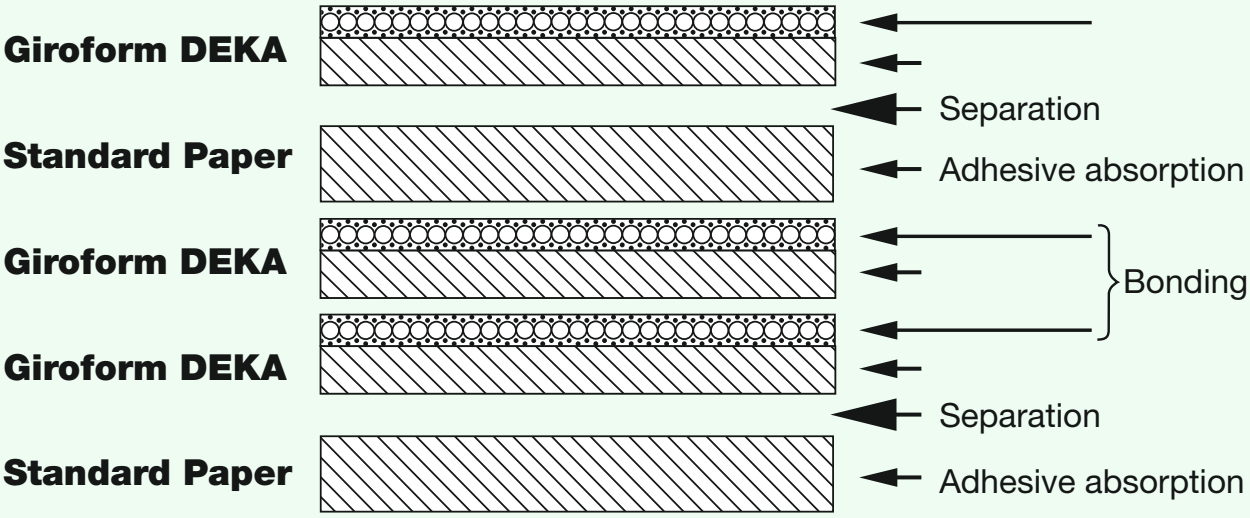
Offset printing has, in comparison to the guidelines given for the Giroform CFB sheet grade, no special limitations for printing the front or reverse side of the sheet, provided the correct minimal pressure setting is used.

Desensitisation

The desensitisation of Giroform DEKA follows the same principles as Giroform. To be on the safe side, the ink coverage should be selected to be somewhat higher than with Giroform. This is due to the delayed colour forming reaction making the assessment of the desensitising efficiency unreliable within 30 minutes of printing.

Carbonisation

Our experience to date has shown that it is possible to use hot carbon inks for printing on the reverse side of Giroform DEKA without adversely affecting copyability. This does not apply for cold carbon inks – we strongly advise against their use. A reduction of the paper‘s whiteness caused by the “strike-through“ of the carbon ink and a reduction in copy contrast is unavoidable. Padding may be carried out with the commercially available adhesives without restriction. If spot, strip or surface gluing is performed we recommend that only recommended and proven adhesives for carbonless papers are obtained from your adhesive supplier.



Giroform DEKA fanapart gluing process principle

Fanapart Gluing with Standard Paper as Original

When gluing Giroform DEKA form sets it is necessary to use the special adhesive which we distribute for this process.

Giroform fanapart adhesive is not suitable. The reliability of this process is, regrettably, much less than that of Giroform when gluing sets, due to the processing system involved. This is due to the fact that when gluing Giroform, all the parts of the set are of our manufacture and, therefore, the processing is mainly under our control.

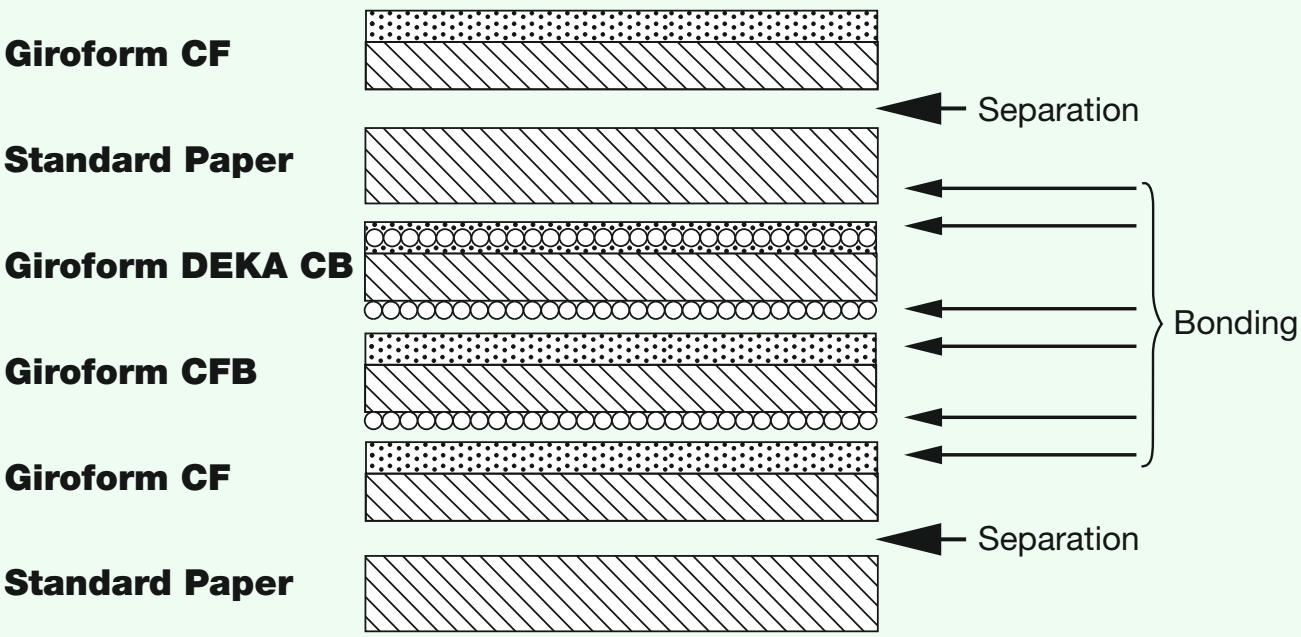
This is only partially the case for Giroform DEKA as the end user has a wide possible choice for selection of the top sheet. We cannot, therefore, guarantee the systems efficiency in use.

Adhesion should always take place between the top surface of Giroform DEKA (where a large amount of adhesive is absorbed by the microcapsule and recipient coatings) and the reverse side of the top sheet lying directly on the Giroform DEKA sheet.

Separation should occur where the top surface of the desired top sheet and the reverse side of the Giroform DEKA sheet are in direct contact. This is because two standard paper top surfaces are in contact which absorb significantly less adhesive.

As the top surface characteristics, the amount of adhesive used, the manner in which the process is carried out and the absorption rate of the top sheet used can vary greatly and are not within our control, poor results are possible. For example, poor separation, and/or insufficient adhesion of the sets.

The adhesive should provide just sufficient adhesion between the sheets, and even in the case of a tendency towards blocking allow separation between the first and last sheets in the form set. Separation of the forms should be carried out by careful lateral sliding.



Giroform DEKA CB fanapart gluing process principle

Fanapart Gluing with Giroform Deka as Original

The fanapart gluing of form sets for ribbonless entries is significantly less reliable than with the Giroform quality. Therefore, we cannot give a guarantee that this process will function for this application. We have, however, learned from experience that it is possible to produce good results with Giroform adhesive, providing that the method of operation is suitably adapted. Therefore, when Giroform DEKA CB is used as the top sheet in form sets combined with Giroform, we recommend the use of Giroform fanapart adhesive.

In this case form sets are produced which are of a similar construction to sets produced with Giroform. Giroform DEKA CB is used in place of the Giroform CB sheet grade. In these forms, adhesive is not only absorbed between the coatings which are to be bonded, but also where the forms should separate – between the reverse side of the CF sheet grade and the front side of Giroform DEKA CB.

This disrupts the separation of the form sets and causes inevitable undesired bonding.

It is, therefore, very necessary to determine the correct timing for separation by carrying out gluing tests with small stacks of forms.

Our experience has shown that the correct time is some 10-30 minutes after gluing. The adhesive will have bonded the two coatings more strongly together than the two surfaces which are to be separated – this difference in bonding strength will allow separation.

Separation of the forms should be carried out by careful lateral sliding of the form stack. If the fanapart glue is allowed to dry completely, separation of the forms will become difficult or impossible due to the strong bonding of Giroform DEKA CB and Giroform CF.

The separation can be aided by printing an ample amount of printing ink as a solid onto the Giroform DEKA CB in the gluing edge margin area. All recommendations for the fanapart gluing of Giroform sets are also applicable in a corresponding manner.



Special Grades / Special Forms Applications

Giroform DIGITAL

Due to the widespread, ever increasing volume of toner based digital printing systems, a requirement has been established for a carbonless paper specifically designed to be run on such digital printing machines: giroform DIGITAL.

The market development is quite dominant towards the digital printing technology because of the high flexibility, efficiency and cost efficience. The digital technology is dominated by multi colour sheet fed equipment. In this area we decide between wet and dry toner systems. The most common wet toner system in the printing industry is the HP INDIGO Press. Dry toners are used by manufacturers such as Kodak with the NEXPRESS. Mitsubishi HiTec Paper Europe was the first manufacturer of carbonless paper who obtained the official approval for the HP Indigo and the Kodak Nexpress.

Product recommendations and uses

Digital printing papers need to meet specific requirements to prevent presses jamming due to poor runnability or residue build up on sensitive machine components such as the photoconductive drum or fuser rollers. The paper must have a high level of dimensional stability and must not react adversely to one sided moisture loss. Coatings must be resistant to short periods of exposure to heat during drying and toner fusing stages and must remain consistent. All these requirements are met by the product group comprising Giroform DIGITAL and DIGITAL SC and this has been confirmed by rigorous testing on a wide range of machines. Giroform DIGITAL can of course also be successfully glued using Giroform fanapart adhesive.

Due to the influence of high temperatures and the direct contact of the paper with the heated surface of the fuser drum, moisture is removed at a very high speed from the sheet, making it is prone to developing strong curl which can lead to jams and runnability problems. It was therefore important to develop a 2-sided product to avoid this problem which occurs with one-side coated papers. Simply manufacturing a product with a low humidity level has not been shown to be a suitable solution. The low humidity level is lost because of the influence of the dampening solution

from the offset printing process which makes the product unsuitable for pre-printing which is an important requirement.

The application of the liquid toner system used by HP INDIGO also places high demands on the product with regard to toner adhesion. The INDIGO technology is to a certain extent based on the surface conductivity of the paper used. The liquid toner can be removed without a trace from a natural paper surface using adhesive tape which is not acceptable due to the risk of counterfeiting. Trials with the so-called Saphire Process have been unsuccessful. Using the special HP ink causes changes in the conductivity of the uncoated paper surface which leads to improved toner adhesion, however, our experience has shown that after a relatively short aging period this measure was not effective.

To meet these demands we have developed an additional coating to protect the paper fibres from the effects of the heat of the fuser roll surface, thereby maintaining the profile of the paper and allowing for optimal toner adhesion. We also offer giroform DIGITAL SC for digital printing. In spite of the high level of protection afforded to the paper fibres, it is imperative that the paper is protected from extreme climatic conditions and stored correctly. It is especially important to acclimatise the paper before printing, i.e. to keep the paper in its packet until it has reached the ambient temperature of the print room when using digital printing systems with high fuser roller temperatures.

When offset pre-printing prior to digital printing, it is important to use the lowest possible pressure setting to avoid build-up of deposits on the image drum of the printer.

Giroform Digital ONEforALL is available in CB 80, CFB 80 and CF 80 in sheets and reels as well as precollated.

Digital Printing on Reels

When printing reels using this type of dry toner-based digital printing systems, we recommend our product “Giroform ULTRA” due to its relatively high grammage (minimum 60 gsm). When processing continuous forms, care must be taken to maintain a perfect stack. To test the stack in subsequent digital printing we recommend using a microwave test. An approx. 2 cm high sample stack should be exposed to about 2 minutes of full microwave power and then the stack should be checked for straightness. Comparative investigations have shown this to be the most accurate testing method.

Giroform OCR Grades

We offer the speciality grades Giroform OCR CB and CF (substance minimum 90 gsm) as document reading paper for character readers. The paper grades are manufactured in compliance with DIN 6723-2. This standard defines the physical requirements of devices used today in banking automation such as coders, high speed readers and scanners for carbonless papers.

Optical properties are no longer specified. As a result of this and in line with market demands, we have therefore discontinued production of whitener-free papers for OCR. Giroform OCR is ultra-white.



Use of Forms

Copying Properties

The use of carbonless papers has changed structurally. Due to the advancement of non-impact technology (laser and inkjet printing), various applications have been transferred to other paper grades. New applications have been created in line with the rapid growth of service companies. Copying capabilities are technologically the realm of matrix printers and handwriting.

The copy quality obtainable from our products is tested in our mill using a device we developed ourselves – the Horand Copy Testing Device.

The copying properties of Giroform when using Giroform CLASSIC CB (52g), CFB (51g) and CF (53g) can be generalised by the parts per set obtainable by the following means of inscription:

Handwriting	4 – 6 part
Matrix printer	3 – 8 part
High Speed Printer	3 – 6 part

When newly designing form sets or using new writing equipment, it is highly advisable to take into consideration and adhere to the printer specifications.

These specifications apply to the copying quality and the selection of the appropriate processing. In the case of applications that encroach on the performance limits of the printer, it is recommended to conduct a test with suitable form sets prior to production of the complete run.

When using heavy first sheets in conjunction with Giroform DEKA, it must be taken into consideration that the writing pressure is naturally cushioned by the paper.

The construction and design of the form set can also have a direct influence on the legibility of the copy.

The order of colours in a form set should always be selected so that the more intensive colours blue, green and pink are used in the upper part or for the first sheets of the set and the less intensive colours yellow and white are used for the final sheets of the set.

This also applies to the selection of background ink shades when, for example, printing screen areas. The aim must always be to achieve maximum contrast for the copy, as this is the most important requirement for good readability.

Compatibility

Giroform is extensively compatible with all carbonless papers, which use an organic developing system. Combination with products from other manufacturers will usually produce an acceptable copy. We cannot take any responsibility for technical problems arising from mixing Giroform with different carbonless grades.

Suitability for Photocopying

Nearly all modern photocopiers produce good copies from Giroform papers. The sheets to be copied should have high contrast and should, therefore, be taken from the first half of the form set.



As different machines have varying spectral sensitivity, it is not possible to give guidelines as to which sheet colour should be used. However, the best results can be expected with the colours yellow and chamois.

If necessary the photocopier should be set to intensify contrast.

Suitability for Microfilming

Giroform copies can be microfilmed perfectly. The quality is determined by the colour reproduction characteristics of the film and the contrast of the copy.

The best results are achieved by using panchromatic films and the third sheet (in the case of multi-part sets), or sheets from the top half of the form set, to produce the microfilm copy. If coloured sheets are to be used the colours yellow and chamois have proven to be the most suitable. This should also be taken into account when designing the forms – especially when printing screen areas. High contrast background areas should be avoided.

The type of camera used is also of direct influence. It has been reported that single frame cameras, using a longer exposure, produce better results than continuous frame cameras.

Copies of varying quality (i.e., hue, contrast) should only be microfilmed with cameras having automatic exposure control.

Light Fastness of the Copy

Our tests have demonstrated that copies retain adequate legibility after exposure of 7000kj with a xenon device. The image intensity of the copy was then approximately 80% of the initial value. Further tests showed that after exposure of up to 1200 kJ almost no reduction of the intensity of the copy occurs and there is no change in hue. If the paper is exposed further, the colour will change slightly and also the intensity of the copy will decrease gradually. Due to the systemic photo-sensitivity, it is advisable to avoid exposure of copies to direct light over a longer period.



Resistance of the Copy to Ageing

The maintenance of the paper‘s ability to produce copies, the length of time that forms may be stored without significant reduction of the copyability in use, and the durability of the copy are major usage criteria.

Under the precondition that the paper is stored correctly we guarantee a period of:

- 5 years for the paper‘s ability to produce a copy
- 10 years for the durability of copies produced

Samples from archives and accelerated ageing tests have shown that the copy may be expected to last for a minimum of at least 25 years. This is far in excess of our guarantee period and is only possible with absolutely correct paper storage.

We understand correct storage conditions as being: Temperature range 18 - 24°C with a relative humidity of 40 - 60%. Storage must be carried out with the total exclusion of light. The exposure of copies to direct sunlight or light of a similar nature for prolonged periods of time must be avoided. The paper should also not be exposed to fumes or any direct chemical action.

Imaging

The top side of all the sheet grades and the reverse side of the CF sheet grade may be imaged with normal writing implements without restriction. Even if problems may occur in individual cases, the reverse side of CB and CFB sheet grades can largely be imaged without restrictions.

Commercially available ball-point pen refills show considerable variations in this respect. There are ball-point pen refills available which give very good writing results on the CB coating of Giroform. Generally refills having a broader stroke have proved to be more suitable than those having a narrow stroke. Refills possessing a ball-point which has a “rougher“ surface also appear to be more suitable. When writing with ink the writing will only “run“ to a limited extent. When writing on the CB coating we would, therefore, recommend using fibre tip pens and ink roller pens, in addition to pencils.

Generally, we have adapted our product to market requirements. Giroform, the reverse side of which can be written on with a ballpoint pen, is no longer considered to be a special grade. With the use of ultra-modern technology, it goes without saying that our standard products fulfil these requirements.

Suitability for Blueprinting

Giroform are not suitable for use in the production of blueprints as this process requires the use of transparent documents.



Marker Pens

The standard marker pens available contain solvents which cause a clearly visible reduction in the contrast of the copy. The intensity loss varies from brand to brand.

Several manufacturers offer marker pens especially for carbonless papers (“for copy paper“) which do not affect the copy. We can recommend the use of these special pens.

Solvents

High polarity, low boiling solvents such as alcohols, ester and acetone, will influence the copy. The image will “run“.

Water will slightly reduce copy contrast.

When the CFB and CF sheet grades are used to produce labels for packages, it is important that tests are carried out in advance to ensure that there are no adverse effects to the copy caused by the adhesive used. High boiling solvents, such as oils, fats, glycerine and glycols, will produce a permanent reduction in the contrast of the copy and overall reactivity.

Plasticizers, Transparent Folders, Plastic Sleeves

The direct contact of Giroform with materials which contain plasticizers such as transparent folders and plastic sleeves or other synthetic materials which contain plasticizers, e.g., PVC, should be avoided for prolonged periods of time.

Plasticizers can be found in glues, adhesives, carbon inks, carbon paper, carbonless paper with mechanical transfer systems using an ink coating, self-adhesive tapes and films. If transparent sleeves have to be used, please ensure that plasticizer free document sleeves are always used – these are freely available.

Health and Safety Aspects

Dermatological and Toxicological Safety

Giroform has been developed by Mitsubishi HiTec Paper Europe in close co-operation with its suppliers. We have obtained guarantees from our suppliers for all the raw materials and additives used in our products. Special care has been taken in the choice of raw materials and additives to ensure that products are only used which, after careful scientific analysis and use in the marketplace, have proven to be perfectly safe.

We do not use chrome, nickel or cadmium in pure or compound form for the production of our paper. Polychlorinated biphenyls (PCB) are also not used. Due to our careful selection of raw materials we can state that Giroform does not cause skin irritation or allergic response.

Employees in our paper mills involved in the production and finishing of Giroform have regular medical supervision. Following medical examinations no specific skin changes or illness have been found. We can, therefore, state that correct use and handling of Giroform is dermatologically and toxicologically safe.

REACH, FSC® and PEFC™

It is European Legislation to follow the REACH rules (Registration, Evaluation, Authorisation and Restriction of Chemicals) for all manufacturers and converters of Chemicals. In case of the presence of SVHC (Substances of Very High Concern) Safety Data Sheets have to be provided. This is not the case for Giroform because of the absence of such substances. Giroform does not contain any substance of very high concern.

On request, giroform carbonless papers are available as FSC® and PEFC™ certified products.



Disposal

Giroform is re-usable as waste paper, and is available without restriction for the recycling process, provided the unprinted and printed paper is subject to the relevant preparation processes. In this regard it is irrelevant whether this is a wash or flotation de-inking processes. The microcapsules are easily separable from the base paper with the help of these processes. The removal of the microcapsules is essential for the recycled paper manufacture because the microcapsule wall material leads to sticky residues on the wire and felts of the paper machine.

Investigations carried out by an independent German scientific institute have confirmed that Giroform can be disposed of safely on waste disposal areas. Rotting occurs quickly and easily. The underlying earth layer is biologically very active. Large organisms such as earthworms become more prevalent in these areas.

When the sludge created leaches out following rainfall, there is no inhibiting or acute effect on the bacteria responsible for biodegradation.

Giroform can be disposed of in waste incineration plants with a completely neutral effect. The fumes caused by incineration are similar to those produced by standard papers or domestic waste.

At this point it should be noted that where it is illegal to dump materials on waste disposal sites, paper must be recycled. This requirement poses no problem to Giroform.

Technical Services

Technical Advice

A product is only as good as the service which supports it. For this reason Mitsubishi HiTec Paper Europe has always offered a Technical Advisory Service for each of the high quality products it manufactures. Mitsubishi HiTec Paper Europe has always considered customer service to be of the highest importance. Our technical advisors consider themselves fully responsible for the successful operation of the Giroform carbonless system, and strive to solve printing, processing and any problems which may occur in usage.

Our Application Engineers and Mitsubishi HiTec Paper Europe distributors are always keen to give advice to ensure that you can always give your customer perfect satisfaction.

The quality of our product, combined with the technical support available, provides the perfect service – a service for which we have become renowned. Each chapter of the handbook has been written to give help and advice for users of Giroform in a true spirit of partnership.

With the best will we cannot totally exclude paper problems with some of our deliveries. A well organised and defined system ensures that Mitsubishi HiTec Paper Europe can process any complaint that may arise smoothly and efficiently.

Damage in Transit

When paper is damaged in transit the delivery notes should be signed with an accurate description of the type and extent of the damage. Please state clearly that the goods have been accepted with the reservation that a claim may follow in respect of damage in transit.

At the same time, please contact our distributor so that the transport company can, if necessary, call in an insurance surveyor to estimate the extent to damage.

Return of Goods, Disposal of Complaint Material

Printed or unprinted complaint material may not be returned or disposed of without our prior consent. To ensure swift and efficient handling we issue a mill returns number for every approved return of goods. Please mark all pallets or packages clearly with this number.

Paper should be held available for collection (when possible) in the original wrappers and in a condition similar to that when delivered. Credit notes are issued immediately upon return of the paper to the mill.

Complaints

The processing of complaints is carried out in close co-operation with our distributors. We would, therefore, ask you to contact our distributor in case of complaint. In order that we can process complaints quickly and efficiently, we would ask you to detail the precise nature of the complaint and to forward samples so that we can identify the nature of the problem. We always require the following information:

- Name of customer and distributor
- Paper specification – sheet grade, substance, colour, size and quantity
- Details of order:
  Our distributor's order no., mill making no., mill order no., or mill invoice no.

We would also ask you to forward us the reel or ream label or precise details of the mill making number. In the case of reel stock, if the label is no longer available, please supply details of the information (making no. etc.,) which is stamped on the reel edge. This will enable us to process your complaint quickly and objectively and help to prevent problems in the future.

An accurate description of a complaint eases and accelerates its processing. Could you please supply the following information as appropriate when submitting a complaint:

- Precise nature of the complaint
- Name of printing machine
- Name of printing ink
- Details of any additives
- Details of printing plates
- Details of rubber blanket, etc.
- Climatic conditions
- Method of imaging
- Details concerning use of the paper
- Handling of the forms
- Length of run
- Value of the forms
- Value of claim
- Action required

Sample Material

Please forward samples of unprinted sheets or reel material, together with printed samples for comparison. To conduct tests we require a minimum of 10 sheets for sheeted material and a length of at least 5 metres for reel material. In order to conduct proper tests for complaints concerning poor separation of fanapart sets, we require a stack of forms 0.5 to 1.0 cms high.

When rubber blankets are damaged, please forward paper samples with the rubber blanket in order to aid identification of the problem.

Should the complaint be caused by paper dusting or deposits (such as coating particles or ink build up on the blanket), we would ask you to send a length of self-adhesive transparent tape with the paper or ink deposit lifted off the blanket.

If the complaint concerns dimensional stability, could you please forward the film or printing plates used, together with paper samples.

Contact:
technical.service.mpe@mitsubishi-paper.com

Troubleshooting Guide Carbonless Papers Continuous Printing

We have endeavoured to add to this Technical Handbook, a practical guide to aid the routine running of carbonless papers. We wish to stress, however that such troubleshooting guides cannot cover every eventuality. Similarly, the explanations of some faults may be superfluous to the experienced printer.

Problem	Cause	Remedy
Dirty print, light edges in printed solids, ink piling on the blanket.	Ink too short with too high tack.	Reduce the ink with paste or printing oil, to reduce the tack (proprietary tack reducers are available for this purpose).
	Inking roller set up incorrect	Check roller setting with control strip on the plate
	Running too dry – too little damping. Poorly bound coating.	Increase the damping level.
	Surface tension of the dampening solution	Check dampening, check alc. content
	Blanket not of the ‚Quick Release' type.	If this is a recurring problem, it is advisable to change the type of blanket.
Smudging and tracking of lines.	Too high ink level, too much damping solution in the ink. Balance is odd.	Reduce the fount concentration. Use a highly pigmented ink to reduce the quantity of ink required. Check and, if necessary, adjust the water hardness.
	Wrong setting of inking rollers, too high roller pressure on the plate, roller strip more then 10 mm	Check roller setting
Poor ink acceptance and low intensity tracking of small printed solids.	Burnished rollers, poorly adjusted inking rollers, incompatible alcohol substitute.	Adjust rollers, change to IPA or an alcohol substitute recommended by the ink or plate supplier.
Emulsification of the printing ink, water taken up too quickly by the ink.	Incompatible ink, too much drying additive, ink too strongly blended, damping level too high, fount solution concentrate addition too high.	Use a compatible ink. Blend the ink according to the recommended procedure. Check and, if necessary, adjust the water hardness.

Problem	Cause	Remedy
Set-off of the printed image on the reverse side when printing reel to reel.	Ink balance not optimised. Ink pigmentation too low. Rewind tension too high. Ink coatweight too high. Fount solution concentrate level too high.	Use a highly pigmented ink. Reduce the fount additive level. Reduce the winding tension. Check and, if necessary, adjust the water hardness.
Ink takes too long to dry.	Acid level in fount too high. Damping level too high.	Check pH level (not <4.8), Re-set the damping level, if necessary, use an additive. Check and, if necessary, adjust the water hardness to >8° dH.
UV ink does not dry or does not dry satisfactorily.	Lamps aged, share of active radiation too low for polymerisation. Reflectors soiled. Too little energy reach the print.	Check with GREEN DETEX or suitable measuring equipment.
Doubling in the rewind direction.	Damaged drive shaft.	Clean reflectors. Reduce speed. If necessary, print critical printing elements on another printing unit. Check gear teeth and replace if necessary.
Doubling across the web.	Side to side register mechanism incorrectly set. Side lays not working.	Check side lays.
Hazed form (blacking), no discoloration in the region of the sprocket hole edge, between the sprocket holes.	High level of microcapsule damage due to printing pressure and winding tension.	Re-set printing units. Check blanket packing. If necessary change printing blanket. Check the impression pressure using CB test spray (available on request). Reduce the winding pressure/ tension.

Troubleshooting Guide Carbonless Papers Continuous Printing

Problem	Cause	Remedy
Overall hazing/bruising of form.	Microcapsule damage too high due to printing pressure, and too hard winding.	Compare with unprinted reel. If necessary put to one side for return to supplier.
Wave like discoloration at right angles to printing direction, in area of plate gap.	Impression pressure too high. Printing blanket moving.	Check impression pressure. Change printing blanket. Re-set impression pressure.
Localised bruising with regular or irregular spacing.	Capsule damage due to incorrect handling during transport. Bounce in perforation mechanism. Drawing in rollers in main area of form.	Tight up the blanket. Check the unprinted paper. Cushion the perforation mechanism with foam rubber tape. Set the draw rollers to the sprocket hole margin area. Check the pressure of the lay on roller at the rewind.
Creasing.	Variation in the paper thickness across the web. Drive rollers not parallel. Partly worn rollers. Worn transfer rollers. Reel tension too high. Winding tension too high.	Check the drive rollers (free from winding). Reduce the tension in the unwind (web guide, pressure rollers etc.), consistent with maintaining good web length control. Knock on the reel (care with CFB!). If the reel gives a different sound across the width, return to the supplier. If no replacement is immediately available, increase the circumfe-rence of the drive rollers in the appropriate position by the application of winds of tape. If necessary freeze a drive roller.

Problem	Cause	Remedy
Web length variations across the width.	Paper thickness variations. Profile problem. Drive roller applying varying pressure across the width.	Monitor the length difference allowing a total variation tolerance of not more than 1 mm. If necessary, turn the reel to determine if the problem lies with the reel. If not, check the drive rollers.
Web length variations when tinting.	Web stretches when exposed to moisture.	Test only with tinting unit switched on, and then off.
Chads (‘hangers‘) remain attached in sprocket hole punched margins.	Blunt punches, poorly adjusted punch units, sleeves out of line, punches too soft, deformed punch edges with serrated tools, poorly working trim extractor, blocked vacuum.	Change punches and dies frequently, and set deeper. Where the time interval between necessary changes becomes too short, the drive units may need overhauling. Too much play in the toothed cogs leads to premature wear in the punch units. Waste extraction units need to be checked on the run.
Desensitising ink toning.	Incorrect pH level of fount solution, inking levels too high.	Adjust the ink-water balance, if necessary make up a new fount with a pH level of 4.8-5.5. If necessary, use a different fount concentrate. If the problem is not easily resolved, wash up, and start again with fresh ink. Test. (See chapter on desensitisation).

Troubleshooting Guide Carbonless Papers Continuous Printing

Problem	Cause	Remedy
Desensitising ink tracking on guide rollers.	Inking level too high, cleaning of rollers too infrequent. Damaged or worn guide roller coverings, desensitising ink coatweight too high.	Clean guide rollers at each reel change. Optimise inking levels (not too high). If necessary, when printing large desensitised areas, split the printing over two printing units.
Build up/piling of perforations.	Poor cutting due to blunt mechanism, damaged or worn anvil cylinder. Bouncing of the perforation blade in a worn area at the point of impression.	Change perforating mechanism, and resume with care. If necessary, shift the plates and units so that the perforating blade does not contact a badly affected area of the anvil cylinder. Check for correct cutting with a magnifier. Use the harder grade from the supplier.
Formation of burs, convergence of part reels.	Blades dip too deep into web, blade heel produces corrugated cut.	Adjust knife shaft, install sharp knife blade.
Stack lean towards or against the printing direction.	Variation in the cut off length of the cross perforation.	Measure the form length arising from a single cylinder revolution. A glass measuring ruler with 1/10 mm divisions is useful for this. Check the perforation rule length. If needed, install a new unit. If necessary, compensate the difference by manipulation of the perforation rule.

Problem	Cause	Remedy
Stack lean across the printing direction.	Guide rollers out of line, irregular running draw rollers, differences in paper thickness over the web width.	Follow testing procedure as follows: Tear off about 10 forms from the stack, and fold half the quantity back on itself at the cross perforation, place the sprocket hole margins together. The displacement of the sprocket holes and the paper edge should never amount to more than 0.5 mm. Check the drawing in system. If necessary check the reel of paper by turning it and re-running. If the stack then leans the other way, the cause of the problem probably lies with the paper.
Stack with steps.	Drive jamming due to defective, unsynchronised rotation. Use of varying perforation rules. Different drives due to metric/imperial conversion.	Check the perforation rules used, if necessary interchange them. Check the cut off length, and adjust by manipulating the perforation rule.
Rotating stack.	Defective squareness of the cross perforation, uneven stretching of the paper web due to out of line or sticking guide rollers. Defective working drawing in system due to uneven wear (flat spots on draw rollers – wear or damage to the rubber surface), paper reel with transport damage (dents).	Measure the throw length on both sprocket hole margins. Check the drawing in system. Check the guide rollers, and for even tension across the paper web. If necessary, change the reel.
Poor delivery, speed of folder delivery too low.	Delivery devices not clean, brushes worn.	Install new brushes. Treat once a month with talcum powder.

Troubleshooting Guide Carbonless Papers Sheet Printing

Problem	Cause	Remedy
Premature wearing out of printing plate.	Contaminated ink. Incorrect pH level of the fount solution, water too soft.	Use new ink. Make up fount according to recommended procedures. ‚Burn in' the printing plate. Check and adjust water hardness.
Doubling.	Sheet not in register with subsequent printing unit. Damage to the drive unit.	Check blanket thickness and packing. Adjust sheet transfer mechanism. Overhaul gripper mechanism.
Electrostatic charge.	Different electric charge between paper and printing press elements. Conductivity in paper too low. Difference between paper and ambient conditions too great.	Store paper in print room and allow to condition (particularly in the winter). Use an anti-static spray. Check air humidifier, if necessary, clean.
Defective fanapart gluing sets fall apart.	Gluing edge not guillotine trimmed. Glue past its shelf life, frost damaged. Alcohol in the glue has evaporated. Grain direction of paper mixed within set. Weight on stack too heavy, too little glue applied. Ink free margin at gluing edge less than 3 mm.	Use fresh glue, new gluing brush. Check grain direction. Guillotine trim the gluing edge. Reduce the weight on the stack. Apply a generous amount of glue with the first stroke of the brush. Check the sheet order. Reprint with 3 mm margin.
Hazing.	Drive and brake rollers applied too heavily. Mechanical double sheet detector too tight. Impression pressure too high.	Optimise machine settings.
Double Feeding.	Sheets sticking together at the trimmed edge, poor blower system, incorrect blower setting.	Use a sharp guillotine blade, clean the air blower filter. Utilise sheet separation devices. Work air into ream of paper prior to use.

MITSUBISHI PAPER MILLS LIMITED

As a responsible manufacturer we pay particular attention to the most environmentally friendly and high quality production and packaging of our carbonless paper. Complying and conforming with rules go without saying. Social commitment is an important part of our corporate culture.

Certifications:

- FSC® Chain-of-Custody
- PEFC™ Chain-of-Custody
- ISO 9001
- ISO 14001
- ISO 50001

Memberships:

- B.A.U.M.
- Klimapakt Flensburg
- Ökoprofit Bielefeld
- Two Sides
- Wirtschaft pro Klima

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Mitsubishi HiTec Paper Europe GmbH
Niedernholz 23 | 33699 Bielefeld | Germany
Sales | Tel: +49 521 2091-535 | sales.mpe@mitsubishi-paper.com

www.mitsubishi-paper.com