



CARBONLESS
technical solutions
SHEETS
HANDBOOK



APPLETON
What Ideas Can Do™

Contents

General Information

Contents.....	1
Introduction & Customer Service.....	2
About Appleton Papers.....	3-4
History of NCR PAPER* Brand Carbonless	5
What is NCR PAPER Brand?.....	6
Carbonless Paper System.....	7
Construction & Verification.....	8

Packaging & Handling

Packaging & Handling.....	9
Recycling.....	9
Storage & Conditioning.....	10

Sheet Printing

Sheet Printing.....	11
Printing on an A.B. DICK Press.....	12
Printing on an AM Multilith Press.....	13
Printing Inks.....	14-15
Dampening Systems & Fountain Solution.....	16-17
Plates.....	18
Blankets.....	19
Screen Tints.....	20
Backprinting.....	21
Dry Offset CF Ink.....	22-24
CF Ink Color Standard.....	24

Cutting & Gluing

Cutting.....	25
Miscellaneous Bindery Operations.....	26
Fanapart Edge Padding.....	27-31

Digital Duplicators

Overview.....	32
Manufacturers, Preparation, Characteristics.....	33
Suggested Tips for Running.....	34

Xero/Form® II

Benefits of Digital Printing.....	35
NCR Paper brand Digital Offerings.....	36
How to Use Xero/Form® II.....	37-39

Troubleshooting Tips

Troubleshooting Tips.....	40-45
---------------------------	-------

Miscellaneous Information

Specialty Applications.....	46-47
Optical Character Recognition.....	48
Magnetic Ink Character Recognition.....	49
Shelf Life & Storage.....	50
Copying & Microfilming.....	51
Instant Replay II.....	52
Receiving API Products.....	53
Complaint Procedure.....	54
Weight, Size & Metric Conversion Guide.....	55-57

Glossary

Glossary	58-68
Customer Service.....	70

Introduction

Our goal is to help your company be more productive and profitable and maintain a technical edge.

As with all our Success Resources programs, Technical Solutions is a result of Appleton Papers' uncompromising dedication to customer satisfaction and our commitment to the industry.

Technical Solutions will help you:

- Enhance printing quality — for more satisfied customers.
- Increase productivity — for improved output rates.
- Reduce waste — to make your business more profitable.
- Improve employee skills — to be more efficient.

Technical Solutions will give you:

- Experienced advice on all aspects of forms production.
- Innovative troubleshooting information in an easy to understand and use format.
- Useful material from manufacturers and suppliers about other products you use.

Technical Solutions is a reference for using Appleton Papers' products. Information in this binder will be updated and supplemented on a periodic basis.

If you have any questions, comments, or suggestions, please contact your local Appleton Papers representative. Or just complete and send-in one of the business reply cards in the back of this binder.

Customer Service

Technical Services Dept:

- Complaints
- Technical information
- Packaging & Handling
- Application Information

Appleton Papers Inc.
Technical Services Dept.
 825 E. Wisconsin Ave.
 P.O. Box 359
 Appleton, WI 54912

West: (800)922-1723

Central: (800)981-9681

East: (800)922-1724

FAX: (920)991-7341

General Offices:

Appleton Papers Inc.
 825 E. Wisconsin Ave.
 P.O. Box 359
 Appleton, WI 54912
 (920)734-9841

Customer Service Department:

- Order Information
- Product Availability
- Product Inquiries
- Pricing

**National Accounts,
 Printer/Converter**
 (800)922-1729
 FAX: (800)922-1712

Merchant East
 (800)533-9421
 FAX: (800)872-4141

Merchant West
 (800)922-1727
 FAX: (800)922-1709

Visit Our Web Site:
www.appletonideas.com



About Appleton Papers

A Leader in High Value-Added Papers

Since its founding in 1907, Appleton Papers has earned a reputation as an innovative producer of high value-added paper products. The company is the world's leading producer of carbonless and thermal papers and a premier producer of a broad range of coated papers used in a variety of commercial printing and specialty applications. Setting Appleton Papers apart in such competitive markets is the company's expertise in coating, its aggressive investment program in manufacturing technology and its unique approaches to customer service and logistics. Driving all these programs and processes are the people of Appleton Papers and their single-minded commitment to meet or exceed customer expectations in everything they do.

Markets We Serve

Carbonless: Appleton Papers sells NCR PAPER brand carbonless paper directly to converters and business forms printers who print carbonless forms and to paper merchants who stock and sell carbonless paper to printers. Companies and individuals who use printed business forms and carbonless paper for transactions are the end users of carbonless paper.

Thermal: Appleton Papers sells its OPTIMA® brand of thermal paper to converters who in turn sell facsimile paper to resellers such as office supply stores, office superstores, warehouse clubs, mail order catalogs, equipment dealers, merchants and original equipment manufacturers (OEM's). Thermal papers are also increasingly used for point of transaction, automated teller (ATM), and pay-at-pump gas receipts. Thermal

label products are sold to companies who apply pressure sensitive coating and then distribute to label manufacturers. Thermal tag, ticket and chart grades are sold to specialty printing companies who convert them to finished products such as entertainment tickets, tags, coupons and medical charts.

Coated Free Sheet: Appleton Papers sells its UTOPIA™ family of coated free sheet papers to merchants, printers and converters who use it to produce annual reports, upscale magazines, catalogs, advertising and promotional materials and other commercial printing as well as to manufacture labels, envelopes, and books.

Specialty Coated Products: Appleton Papers' Specialty Coated Products are sold to merchants, printers and converters and are used in a wide variety of niche market applications.

Facilities

Headquartered in Appleton, WI, the company has 30 sales offices throughout North America. Appleton Papers operates a pulp and paper mill and coated free sheet complex at Combined Locks, WI; a pulp and paper mill at Roaring Spring, PA; a paper mill with integrated recycling operations at West Carrollton, OH; a paper mill focused on coated free sheet production at Newton Falls, NY; coating and converting plants at Appleton and Harrisburg, PA, and a carbonless capsule plant at Portage, WI. Distribution centers are located in Appleton, WI, Harrisburg, PA, Florence, KY, Kansas City, KS, Portland, OR, Los Angeles, CA, Albany, NY, Davenport, IA, Atlanta, GA, and Peterborough, ON.



APPLETON
What Ideas Can Do™

- ☆ Headquarters
- Manufacturing Facilities
- △ Distribution Centers

About Appleton Papers

continued

Company Promise

Our 4,300 employees are dedicated to meeting or exceeding customer expectations in all aspects of every transaction with Appleton Papers. We call this **Customer Focused Quality**. We believe customers define quality for Appleton Papers and one way we support that belief is by offering an **Unconditional Satisfaction Guarantee** for all our carbonless and thermal paper products and related services. Visit our web site for more information, www.appletonpapers.com.



Leadership Through Customer Focused Quality

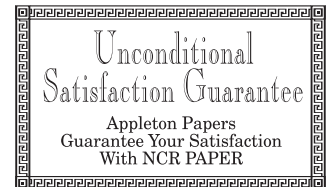
Appleton Papers' quality improvement process is known as Customer Focused Quality. Customer Focused Quality is defined as meeting or exceeding customer expectations in

all aspects of every transaction with Appleton Papers. The CFQ process focuses on both internal and external customers. It is based on the principle that every employee serves a customer. Knowing your customers, identifying their expectations, measuring the effectiveness of your actions, and implementing methods to achieve continuous improvement are the fundamental elements of the CFQ process.

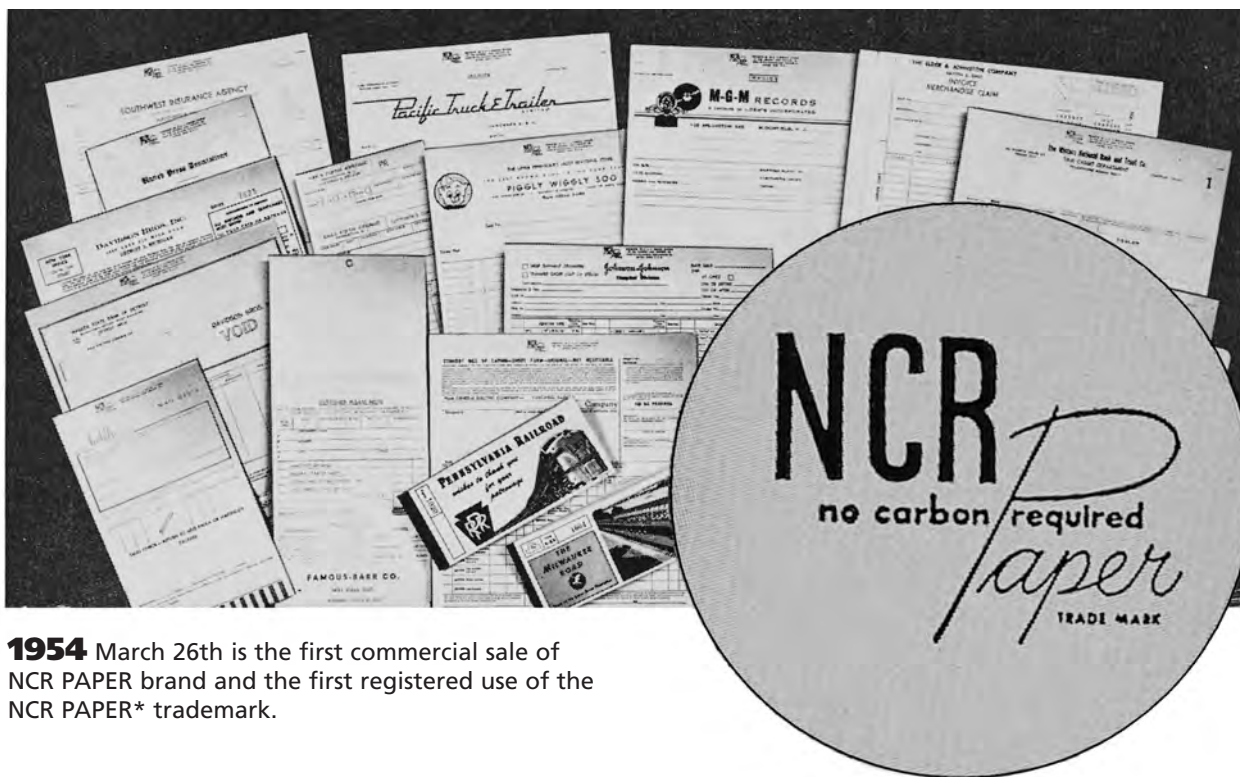
Appleton Papers guarantees your satisfaction.

If you are dissatisfied with our products or services for any reason, we will help you resolve the problem, replace the product, or refund its cost.

No hassles. No fine print.
No conditions.



History of NCR PAPER* Brand Carbonless



1954 March 26th is the first commercial sale of NCR PAPER brand and the first registered use of the NCR PAPER* trademark.

The development of NCR PAPER brand of carbonless paper dates back to the late 1940s when researchers were asked to develop a technique for printing without using ink rolls or ribbons.

A key factor in achieving this goal was the development of a technique to chemically convert certain color dyes to a colorless state. When these dyes are in a colorless state, they will not produce color when placed in contact with ordinary paper, clothing, or skin. However, when the dyes are placed in contact with special reaction materials, intense colors are formed.

The next step was to develop a medium for transferring the colorless dye solution to the surface of paper. This medium was required to provide intense and complete color development, localized only in the areas being

imaged by pressure. The method of applying this medium to paper had to provide uniform coverage and proper adhesion of the colorless dye solution. Poor adhesion would result in evaporation of the medium and loss of the dyes causing premature color reaction when the dyecoated side of the sheet is placed next to the reactant coated side.

After several years of concentrated effort, research scientists developed the process of "microencapsulation," utilizing principles of colloid chemistry. This unique process permitted placement of the colorless dye solution into millions of microscopic containers, called "capsules" Micro-capsules were the key to development of the new printing system which enabled NCR PAPER, the first carbonless paper for business forms, to be introduced in 1954.

What is NCR PAPER Brand?

NCR PAPER brand of carbonless paper is a business forms paper system uniquely coated to transmit an image from writing or mechanical pressure without using carbon paper.

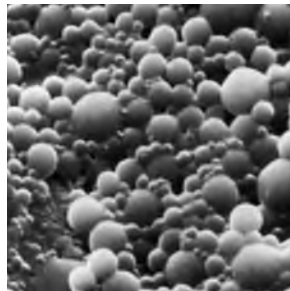
Normal pressure of inscribing impact on the top sheet automatically reproduces data on subsequent sheets within a properly ordered form set.

The system can be used for making handwritten, typewritten or machine-printed copies. It's also adaptable to ribbonless imprinting devices.

An image is created when two separate chemical compounds, coated on the sheets, are brought together. These coatings are colorless. The colored image produced by the union is nonsmearing.

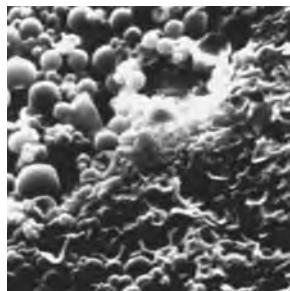
Three different types of carbonless paper — CB, CFB and CF — are used to create a three-ply business form set (please refer to the enlarged photos with supporting text below).

CB, meaning **Coated Back**, is the original or top sheet of a multi-part form. This sheet is back-coated with millions of microscopic capsules, dry to the touch, but containing a solution of colorless dyes and oils. These materials are permanently sealed within plastic-like capsules, until the capsules are broken by pressure.



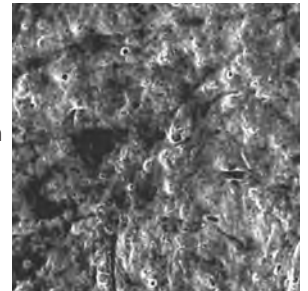
CB Coating

CFB coating, or **Coated Front and Back**, constitutes the intermediate sheets of a multi-part form. The front side has the CF coating, the reverse side has the CB coating. Several intermediate sheets can be used to provide the desired number of copies.



Microcapsules destroyed by writing pressure

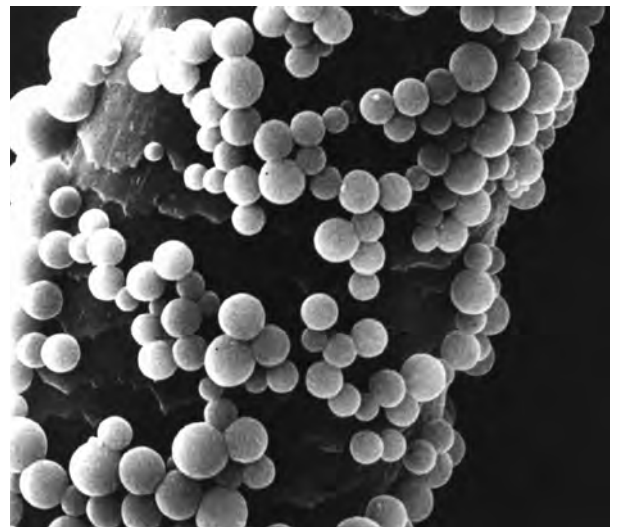
CF, or **Coated Front** is the receiver part and generally the last ply of a multi-part form. The front side of this receiving sheet is coated with a resin coating which reacts with the colorless dyes released from the broken capsules to develop a color on the CF surface, in the identical pattern of the imaging pressure.



CF Coating

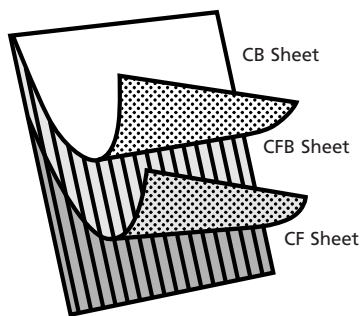
Encapsulation Process

Although there are several variations, the basic process of microencapsulation is as follows: Colorless dyes are dissolved in oils and mixed with aqueous solutions to form large dye-oil drops. By a homogenization process, the large drops are reduced to microscopic dye-oil droplets. Through a patented chemical process, a thin protective wall is deposited and surrounds the individual droplets. The walls are then chemically hardened to form microcapsules, each capsule having a complete, chemical shell.



CB capsules on a human hair

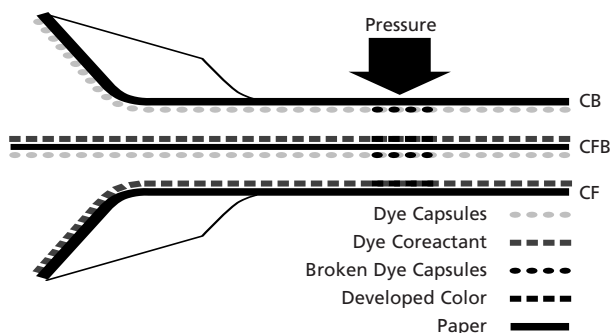
Carbonless Paper System



Basic System

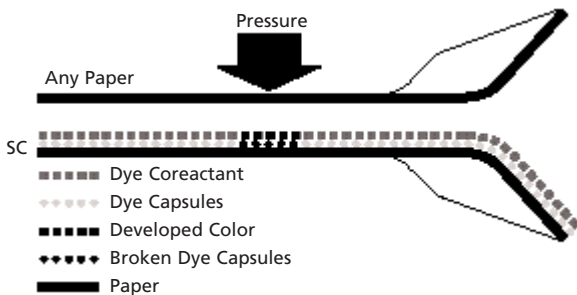
- Coated Back
- Coated Front and Back
- Coated Front

Carbonless Paper System



In a formset, the carbonless plies need to be in the correct sequence of CB — CFB — CF. Should any ply be out of sequence or reversed, the desired carbonless image will not be produced.

Self Contained (SC)



Another type of NCR PAPER brand, termed Self Contained (SC), is made with both the capsules and receiver coating on the same side of a single sheet. Thus, any sheet of paper can be pressure-imaged and the Self Contained sheet beneath will reproduce the image. Self Contained paper can also be used in the original position for ribbonless imprinter applications.

Construction & Verification

Write-Test

A "write test" involves preparing a dummy form in the color and grade sequence to match the proposed form construction. This form should then be imaged by the end user's imaging device. The "write-test" will verify the equipment's ability to adequately produce the desired carbonless image on each ply of the form. A manual process, using a pen to image the form ("pen-check", or "pencil-check"), is also recommended as a quick check for correct collation sequence and print side during the manufacturing process.

Intermixing NCR PAPER Brand Carbonless Products

Continual improvements in the design and chemistry of all NCR PAPER brand products are made to meet diverse end use requirements.

- For special purpose applications, the uniquely designed features of NCR PAPER Specialties products may be needed.
- NCR PAPER Specialties products are designed to be compatible with other specific NCR PAPER products; consult Technical Services with questions that arise.

- While all NCR PAPER brand carbonless products are compatible, optimal performance is achieved when intermixing of grades is avoided.
- In situations where intermixing is required, please be aware that intermixing can cause performance variability. Physical and aesthetic differences may be noticeable, and intermixing may cause variation in image intensity, image development speed and image clarity.
- To ensure that your application requirements will be met when intermixing, we recommend the use of the "Write Test" procedures described above to verify performance.

Intermixing Other Carbonless Products With NCR PAPER Brand

The specific chemical composition used to produce carbonless paper varies between manufacturers.

- Should intermixing occur, these differences may adversely affect such properties as image intensity, dimensional stability, and Fanapart edge padding.
- Intermixing of various brands of carbonless paper is not recommended.

Packaging & Handling



Characteristics

- There are two important characteristics of the emulsion grades (CB, CFB, Self-Contained) of NCR PAPER brand that set them apart from conventional forms papers.
 - They are sensitive to pressure.
 - They are coated papers.
- These points should be considered in all operations.
- The CF grades are not sensitive to pressure and can be handled the same as bond or ledger paper, as long as it is not in combination with any of the emulsion grades, such as finished forms.

Recycling

Carbonless Paper Recyclability

All NCR PAPER brand carbonless products are recyclable. Recyclability is one of the primary advantages that NCR PAPER brand has over carbon paper. Carbon paper is not recyclable in the normal wastepaper stream.

NCR PAPER brand wastepaper from forms manufacturing is typically sold to a wastepaper dealer who may require the waste to be segregated.

While some paper waste is unavoidable when producing business forms, Appleton Papers is dedicated to helping our customers minimize waste and improve production efficiencies. For consultation regarding waste reduction and production improvements, please contact our Technical Services Department.



All NCR PAPER brand carbonless products are recyclable.

Storage & Conditioning

Storage

Storage and conditioning can effect paper performance on press.

- NCR PAPER brand of carbonless paper is manufactured to be in equilibrium at 71 degrees F and 45% RH.
- For ideal pressroom performance, the printing plant should be controlled to match these temperatures and RH values.
- It is very important that the relative humidity (RH) be maintained above 35% RH during the heating season (air drying) to reduce abnormal static and paper stretch problems.

- As a matter of good inventory practice, NCR PAPER brand should be used on a **first-in first-out** basis.

Conditioning

Proper conditioning of paper will alleviate some of the problems caused by fluctuating RH, but nothing short of humidity control in the pressroom itself can eliminate them.

- Unless the temperature and relative humidity are the same in the paper storage area and pressroom, wrapped reams should be stored in the pressroom prior to processing, away from heaters or cold walls, in accordance with one of the following charts:

Temperature Conditioning Charts for Paper

Volume of Paper [†] on Skid, in Case or in Roll (cubic ft.)	Difference in Temperature(°F) of Paper and Temperature of Room in Which it is Opened							
	10°	15°	20°	25°	30°	40°	50°	60°
6	5	9	12	15	18	25	35	54
12	8	14	18	22	27	38	51	78
24	11	16	23	28	35	48	67	100
48	14	19	26	32	38	54	75	109
96	15	20	27	34	41	57	79	115
(Hours paper should stand)								

Volume of a Case (cubic ft.):

(Length inches x width inches x height inches) ÷ 1,728.

EXAMPLE: Four cartons of paper stacked 22" wide, by 34" long, and 12" high (6 cubic feet, using the formula); coming off a 30°F truck into a 70° pressroom (40° temperature difference); will require 25 hours of conditioning.

† Volume of a Roll (cubic ft.):

[3.14159 x (roll radius[‡] inches x roll radius inches) x roll width] ÷ 1,728.

[‡] radius = 1/2 diameter

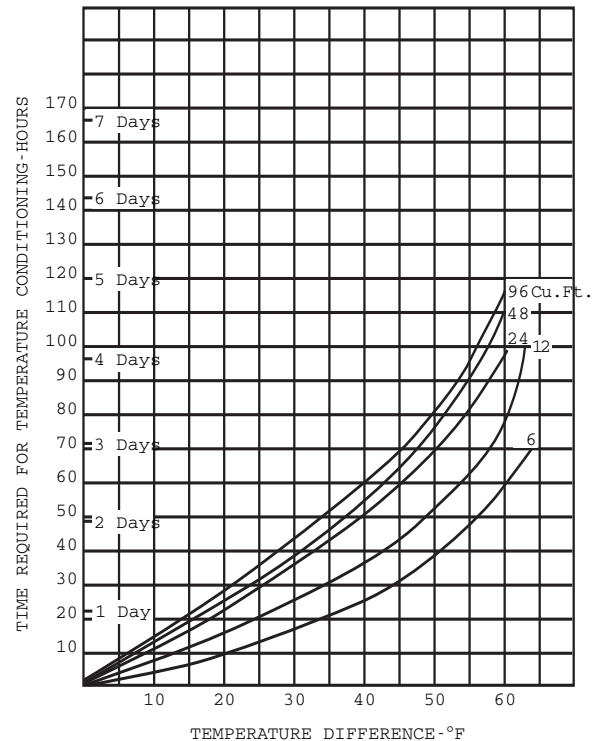


Chart source: Graphic Arts Technical Found

Sheet Printing

NCR PAPER brand is a premium, coated, bond-like sheet whose press performance equals or betters that of similar products.

Preparation of Paper

- NCR PAPER brand single sheets and precollated sets including, 8½" X 11", 8½" X 14", 8½" X 11½", and 9" X 11" are trimmed grain long to reduce "dog-earing" and improve delivery on presses with chute or chain deliveries
- Other size sheets can be trimmed so grain direction will be parallel with paper flow through the press (grain long).
- Fan each edge of the paper before loading it into the feeder. Fanning reduces clinging tendencies, thereby improving feeding characteristics.
- To produce a flatter sheet, roll edges of slightly curled paper in the opposite direction of the curl.

Operation of the Press

- Use a clean, properly cared for blanket at all times.
 - Higher quality printing and improved runnability are generally obtained by using compressible blankets, which minimize squeeze at the printing nip.
 - Compressible blankets are generally quick-release in nature and produce more uniform ink laydown.
- Use soft-bodied inks with tack in the 10-12 range or below, plus a fountain solution with a pH of 4.0 to 5.0.

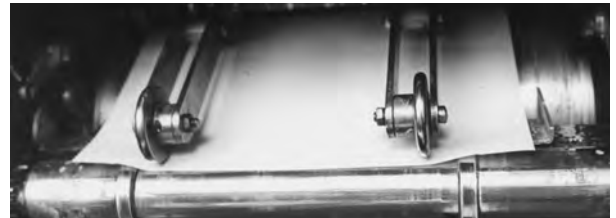
- Use fountain solution sparingly to minimize curling and picking tendencies, which can result from excessive wetting of the coated surface.
- We recommend that inks be used *straight from the can, without alteration.*
 - If a tack reducer is used, be sure that the reducer is compatible with the ink being used.
 - The reducer and amount to be used should be ink-supplier recommended.
- Adjust feeder so sheet separators are slightly higher than the bottom of the suction feet.
 - Blower and vacuum settings should be set slightly higher than the lowest acceptable operating level for good separation with minimum flutter.
 - Place paper in center of feeder with every other suction foot engaged starting at the outside edge.
- Adjust guides on the register board for minimum side guide push.
 - Set skid rolls to barely touch the trailing edge of the sheet, when the sheet is at rest against the front guides.
- Adjust ejector rolls and rings to minimize delivery problems caused by paper curl.
 - Offset upcurl by placing ejector rolls *outside* ejector rings, downcurl with ejector rolls *inside* ejector rings.
 - Chain delivery systems provide more positive control during paper delivery at all speeds.
 - Generally, chain delivery is preferred over chute delivery when optimum press results are desired.

Ejector rolls outside rings



Setting ejector rolls outside of the ejector rings offsets upward curl in stock and sheet delivery will improve. See comparison.

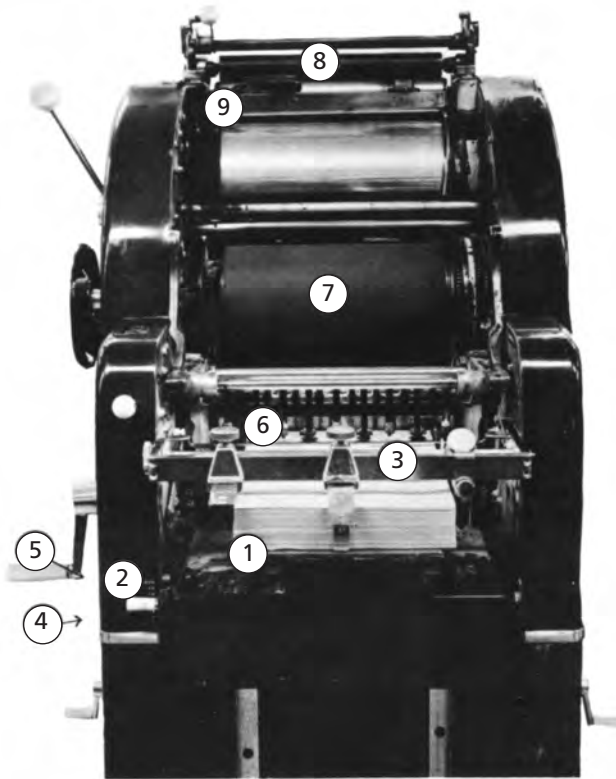
Ejector rolls inside rings



Ejector rolls are set inside ejector rings to compensate for downward curl in stock and to minimize delivery problems.

Printing on an A.B. Dick[†] Press (350-360-369)

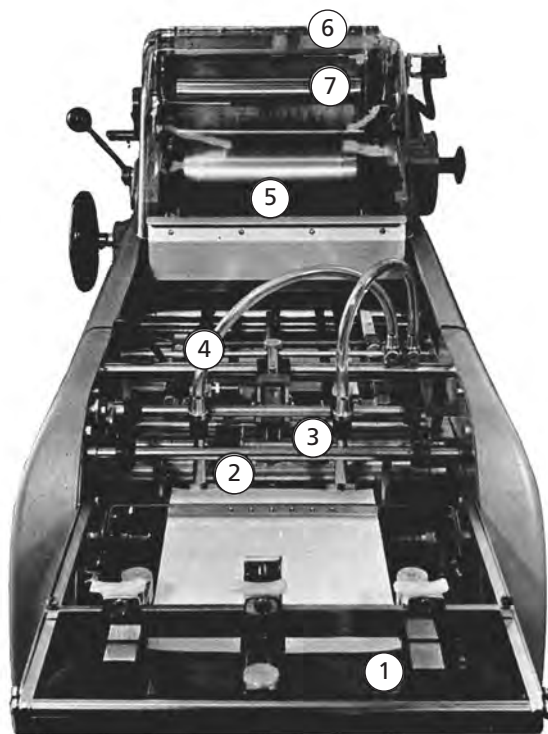
- ① Fan and load paper on a stiff board in the center of the press.
 - Check to assure the printing side is up.
 - Rear and side paper guides should lightly touch the lift.
- ② Set the paper lift height to a point where the suction feet just barely pick up the top sheet of paper.
 - Begin with the pile height adjuster set between No. 2 and 4.
- ③ Place paperweight bar in one of the two "forward" notches which will help control the amount of air separating the sheets.
 - In some situations, your press may perform better using the lightweight paper kit (Part No. 1-3507).
- ④ Air should be adjusted to float the top 3 or 4 sheets.
 - Air and vacuum may have to be adjusted as press speed increases.
- ⑤ Set buckle at 12 to 14.
- ⑥ Set bump at lowest setting to ensure good print quality and minimum capsule damage.
- ⑦ Quick release compressible type blankets are recommended to minimize capsule damage and reduce any tendency for the paper to stick to the blanket.
 - Results can be checked by spraying a CB surface with Instant Replay II CB Damage Indicator.
- ⑧ Keep ink flow to the minimum necessary.
 - Use quality inks that dry by oxidation and have lower ink tack (in the 10-12 range on a GATF Inkometer) to reduce the possibility of setoff and coating buildup on the blanket.
- ⑨ Run with a minimum amount of fountain solution necessary to keep plate clean and for quality printing.



† A.B. Dick is a registered trademark. Use does not imply endorsement.

Printing on an AM Multilith Press (1250-1850-2650)

- ① Fan and load paper in the center of the feed table.
 - Check to assure printing side is up.
 - Rear and side paper guides should lightly touch the lift.
- ② Paper height should be between $\frac{1}{8}$ " and $\frac{1}{4}$ " below the sheet separators.
 - Blower tubes should be adjusted to evenly float 6 sheets just below the separator fingers.
- ③ In-feed wheels should be positioned equally from the sheet edges; the suction feet should be located about 1" from the edges.
- ④ The side register guide should barely tap the side of the sheet.
 - Pushing the sheet excessively to the register point may cause it to buckle and wrinkle as it passes through the press.
- ⑤ Reduced impression pressure and quick release compressible type blankets are recommended to minimize capsule damage.
 - This will also reduce any tendency for the paper to stick to the blanket.
 - Results can be checked by spraying a CB surface with Instant Replay II CB Damage Indicator.
- ⑥ Use quality inks that dry by oxidation and have lower tack (in the 10-12 range on a GATF Inkometer) to reduce the possibility of setoff and coating buildup on the blanket.
- ⑦ Run with the minimum amount of fountain solution necessary for quality printing.



t Multilith is a registered trademark. Use does not imply endorsement.

Printing Inks

The standard inks available for forms printing are generally comprised of a **pigment**, a **vehicle** and certain **additives**.

NCR PAPER brand can be printed with most quality inks normally used by the printer to produce business forms.

Ink Pigments

The pigment is finely ground solid particles suspended in the vehicle that impart color.

- Pigments also contribute to many other properties of the ink, such as specific gravity, opacity or transparency, and permanency to light, heat and chemicals.
- They usually determine the resistance of a print to bleed in water, oil, alcohol, acid or alkali.

Ink Vehicles

A vehicle is the liquid portion of an ink that carries the pigment and binds it to the paper after the ink has dried.

- Varnish, obtained from linseed oil, soya oil, and other blends of agra oils are the most widely used vehicle in business forms inks today.
- Other common oils such as cottonseed oil, castor oil and fish oil are also used as ink vehicles.
- A combination of certain synthetic resins with a vehicle will produce many specially desired properties.

Ink Additives

Ingredients such as driers, waxes, lubricants, gums, starches and wetting agents are used to impart special characteristics.

- Driers, for example, act as catalysts to speed the oxidation and drying of the varnish.
- Lubricants will reduce the tack of the ink and cause it to set quickly.
- Additions must be carefully controlled in the pressroom, since each pigment-vehicle combination will behave differently.
- It is advisable that the ink manufacturer be consulted before altering the ink.

Ink Feed

The inking system for each offset printing unit consists of an ink fountain, fountain roller, ductor roller, three or four oscillating (vibrator) rollers, four or more distributor rollers and two, three, or four form rollers. It is not necessary to make any changes or additions to this basic system when running NCR PAPER brand.

Ink Tack

One of the most important physical characteristics of ink in relation to NCR PAPER brand is the "Ink tack".

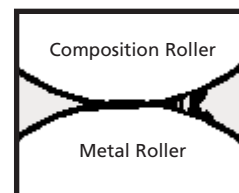


Figure 1. Ink tack.

- Ink tack is a measure of the resistance of an ink film to being split (Figure 1).
- The number, such as 10 tack ink, is a value assigned to represent the force required to split the ink film.
- If the force required to split the ink film is greater than the force required to pull the coating from the base paper, the coating material will be physically picked from the sheet.
- The coating that is removed from the paper can build up on the blanket, plate or elsewhere in the inking system and create major problems.
- With the wet offset process, we recommend the use of a 10 to 12 or lower tack ink, based on a GATF inkometer reading at 800 rpm.
- If using the dry offset process, we have found a 5 to 7 tack ink works better.
- Inks with a higher reading can create problems. Care should be taken to assure stripe settings are at manufacturer's specifications.
- We recommend that ink be used "straight from the can." However, if a reducer is needed, we suggest that you contact your ink supplier for specific recommendations.
- The use of a non-compatible tack reducer can cause offsetting in the roll, ink bleeding through the finished form or failure of the ink to dry.

Printing Inks

continued

Ink Stability

A subject closely related to tack is ink stability.

- Ink stability is the ability of the ink to maintain its physical and chemical properties throughout the inking system until it reaches the paper.
- Changes in the stability can be created by contact with the atmosphere, when the film is split, or by water logging.

If the ink laydown is not of the best quality, the back cylinder pressure may have to be increased to help create a better image.

- In doing this, however, care must be exercised not to create too much pressure on the paper as this could cause damage to the pressure sensitive capsules of CB, CFB and Self Contained.
- If back cylinder pressure is changed, use Instant Replay II to check for capsule damage.

Ink Drying

Poor ink drying is the cause of many printing problems. When printing coated sheets such as the CB side, it is particularly important to take precautions to insure proper drying.

Ink Driers

There are two types of driers added to inks: internal driers and external, or top driers.

- Internal driers dry from the inside out and top driers dry the surface of the ink.
- When ink drying problems occur your ink supplier can adjust the amount of driers to match your needs.
- It is not recommended that driers be added by the printer unless specified by the ink manufacturer.
- There is a point when too much ink drier will extend drying times.

Fountain Solution

Fountain solutions can retard drying in inks.

- If the pH of the fountain solution is too acid for the ink (generally 4.5 or more acid) or if the ink is contaminated, it will stay open longer. This could lead to offsetting, tracking and other problems.
- Other ink drying problems created by an improper fountain solution are ink emulsification and over-wetting of the paper so it will not accept ink as well.

Ink Film

Too dense an ink film will create drying problems.

- Higher pigmented inks will allow the printer to get good color without laying down too much ink.
- The thinner the ink film the faster it will dry.

Precautions and Tips

Although it is generally true that standard inks used with conventional printing processes are suitable for NCR PAPER brand, observation of the following guidelines can help avoid problems related to carbonless paper and ink.

- An ink of reduced tack will minimize coating-pick or loose material pick-up.
- Certain formulations of inks may develop a halo as the ink components separate. (A simple change in ink formulation should correct the problem. The ink manufacturer involved should be contacted regarding the recommended change.)
- Inks that dry by oxidation/evaporation should be used for backprinting (printing on the CB side of the sheet).
- The ink stripe on the ink form roller should be of the manufacturer's recommended width and uniform across the roller. This ensures uniform ink laydown, color density and coverage.

Dampening Systems & Fountain Solution

Dampening Systems

Although there are no specific precautions in the area of plate dampening when printing on NCR PAPER brand, a higher degree of quality is realized when:

- Dampening rollers have a uniform pressure from end to end.
- All rollers are set to manufacturer's specifications.

Fountain Solution

There are no special requirements for printing NCR PAPER brand carbonless. Fountain solution plays a key role in quality and performance using a wet offset printing process. The choice of fountain solution is the first step in a properly balanced water system. A good solution should meet the following criteria to get the best results:

- It should be pH buffered to match the recommended pH level of the plate and the ink you are using.
- It should be formulated to match the hardness of the water with which you mix your solution.

pH Buffer

Most fountain solutions are designed to buffer out at a preset pH level and hold that level. The buffer acts like a sponge to absorb any chemical which is a different pH, either more acid or more alkaline. The buffer will control the pH to the level it is designed to handle until the buffer is exhausted. At that point the fountain solution is no longer able to tolerate outside chemicals and the pH will start to change.

Too acid conditions can cause the following problems:

- Toning due to etching of the plate.
- Ink drying is retarded.
- Ink will emulsify.
- Ink rollers will not accept ink, stripping.
- Plate wear is accelerated.
- Plate will not accept ink or have low contrast, blinding.
- Ink color changes may occur if too acid a condition exists.

Too alkaline conditions can cause the following problems:

- Plate wear.
- Toning/tinting of plate.

Dampening Systems & Fountain Solution

continued

Conductivity

Conductivity is the ability of a solution to conduct an electrical charge. Conductivity is a measure of the amount of available ions present in the solution. The more available the higher the conductivity. Conductivity is measured in micromhos by a meter. In the printing process, a workable conductivity range is determined by the requirements of the plate being used, the base water used, the inks and the type of dampening system.

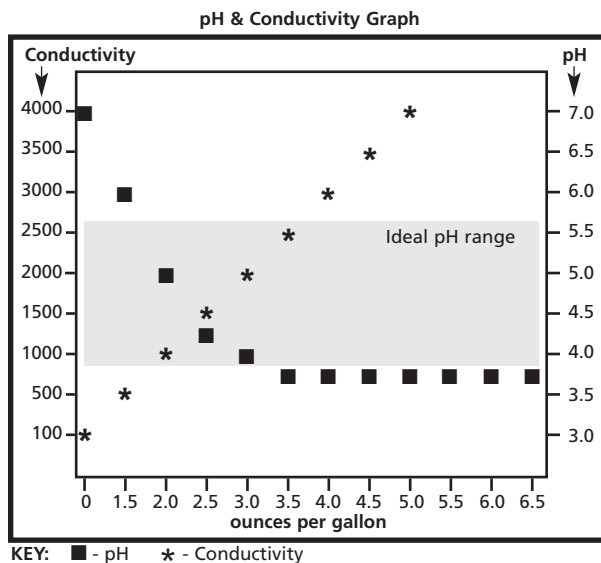
There are both good and bad dissolved ingredients (ions) which are measured when a conductivity reading is taken. The good components are from the fountain solution and are used to clean the plate. The bad components are contaminants which are collected in the printing process. These contaminants raise the conductivity in a negative manner and create printing problems.

What is an ideal conductivity?

Only you can determine that. What works for you is correct. But to determine a starting point:

- Contact your plate and ink suppliers and ask for the ideal pH & conductivity range for the plate and ink being used.
- Take a gallon of your water and add 1/2 ounce of fountain concentrate per gallon, mixing well. Take the pH and conductivity reading. Repeat for 1 oz/gallon, 1 1/2 oz, 2 oz. etc. up to 8 oz.

■ Plot the results on the following graph:



■ From the graph you can determine if the fountain solution is properly buffered to match your plate and ink. Also you can decide if what the proper number of ounces per gallon is best for your shop.

Process Control

Once the proper fountain solution and the mixture has been determined, the next step is to maintain that level and know when to change the solution.

A regular schedule of changing the solution and cleaning the tanks should be set up.

SHEET PRINTING

Plates

The lithographic plate is different from other mechanical printing plates.

- The litho plate is planographic, that is, the image and non-image areas are essentially on the same level.
- The image areas are not raised as in letterpress, nor depressed as in gravure printing.
- The image areas are simply ink-receptive areas surrounded by water-receptive (ink-repelling) areas.
- When moistened, the water-receptive areas refuse to take ink, while the image areas repel the water.
- The printing cycle, consists, therefore, in
 1. dampening the plates non-image areas,
 2. inking the imaging areas, and
 3. transferring the ink from the image areas to the blanket from which the image is offset onto the paper.
- Water flow should be sufficient to keep the plate clean from and minimize tinting or toning.
- Excessive amounts of water carried by the plate can lead to ink/water emulsification and tinting.

Types of Plates

There are three general types of plates for offset duplicator use, and NCR PAPER brand carbonless can be printed with each of them. These three types are paper, polyester, and metal.

- The type of plate selected often depends upon the desired printing quality and the required plate durability (length of run).
- Paper plates are the most economical. Printing quantity is typically limited to 5,000 although some paper plates are capable of 10,000 (depending on paper and pressure used). Halftone reproduction is not as good as with other plate types.
- Polyester plates can generally be used for quantities up to 50,000.
- Metal plates provide the best printing quality and longest wear. They are recommended for halftones and fine screen work, and usually provide better registration. There are three types of metal plates: smooth, grained and wipe-on.

Smooth Metal Plates

Smooth presensitized plates require less printing pressure than grained plates to obtain good printing.

- Smooth plates also carry and transfer less water to the blanket thereby keeping the blanket drier and less tacky.
- A close check should be made periodically to be certain not to run too dry, because this can contribute to dry blanket piling in the non-image areas.

Plate Life and Performance

Properly developed plates are necessary to ensure optimum printing results.

- Plates must be well desensitized in the non-image areas to prevent scumming.
- Image areas of the plate should be developed to produce a solid 6 or 7 on a gray scale to ensure against premature image breakdown.

When printing CF, plate life is comparable to that obtained with other coated papers. The uncoated printing side of CB should perform comparable to a regular forms bond.

Another determinant of plate life and performance is the fountain solution.

- An improperly balanced or mixed fountain solution can contribute significantly to reduced plate life.
- The pH of the fountain solution regulates the amount of gum arabic available to the non-image areas of the plate.
- Each plate manufacturer has set the ideal operating ranges for pH and conductivity for their plates; the fountain solution should be filled to match these recommendations.

Blankets

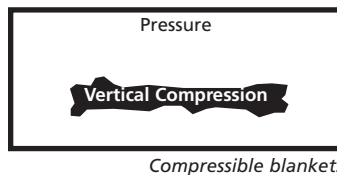
Blankets have a direct effect on the quality of your printing. The best assurance for quality blankets is to buy from a reputable firm.

- An offset blanket is wrapped around the cylinder and held with sufficient tension or adhesive to prevent slippage during printing.
- The most commonly used offset blankets consist of several plies of long fiber cotton fabric calendered together with a special rubber cement and then coated with a rubber compound on one side.
- The thickness of the individual rubber layers vary according to press specifications and requirements.
- The exact thickness is not as important as thickness uniformity. Variations in thickness of up to .001" are normally acceptable.
- A clean, properly cared-for blanket should be used at all times. However, if the blanket becomes tacky, an application of blanket powder (available from blanket suppliers) or talcum powder is helpful in preventing the web from sticking to the blanket.

Compressible Blankets

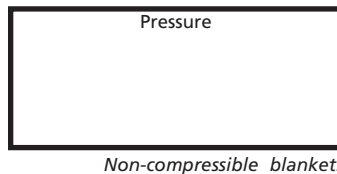
To minimize capsule damage, the use of compressible blankets is recommended.

- The compressible blanket contains tiny air pockets into which the blanket fibers and rubber can be displaced under pressure.



- The material that forms the walls of these air voids in the compressible blanket will act as tiny springs that contract under pressure, then regain their original form rapidly when the pressure is removed.

- Lateral flow, which is the displacement of a blanket on both sides of the pressure point, is found only with non-compressible blankets.



- Lateral flow can cause blanket bounce or blanket chatter at the printing nip and ultimately damage the CB capsules.
- Lateral flow is reduced by using compressible blankets.
- Compressible blankets usually have a more even caliper across the web, which reduces concentrated pressure points, and produces more uniform ink coverage and better release.

General Information

Here are some helpful hints pertaining to blankets when running NCR PAPER brand:

- Sponge the blanket with water after every washup so the blanket surface does not lose its ink receptivity by becoming glazed or hard. This will keep the printed impression from gradually losing its sharpness.
- To avoid horizontal streaks in the printing, make sure the blanket is kept tight. A loose blanket tends to follow the plate and slip on the blanket cylinder. Remember, the greater the plate-to-blanket pressure, the worse the slippage.
- Check the squeeze between blanket and plate frequently to make certain it is within the accepted tolerance of .002" to .003"

Press Blankets can swell due to a reaction with capsule oils and/or blanket cleaning solvents. As this swelling occurs, excessive pressure may be exerted to the stock damaging more capsules. It may be necessary to change the type of blanket used to one which is resistant to oils. A number of blanket companies have developed such blankets.

Blanket swell can be identified by you both visually and by running your hand over the blanket. If the printing image feels embossed, or like braille, it is likely blanket swell has occurred.

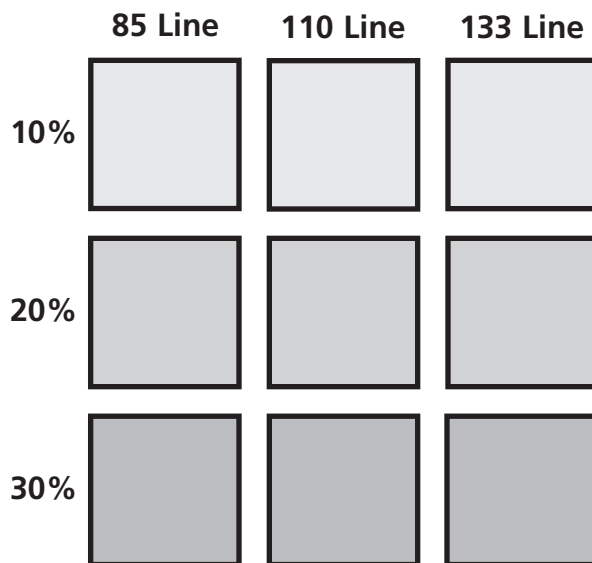
The capsule damage indicator spray, Instant Replay II can help identify this condition.

Screen Tints

Printing inks, when applied to either the CB, CF or SC surface with heavy coverage such as in a screen or solid, can reduce intensity of NCR PAPER brand carbonless imaging in that area. This is objectionable only where the printed area is also a writing area. The reduced intensity occurs because some printing inks can cause a physical blocking between coatings. Certain inks will cause more difficulty than others. For example, gloss inks that dry with a hard, continuous film cause a carbonless image with reduced intensity.

To minimize intensity reduction of NCR PAPER brand carbonless imaging:

- Maintain a very thin film of ink. Heavily pigmented inks, applied to the paper in the smallest practical amount, will generally give best results.
- Generally, use an 85 to 133 line screen at 10%-20% density for best results.
- Use ink colors other than blues or blacks that may be close to the hue of the carbonless image color.



Backprinting

Backprinting can be used to show additional information on the back (CB) side of the sheet. For example, the terms and conditions of a contract could be backprinted.

To ensure good printing without damage to the CB capsules, certain precautions should be taken:

Copy:

- Whenever possible, screen copy to reduce coverage.
- Whenever possible, avoid large solid areas, logotypes or trademarks with heavy coverage.

Printing Method:

- Use Instant Replay II spray to detect capsule damage. The release of capsule oils will mix with the inks creating a chemical reaction. They will also retard the drying of the ink which leads to set off and tracking.

Inks:

- In order to ensure good drying, only use an ink formulated specifically for carbonless backers (an ink that dries by oxidation/evaporation).

- Use a minimum ink film thickness. Whenever higher pigmented inks are used, the ink film can be run thinner and yet have adequate coverage.
- Inks with a high soy content have been found to react with carbonless coatings. Lower soy contents, other agra based inks and petroleum ink give best results.

Fountain Solutions:

- Maintain a pH and conductivity compatible with the ink and plate. A fountain solution which is too acid or too alkaline will retard in drying.



For backprinting use light-face type or screened images.

It is important that a write-test be done (see page 8) if heavy ink coverage on the coatings is utilized. This test should pick up any image intensity reduction caused by the ink.

Dry Offset CF Ink

Introduction

CF Ink is a CF coating applied in an area to produce the CF ply of chemical carbonless forms. CF Ink can be applied to the paper base of your choice (see page 24). This ply can then be used in conjunction with NCR PAPER brand of carbonless paper CB (coated back) and CFB (coated front and back).

- CF Ink must be applied by the dry-offset or letterpress printing process as the last color down using a full offset tower inking system or equivalent rubber tower.
- CF Ink can be applied on the maximum size solid your press will print without form roller starvation (mechanical ghosting).
- Should starvation occur, consult press manual or press manufacturer.
- CF Ink is compatible with both Blue Print and Black Print grades of CB and CFB NCR PAPER brand.
- Questions or inquiries regarding the CF Ink product itself can be directed to Technical Services.

Storage and Handling Information

Shelf Life

- CF ink should be used within six months of receipt.
- Forms produced containing CF ink printed parts should be used within two years of production.

Ink Storage

- Normal climatic conditions will not affect CF ink. If stored or received in adverse conditions, bring ink to pressroom temperatures before use. Do not store above 140° fahrenheit.

Precautions

- Do not use any additives with CF ink. Any additions will change the performance of the ink and result in a decline of functionality.
- CF ink applied on a bond weight CB sheet may cause unwanted color development.
- Forms produced with CF ink printed plies cannot be fanapart edge padded.

- Certain substances have been identified which can adversely react to NCR PAPER brand CF surfaces and CF Ink. These include unapproved carbons, shrink wraps, wet toner copiers, etc.

- Incompatible paper basestocks may result in imaging outside of the non-inked areas. See page 24 for further information.

Press Instructions Dry Offset Applications Only

Full Printing Tower Preparation

- Color wash rollers — residual ink will contaminate CF ink.
- Roller stripe settings should be set to meet manufacturer's specifications. Proper CF Ink settings should be 1/8 inch to the plate. Stripes must be uniform across the printed web to ensure proper laydown. Improper roll settings may cause piling.
- Plate and blanket cylinders should be packed to ensure proper printing nip squeeze.

Idler Rolls

- Must be free turning.
- Must contain like-new roller covering. Worn or contaminated covers can promote tracking.

Ink Preparation

- Ink should be at pressroom temperature.
- Agitate ink in can.
- Fill fountain.

Ink Film Adjustment

- Set fountain keys for normal ink flow to image area.
- Set ductor roll dwell to near maximum.

Run at desired speed to check ink film laydown

- See page 23 for measurement of ink laydown.

(Continued on next page)

Dry Offset CF Ink

continued

Running Conditions

- Maintain full fountain to eliminate skip coating.
- Check for tracking on idler rollers which can be caused by:
 - Heavy, first-down colors wet picking.
 - Heavy CF ink film.
 - Worn or contaminated idler roll covers.
- Check for misting which can be caused by too short of a ductor roll dwell or too heavy of an ink film.
- Fountain agitator is desirable, if not available, press operator must periodically manually agitate ink in fountain.

Registration and Laydown

Since CF Ink is a clear ink film, it is difficult to identify its location once it is on the paper.

- Check for registration and CF Ink laydown using CF Indicator spray.
- The spraying of the CF Indicator on to the sheet being printed will show color development in any areas where CF Ink has been applied.
- CF Indicator will also show ink tracking, voids in the ink laydown and any extraneous ink that has transferred onto the printed sheet.
- To check the amount of CF Ink laydown, compare the sprayed area to the CF Ink Color Standard (see page 24).
- The blue color of the CF Ink area should meet or exceed (be darker than) the color shade of the CF Ink Color Standard.

- A check of color hue on a reflection densitometer using the blue color setting can also differentiate CF Ink laydown amounts.

- Questions regarding the use of a densitometer for this purpose should be addressed to Appleton Papers Inc., Technical Services.

Image Development

To check that the amount of CF Ink that has been applied is sufficient, the following method is recommended.

- Obtain sheets of the NCR PAPER brand CB surface that will be used to image the CF Ink surface when the form is collated.
- Place the CB surface in contact with the CF Ink surface and write on the form so that an image will develop on the CF Ink surface.
- Evaluate the image to determine if it is an acceptable image for your customer. Note: the ability of CF Ink surface to make an image will decline slightly once the CF Ink has dried completely.
- Make sure that the image that you initially obtain is slightly better than you need.
- When acceptable image levels are obtained, the following conditions are usually met:
 - CF Ink film thickness — .3 to .4 mil laydown
 - One lb. CF Ink covers approximately 300,000 sq. in.
- Remember, you are responsible for applying enough ink to produce an acceptable image for your customer.

(Continued on next page)



Checking CF Ink with CF Indicator Spray



Densitometer check for CF Ink



Pencil check

Dry Offset CF Ink

continued

Paper Basestocks

NCR PAPER brand "Spot Safe CB" is specifically designed for printer-applied CF Ink applications.

Printers are free to use the basestock of their choice, however, some general guidelines are recommended. These guidelines are listed primarily to ensure selection of a good basestock for best ink laydown and press run performance for desired carbonless imaging capability.

- The paper base should be relatively free of excessive pinholes, dirt, fuzz, slime spots, wrinkles and other visual defects.
- The paper should be uniform in basis weight, smoothness, caliper, formation and shade.
- Rolls must be true and uniformly wound with clean slitter edges free from dust and fiber particles.

One primary consideration that must be followed when choosing a basestock is the pH or acidity/alkalinity of the paper.

- Upon imaging an acid sized base, a latent image may occur.
- You can write test using a CB sheet on your basestock to be printed.
- An alkaline sized base will reduce this reaction. However, due to the CB dye oils in the mated sheet, there will always be a slight image in the non-inked areas of an acid sized base.
- Because of the chance for latent imaging in acid sized bases, we cannot guarantee a specific basestock manufacturer but only recommend those that appear to have less imaging in the non-inked areas and acceptable imaging in the inked areas.
- It may also be noted that the bond manufacturers may periodically change their paper formulations without our knowledge.

CF Ink performs best on plain bond, however special bases such as dry-gummed or pressure sensitive papers can be used.

- It is possible that the special coatings on some basestocks can adversely affect the CF Ink and its imaging capacity.

- Different basestock characteristics may require some ink film adjustments.

We suggest submitting samples of the desired basestock before applying CF Ink for a compatibility study.

- One dozen 8½" x 11" paper samples are required for lab testing.
- Please submit the samples to:
Appleton Papers Inc.
Technical Services Department
825 E. Wisconsin Ave.
P.O. Box 359
Appleton, WI 54912

CF Ink Color Standard

CF Ink area sprayed with CF Indicator Spray should approximately match the intensity of Pantone®* 279.

Evaluation Instructions

- Spray CF Ink area with CF Indicator Spray.
- Place printed sample side-by-side with this color standard.
- If blue color development is lighter than this color standard, more ink should be applied.
- If blue color development is equal to or darker than the color standard, the CF Ink surface should be capable of developing an acceptable image. (Note: your customers' needs may vary depending their application.)

*Pantone, Inc.'s check-standard trademark for color reproduction and color reproduction materials.

Cutting

Exercise caution when guillotine-cutting pressure-sensitive grades of NCR PAPER brand.

- On CFB, unwanted background color will develop on the CF side under the clamp (hold-down bar) if pressure is excessive.
- After CFB has been cut without unwanted color formation, CB can be cut using the same pressure and procedure without damage to the dye capsules.
- CF grades are not pressure-sensitive and may be trimmed using the same procedure as for bond paper.

Cutting carbonless paper to prevent damage:

- Reduce the clamp pressure to less than 35 p.s.i. (total clamp gauge pressure divided by square inch surface area of the clamped paper). *This will not cause color development on CFB and will not damage CB coating.*
- Place a piece of open-cell, medium-density sponge rubber, $\frac{3}{8}$ " to $\frac{3}{4}$ " thick, under the clamp to cushion the impact of the clamp. *With some large guillotine cutters, it is advisable to prevent the clamp from striking the paper. Apply clamp pressure gradually.*
- Block up the clamp with a chipboard stack. The stack should be $\frac{1}{4}$ " higher than the lift of paper and $\frac{1}{2}$ " from the edge of the paper. *Chipboard may be placed on top of the forms to be cut and will reduce the pressure damage on the lift of forms and eliminate any draw.*
- Be sure the shear stick, which receives the knife, is even with the table and in good condition. *Place a protective sheet of chipboard under the lift to prevent marking of the bottom sheets in a lift.*
- "Gang" cutting (more than one lift of forms cut at the same time) can be a convenient way to distribute clamp pressure, and prevent capsule damage.

If there is any capsular damage, it will become more apparent in time.

- The initial lift should be observed shortly after cutting to see if there is any indication of unwanted color indicating capsule damage.

- If there is no coloration on the CFB immediately after it is cut, the final developed color, if any, should be slight and unobjectionable.

The cut edge on CFB will show a small amount of coloration. This can be minimized by:

- Using a sharp cutter knife and
- Preventing "draw", i.e., movement of the paper, under the clamp.

Experience has proven that the reduced clamp pressure required to cut carbonless paper is still sufficient to prevent "draw", which can affect sheet dimension and give undesirable edge coloration.

If the printed, live area of a job is positioned on an oversized sheet, it may be possible to clamp on the part of the sheet to be discarded, eliminating any possibility of damage to the printed area.



Sponge rubber pad is attached to bottom of the clamp bar. Chipboard stack prevents clamp damage to lift of paper. Proper trimming methods provide best results.

Miscellaneous Bindery Operations

Bracket Cutting

This operation, because of equipment design, should be periodically checked to assure that it is not causing excessive CB damage.

- To minimize damage on CB, CFB and Self Contained type, we recommend that the knives be kept sharp and that the height of lifts be reduced.

Scoring-Creasing

These operations do not usually cause problems with NCR PAPER brand.

- They can damage CB, CFB and Self Contained type coatings; however, in most forms applications there is no need to produce a print at the score or crease.
- Color will develop on Self Contained type paper upon scoring or creasing.

Tipping

Problems have not been experienced with regular equipment using adhesives formulated for this purpose.

Jogging

Care should be taken to assure proper sequencing and orientation of copies.

- Sets should be pencil checked occasionally to assure proper transfer though all parts of the form.
- We recommend the use of collating racks or a table with the jogger to reduce costs on this operation.
- Multiple-set collation from racks will result in additional savings over single-set collation.

Round Cornering

The plunger ram should be locked to keep it from operating, because the pressure may cause damage to the capsules.

Drilling

Sharpness of the drills is essential to minimize blocking and extensive discoloration around the holes.

Perforating Machines

Except for occasional capsule damage caused by guide wheels, we have not had any indications of problems on this type equipment.

- For optimum performance, we recommend using an angled conveyor delivery to the perforating head.

Indexing

Damage resembling paper clamp pressure on a cutter can result from die pressure on some indexing machines.

- Care should be taken so that the die throat does not compress the forms.

Forms Packaging

We recommend good quality corrugated cartons (200# minimum bursting strength) for packaging finished forms.

- The box should be firmly packed to keep the forms from shifting.
- If possible, the boxes should be matched to the size of the forms being packaged.
- Contents should be firm but not over packed as pressure damage can result.
- A piece of corrugated board should be placed inside the carton at both top and bottom for additional protection.

Shrink Wrap Packaging

Many of our customers have had very good results with shrink-wrapping packages of forms.

- This provides a low cost, convenient and attractive means of packaging that gives good protection to the contents.
- Best results are obtained when chipboard is used at the top and bottom of the stack of forms, for added protection.
- Some plastics contain ingredients that can have an adverse effect on the carbonless coatings, so any shrink films being used for the first time should be checked by Technical Services to assure they are compatible.

Fanapart Edge Padding

How to Consistently Create Perfect Multi-Part Form Sets with NCR Paper* Brand Carbonless Sheets

Unit Sets:

Offset Press



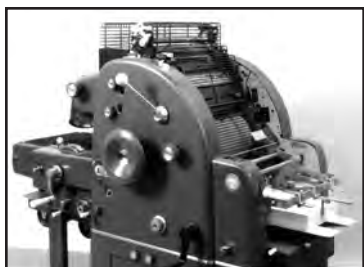
Individual unit sets easily separate from an edge padded stack.



The individual plies of each unit set, can be peeled-off.



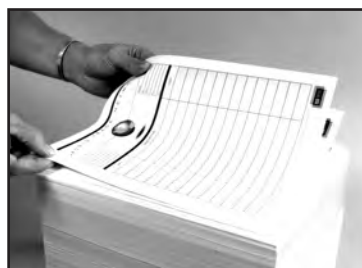
NCR PAPER* brand SUPERIOR.



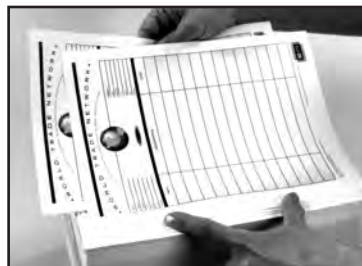
NCR PAPER* brand carbonless is produced for trouble-free runnability on offset presses such as this A.B. Dick.

Snap-Sets:

Offset Press



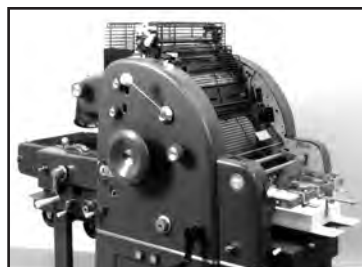
Individual snap-sets easily separate from an edge padded stack.



Individual plies can be snapped-out (leaving the stub plies intact).



NCR PAPER* brand LASERSNAP®.



LaserSnap® is produced for trouble-free runnability on offset presses such as this A.B. Dick.

Unit Sets:

Copier or
Laser Printer



Individual unit sets easily separate from an edge padded stack.



The individual plies of each unit set, can be peeled-off.



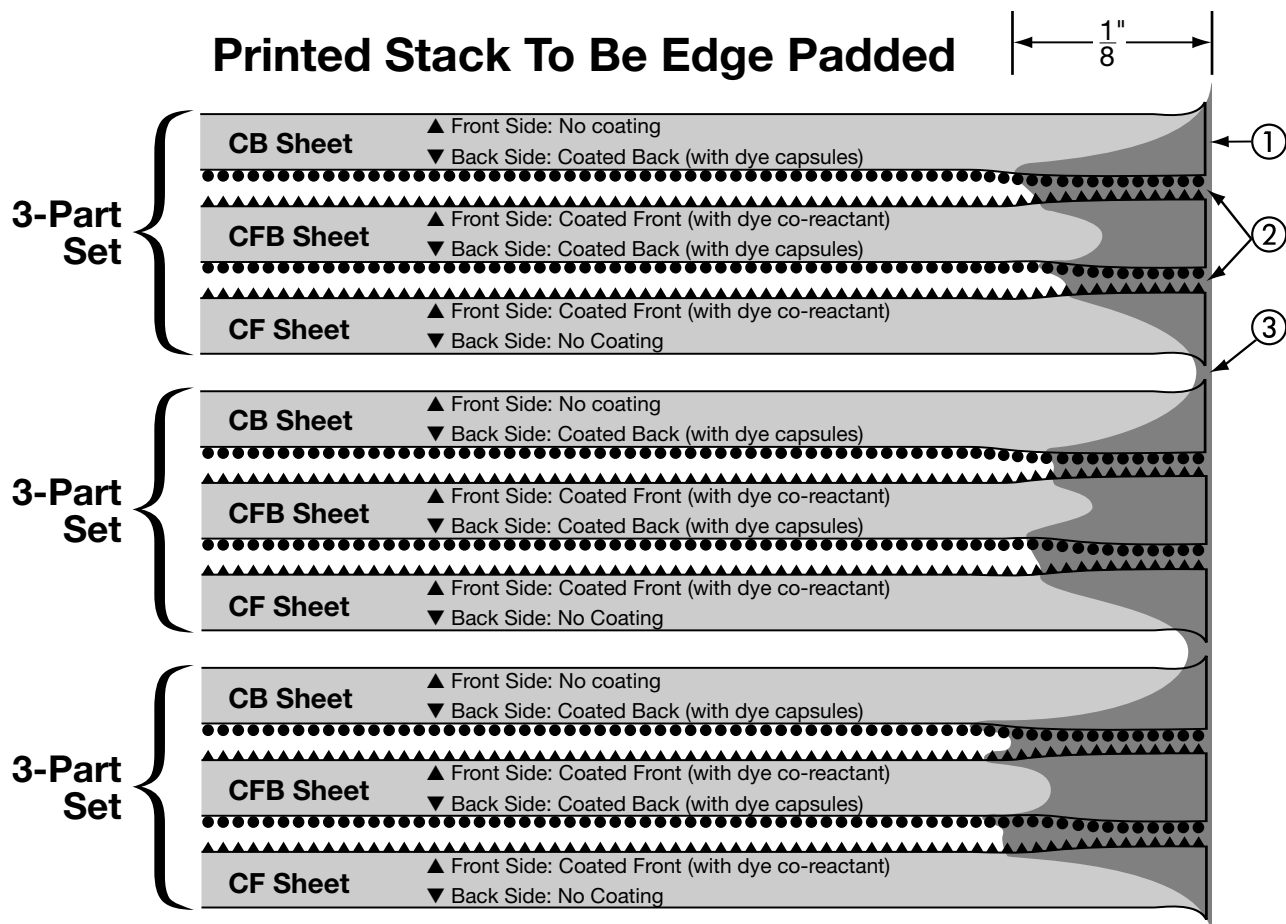
NCR PAPER* brand XERO/Form®.



Xero/Form® is produced for ultimate runnability and productivity on copiers such as this Xerox DocuLink 5690.

Fanapart Edge Padding continued

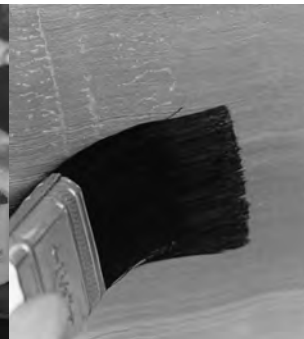
Edge Padding Mechanism: "How It Works"



- ① Fanapart High Strength Edge Padding Adhesive (shown in red) is applied to one (1) edge of a stack of printed or copied/laser-printed carbonless sheets.
- ② The edge padding adhesive penetrates the stack only into and along the sheets' "coated" (front and back) sides causing these sides to swell closer together. *NOTE: The "coated" sides are always the inside sides of a multi-part set – so as the adhesive dries, only the set itself sticks together.*
- ③ The adhesive does not penetrate the stack into or along the sheets' "no coating" sides. *NOTE: The "no coating" sides are always the sides between two different multi-part sets – so the two sets don't stick together and easily fan apart (break apart) when the adhesive dries.*

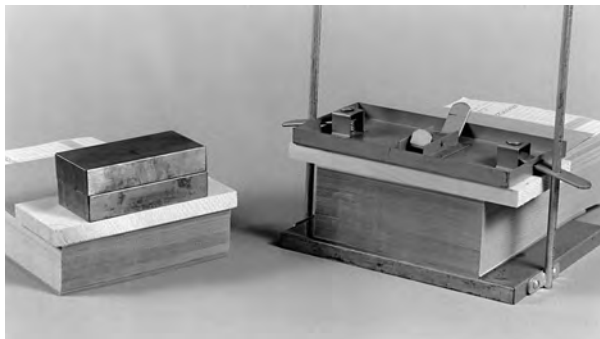
Fanapart Edge Padding continued

How to Consistently Create Perfect Multi-Part Form Sets



Jog

- Jog stack of paper by hand or machine. *(Sheets must smoothly align along the edge to be padded.)*



Place

- Place stack on flat surface or in padding rack. *(Edge to be padded should not overhang support base.)*
- Place "weight-distribution board" on stack, flush with edge to be padded. *(Board must be as wide or wider than edge to be padded.)*



Weight

- Place weight on board to bring sheets into contact with each other. *(Use enough weight to restrict paper separation to about 1/8" when thumb is firmly run down corner.)*

Brush

- Saturate the bristles with enough "Fanapart High-Strength Padding Adhesive" for several strokes. *(Start with a dry, clean, 1 1/2" to 2" brush.)*
- With a fully loaded brush, apply adhesive to the entire edge to be padded. *(Start from the bottom center of the stack stroking several times outward to the edges, and work up.)*
- Repeat strokes in same area to ensure 1/8" adhesive penetration into the stack. *(Do not apply one "light" coat to the entire area, then apply a second coat.)*



Dry & Fan Apart

- Let stand for 30 minutes before packaging. *(24 hours recommended before using.)*
- When dry, fan forms to separate sets.



Fanapart Edge Padding

continued

Frequently Asked Questions

- 1) **How can I reduce wavy edges?** Because you are putting liquid adhesive onto the paper edge, some waviness will naturally occur. If the adhesive moves into the sheet more than the recommended 1/8", waviness is likely to occur. One way to minimize a wavy edge is to apply the adhesive to a fresh cut edge. Allow time for the edge to stabilize, approximately 1/2 hour. The fresh cut edge will assure proper sheet alignment and reduce excessive adhesive penetration.
- 2) **What will happen if the multi-part form sheets are not in the correct order (CB / CFB / CFB / CF)?** Proper sheet order is critical to successful edge padding. Remember, only coated surfaces accept adhesive and stick together to form sets; uncoated surfaces do not accept adhesive and will not stick together.
- 3) **Why won't the adhesive penetrate into the stack?** How can I control penetration? There are several things to check to make sure the adhesive is going into the stack:
 1. Check the amount of weight you are using. Too much weight will not allow the adhesive to move in between the sheets.
 2. Be sure to follow the correct procedure shown to apply the adhesive. You must cover each area of the stack thoroughly before moving on. That is why we recommend going over the same area with 2-4 strokes to be sure the adhesive has penetrated. (Example. Let's say you started at the bottom center and stroked to the edges (as recommended) but decided that you would apply one pass on the entire stack, then go back and apply more adhesive with another pass. By the time you returned for the second pass, the adhesive that was applied first would already be swelling the fibers and the second application would not be able to move into the stack.)
 3. Check the amount of adhesive your brush is carrying and the condition of the brush. Brushes that do not hold their shape, are worn out, or have dried adhesive in them will not hold enough adhesive. Make sure your brushes are in good shape and have been cleaned properly.
- 4) **Do I have to use a brush? Can I use a spray applicator?** We recommend using a brush because you need a little bit of pressure to move the adhesive into the stack. A spray applicator does not provide this pressure. A brush is also neater and will ensure total coverage.
- 5) **What kind of brush should I use? What should I clean it with and how often?** Most commercial paint brushes will work with Fanapart Adhesive. The actual type of brush is not as important as the care and cleaning. It is very important to wash your brush out thoroughly after use. If adhesive is left in the brush it will harden and reduce the amount of adhesive the brush will carry. If you would like to only wash-up once a day you should always keep the brush covered so the adhesive will not start to dry. You can do this by covering the brush bristles with aluminum foil. Wash the brush with a commercial liquid soap. Do not use a soap that contains abrasive grains. These will become lodged in the bristles and interfere with adhesive application. After the brush is washed we recommend wrapping the end in a paper towel. This is done so that the brush dries properly and maintains its shape. This will allow it to hold more adhesive. NOTE: Always cover the adhesive container when not in use. Leaving the cover off will change the adhesive's ability to penetrate correctly. Water and fluids will evaporate, changing the adhesive's viscosity.
- 6) **Why can't I edge pad on two sides?** We do not recommend applying adhesive to more than one side because it may cause unwanted sheet separation and wrinkles. If you must edge pad two sides to satisfy your customer, we recommend that you perform a fresh cut on the edges to assure complete alignment of all the sheets in the stack.
- 7) **Can I put a sheet of bond paper into my carbonless form set?** No. The bond sheet does not have the proper coating for edge padding. Remember, form sets separate at uncoated surfaces. If an uncoated bond sheet is in the set, that is where it will separate.

Fanapart Edge Padding continued

8) Can we use other manufacturers' adhesive on NCR PAPER* brand carbonless?

Can we use Fanapart Adhesive on other carbonless products? No. We do not recommend using other manufacturers' adhesive on NCR PAPER* products. We also do not recommend using Fanapart on other carbonless products. Each manufacturer formulates their adhesive for their own product. Best results are seen when the adhesive and paper are matched.

9) I have a job that has ink right up to the edge of the sheet and it won't pad. What's wrong?

A layer of ink on the paper coating will not permit the adhesive to penetrate correctly. Try to redesign the job so that the printed image does not bleed off the edge to be padded.

Helpful Hints:

- JOGGING IS CRITICAL – Proper alignment of the sheets is the difference between a good padding job and a bad one. Make sure to jog the stack correctly.
- DON'T RUSH – Moving too quickly when applying the adhesive may result in some areas not being covered well enough. Do it right the first time!
- USE A GOOD BRUSH – Using the proper technique and a brush in good condition will result in a reliable pad. Remember, a brush is a lot less expensive than a re-run.

Digital Duplicators

Overview

Digital duplicators are computerized versions of the old mimeograph machine, except they are faster, cleaner, and more efficient. Today's digital duplicator incorporates a scanner and thermal head, and has the ability to print up to a 600-dpi resolution.

Digital duplicators fill the gap between copiers and offset printing for businesses or organizations with high copy volume and a limited budget.

- **Appeal** - Digital duplicators are emerging as an affordable alternative for quick printers. Copies can be made for a fraction of the cost (typically around one-third cent per copy) of a photocopy.
- **Quality** - With higher 600-dpi resolutions, fine lines and shading meet the quality of digital copiers or high-speed laser printers.
- **Applications** - Digital duplicators are perfect for print jobs between 25 and 5,000 copies. Many models are capable of delivering up to 8,000 - 10,000 impressions an hour, and cost less to purchase than copiers with comparable speed.
- **Ink** - A high-density water base ink held in a cartridge is placed inside the print cylinder. This ink cartridge technology keeps hands clean and facilitates quick ink changeovers without wash-up.
- **Feeding system** - Friction on most digital duplicators.



Riso[†] GR3750

- **Operation** - Digital duplicators take about 30 seconds to produce the first copy, and about 5 minutes to produce 500 sheets. They can be interfaced with PC or Macintosh computers. No technical training or special skill is required to operate a digital duplicator.
- **Maintenance** - Digital duplicators are less service intensive than copiers.

[†]Riso is a registered trademark. Use does not imply endorsement.

Digital Duplicators

continued

Manufacturers

Riso, Inc., Ricoh and Duplo are the leading manufacturers of digital duplicators.

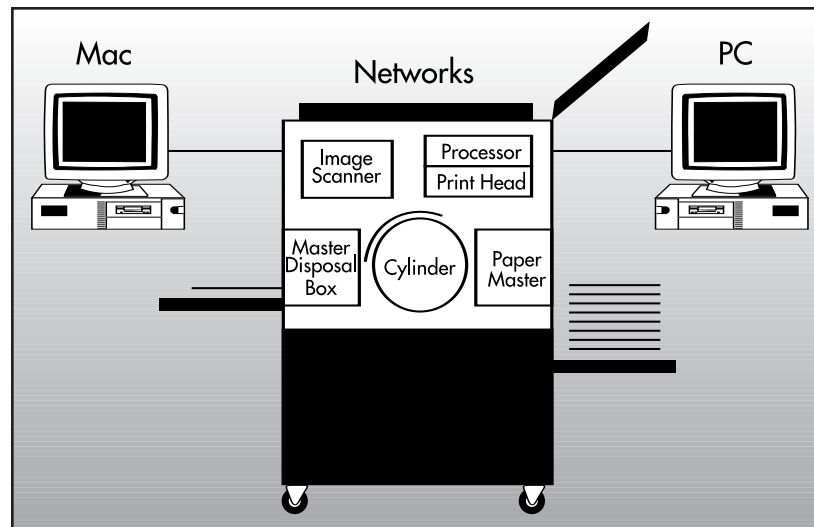
- Riso[†] - The Riso GR3770 Risograph was the first 600 x 600-dpi digital duplicator. The GR3750, with 400 x 400-dpi is shown on the preceding page.
- Ricoh[†] - Among others, distributes its equipment through its Savin and Gestetner divisions, and is the OEM for Standard Duplicating digital duplicators.
- Duplo[†] - Offers a complete line of digital duplicators, and differs from Riso and Ricoh with an air assisted sheet separator.

Preparation

- Jog the paper into a straight stack.
- Fan paper on the edge leading into the digital duplicator.

Characteristics/Issues

- Print resolution is poor on older digital duplicator models. Today's models have improved print resolution.
- Registration is poor (+ or - 1/16 in.) on older digital duplicator models, but much better on new models. Registration also improves with running at slower speeds.
- The friction feeding system of the digital duplicator can produce double or misfeeds. It also produces a smudge mark on CF sheets when running carbonless paper.
- Two color printing is accomplished by changing the ink cartridge and then running a second pass.
- Digital duplicators are better suited for line copy originals than for originals with heavy solids and halftones.



Digital Duplicators are driven by either PC or Macintosh computers.
Illustration courtesy of Riso[†] Inc.

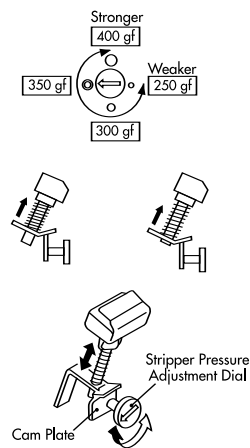
[†]Riso, Ricoh and Duplo are registered trademarks. Use does not imply endorsement.

Digital Duplicators

continued

Suggested Tips for Running MCR PAPER* brand Carbonless Sheet

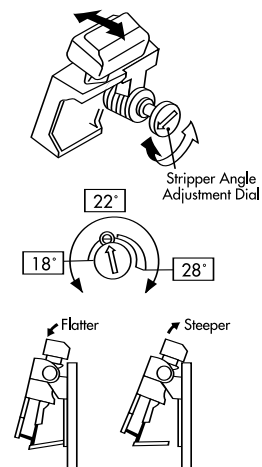
- Run the digital duplicator at medium to slow speed.
- Adjust the original so that the CF smudge mark doesn't appear in a critical area.
- On the Riso GR model, adjust the stripper angle and pressure (see fig.1) to high.
- On the Ricoh VT6000, 3800, and 3600 models, remove the feed cradle weights located in the infeed section of the duplicator (see fig.2).
- Tighten the side feed guides on any make or model (see fig. 3).



Adjusting the pressure of the Stripper

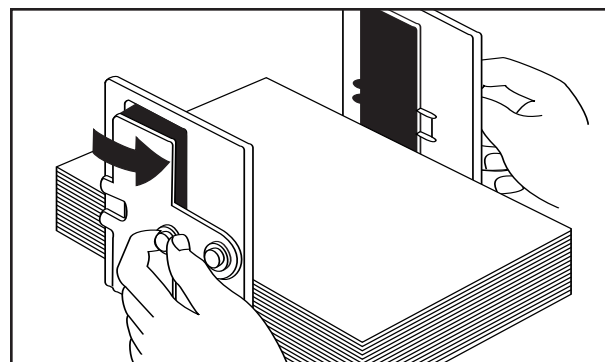
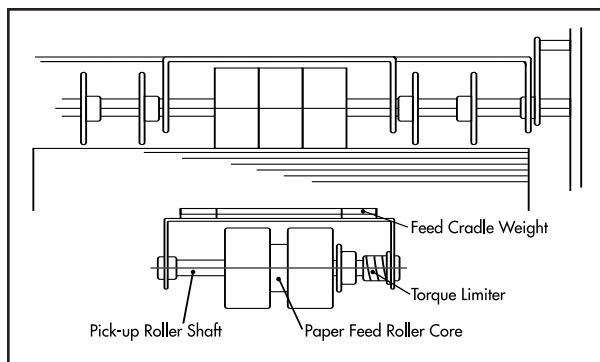
Figure 2.

Figure 1.



Adjusting the angle of the Stripper

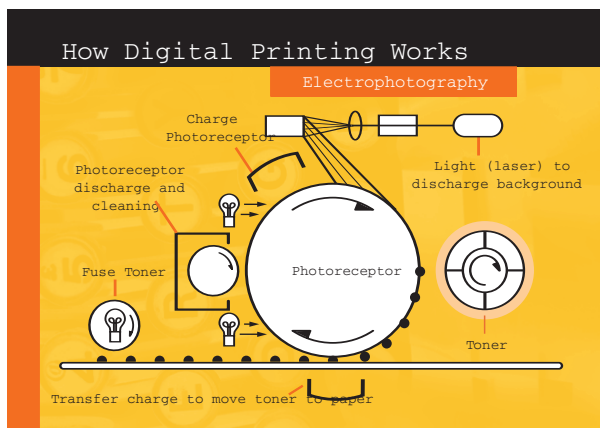
Figure 3.



Xero/Form II

Benefits of Digital Printing

Throughout the evolution of printing technology, the reliability, speed, cost and quality of the entire printing process has continued to improve. However, the introduction of the Xerox DocuTech® system in 1991 was a quantum leap forward in printing capabilities. The DocuTech®, a high-end digital copier, gives owners the capabilities of a printing press with the functionality and flexibility of a copy machine. And it makes tasks that were once complicated simpler than ever.

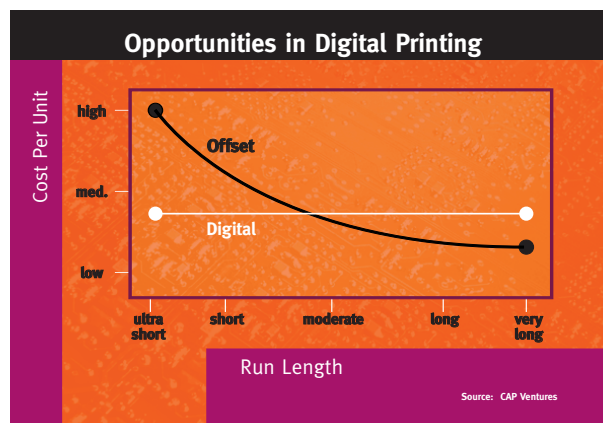


Unlike traditional methods, digital equipment works by projecting laser light onto a photo-receptor to produce a charged image. The toner electrostatically “jumps” from the toner source roll onto the photoreceptor, where the document image is created. The toner is then transferred to the paper to produce the finished document. Because the components do not contact each other, physical wear and image distortion are greatly reduced. So, with proper

care, digital equipment has the potential to last considerably longer than its non-digital counterparts.

Another benefit of digital copying is that it speeds up the outputting process by allowing images to be printed and altered directly from computers. This also ensures that quality remains strong and consistent throughout the length of every run, no matter how short or long.

An additional factor driving the growth of digital outputting is its overall cost-effectiveness. Due to its simplified nature, which does not require film, plates or ink, high speed digital outputting is cost-competitive across a wide range of run lengths - even extremely short runs (see chart below). And since digital is able to save money, even on small runs, it's like turning your high speed copier/duplicator into a business forms printing press. Additional benefits are forms on demand and reduced forms inventories.



Xerox and DocuTech® are registered trademarks. Use does not imply endorsement.

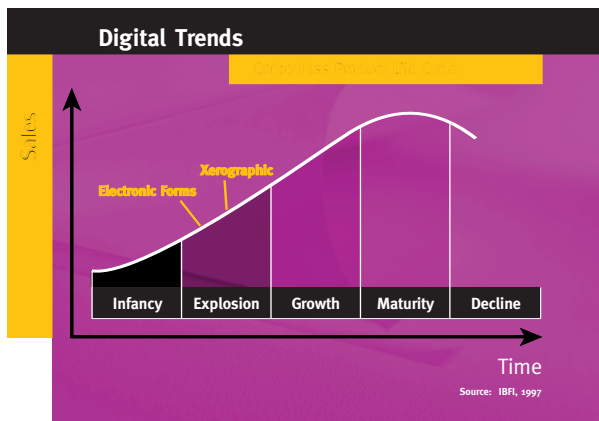
Xero/Form II

continued

NCR Paper* brand Digital Offerings

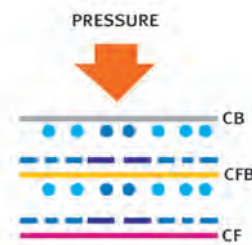
NCR PAPER* brand was the first to notice the need for paper which complements today's digital equipment. NCR PAPER* brand introduced xerographic carbonless paper in the 1980s, and introduced the original Xero/Form® in 1992. The tradition of innovation continues with the introduction of our newest carbonless paper, Xero/Form® II. This new generation of carbonless paper alleviates several shortcomings of traditional carbonless by reducing contamination and odor, while improving printability, runnability and appearance.

Xero/Form® II is the perfect fit for today's broad range of digital and electronic equipment, including high speed copiers and laser printers. It is a special carbonless grade designed to run easily through copiers and laser printers with bond-like performance, and is proven to provide the cleanest running sheet of any xerographic carbonless paper. It also has heavyweight stiffness, excellent toner adhesion, intense, clear imaging and stiff sheets which feed and deliver with ease.



In addition to Xero/Form® II, NCR PAPER* brand has a large variety of product options which can be tailored to your business form needs, whether your customers print for office managers, hospital administrators, shipping managers, financial officers, or others.

Three types of carbonless paper - Coated Back (CB), Coated Front and Back (CFB), and Coated Front (CF) - are used to create a multi-ply business form. These plies need to be in the correct sequence - CB, CFB, CF - and with the correct sides facing each other, or the desired carbonless image will not be produced.



Coated Back (CB) - The top sheet of a multi-part form. This sheet is back-coated with millions of tiny, microscopic capsules containing colorless dyes.

Coated Front and Back (CFB) - The intermediate sheet of a multi-part form. The front has CF coating, the reverse has CB coating. Several intermediate sheets can be used for the desired number of copies.

Coated Front (CF) - The "receiver" part of the form. The front side is coated with a receiver coating which reacts with the colorless dyes from the broken CB capsules to develop an image on the CF surface.

After all the parts of a carbonless form are printed and collated, a special adhesive is applied to one edge of the stack in order to create the multi-ply forms. Appleton Papers' Fanapart High-Strength Padding Adhesive delivers consistent, reliable edge-padding. It's easy to use and dries faster than other padding adhesives. You can use it with all NCR PAPER* brand carbonless sheet products. And it only adheres to the carbonless coated surfaces (CB and CF) - it will not adhere between the back of the CF sheet (the last ply of one form) and the top of the CB sheet (the first ply of the next form).

Unit sets (non-continuous form sets with a glued edge) and snap sets (non-continuous form sets with a laser-scored construction) are available in 8 1/2" x 11", 8 1/2" x 11 1/2" and 9" x 11" standard sizes. Other sizes are available.

Please note that all of our options produce dark, sharp images down to the last ply.

Xero/Form II

continued

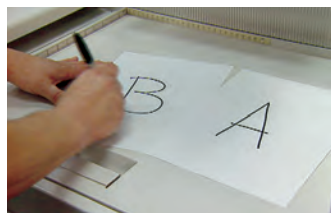
How to Use Xero/Form® II

In addition to its unmatched features, Xero/Form® II is also incredibly easy to use. To easily create your own form sets, simply use the following guide:

Step 1:

Determine Straight/Reverse Sequence Requirement and Print Side (applies to both copiers and laser printers)

1. Mark Plain Paper Sheets - Mark 2 sheets of plain xerographic bond paper "A" and "B".
2. Load and Prepare Copier - Place the original you wish to copy face down on the copier platen and position it properly, then load the two sheets marked "A" and "B" face up. Xero/Form® II works well whether you've got a friction or vacuum feed tray, although vacuum is preferred.
3. Produce Check Copies - Set the copy quantity to "2" and press the START button. Then remove copies from the output tray without disturbing the delivered sequence.
4. Determine Print Side - If the original image has been copied onto the side marked with the "A" and "B" designation, the paper's print side must be loaded FACE UP in the feeder tray. If the original image has been copied onto the reverse side, the paper's print side must be loaded FACE DOWN in the feeder tray. The paper's print side is clearly indicated on the label af fixed to each ream.
5. Repeat Steps 1-3 - Load paper PRINT SIDE UP or DOWN as was just determined.
6. Check Sequence - If the sheet marked "A" is on top, your copier requires STRAIGHT SEQUENCE Xero/Form® II sheets. If the sheet marked "B" is on top, your copier requires REVERSE SEQUENCE Xero/Form® II sheets.



Step 1 - 1



Step 1 - 2



Step 1 - 2



Step 1 - 3



Step 1 - 4



Step 1 - 5

Xero/Form II

Xero/Form II

continued

Step 2:

Prepare Paper, Program Copier and Run Job (also applies to laser printers)

1. Load and Prepare Paper - Fan paper and ensure proper stacking and edge alignment before loading paper into feeder tray. Place the stack in the feeder tray you intend to use.
2. Proof Sequence - Place the original you wish to copy on the copier platen and position it appropriately. Run only 2 or 3 sets, and check to ensure that the proper sequence is being used. For 2 two-part sets, program 4 copies, for 2 three-part sets, program 6 copies, etc. To ensure the proper sequence, mark the top sheet to be certain the mark is imaged through all plies of each set.
3. Program the Copier - Enter the number of copies needed (determined by multiplying the number of sets desired by 2, if using two-part Xero/Form® II, 3 if using three-part, etc.). Programming may vary with different copiers.
4. Run the Job - Press the copier's START button. Once the job is complete, remove sheets from the output tray. Proceed to pad the Xero/Form® II sheets into form sets using Appleton Papers' Fanapart High-Strength Padding Adhesive.



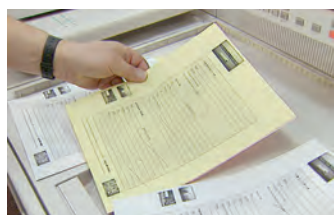
Step 2 - 1



Step 2 - 1



Step 2 - 2



Step 2 - 2



Step 2 - 3

Xero/Form II

continued

Step 3:

Edge Pad Xero/Form® II Sheets Into Perfect Carbonless Form Sets

1. Jog and Stack the Sheets - Jog the sheets to the edge that is going to be padded and place in a stack. Anchor the stack with a weight (roughly 1 pound of weight per inch of edge) and a board (to evenly distribute the weight) placed flush with the edge to be padded. Check to make sure the weight distribution is such that thumbing the corners of the stack results in paper separation of about 1/8 inch.
2. Apply Appleton Papers' Fanapart Adhesive - Use a clean, dry brush (minimum 1" is recommended) and apply a liberal coat of Fanapart High-Strength Padding Adhesive, starting at the bottom center, brushing horizontally out to the edges and moving up gradually. Do not oversaturate the paper. Then, rinse the brush in water and re-seal the adhesive container.
3. Allow Fanapart Adhesive to Dry - Let the stack stand undisturbed for 20 to 30 minutes to ensure proper adhesion and Fanapart performance.
4. Fan the Form Sets Apart - Remove the weight and distribution board from the stack. Starting at the bottom of the stack, fan the sets apart. Lightly run your thumb along the corners of the padded edge to fan the sets apart perfectly. The forms are now ready to use, or be stored for later use.



Step 3 - 1



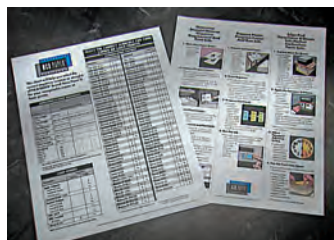
Step 3 - 1



Step 3 - 2



Step 3 - 4



Additional information can be found in your handy Xero/Form® II Sequence Guide.

Troubleshooting Tips

This section consists of a list of conditions that may occur when processing NCR PAPER brand, along with recommended corrective action.

- The recommendations are listed in the order that our experience indicates should be followed for the fastest solution of the problem.
- Those conditions common to all paper grades, which are normally solved through the operators' general knowledge and experience, have not been included in this listing.
- If the suggestions presented in this section are not effective in correcting the problems described, or if problems not included in this list are encountered, please contact Technical Services for additional recommendations.

- In problems relating to ink, where we recommend additives, it is advisable that the ink manufacturer be consulted before making alterations to assure that it will not harm the performance of the ink.
- It has been our experience that, when manufacturers are informed of the use of the ink, they can provide inks that do not require further modification.
- For additional general information, we recommend the GATF publications "Web Offset Press Operating" and "Web Offset Press Troubles".
- Specific information relative to inks, blankets, presses, etc., is generally available from each manufacturer.

CAUSE

CONDITION	CAUSE		RECOMMENDATION
	GENERAL	SPECIFIC	
Backaway from fountain roller*	Ink	Ink rolls up	Agitate with ink knife or add agitator.
	Ink	Ink is too short and heavy bodied	Add varnish (consult ink manufacturer) except desensitizing ink.
Blanket swelling	Paper	Damaged CB coating	Reduce impression pressure and maintain minimum pressures during processing.
	Press	Extraneous oil	Watch for excessive oil applied during routine equipment maintenance.
	Blanket	Blanket wash	Consult manufacturer.
	Ink	Ink-blanket compatibility	Consult manufacturer.
Blinding	Plate	Improper preparation	Make new plate following manufacturer's processing recommendations and develop to a solid 6 on gray scale.
	Dampening	Too much acid	Check pH.
	Dampening	Too much gum	Reduce gum in dampening system. Check for swollen blanket.
	Press	Plate-blanket pressure	Check impression to ensure .002" to .003" nip.
	Ink	Improper formulation	Consult ink manufacturer.

(Continued on next page)

*Low tack inks recommended for coated papers will occasionally cause this condition, if they are not properly formulated.

Troubleshooting Tips

continued

CONDITION	CAUSE		RECOMMENDATION
	GENERAL	SPECIFIC	
CB Damage	Paper	Transit damage	Inspect all incoming shipments for damage from mishandling or dropping - contact carriers for improved handling and damage claim.
	Paper	Excessive truck clamp pressure	Reduce clamp pressure to minimum amount needed to lift material for transporting. Use pressure relief valve on clamp trucks.
	Press	Excessive impression pressure	Reduce impression pressure.
	Press	Localized damage	Avoid excessive impression pressure and raised metal plates.
	Press	Crash imprinting	Keep transfer area clear of solid or heavy density imprint.
	Press	Perforating	Replace perforating jacket when excessive area abrasion is created.
	Collator	Localized damage	All feed and guide mechanisms or any points where the paper is contacted by the equipment should be set to the minimum pressure consistent with satisfactory performance.
Chalking	Shear Cutting	Excessive paper clamp pressure	Reduce clamp pressure to 35 pounds per square inch, or less, of paper covered by clamp. Operate clamp manually to ensure gradual contact with paper. See Section 3 (Collating and Binding) for detailed instructions.
	Ink	Vehicle absorbed before ink is set	Add binding base or body gum (consult ink manufacturer).
Color varies	Ink	Wrong ink	Consult ink manufacturer.
	Dampening	Dampening feed varies	Keep system clean - maintain uniform level.
Dust, lint or fuzz buildup	Dampening	Erratic dampening	Keep system clean - eliminate drafts.
	Paper	Loose dust or paper fibers	See Picking.

Troubleshooting Tips

continued

CONDITION	CAUSE		RECOMMENDATION
	GENERAL	SPECIFIC	
Filling in of screens	Press	Too much ink	Decrease ink flow from fountain.
	Press	Impression pressure	Check impression to ensure .002" to .003" nip.
	Ink	Ink too soft	Add binding base or body gum (consult ink manufacturer).
	Ink	Too much drier	Consult ink manufacturer for correct formula. Check printing pressures.
Flaky solids	Dampening	Too much dampening	Decrease dampening water flow.
Ghost image	Press	Embossing & Back Trap	See Piling. Ink not drying.
Horizontal streaks	Press	Loose slipping blanket	Tighten blanket.
Ink fails to dry	Dampening	Solution too acid	Check pH.
	Ink	Improper formulation	Consult ink manufacturer.
Ink rollers stripping	Dampening	Fountain solution too acid	Check pH.
	Dampening	Too much water	Reduce dampening water flow.
	Press	Desensitized rollers	Pumice and etch ink rollers as recommended by manufacturer.
	Press	Rollers glazed	Deglaze rollers.
Loss of sharpness and solidity	Press	Printing pressure	Check blanket height with a packing gauge.
	Blanket	Swelling	Check blanket for correct solvent or oil resistance. Obtain faster evaporating wash that is compatible with blanket being used (consult manufacturer).
	Paper	Blanket swelling or piling	See Blanket Swelling and Piling.
	Ink	Wrong ink	Make sure ink and blanket are compatible.
	Blanket	Glazing	Scrub with pumice powder and sponge the blanket with water after each washing or use a commercial glaze remover.

(Continued on next page)

Troubleshooting Tips

continued

CONDITION	CAUSE		RECOMMENDATION
	GENERAL	SPECIFIC	
Mottling	Ink	Ink too heavy or thin	Reduce or build as needed (consult ink manufacturer).
	Ink	Improper tack	Add body gum (consult ink manufacturer).
	Press	Impression pressure	Check impression to ensure .002" to .003" nip.
	Ink	Wrong ink	Consult ink manufacturer.
	Paper	Galvanized (Cal. Crush)	Consult Technical Services Department.
Offsetting	Press	Too much ink on paper	Reduce ink flow from fountain.
	Ink	Not enough drier	Add cobalt drier (consult ink manufacturer).
	Ink	Wrong ink	Check ink manufacturer or their reference charts.
	Ink	Ink too heavy - is not absorbed	Add varnish (consult ink manufacturer).
	Dampening	Fountain solution too acid	Check pH.
	Press	Delivery stacked too high	Remove completed sheets more often.
	Press	Operator mishandles	Educate personnel to offset problem.
	Press	Static	Attach static eliminator.
Picking	Ink	Ink too tacky	Use ink in the tack range of 10 - 12 or add reducer* (consult ink manufacturer).
	Blanket	Tackiness	Use quick release blankets. For temporary relief treat with blanket lacquer or hardener.
	Dampening	Insufficient dampening	Increase dampening water flow.
	Dampening	Water-alcohol balance	Check alcohol - bring content to between 20% to 30%.
	Press		Reduce operating speed.
	Press		Reduce impression pressure.
	Press	Water-alcohol balance	Install vacuum sheet cleaner.
	Paper	Poor coating adhesion	Contact Technical Services Department.

*A number of our customers indicate that Jet Speed Pomade from Sleight & Hellmuth, Inc. effectively lowers the tack range of inks; however, other reducers are also available that give satisfactory performance. Contact your ink supplier.

Troubleshooting Tips

continued

CONDITION	CAUSE		RECOMMENDATION
	GENERAL	SPECIFIC	
Piling — non-image area	Ink	Paper dust or lint	Add reducer (check ink manufacturer).
	Press		Check impression to ensure .002" to .003" nip.
	Dampening		Increase dampening water flow.
	Dampening		Increase ink flow from fountain.
	Press		Reduce operating speed.
	Press		Install vacuum sheet cleaner.
Piling — image area	Dampening	Ink-water balance	Same as non-image area, except reduce ink flow from fountain.
	Paper	Micro-picking or ghost image	Increase ink and/or dampening water.
	Dampening	Ink-water balance	Check alcohol content - bring content to between 20% and 25%.
	Dampening		Increase dampening water flow.
	Blanket		Use good quality, quick release blanket.
	Press		Check blanket height to ensure .002" to .003" impression nip.
Plate Image Wear	Dampening	Too much gum	Re-etch plate, reduce gum in dampening system.
	Dampening	Too much acid	Check for roller stripping - check pH.
Plate Wear	Press	Form roll pressure	Readjust form roll pressure.
	Dampening	Fountain solution too acid	Check pH.
	Press	Too little ink	Increase ink flow from fountain. Check plate and blanket packing.
	Ink	Too much drier	Reduce drier (consult ink manufacturer).
	Plate	Plate processed wrong	Make new plate.*
	Paper	Loose coating particles	Contact Technical Services Department.

(Continued on next page)

Troubleshooting Tips

continued

CONDITION	CAUSE		RECOMMENDATION
	GENERAL	SPECIFIC	
Scumming	Ink	Ink is too soft	Add binding base, body gum or varnish (consult ink manufacturer).
	Ink	Too much ink	Adjust ink-water balance - pH should be between 4.0 and 5.0.
	Ink	Too much drier	Consult ink manufacturer.
	Dampening	Dirty or worn covers	Wash dampener or ductor roll covers.
	Dampening	Greasing	Clean fountain and distribution roller; re-etch.
	Dampening	Dampening roller pressure	Reset rollers, check for trueness, consider enclosed system eliminating plate dampening rollers.
	Dampening	Emulsifying-sensitizing coating agent	Use stiffer ink, eliminate wetting agent (consult manufacturers).
	Dampening	Water streaks	Adjust ductor-distributor roller contact.
	Dampening	Insufficient acid or gum	Check pH.
	Press	Form roll pressure	Readjust form roll pressure.
	Plate	Plate wear	Wash plate more frequently to remove foreign particles.
Plate	Oxidation	Dry plate quickly. Keep storage areas as dry as possible.	
Slur or double image	Press	Loose blanket	Replace or tighten blanket.
	Press	Wear or malfunction	Have press serviceman check press out.
Sticking	Blanket	Blanket wash too strong	Change blanket wash (consult blanket and chemical manufacturers.)
	Paper	Poor coating adhesive balance	Contact Technical Services Department.
Tinting	Dampening	Fountain solution too acid	Check pH.
	Dampening	Ink-water balance	Washup - readjust ink and water.
	Ink	Ink is too soft	Add binding base, body gum or varnish (consult ink manufacturer).
	Plate	Plate processed wrong	Make new plate.
Wash marks	Dampening	Excessive water	Decrease dampening water flow.

Specialty Applications

NCR PAPER brand carbonless is used for a number of specialty applications: bar coding, MICR, CMC7, ink jet, mark sense, and OCR.

- In each instance, trial forms should be run and extensive testing done on the equipment on which the form will be used.
- Appleton Papers recommends this approach for new forms applications or in instances where a printer is duplicating a form which is now being used in a specialty application.
- Warranties may be limited in experimental applications, so it is recommended to contact your Technical Service Representative before producing these specialty applications.

Bar Code

The rawstock surface of CB, the CF surface of CFB, and the CF surface of CF have been found to accept certain fast drying ribbons designed for bar coding.

- Specialty inks and specialty mylar ribbons for encoders and ink jets are also being used to apply bar codes to NCR PAPER brand carbonless.
- Suppliers of these materials and equipment are familiar with printing processes and the paper.
- Pretesting should be done to prevent misapplication of the papers chosen.
- The reading of bar coded carbonless images is not recommended.

- Although a bar coded carbonless image may read in some instances, the readability will vary by the type and condition of the reader.
- Appleton Papers makes no guarantee of the readability of bar code carbonless images. NCR PAPER brand grades have been used successfully for these types of applications (testing recommended).

MOCR/OCR

- Appleton Papers produces specialty grades for MICR applications.
- Appleton Papers MICR/MOCR grades meet:
 - AMB-Estandares Papa El Proceso de Cheques (Mexican Standard)
 - ISO 1004
 - APACS CBS1 Standard
- Appleton Papers also produces grades for OCR applications.
- Our OCR CB grades are sold for specialty medical, insurance, retail and other applications where OCR is being used with machine readable fonts.
- OCR scanners are increasingly flexible so other grades may work but only OCR qualified grades are recommended.
- Appleton Papers strongly recommends that MOCR/OCR forms are trialed in all equipment used in the applications.

Specialty Applications

continued

CMC7

- CMC7 is used for checks in Europe, South America and some regions of Asia.
- CMC7 is a hybrid between MICR and bar coding.

Ink Jet

- Ink jet printers are being used to apply specialty fonts and graphics to NCR PAPER brand carbonless.
- This equipment includes small desk top ink jet printers and large ink jet printing presses.
- The large presses are most often used for applying variable data to preprinted forms for direct mail applications.
- The raw stock surface of some CB grades has been tested and found to be receptive to ink jet inks.

- Coated surfaces such as the CF side of CFB and CF, are less likely to receive ink jet ink without smearing or feathering.
- Trials are recommended before producing forms using ink jet as a printing method.

Mark Sense

- Mark sense forms require very exacting specifications.
- OCR papers are required.
- The raw stock surface of OCR CBs are used in some applications.
- Pretesting is necessary because Mark Sense readers vary in their ability to accept different papers and are often set up for only approved papers.
- Consult the reader manufacturer's specifications and Appleton Papers Technical Service before producing forms.

Optical Character Recognition (OCR)

Optical Scanning forms with machine-readable language are used to eliminate the manual entry of information.

- Optical Character Recognition (OCR) is only one type of optical scanning among many.
- The quality of optical reader equipment has improved to the point where special papers are not as critical as in the past.
- OCR grades are specifically designed to have the proper physical and functional properties such as shade and reflectance needed to maximize performance with optical readers.

Because of the difference in scanners, it is impossible to say whether any paper is acceptable unless you know the type of scanner being used.

- Selection of the correct paper will depend on the scanner being used and the specific physical and functional requirements of that reader and other equipment in the system.
- Required values of paper properties such as brightness, stiffness, shade, reflectance, opacity vary from reader to reader.
- If specific paper specifications are not available, trials are recommended.



NCR PAPER brand OCR and MOCR grades are designed to meet multiple scanner requirements, while functioning correctly as a carbonless sheet. MOCR grades, for example, meet both MICR and OCR requirements.

It is recommended that optical reading be restricted to the original document and not the copies unless extensive testing has been performed.

- The lighter weights and the colors other than white associated with the back plies of a form usually make these plies difficult to scan.
- The carbonless image produced by multiple plies may not have the contrast values needed to scan properly.
- In cases where the properties of CB do not meet the specifications of selected equipment, or the equipment manufacturer does not recommend carbonless, OCR bond for the original with Self Contained for the copies makes a viable alternative.

Technical Service will attempt to answer specific questions regarding specific applications.

Optical character recognition is one form of optical scanning. Optical scanning eliminates the task of manually converting information into machine-readable language.

Magnetic Ink Character Recognition (MICR)

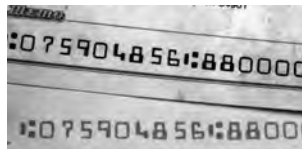
Development

The American Bankers Association (ABA) approved the MICR standard in 1958. This system was developed because the manual procedures used for processing the growing flow of paper documents in the 1950's was becoming inadequate.

- Encoding with the E13B font, referred to as MICR numbers, makes checks, deposit tickets or forms machine-readable.
- Generally speaking, checks are encoded with three sets of MICR numbers: routing, customer account, and the amount.
- A rigid set of standards have been developed for MICR by ANSI, including size and location of characters, number of digits allowed within a field of information, the sequence of these fields, and proper ink densities.

MICR Ink, Toner and Transfer Ribbon

- MICR pigments, used to print the E13B font, contain iron oxide.
- Iron oxide is electronically excited, forming a magnetic field which can be read by specially designed equipment.
- Each MICR character emits its unique signal which can be interpreted by the reader to designate the individual character.
- There are three widely used methods for applying MICR pigments to documents.
 - Magnetic ink is a specially formulated ink with iron oxide in it.
 - Magnetic toner is used in copiers and laser printers.
 - Magnetic ribbon, used in impact printers, ribbon encoders, and post encoding devices to apply MICR pigments in a dry form.



MICR Quality

The quality of MICR printing is critical.

- Most banks are testing printed samples before check orders can be used by customers.

- Banks test for format, spacing, alignment, character edge irregularities, voids, uniformity of ink, ribbon and toner, extraneous ink, debossing or embossing of characters, signal strength of characters.

- All these specifications must meet ANSI standards.

Press Tips

When printing magnetic inks, it is important to balance the formulation for the type of press being used.

- Magnetic ink is more sensitive to fountain solution conditions and ink tack than other printing inks because of the higher pigment content.
- MICR inks do not flow as easily as other inks so they require more monitoring.
- They also tend to increase in tack on press causing difficulties in character formation.
- Regular addition of fresh ink to the fountain is recommended.

MICR ribbons are applied by ribbon encoders and post encoding devices in banks.

- Although no special ribbon is required to print NCR PAPER brand MICR grades, some ribbon brands give better results than others.
- Testing, when choosing the brand of ribbon, is important for best results.
- Regular batch testing of new shipments is advisable in order to ensure maximum productivity and quality that complies with ANSI Standards.
- Encoder maintenance plays a large role in accurate results.

The quality of MICR applied by toner on laser printers and copiers is critical.

- Regular testing of the results is expected by the banks before introducing the check into the Federal Reserve System.
- Toners supplied by the printer manufacturer are recommended but OEM toners can also give good results.
- Batch testing is advisable to prevent rejection by the banks.

Shelf Life & Storage

Shelf life is the length of time printed forms are stored—under normal conditions—before they are imaged for use.

- A shelf life of two years is assured, but storage duration can be greater, especially if forms are stored under ideal conditions.
- Forms that have been stored in files since initial production over 30 years ago are still capable of producing an acceptable image.

Print stability is the ability of the carbonless image to resist fade and maintain legibility for a prolonged period.

NCR PAPER brand carbonless images are guaranteed to last for the life of the document when stored under normal office conditions.

- Normal office conditions assume drawer file storage, 60-95 degrees fahrenheit, and 40%-60% relative humidity.



- Many government agencies and large institutions including the IRS have approved NCR PAPER brand for applications requiring permanency.
- An NCR PAPER brand image is also feather or bleed free, unlike carbon paper images.

But, certain unusual external or chemical factors have been identified that can adversely affect stability of the NCR PAPER brand carbonless images. Substances to be avoided and which usually are not factors under normal office and storage conditions include:

- Contact with certain vinyls and plastics.
- Contact with, or exposure to, fresh copies from wet toner copy machines, or stencil masters and solvents.
- Prolonged exposure to ultraviolet light sources, such as direct sunlight and fluorescent lighting.
- Repeated, direct contact with hand creams, skin oils, or related ointments.
- Storage with unapproved carbon papers.
- Unapproved label protection tapes.
- Unapproved shrink film.

Coated front surfaces may turn yellow with age.

- This yellowing characteristic may be accelerated with time, high temperature, certain types of light, and some industrial fumes such as exhaust fumes from internal combustion engines.
- This effect is referred to as resin-yellowing.

Very cold temperatures will slow the development of an image.

- The image will still develop to maximum intensity at room temperature.

Copying & Microfilming

Photocopies of carbonless images on sheets of NCR PAPER brand are readily reproducible on a wide variety of office copy machines.

- Blue Print image gives satisfactory results in most situations.
- Black Print image provides optimum results.
- When possible, construct a dummy set. Write or type on it as in its end use. Copy and evaluate.
- Little or no difficulty should be encountered on any diffusion, dye transfer, electrostatic or dual spectrum machines.
- NCR PAPER brand images cannot be copied on thermal (infrared) systems, for these systems copy pigmented images only.

Some office copiers have difficulty copying gray and blue images, but it's usually possible to get good results if the following suggestions are considered:

- The primary variable is the copier. Keep it well maintained and properly adjusted.
- Copy quality depends upon good print definition and intensity of the original.
- For best results, copy a ply closest to the original in a form set, for the image sharpness should be better than a ply further down in the form.
- If possible, avoid copying goldenrod or pink colored sheets on xerographic machines.
- On electrostatic copiers (particularly those that use zinc oxide coated papers), paper colors that detract from copiability are blue, green and goldenrod.

Occasionally some background discoloration and print bleeding occurs when NCR PAPER brand documents are placed in contact with copies from an electrostatic copier having a *liquid* toner system.

- The excess toner solvent remaining in the copy sheet migrates to the carbonless paper and attacks the print or coatings.
- This condition can be minimized by proper adjustment of the drying system and/or wringer rolls in the copier and not placing fresh electrostatic copies in immediate contact with carbonless sheets.
- It is not possible to guarantee complete satisfaction in copying an NCR PAPER brand print because of the many variable and uncontrollable factors.

When microfilming, the image to be filmed should be well defined and intense.

- Film a copy close to the original in a manifold set.
- The most important controlling factor in microfilming is the film. Two film types, ortho and panchromatic, are used for microfilming.
- Generally, best results are achieved using panchromatic film with AHU (Anti-Halation Undercoat).
- Types of cameras used can affect proficiency of microfilming carbonless images. Cameras with longer exposure times usually give better results.



NCR PAPER brand Black Print provides high-contrast reproduction

Instant Replay® II

Instant Replay II helps detect pressure-damage to CB sheets.

- It reacts with colorless dye released from damaged capsules, causing color development in damaged areas.
- This helps a printer adjust pressure settings for optimum running of NCR PAPER brand.

The CB coating on CB and CFB grades is sensitive to pressure, thus can be damaged during handling or processing.

- Using Instant Replay II helps establish where damage has occurred, so corrective steps can minimize, or eliminate, the condition.
- CB coating can be damaged on a sheet press by such conditions as excessive impression pressure, and improper settings of ejector and infeed wheels.
- On web presses, damage may result from frozen or dragging idler rollers, excessive impression pressure, excessive rewind tension, or from bumping or dropping rolls— or even rolling rolls on the floor.
- Guillotine cutting NCR PAPER brand without minimizing clamp-bar pressure may also rupture CB capsules.

Using Instant Replay II reveals CB damage through variations in color intensity or pattern.

- *Overall damage* is indicated by fairly uniform color development in the sprayed area, *localized damage* by color concentrations in specific areas.
- To illustrate damage effects, take samples from the same roll or lift before and after processing,

spray and compare.

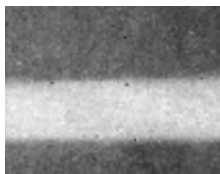
- *Some color will develop on undamaged paper.*
- Due to variations in spraying technique and color development, *one cannot accurately estimate amount of damage by color intensity.*
- Take samples through successive stages of processing, spray after each step, and note the degree of color.
- At each point where pressure damage is evident, make adjustments to reduce damage.

When setting up a press, compare samples from feed and delivery piles — or web press sheet unwind and rewind stations — for excessive impression pressure, or other improper settings.

- Take corrective steps.
- Follow the paper through each pressure area.
- Adjust and check with Instant Replay II until any damage is minimized.

Instructions for use of Instant Replay II:

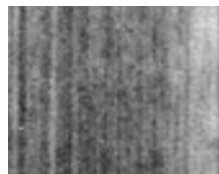
- Can should be at room temperature.
- Place samples closely together.
- Shake can briefly.
- Hold can upright 10-12 inches from sheets, spraying back and forth till sheets appear damp.
- Allow paper to dry, then examine.
- Compare the pattern with adjacent photos for common CB damage.



Excess impression pressure



Excess idler roll pressure



Dragging roll



Roll dropped on edge



Roll bumped



Infeed wheels



Roll dropped on floor



Excess impression pressure



Ejector rolls



Clamp-bar damage

Receiving API Products

A Carrier Delivery Receipt and a Packing List will accompany each Appleton Papers shipment. You will be required to sign the Carrier Delivery Receipt. *Before signing the Carrier Delivery Receipt please follow these instructions:*

- Immediately inspect for transit damage.
- If there is damage...
 - Indicate type and extent of damage (be specific) on Carrier Delivery Receipt.
 - Sign the Carrier Delivery Receipt and ask carrier driver to also sign. (If driver refuses, so indicate.)
 - Take photos of the load when possible (before unloading).
 - Accept damaged paper and set aside for inspection by carrier or API Field Technical Service Rep.
 - Take photos again of the damaged paper when possible (after unloading).
 - Phone Appleton Papers Customer Service Department at:

**National Accounts,
Printer/Converter**
(800)922-1729
FAX: (800)922-1712

Merchant East
(800)533-9421
FAX: (800)872-4141

Merchant West
(800)922-1727
FAX: (800)922-1709

- Submit claim to:
Appleton Papers
Customer Service Department
825 E. Wisconsin Ave.
P.O. Box 359
Appleton, WI 54912

- Include with claim:
 - Copy of Delivery Receipt
 - Amount of damage (piece count and description)
 - If salvage, amount recovered
 - Evidence of damage (photos)
 - *API (not the carrier) will process transit damage claims when the above steps are followed.*
- Next, compare piece count on Delivery Receipt with piece count of material received. If discrepancy:
 - Indicate discrepancy (be specific) on Delivery Receipt.
 - Sign the Delivery Receipt and ask carrier driver to sign. (If driver refuses, so indicate.)
 - Submit claim to Appleton Papers Technical Services Department.
- You should also receive a Packing List with the shipment, if you do not, please contact Appleton Papers.
- Immediately compare individual items received with each item listed on packing list. Discrepancies must be reported in ten days. If a discrepancy:
 - Indicate discrepancy (be specific) on Packing List.
 - Sign the Packing List.
 - Phone claim to Appleton Papers Technical Services Department within ten days after receipt of shipment.
 - Submit a copy of signed Packing List indicating discrepancy to Technical Services Department.

Complaint Procedure

In order that we may best provide you with expedient service and complete answers to any inquiries or complaints, we request certain documentation and samples. Most questions or complaints are resolved in principle on the same day they are received by Technical Services.

- All complaints should be forwarded to:
Appleton Papers Technical Services Department
825 E. Wisconsin Ave.
P.O. Box 359
Appleton, WI 54912
West: (800) 922-1723
Central: (800) 981-9681
East: (800) 922-1724
Fax: (920) 991-7341
- The following information is necessary to expedite handling of your complaint:
 - Your company name and address.
 - (Your merchant's name and address.)
 - Paper identification — grade, weight, color, size, amount (pounds, rolls or sheets).
- Order Identification — send the following:
 - Labels
 - Set number: Stencilled on cutsize cartons and on each ream.
 - Set number: Marked on folio size cartons adjacent to label.
- Complaint Information — List all significant details concerning nature of the complaint:
 - Description of the problem — What happened, remedies attempted, results.
 - Equipment used — Type of press, inks, blankets, plates used.
 - Air conditioned? Humidity controlled?
 - Were any special adjustments made on the press, to the ink, or to the paper? Describe.
 - Any abnormal or severe forms usage conditions?
 - Any unusual observations or aspects of the complaint?

- Samples — send:
 - Unprinted *and* printed (exhibiting the problem).
 - 12 qty. original size sheets
 - 12 qty. finished forms.
- Other support to send:
 - Curled or Wavy Edges — Send samples flat. Do not roll.
 - Damaged Blanket — Submit along with sample of the associated paper defect.
 - Dimensional Instability — Besides adequate form samples, include a film positive.
 - Blanket Contamination — Send sample of contaminant: Remove by tape from blanket, then fold the tape inward. Do not tape to a sheet.
 - A photograph may be sent in lieu of samples, if the nature of the problem is such that samples would not verify the difficulty, such as a loosely rewound roll.
- Returned Paper
 - Do not return or dispose of any paper, except for samples submitted to illustrate the complaint, until instructions have been received from Technical Services.
 - To avoid transit damage, all authorized returns of defective paper should be securely packaged in the original or similar container if possible.
 - Return according to instructions given.
 - All materials returned should be plainly marked with the appropriate complaint reference number.
- Final Disposition will be promptly given upon verification of the problem.

Weight Calculation Factors

To calculate the weight of 1,000 sheets of any sheet size, multiply the area (length X width) of the sheet by the factor.

Sheet Basis Weight	Factor	Sheet Basis Weight	Factor
14 .....	.0749	24 .....	.1283
15 .....	.0802	26 .....	.1390
16 .....	.0855	28 .....	.1479
17 .....	.0909	30 .....	.1604
19 .....	.1016	33 .....	.1764
20 .....	.1069	36 .....	.1925
22 .....	.1176	105 .....	.2431
		140 .....	.3241

MISCELLANEOUS INFORMATION

Conversion Factors (Multiply By)

To Convert from	To	17" X 22"	20" X 30"	24" X 36"	25" X 38"	GM/SQ. MTR
17" X 22" — 500	>	—	1.60	2.31	2.54	3.76
20" X 30" — 500	>	.62	—	1.44	1.58	2.34
24" X 36" — 500	>	.43	.69	—	1.1	1.63
25" X 38" — 500	>	.39	.63	.91	—	1.48
GM/SQ. MTR	>	.266	.427	.614	.676	—
SQ. FT./REAM	>	1300	2083	3000	3300	—
THOUSAND SQ. IN./REAM	>	187	300	432	475	—

Example: CFB, which weighs 17# (1" X 22" X 500) can be converted to Book basis (25" X 38" X 500) as follows:

$$17 \times 2.54 = 43.18$$

thus, 17# CFB is equivalent in basis weight to 43.18 Book.

Roll Length Calculation

To calculate the length of paper on a roll, we recommend using the following formula:

$$L = \frac{(D^2 - d^2) \times .06545}{C}$$

Where

- L = length (feet)
- D = outside diameter of roll (inches)
- d = outside diameter of core (inches)
- C = caliper (inches)

Calculating the length of paper .0037" in caliper on a 16" O.D. roll with a 4" O.D. core would be accomplished as follows:

$$L = \frac{(16^2 - 4^2) \times .06545}{.0037}$$

$$L = \frac{(256 - 16) \times .06545}{.0037}$$

$$L = \frac{(240) \times .06545}{.0037}$$

$$L = 4245 \text{ Feet}$$

Metric Conversion Guide

Area

Sq. centimeter (sq cm)= .0001 centare (ca)
 or 1 ca ÷ 10,000

**Basic Unit...Centare (ca);
 which is 1 square Meter (sq m)**

Are (a).....=1 ca x 100
 Hectare (h).....=1 ca x 10,000
 Sq. kilometer (sq km)
= 1 ca x 1,000,000
 1 sq mm00155 sq. in.
 1 sq cm.....1550 sq. in.
 1 sq m or ca10,7639 sq. ft.
 or 1.1960 sq. yd.
 1 a119.599 sq yd.
 1 ha2.4711 acres
 1 sq km3861 sq. mi.

6.4516 sq cm.....1 sq. in.
 .0929 sq m.....1 sq. ft.
 .8361 sq m1 sq. yd.
 4047 sq m1 acre
 2.5900 sq km ..1 sq. mi. or 640 acres

Weight & Mass

Milligram (mg).....= Gram ÷ 1,000
 Centigram (cg).....= Gram ÷ 100
 Decigram (dg).....= Gram ÷ 10

Basic Unit... Gram (g)

Kilogram (kg).....= Gram x 1,000
 Metric Ton (MT)..... =2,204.6 lb.
 1 g......0353 oz.
 1 kg or 1,000 g 35.274 oz
 or 2.2046 lb.
 Ton
 .097 MT.....1 short ton 2,000 lb.
 1.016MT.....1 long ton 2,240 lb.
 Hundredweight (cwt)
 45.359 kg.....1 short cwt 100 lb.
 50.802 kg.....1 long cwt 112 lb.

28.350 g.....1 oz.
 453.59 g.....1 lb.
 .4536 kg.....1 lb.
 .907 MT1 short ton
 1.016 MT1 long ton

Length

Millimeter (mm).....=Meter ÷ 1,000
 Centimeter (cm).....=Meter ÷ 100
 Decimeter (dm).....=Meter ÷ 10

Basic Unit... Meter (m)

Decameter (dkm).....=Meter x 10
 Hectometer (hm).....=Meter x 100
 Kilometer (km).....=Meter x 1,000
 Myriameter (mym)....=Meter x 10,000
 1 mm0.0394 in.
 1 cm0.3937 in.
 1 dm3.9370 in.
 1 m.....39.37 in.
 1 dkm.....32.81 ft.
 1 hm328 ft. 1 in. or 109 yd. 13 in.
 1 km.....3280 ft. 10 in. or .6214 mi.
 1 mym.....6.214 mi.

2.540 cm.....1 in.
 30.480 cm1 ft.
 .9144 m.....1 yd.
 1.6093 km.....1 mi.

Metric Conversion Guide

Fraction, Decimal and Metric Equivalentents

MM			MM			MM		
1/64	=	.0156 = .397	3/8	=	.3750 = 9.525	5/7	=	.7143 = 18.143
1/32	=	.0313 = .794	25/64	=	.3906 = 9.922	23/32	=	.7188 = 18.256
3/64	=	.0469 = 1.191	2/5	=	.4000 = 10.160	8/11	=	.7273 = 18.473
1/16	=	.0625 = 1.588	13/32	=	.4063 = 10.319	47/64	=	.7344 = 18.653
5/64	=	.0781 = 1.984	5/12	=	.4167 = 10.583	3/4	=	.7500 = 19.050
1/12	=	.0833 = 2.117	27/64	=	.4219 = 10.716	49/64	=	.7656 = 19.447
1/11	=	.0909 = 2.309	3/7	=	.4286 = 10.886	7/9	=	.7778 = 19.756
3/32	=	.0938 = 2.381	7/16	=	.4375 = 11.112	25/32	=	.7813 = 19.844
1/10	=	.1000 = 2.540	4/9	=	.4444 = 11.289	51/64	=	.7969 = 20.241
7/64	=	.1094 = 2.778	29/64	=	.4531 = 11.509	4/5	=	.8000 = 20.320
1/9	=	.1111 = 2.822	5/11	=	.4545 = 11.546	13/16	=	.8125 = 20.638
1/8	=	.1250 = 3.175	15/32	=	.4688 = 11.906	9/11	=	.8182 = 20.782
9/64	=	.1406 = 3.572	31/64	=	.4844 = 12.303	53/64	=	.8281 = 21.034
1/7	=	.1429 = 3.629	1/2	=	.5000 = 12.700	5/6	=	.8333 = 21.167
1/6	=	.1667 = 4.233	33/64	=	.5156 = 13.097	27/32	=	.8438 = 21.431
11/64	=	.1719 = 4.366	17/32	=	.5313 = 13.494	6/7	=	.8571 = 21.771
2/11	=	.1818 = 4.618	6/11	=	.5455 = 13.855	55/64	=	.8594 = 21.828
3/16	=	.1875 = 4.763	35/64	=	.5469 = 13.891	7/8	=	.8750 = 22.225
1/5	=	.2000 = 5.080	5/9	=	.5556 = 14.111	8/9	=	.8889 = 22.578
13/64	=	.2031 = 5.159	9/16	=	.5625 = 14.288	57/64	=	.8906 = 22.622
7/32	=	.2188 = 5.556	4/7	=	.5714 = 14.514	9/10	=	.9000 = 22.860
2/9	=	.2222 = 5.644	37/64	=	.5781 = 14.684	29/32	=	.9063 = 23.019
15/64	=	.2344 = 5.953	7/12	=	.5833 = 14.817	10/11	=	.9091 = 23.091
1/4	=	.2500 = 6.350	19/32	=	.5938 = 15.081	11/12	=	.9167 = 23.283
17/64	=	.2656 = 6.747	3/5	=	.6000 = 15.240	59/64	=	.9219 = 23.416
3/11	=	.2727 = 6.927	39/64	=	.6094 = 15.478	15/16	=	.9375 = 23.813
9/32	=	.2813 = 7.144	5/8	=	.6250 = 15.875	61/64	=	.9531 = 24.209
2/7	=	.2857 = 7.257	7/11	=	.6364 = 16.164	31/32	=	.9688 = 24.606
19/64	=	.2969 = 7.541	41/64	=	.6406 = 16.272	63/64	=	.9844 = 25.003
3/10	=	.3000 = 7.620	21/32	=	.6563 = 16.669	1"	=	1.0000 = 25.400
5/16	=	.3125 = 7.937	2/3	=	.6667 = 16.933			
1/3	=	.3333 = 8.467	43/64	=	.6719 = 17.066			
11/32	=	.3438 = 8.731	11/16	=	.6875 = 17.463			
23/64	=	.3594 = 9.128	7/10	=	.7000 = 17.780			
4/11	=	.3636 = 9.236	45/64	=	.7031 = 17.859			

To convert a decimal to percentage, carry the decimal point two places to the right. Thus, 63/64, or .9844, equals 98.44%.

Glossary

Absolute Humidity

The amount of water vapor present in a specified volume of air.

Acid

A corrosive compound containing hydrogen which reacts with certain metals and alkalis to form salt. In solution it turns blue litmus red and is characterized by a sour taste. It is used in printing for etching plates and in fountain solution. The acidity of a solution is generally expressed as pH.

Adhesion

The strength of bond between paper and coatings.

Air Shafts

Pneumatic expandable mechanisms inserted into roll core to position and hold the roll on the press unwind or rewind shaft.

Alkali

A caustic alkali hydroxide or metallic oxide which reacts with acids to form salt. In solution, it turns red litmus blue and is characterized by a bitter taste and soapy feel. Alkalinity of a solution is generally expressed as pH.

Anhydrous Alcohol

Alcohol that is free from water.

Anvil Cylinder

A hardened metal press or collator roll which backs up the score cutting knives.

Art Work (Black and White Reproduction Art; Camera Ready or Finished Art; Keyline or Pasteup; Mechanical Art.)

Final drawing or good, sharp print of illustration or type matter which can be photographed.

Backaway

A condition occurring in the ink fountain when the ink does not adhere to the roller.

Back Gauge

Movable metal bar behind the knife on paper cutters used for squaring the paper.

Background Color

Overall color development resulting from damaged CB in contact with CF.

Backprinting

Applying thin film of ink to CB surface as screened image. Ink dries by oxidation and evaporation.

Baggy Rolls

A roll condition caused by tension variations across the web.

Basis Weight

The weight of one ream (500 sheets) of paper in a specified or standard size for that grade.

Bearers

Bands on each end of the press cylinders which maintain the correct separation between the cylinders.

Binder

A material used in coatings and inks to hold them together and make them adhere to the material on which they are applied.

Black Light

Ultraviolet light used to detect desensitizing ink tracking, spray or voids.

Blanket

Vulcanized rubber sheet on a fabric base used to cover the press cylinder. It transfers the inked image from the plate to the press sheet in offset printing.

Blanket Swelling

An increase in blanket caliper caused by contact with substances that are not compatible with the blanket materials.

Bleed

A colored halo extending beyond the impression area of a printed line, character or imaged area. (See Feathering)

Blinding

Plate with an image that will not accept ink.

Glossary

Blocking

Undesirable sticking of successive plies or sheets.

Blockout

The use of printed solids or patterns on specific areas of parts of a form set to prevent disclosure of information.

Body

Viscosity or consistency of an ink or vehicle.

Body Gum

Thick varnish used to stiffen inks.

Bond Paper

Chemical wood or rag content papers with basis weights (17" X 22") up to 24# (26# NCR PAPER brand used for forms, letterheads and general business purposes).

Breaker Bar

A metal bar over which a web of paper is drawn at a sharp angle to reduce curl.

Bridge

The uncut area in a perforation.

Brightness

A measure of whiteness of paper.

Bulk

A bookmaking term for thickness of paper expressed in number of pages per inch under a given pressure.

Burster

Mechanical device used to separate continuous forms into individual sets.

Bursting Strength

Resistance of paper to rupture under pressure, indicated in pounds per square inch on a Mullen Tester.

Caliper

Thickness of a sheet of paper expressed in thousandths of an inch.

Capsules

In CB and SC type coatings, the micro-droplets of colorless dye solution are surrounded by a protective coating. These microcapsules are ruptured by pressure above 35 pounds per square inch, which releases the dye solution in contact with the CF surface, causing the print to develop.

Capsule Damage

CB coating which has been subjected to excessive pressure which caused the microcapsules to break thereby rendering that area incapable of making a satisfactory print.

CB — Coated Back

The back coated sheet which serves as the original in a carbonless form set.

CF — Coated Front

The front coated sheet which serves as the receiving part of the form.

CFB — Coated Front and Back

The front and back coated sheet that serves as the intermediate part(s) of a carbonless form set.

C1S

Coated one side, either CB or CF coatings.

C2S

Coated both sides with the same coating, either CB or CF.

Chain Delivery

Endless chain with grippers that accept the sheet from the impression cylinder and transport it to the delivery pile for ink drying and better runability purposes.

Chalking

A condition in a printed image in which the pigment is not properly bound to the paper and can easily be rubbed off as a powder.

Chucks

Mechanisms inserted into roll core to position and hold the roll on the press unwind or rewind shaft.

Glossary

Coating

Material applied to paper surface to give it special characteristics.

Coating Pattern

Appearance of a coated surface caused by the nature of the coating, method of application or drying technique.

Coating Weight

A measure of the amount or weight of coating applied, usually expressed in pounds per ream for a given sheet size.

Cobalt Drier

A material that accelerates ink drying.

Cockle

A puckered appearance in paper caused by uneven drying.

Collating

Gathering and assembling into order, parts of multiple part forms.

Collator

A device for assembling multiple part forms.

Color Development

Chemical change that occurs when the colorless dye in the CB coating reacts with the CF coating and gives a colored image.

Combers

Wheels that buckle the top sheet in the feed pile to start the sheet separation.

Compatible

Dissimilar materials that do not affect or are not affected by contact with the others.

Compatible Carbon

Carbon paper that can be incorporated into an NCR PAPER brand form set without affecting the functional properties of the system.

Consecutive Number

Sequential numbering.

Copy

Any material (hand drawn, typewritten manuscript, pictures, art work, etc.) to be set and reproduced.

Crash Printing

A method of printing precollated form sets using hard type and heavy impression pressure to image all parts except the original which receives the ink.

Crimp Lock

Joining of continuous webs of paper and/or carbon by pressing several punched tabs on each ply through the bottom ply.

Crop

Remove outer area, or edge, of copy by masking or cutting.

Cross Direction

Perpendicular to the machine or grain direction of a sheet or web of paper.

Crushed Core

Collapsed core due to handling or transit damage.

Curl

The tendency of paper to not lie flat. There are two kinds: structural, which is related to the manufacturing and/or coating process, and roll-set (wrap), which results from the paper being wrapped around the core. Structural curl is with (or occasionally diagonal to) the grain; roll set curl is always across the grain.

Cut

A type-high engraving, line or halftone, used in the letterpress printing process.

Cylinder Press

A printing press having a flat bed for the type form with the printing being done against a revolving cylinder.

Dampeners

Rollers that transfer the dampening solution to the offset plate.

Glossary

Dancer Roll—Dancing Idler

A weighted roller that rides between the unwind and metering unit. The roller is used to take up slack and maintain a uniform web tension.

Dandy Roll

Wire-cylinder on papermaking machines that patterns or watermarks the web.

Decollator

Mechanical device used to separate parts of continuous forms while removing waste materials such as carbons.

Desensitize

To restrict the ability of NCR PAPER brand to produce a print.

Desensitizing Ink

Transparent ink applied to CF coating to prevent print development.

Diecut

Removal of form sections by use of cutting rule or special die.

Dimensional Stability

The property of a paper to resist changes in size caused by stresses occurring during processing and/or changes in temperature and relative humidity.

Discoloration

A change in the color of the paper.

Distributing Rollers

Rollers that break down and distribute ink to the form rollers.

Double-Double Bevel

A slitter wheel with both sides angled in from the center having sharper angles at the cutting edge, to give better resistance to dulling.

Draw

Movement of paper under clamp when guillotine cut, causing a difference in length between top and bottom of lift.

Driers

Compounds added to ink to accelerate drying.

Drilling

The use of hollow rotating paper drill bits to make holes in a lift or stack of paper.

Driography

An offset printing process using special planographic plates and inks that do not require dampening to differentiate between image and non-image areas.

Dry Offset

A printing process using a relief plate and blanket but no water.

Ductor Roller

Ink or water roller that alternately contacts the fountain and distributing rollers.

Duplex

Paper having different colors and/or finishes on opposing sides.

Dusting

Debris, coating pick, slitter dust, fibers, and/or starch is deposited onto the blanket from the paper during the printing process. In severe cases dusting can affect the quality of the printed image.

Dwell Time

The period when two objects are in contact.

Edge Gumming

The process of gluing multiple parts along the edge of the sheets to create a finished form.

Edge Padding

A process of gluing collated form sets or similar sheets along one edge to hold them in order for further processing or use. (See Fanapart)

Emulsification

A condition when the offset ink and fountain solution mix.

Glossary

Endorsability

The writing upon the CB portion of a carbonless sheet, such as endorsing a check. Fine point pens can give inconsistent results due to coating accumulation at the point.

Etch—Offset Lithography

A dilute acid that is mixed with the dampening fountain water to increase water acceptability in the non-printing areas of the plate.

Etch—Photoengraving

To image a plate by chemical or electrotype action.

Fanapart

A system of edge padding using a special adhesive that enables a lift of glued forms to be quickly and easily separated into individual sets by fanning.

Fanfold

The process of folding a web width of paper into a form set with a subsequent zigzag fold to make packs of completed forms.

Feathering

A form of bleeding in which fine lines of color radiate from the imaged areas.

Feeder

A mechanical device on a printing press that separates and delivers the sheets into the press.

Felt Side

The top side of the sheet from a fourdrinier paper machine.

Flaky Solids

Printed solid ink areas on paper that have the appearance that the ink has flaked or peeled off.

Flat Side

The ends of a paper roll.

Flow

The tendency of an ink to level out in an ink fountain.

Flying Paster

A mechanism that allows the lead end of a new roll of paper to be connected to the trailing end of the previous roll without stopping the press, coater or paper machine.

Formation

A pattern in paper caused by variations in the amount of fiber laid down across the web.

Form Rollers

Ink or water rollers that contact the plate or form.

Fountain

Reservoir for ink or water on printing press.

Fountain Solution

Solution carried in the water fountain of an offset printing press.

Fuzz

A residue on paper consisting of loose fibers or lint.

Gap Space

The area unaffected by the use of excessive impression pressure.

Gathering

Assembling into order, parts of multiple part forms.

Ghost Image

A term used when two sheets of CB are placed one over the other, and pressure or imaging is applied to the top sheet. Due to basestock pH and a mild reaction with the broken capsule dye, a light image may appear on the bottom ply.

Grain Direction

The direction in which the paper was produced on the paper machine and the majority of the individual fibers lie. Also referred to as machine direction.

Grain Long

In cut paper, when the grain runs in the long dimension of the sheet.

Grain Short

In cut paper, when the grain runs in the short dimension of the sheet.

Glossary

Grippers

Metal fingers that hold paper and carry it through the press.

Gripper Edge

The front or leading edge of paper held by the grippers as it passes through the press.

Gripper Margin (Plate Gap)

Unprinted edge of area of paper it passes through a printing press.

Gum Arabic

Water soluble dried sap from acacia trees used in fountain solution and as protective coating on offset plates.

Gumming Up

Process of applying a gum arabic solution to the surface of an offset plate to prevent oxidation and protect it from damage during washup and make-ready.

Hairline Rule

A rule less than one point ($1/72$ ") wide.

Halftone

A method of reproducing a continuous tone picture by using small screened dots on the plate to represent varying degrees of light and dark.

Hickies

Doughnut shaped spots in inked areas caused by dirt or other extraneous matter.

Hold Down Bands

Flexible strips at the delivery end of a press or collator to guide the sheets to the stack.

Idle Rollers

Rollers used to break down the ink before it reaches the form rollers.

Impression Cylinder

A press cylinder which presses the paper against the blanket or type to transfer ink to the paper.

Indexing

Diecutting of forms to place tab or shoulder cuts at one or both ends for easy identification.

Indicator Solution for Ludox*

Desensitizing ink tracking, spray, or voids can be detected by using an Indicator Solution for Ludox which turns the CF coating blue when sprayed on nondesensitized areas. The spray will *not* indicate adequate coverage or effectiveness of the desensitized area.

Ink

Fluid or viscous material of various colors used in printing. The ingredients are determined by the printing process, type of paper and the end use requirements.

Instant Replay

CF material in an aerosol spray can that is used to detect CB damage.

Intaglio

A direct process, printing from an ink filled recessed image plate.

Jog

The process of aligning sheets of paper for further processing.

Jump Perforation

Perforations applied partially to the form length by cross perforating cylinders.

Knurled Wheel

A rough surfaced wheel used on collators to break through the paper coating, exposing fibers in the stub or margin to give improved adhesive performance.

Ledger

Chemical wood or rag content papers in the 24# to 36# (17" X 22") range used for bookkeeping and machine applications because of their superior physical properties.

Legibility

Clarity or definition of print.

Letterpress

A direct process printing from relief type or plates.

Letterset

Dry offset printing from plates with a relief image.

*DuPont registered trademark

Glossary

Lift

A stack of paper.

Line Hole Punching

Equally spaced holes punched in one or both margins of continuous forms to facilitate feeding in forms handling equipment.

Lithography

The process of printing from a planographic surface (Plate) that has been sensitized and selectively developed so that the image area is ink receptive, while the non-image area is water receptive.

Long

Ink that has good flow properties in the fountain.

Machine Coated

Paper that has been coated on the papermaking machine.

Magnetic Ink

Ink containing a magnetic oxide pigment.

Makeready

Press preparation necessary for printing a job.

Manifolding Form

A multiple part form designed for good writing and print-through properties.

Marginal Word (Phrase, Letter or Numeral)

Identifying marks printed on form parts to designate distribution or flow after decollation.

MICR—Magnetic Ink Character Recognition

A system of electronically reading information encoded on documents printed in magnetic ink with a special type font.

Micro Picking

Similar to picking except that the particles pulled from the surface are too small to be readily visible.

Micropiling

Micropiling is a variation of piling characteristic of, but not limited to, CB surface printing. It appears as minute particles of build-up within the boundaries of the printed image. Its damaging effect is limited to image quality.

Misting

Misting is a fine spray of ink droplets thrown off from the rollers in a fast running press. This is more likely to occur with a low viscosity ink.

Moisture

The amount of water present in paper.

Moisture Welts—Weather Wrinkles

Small raised areas on the outside of rolls caused by absorption of moisture from the air.

Molleton

Cloth used to cover dampening rollers on an offset press.

Mottle

Irregular and unwanted variation in color or gloss caused by uneven absorbency of the substrate.

Mullen Tester

A machine for testing the bursting strength of paper.

NCR PAPER Brand

Carbonless paper in which microcapsules of colorless transfer material and colorless receiving material coated on adjacent paper surfaces enable reproduction of the image printed or written on the original through successive parts without the use of carbon. This is accomplished when pressure ruptures microcapsules and transfers the colorless dye solution to the receiving surface where a chemical reaction occurs, causing a colored image to develop.

OCR—Optical Character Recognition

Use of an electronic device to recognize marks printed or written on documents and convert them into machine language. The process relies on differences in contrast between marks or characters and the surface of the paper.

Offset

A printing process in which ink is transferred indirectly from the plate to the paper by means of a blanket.

Opacity

The resistance of paper to transmission of light or "show through".

Glossary

Oscillating Rollers

Rollers that move back and forth sidewise as they rotate to distribute ink to the form rollers.

Packing

Sheets of paper or plastic used to raise surface of plates or blankets to correct printing height.

Padding

The process of gluing multiple sheets along the edge to hold them together.

Pallet

A wood base consisting of two large opposing side frames with top and bottom cross members that is used to facilitate handling of paper rolls.

Pallet Pak

A type of packaging for pressure sensitive grades in which the wrapped rolls are placed on a pallet and enclosed in a corrugated carton.

Paper Clamp

The pressure-actuated bar on a guillotine that holds the lift of paper down to prevent draw.

Pencil Check

Test before printing to assure that correct side will be printed.

Perfecting Press

A press capable of printing both sides of the paper in one pass.

Perforate

Placing alternating in-line cuts and ties in paper for subsequent separation.

pH

The degree of acidity or alkalinity in a solution. pH 7 is neutral, above is alkaline, below is acidic.

Picking

Picking is characterized by coating and/or fiber being pulled off in the Z direction of the paper. This can be caused by too high of an ink tack, too fast of press speed, poor internal bonding of paper fibers or insufficient binder in the coating. In commercial printing, picking can also occur between two or more layers of ink.

Picture Framing

Slitter or coating dust that accumulates on the blanket, outlining the edge of the sheet.

Pigment

Microscopic particles added to printing inks to give color, body and opacity.

Piling

Piling is the result of ink-in-water emulsification mixing with particles of dust, debris, or coating pigment thus interfering with the transfer properties of the ink. A crusty build-up may occur on the blanket along the trailing edge of the printed image. In extreme cases, if undetected, blanket smash will occur.

Pin Holes

Barely visible openings in paper where no fibers were deposited by the machine.

Plate-Offset

Light sensitive coated sheet material, which after imaging, serves as the master for offset printing.

Plies

Individual parts of a multiple copy form.

Position Sequence

The order, relative to location in the web, in which narrow rolls are slit on the press (left, center, right, etc.).

Precolated

Sheeted carbonless paper consisting of the required grades, weights and colors assembled in reverse or straight sequence to eliminate collation after printing.

Pressure Sensitive

A material that is susceptible to damage by weight, friction or impact.

Print Fade

Loss of image due to exposure to certain unusual external or chemical factors.

Print Intensity Development

An increase, with time, in the strength of color after carbonless paper is imaged.

Glossary

Print Intensity

The degree of color occurring when carbonless paper, CB and CF (or SC alone), coatings are imaged.

Print Stability

The ability of the image to resist fade and maintain legibility.

Proof

A trial impression or test print made to permit easier examination prior to final printing.

Punching

A method of making holes by means of a two-part die.

Ream

Five hundred sheets of paper of a specific size.

Register

Alignment of forms, images or ink colors relative to each other.

Relative Humidity (RH)

The amount of water vapor present in the atmosphere expressed as a percentage of the maximum that could be present at the same temperature.

Resin Yellowing

The term used to describe yellow discoloration on CF surfaces. This occurs over time as the resin in the CF reacts with the atmosphere. Certain storage conditions can cause greater amounts of the discoloration.

Reverse Stacking

A technique used when guillotining assembled forms having varying length plies to eliminate the need for building up the thick end of the lift.

Ridges

Raised streaks running in the grain direction in rolls or skids of paper resulting from localized higher caliper or lower compressibility of the paper.

Rope Wrinkles

A distortion having a rope-like appearance running in the grain direction in rolls or skids of paper resulting from localized lower caliper or stretching. These normally disappear during running and do not cause wrinkles or misregister.

Rotary Collation

Assembling sets in the proper sequence from rolls printed on a roll to roll press.

Round Side

The cylindrical or curved side of a paper roll.

Rubber Plate

Relief molded rubber plate used for direct transfer of ink to paper.

Safety CB

An NCR PAPER brand grade in which the CB coating is applied to the back side of safety paper.

Safety Paper

A special patterned grade for checks or documents made to reveal any attempts at chemical or physical erasure or alteration.

SC—Self Contained

A self imaging grade of NCR PAPER brand in which both dye and reactant coatings are applied to the front side of the sheet.

SC-CB—Self Contained CB

A self imaging grade of NCR PAPER brand that has CB coating on the back surface allowing it to be used with transfer grades of NCR PAPER brand.

Score

To impress or indent paper to facilitate folding.

Scumming

Scumming is an imbalance in the printing process causing the non-image area of the plate to accept ink. Not to be confused with toning which differs in appearance and is ink/water oriented, scumming is not easily cleaned up and can result from one or more of the following situations: — Incompatibility between ink and fountain solution — Plate wear — Poorly desensitized plate — Poorly formulated ink — Improperly set rollers — Paper contaminants.

Setoff (Offset)

Undesirable transfer of ink to a contacting surface.

Shelf Life

Shelf life is the length of time printed forms are stored—under normal conditions—before they are imaged for use.

Glossary

Short

An ink that does not flow freely in the fountain.

Shrink Wrapping

A packaging system in which objects are tightly sealed in special plastic films. The material is placed in a loosely fitting film sleeve which is then passed through a special oven where heat causes the film to contract and hold the contents firmly. Some shrink wraps adversely affect NCR PAPER brand.

Silk Screen

Process of printing through a masked fine silk or wire screen to transfer ink to the image areas on the paper.

Sizing

Material applied to the surface of paper to improve its physical or functional properties.

Skid

A wood base consisting of two large opposite side frames with top cross members which is used to facilitate handling large quantities of paper.

Skip Coating

Areas or streaks on the paper web to which coating was not applied.

Skip Perforation

Perforations that are applied partially to the form width by cam action.

Slime Spots

Translucent spots or holes in paper caused by micro-organisms in the papermaking system.

Slip Sheet

Sheets of paper inserted between printed sheets to eliminate ink set.

Slitting

1. Separation of individual sets from a stack by using a cut down knife drawn along the padded edge of the sheets in the stack.
2. Conversion of mill rolls into smaller widths and diameter rolls for use as adding machine rolls, tally rolls, etc.

Smoothness

The surface finish or lack of roughness of paper.

Smudge

A blue discoloration on the CF coated side of carbonless paper that occurs when it is in contact with CB coating under excessive pressure. Some of the conditions leading to this are storing CFB rolls on their side, failure to follow recommended cutting procedures, heavy impression on press followed by tight rewind and prolonged storage before collation. Self Contained type NCR PAPER brand is also subject to this condition.

Smudge—Frictional

A blue discoloration on the CF coated side of carbonless paper that occurs when it is brought in tight, sliding contact with CB coating such as would occur on rewinding a CFB roll or multiple ply tally rolls. SC paper is also subject to this condition.

Sponge Rubber

Pad attached to bottom of clamp bar to alleviate clamp bar smudges.

ST

Carbonless paper for stock forms applications. Also called Economy.

Stiffness

The resistance to bending of paper.

Suckers

Vacuum feet used on press for lifting paper and moving it forward in the press feeder system.

Tablock

A type of flexible fastening used on continuous forms.

Tack

The resistance of an ink film to splitting.

Tag

A smooth heavy grade of paper used where durability and strength are prime requirements.

Tear

A measure of paper strength.

Glossary

Telescoping

A condition occurring with loosely wound rolls where pressure on the flat side causes the opposite side to bulge out.

Thermal Paper

Heat-sensitive products used on facsimile, labels, data terminals, calculators and chart recording equipment.

Throw Length

The theoretical circumference of a printing plate and the length of image it produces. It is measured in terms of the cumulative deviation from the theoretical length.

Tie

The uncut area of a perforation.

Tinting

Tinting as it relates to the production of business forms is the process of using an alcohol or water based solution to dye white paper various colors. This is an on-line process.

Toning

A phenomenon characterized by ink in the nonimage areas on the blanket, paper, and eventually the plate, which stems from ink/water logging.

Tipping

A technique for assembling unit set forms in which the individual parts vary in length and location along the stub.

Tracking

A form of set off where ink is transferred from printed areas to clear areas by contact with idler rolls, etc.

Translucent

A grade of paper providing more "show through" or light transmission than bond grades, generally used when diazo copies are needed.

Trapping

Ability of ink to accept and hold succeeding colors on multiple color runs.

Tusche

Liquid ink used for corrections on lithographic presses.

Unit-Set Forms

Non-continuous forms in which the parts are permanently glued in the stub but perforated for ease of separation.

Varnish

Substance used as a vehicle or base in the making of ink.

Vehicle

The fluid ingredients of printing ink that provide flow and act as a carrier for the pigment.

Viscosity

An ink's resistance to flow.

Wash Marks

Streaks in ink patterns on the paper from excessive dampening solution.

Washup

Removal of ink from ink mill and fountain.

Watermark

An identifying mark or pattern made by a dandy roll as the paper is formed.

Water Penetration

A test that indicates the degree of sizing in a paper.

Web Detector

Sensing device that trips off the impression and ink when the web breaks.

Web Guides

Use of electric eyes, air resistance or touch to control lateral position of paper flow.

Web Press

Rotary presses that print a continuous roll (web) of paper.

Wire Side

Side of paper in contact with wire during manufacture.

Yield

An expression for square inches of paper per pound of weight.

Zigzag Fold

The process of folding continuous form web lengths into packs.

Customer Service

Technical Services Dept:

- Complaints
- Technical information
- Packaging & Handling
- Application Information

Appleton Papers Inc.
Technical Services Dept.
825 E. Wisconsin Ave.
P.O. Box 359
Appleton, WI 54912

West: (800)922-1723

Central: (800)981-9681

East: (800)922-1724

FAX: (920)991-7341

Customer Service Department:

- Order Information
- Product Availability
- Product Inquiries
- Pricing

**National Accounts,
Printer/Converter**
(800)922-1729
FAX: (800)922-1712

Merchant East
(800)533-9421
FAX: (800)872-4141

Merchant West
(800)922-1727
FAX: (800)922-1709

General Offices:

Appleton Papers Inc.
825 E. Wisconsin Ave.
P.O. Box 359
Appleton, WI 54912
(920)734-9841

Visit Our Web Site:

www.appletonideas.com/ncrpaper

APPLETON
What Ideas Can Do™



*NCR PAPER is a registered trademark licensed to Appleton GENERAL OFFICES: P.O. Box 359, Appleton WI 54912
©1997 Appleton Papers Inc. Printed in U.S.A. Optima® and UTOPIA™ are trademarks of Appleton Papers Inc. PL-300N-CS 09/05

www.appletonideas.com/ncrpaper

