

IBM InfoColor 70  
and 3170 Full Color Digital Printer/Press



# Paper Selection Guide



IBM InfoColor 70  
and 3170 Full Color Digital Printer/Press



# Paper Selection Guide

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**Second Edition (November 1996)**

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## Preface

This publication describes important characteristics of the paper and special-purpose media that can be used with the the InfoColor 70 Printer and the 3170 Full Color Digital Printer/Press.

For more information about the InfoColor 70, refer to the *IBM InfoColor 70 Introduction and Planning Guide*. For more information about the 3170 Full Color Digital Printer/Press, see the *IBM 3170 Full Color Digital Printer/Press Introduction and Planning Guide*.

A broad range of output supplies is available. Because some supplies work better than others, choosing the most appropriate supplies can help ensure that you get the best possible results from your printer.

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## Audience

This publication is for people who order paper and special-purpose materials, such as labels. It also contains information for people who develop applications that use bar codes, or other printed output having unique requirements. The word *paper*, as used in this document, represents all the media handled by the printer.

Even though the printer is working correctly, it may have paper handling problems due to poor paper characteristics. The quality of your output depends on the characteristics and quality of the paper and supplies you use.

Planners and buyers may want to share this document with their paper manufacturers or suppliers. This publication contains detailed technical information that can help them determine which of their products will work best for your particular applications. IBM strongly recommends testing any media prior to purchasing large quantities to assure satisfactory performance.

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## About This Publication

This publication contains the following chapters:

- Chapter 1, "General Guidelines for Selecting Paper" on page 1 describes general requirements and recommendations that apply to all media used by the printers.
- Chapter 2, "Selecting Paper" on page 3 defines quality, weight, thickness, and other paper characteristics that can affect print quality and performance.
- Chapter 3, "Developing Special Applications" on page 13 provides specifications for printing bar codes.
- Chapter 4, "Testing Paper and Applications" on page 15 describes techniques for determining if papers and specialty media are suitable for use with the printers.
- Chapter 5, "Troubleshooting" on page 17 describes situations that can cause print quality problems during processing.
- Chapter 6, "Safety Practices" on page 19 describes health and safety considerations for a variety of media.

- “Acronyms and Abbreviations” on page 21 defines acronyms used in the documentation.
- “Glossary” on page 23 defines terms used in the documentation.

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## Machine Types Covered in This Publication

The following machine types and model types are covered in this publication.

Printer Name	Machine Type	Model Number
IBM 3170 Full Color Digital Printer/Press	3170	Model 001
IBM 3170 Full Color Digital Printer/Press	3170	Model 01C
IBM InfoColor 70 Printer	3170	Model 002
IBM InfoColor 70 Printer and Collator	3170	Model 02C

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## Related Publications

*IBM InfoColor 70 Introduction and Planning Guide*, S544-5333, summarizes the functions of the IBM InfoColor 70 Model 002 and Model 02C and provides information to help your site prepare for installing it.

*IBM 3170 Full Color Digital Printer/Press Introduction and Planning Guide*, S544-5333, summarizes the functions of the IBM 3170 Full Color Digital Printer/Press Model 001 and Model 01C and provides information to help your site prepare for installing it.

*IBM InfoColor 70 Operator's Guide*, S544-5334, describes how to operate the IBM InfoColor 70 Printer and the IBM InfoColor 70 Printer and Collator.

*IBM 3170 Full Color Digital Printer/Press Operator's Guide*, S544-5334, describes how to operate the IBM 3170 Full Color Digital Printer/Press and the IBM 3170 Full Color Digital Printer/Press and Collator.

*IBM 3170 Full Color Digital Printer/Press Safety Information*, G544-5335, provides important safety guidelines for using both the InfoColor 70 Printer and the 3170 Full Color Digital Printer/Press.

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## Chapter 1. General Guidelines for Selecting Paper

The quality and consistency of printed output on the IBM InfoColor 70 and IBM 3170 Full Color Digital Printer/Press is directly related to the quality and consistency of the paper or special-purpose media used for printing. This chapter explains important issues to consider when you select media for your printer. Items to consider include:

- Paper stock<sup>1</sup>
- Size
- Standards and tolerances
- Shipping, storage, and operating environment
- Print areas

For best printing, use forms that meet the recommendations in this guide. Provide your paper vendor with the paper criteria outlined in "Summary of Paper Selection Recommendations" on page 8 and request paper that meet these criteria.

You may need to work with your form vendor to optimize some characteristics for your application. IBM strongly recommends testing all paper prior to purchasing large quantities.

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### Size

The printers are designed to use roll-feed, single-ply forms. To verify the paper sizes your printer supports, please review the *Introduction and Planning Guide* and consult your marketing representative.

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### Standards and Tolerances

You can avoid printer problems and operator interventions by using only those papers that meet the standards and tolerances described in this document.

The printers are designed to use roll-feed, single-ply paper. The paper width must be no more than 320 mm (12.6 in.) and no less than 210 mm (8.27 in.). The InfoColor 70 can cut the paper to lengths at least 2772 mm (109 in.) and no less than 210 mm (8.27 in.).

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### Shipping, Storage, and Operating Environment

Keep paper in its protective coverings until you load it into the printer. The sealed shipping container lessens moisture changes during shipment from the supplier and during storage. Variations in temperature and humidity affect paper size, weight, flatness and electrostatic qualities, which in turn affect print quality and printer performance. To minimize this change, maintain the storage area at between 19 and 23°C (66 and 73°F) and about 50% relative humidity. Store the sealed shipping boxes off the floor (on a pallet, for example). This keeps the paper from absorbing any moisture that might be in the floor.

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<sup>1</sup> Refer also to Chapter 2, "Selecting Paper" on page 3 for important considerations when selecting paper stock.

The printers can operate in the following environments (expect degraded print quality or performance outside of these ranges):

Minimum: 15°C (59°F) at a relative humidity of 18–80%  
 Maximum: 30°C (86°F) at a relative humidity of 25–55%

**Note:** Before using paper, IBM recommends storing it in its original packaging in the same environment in which the printer will be operating for between one and five days or more.

The maximum temperature to which paper should be exposed is 43.3°C (110°F), with relative humidity limits of 20% to 80%. Before using paper that is exposed to temperature extremes, allow it to acclimate in its sealed carton at the recommended temperatures for up to five days, depending on the volume of paper involved and the difference between the room temperature and the paper. Use the following examples to estimate the time required:

*Table 1. Acclimation Times in Hours (Rolls per Room-to-Paper Temperature Differences)*

Rolls	Temp Diff 7.5°C	Temp Diff 10°C	Temp Diff 15°C	Temp Diff 20°C	Temp Diff 25°C	Temp Diff 30°C	Temp Diff 35°C
1	10 hrs	12 hrs	17 hrs	26 hrs	38 hrs	55 hrs	81 hrs
2	11 hrs	13 hrs	19 hrs	28 hrs	41 hrs	60 hrs	88 hrs
4	12 hrs	15 hrs	22 hrs	33 hrs	48 hrs	70 hrs	104 hrs
5	14 hrs	16 hrs	24 hrs	35 hrs	52 hrs	76 hrs	112 hrs

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## Print Areas

The printers can print up to 5 mm (0.2 inches) from the edge of the paper roll.

Paper ripple (caused by humidity stress during shipping, storage, or printing) and paper embossing (caused by dull cutting equipment or other paper-handling equipment during paper manufacturing) may produce voiding within the print area. This voiding (some of printed text or graphics is not printed) usually occurs near the edges of the print area.

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## Chapter 2. Selecting Paper

This chapter explains what you need to consider when you select paper and specialty media for use in the printers, and provides some lists of IBM tested media. The topics covered include:

- Grades
- Quality
- Weight and thickness
- Smoothness
- Fusing ability
- Paper selection recommendations
- IBM-tested media
- Labels

IBM strongly recommends testing any media prior to purchasing large quantities to assure satisfactory print quality and performance.

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### Paper Grades

IBM recommends the following basic paper grades for use in the printers:

- Uncoated
  - Uncalendared
  - Calendared
  - Super Calendared
- Coated
  - Matt
  - Satin
  - Gloss
  - High Gloss
- Specialty Media
  - Embossed
  - Recycled
  - Transparent
  - Parchment

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### Paper Quality

The printers use continuous, roll-feed paper. IBM recommends *Bond* paper made from at least 80% chemical wood pulp. Characteristics of this type of paper are normally within the ranges that work best in the printers. Experience also indicates that some papers with 25% cotton content are satisfactory. Some recycled papers are satisfactory when the paper parameters meet the recommended values (see “Summary of Paper Selection Recommendations” on page 8).

Some paper suppliers offer recycled and blended papers. Recycled paper should conform to the fiber content characteristics (80% chemically pulped wood) and in all other ways conform to the paper quality recommendations. In addition, recycled paper should be free of any contaminants that may have been added to the paper in its previous application. Some of these contaminants can interfere with print quality, paper handling reliability, or toner adhesion. These contaminants can build up on various paper-path and print-element components and cause premature

failure of these components. Blended papers of lower chemical wood pulp content may be desirable for economical and ecological reasons. Consider these papers carefully, because there may be an increased printer operating cost when processing these papers.

IBM can assist you in developing criteria for selecting paper for various applications; however, you are responsible for initiating contact with paper vendors and making the final selection. Remember the following points:

- Provide the paper supplier with the criteria outlined in this guide (See “Summary of Paper Selection Recommendations” on page 8) and request paper that meets these recommendations.
- Before ordering large quantities of paper, check the suitability for the application desired.
- IBM does not manufacture the paper and does not control the paper properties. For most papers, IBM test results are based on a small run of 1 to 3 rolls of paper. The customer needs to conduct more tests before establishing the suitability of the paper stock.

For best print quality and performance, use papers that meet the recommendations in this guide. Papers that do not meet these recommendations may be acceptable if they run well and do not cause machine damage. If the use of a paper causes printer damage, service calls, or part replacement (other than that caused from normal wear), IBM will charge for the time and material of all required service and parts.

IBM recommends testing recycled and blended papers for your applications, as described in Chapter 4, “Testing Paper and Applications” on page 15. This testing should consist of initial sample (500 to 1 000 sheets) testing with follow-up testing. This follow-up testing should demonstrate the printer's ability to perform for 30 to 60 days. Perform all initial testing of new paper by using your own application.

**Note:** Consider any effect the paper might have on printer components (such as the paper conditioning roll, web drive rollers, and paper cutter), or on the environment (volatile emissions).

Consider the following paper characteristics when choosing your paper and paper-based media:

- Paper exposed for about five (5) seconds to a maximum fuser temperature of 150°C (302°F) emits small amounts of some compounds that may cause odors. Examples of odor-causing compounds are sulphur compounds, chlorides, resin-base aerosols, and organics. Such emissions may create an industrial hygiene safety exposure (see Chapter 6, “Safety Practices” on page 19).
- Embossed paper may cause wear on printer components, such as photoconductors, and may reduce print quality.
- Paper with poor surface stability and high amounts of sizing and filler can create paper dust. Excessive paper dust can cause reduced print quality, printer malfunctions, increased operator interventions, or fusing failures.
- Certain adhesives or coatings added to paper can soften or weaken the paper and give off vapors that cause discomfort to operators or service personnel. The additives should not be abrasive or have a tendency to chalk. Some

adhesives can contaminate the cutter. Test these papers thoroughly before using large quantities.

- Certain salts or metallic compounds added to paper to reduce static charge can reduce print quality and cause printer contamination.
- Fillers and other additives may increase paper abrasiveness and cause excessive machine wear, reduced print quality, increased operator interventions, or fusing failures.
- Paper with calendar cuts, grease spots, loose sizing particles, wrinkles, voids, cuts, and tears can cause wrinkling, web breaks and illegible characters.
- Moisture in paper can cause differences in the final print appearance. To transfer enough toner to the paper, the conductivity of the paper must be reasonably low. Increasing paper moisture causes an increase in paper conductivity. The range of 4% to 6% moisture content, by weight, is best.

When testing the moisture content, measure paper immediately after removing it from the shipping container.

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## Paper Basis Weight

*Basis weight* refers to the heaviness of paper and is defined as follows:

- **In U.S. measurements:** The weight, in pounds, of 500 sheets of 17- by 22-inch bond paper. Standard U.S. basis weights are 16 to 50.6 pounds.
- **In metric measurements:** The weight, in grams, of one sheet of 1 square meter (m<sup>2</sup>) paper. Standard metric basis weights are 60 to 190 grams per square meter (g/m<sup>2</sup>).

Paper with a basis weight of 60 g/m<sup>2</sup> (16 pounds) or less does not stack as well as heavier paper. Table 2 gives the recommended basis weights for paper.

Xerographic Bond	Offset (Text and Book)	Cover	Bristol	Index	g/m <sup>2</sup>
16	41	22	27	33	61
20	51	28	34	42	75
24	61	33	41	50	90
28	71	39	48	58	105
32	81	45	55	67	120
36	91	50	62	75	135
40	102	56	69	83	158
43	110	60	74	90	163
47	119	65	80	97	176
52	133	73	88	107	195

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## Smoothness

*Smoothness* is the evenness of the surface of the paper. Rough paper tends to cause variable print darkness, loss of fine lines, and poor toner adhesion. Paper that is too smooth may cause jams in the printer. In general, the printers work better with smoother paper than do previous IBM printers.

Paper smoothness is a function of:

- The type of material used to make the paper
- The processing of the material

For best operation, the smoothness of the paper should be between 35 and 60 Sheffield units, however 35 to 100 is acceptable.

Table 3 shows the relationship between the smoothness and glossiness of various papers.

Type		Gloss	Smoothness
Uncoated	Uncalendared	Very Low	Low
	Calendared	Very Low	Low
	Super Calendared	Very Low	High
Coated	Matt	Low	High
	Satin	Medium	Very High
	Glossy	High	Very High
	High Gloss	Very High	Exceedingly High

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## Fusing Ability

*Fusing* refers to the process by which toner is melted onto paper to create a permanent bond. Fusing quality, and therefore print quality, can be enhanced by selecting paper designed for electrophotographic printing.

The best fusing is achieved when toner particles adhere to the paper surface, to the individual fibers that make up the paper structure, and to other toner particles. The printers use heat to melt the toner into the paper fibers.

The ingredients used in making paper have a significant effect on this process. Some materials resist penetration and adherence of the toner.

Good fusing papers contain minimal amounts of the organic additives traditionally used for sizing printing and writing paper (slack rosin-starch sheets). Use paper treated to resist liquid penetration (hard sizing) *only* after thoroughly testing it for fusing quality.



The following factors can have a significant effect on fusing quality:

- **Sizing**

Sizing agents affect contact between toner and paper. Keep overall sizing low.

- **Smoothness**

In general, the printer fusing system works better with **smoother** papers. Rough papers tend to reduce fusing quality.

- **Moisture Content**

Because the printer fusing temperatures can vaporize moisture in the paper, excessive moisture content prevents the paper from heating adequately for fusing. The printer fusing and paper-handling performance is best with paper that is used immediately after it is removed from the shipping materials, when its moisture content is generally from 4% to 6%.

The moisture content is especially important for the higher basis weight papers (high g/m<sup>2</sup>), because the total weight of water in the paper to be evaporated by the Paper Supply (PRS) conditioning unit can become too high. For higher basis weight papers, the moisture content should be at the lower end of the 4% to 6% range. For lower basis weight papers (below 160 g/m<sup>2</sup>), the moisture content can be at the higher end of the 4% to 6% range.

Controlling these characteristics improves fusing performance for many of the papers typically used in the printers; however, only actual testing can determine the exact effect of any paper on fusing performance.

## Summary of Paper Selection Recommendations

Table 4 summarizes recommendations that can help you and your paper supplier choose the paper that is *most suitable* for your printer.

IBM recommends using 75 g/m<sup>2</sup> (20-lb) continuous form bond, and that you initially test a small sample of supplies in your printer before you purchase production quantities for a given application.

<i>Table 4. Paper Selection Recommendations - Summary</i>		
Parameter	Test Method	Recommendation
Basis Weight (Xerographic Bond)	D 464, ISO 536 (see Notes 2 and 3)	16–50.6 lb (60 g/m <sup>2</sup> –190 g/m <sup>2</sup> )
Caliper	T 411, ISO 534 (see Notes 1 and 3)	3.0–8.0 mils
Stiffness (Taber)	T 489 (see Note 1)	17–19 lb (64–72 g/m <sup>2</sup> ) Machine direction: 1.2 Taber units Cross direction: 0.5 Taber units
Smoothness	UM 518, ISO 2494 (see Notes 1 and 3)	35–60 Sheffield units (see Note 6)
Coefficient of Static Friction	D 1894 (see Notes 2 and 4)	0.45–0.65
Porosity (Gurley)	UM 524, ISO 3687 (see Notes 1 and 3)	10 sec/100 ml minimum
Fiber Composition		80% chemical wood pulp or woodfree pulp (The European term <i>woodfree pulp</i> is synonymous with the American term <i>chemical wood pulp</i> .) (either sulphite or kraft)
Color		White or pastel colors
Ash Content	T 413, ISO 2144 (see Notes 1 and 3)	18% Maximum
Filler		The amount and type of filler should be chosen to produce a paper that has low abrasive and dusting characteristics. In general, low filler percentage and small particle size are best.
Surface Sizing		Starch
Internal Sizing		Acid rosin or synthetic (alkylketene dimer or alkenyl-succinic anhydride)
Moisture Content	D 644, ISO 287 (see Notes 2 and 3)	4.0–6.0%
Surface Resistivity	D 257 (see Notes 2 and 5)	1x10 <sup>10</sup> –1x10 <sup>12</sup> ohms
Brightness		94 or above (uncoated) 84 or above (coated)
Opacity		94 or above
Surface		Varies with paper stock
Size		Roll-feed paper Width no more than 320 mm (12.6 in.) Width no less than 210 mm (8.27 in.)

All tests were conducted per TAPPI 402 or ISO 187, except moisture content, which pertains to the paper as packaged.

**Notes:**

1. Testing method—Technical Association of Pulp and Paper Industry (TAPPI).
2. Testing method—American Society for Testing Materials (ASTM).
3. Testing method—International Organization for Standardization (ISO).
4. Use 127-mm per minute (5.0 in. per minute) pull rate.
5. Isolate the test specimen from the metal backing plate with a piece of smooth, nonconductive polyester film, at least 0.254-mm (0.010 in.) thick. Use 100 volts.
6. The front to back Sheffield measurements should be within 10 percent of each other for uniform print quality.

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## IBM-Tested Media

The current list of papers and media that IBM has tested and approved is contained in the document *IBM 3170/InfoColor 70 Approved Media*, available from your IBM representative. This list is updated from time to time as IBM tests and approves additional media. See your IBM representative for the latest list.

When these papers are used in the InfoColor 70 in conjunction with IBM's ventilation recommendations, the printer complies with current safety, environmental, and performance standards, with the following qualification:

IBM does not encourage the use of media rated "B" ("Best print quality may be difficult to achieve"), or any media over 200 gsm, although a few such media are included in the list. A customer can expect these media to be extra sensitive and probably require fine-tuning of various machine adjustments to obtain acceptable print quality. Some customers may have difficulty running media over 200 gsm at all. These media are included in the list for the convenience of customers willing to accept these limitations and accept the responsibility for "tuning" the machine as needed. This tends to require a high level of operator expertise.

When IBM tests with small sample sizes, results are not as conclusive as with larger sample sizes. With small sample sizes, IBM is not able to control the specifications of the stock, and cannot guarantee that you will obtain satisfactory results from these stocks. Remember that IBM Maintenance Agreements state that you are responsible for any increased repair activity resulting from using non-IBM recommended supplies.

Before ordering large quantities of paper, ensure that one of the suggested papers works well for your applications.

## Customer Media Samples

IBM will evaluate samples from customers on an ongoing basis, on negotiated schedules based on printer availability for testing.

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## Labels

Printable labels vary widely in their weight, construction, and adhesive. Because of this, **label applications require thorough testing** before ordering production quantities. These applications require more operator support than standard applications. **Do not use pre-die-cut labels.** The printers perform well when you print the labels on whole sheets and cut the labels after printing.

If you choose to print labels with your printer, follow the recommendations in this chapter very carefully and work closely with your IBM marketing representative while you are selecting label stock. Your marketing representative can give you technical help and share information from other successful users.

Chapter 4, "Testing Paper and Applications" on page 15 contains additional information about techniques to use when you are evaluating label stock.

## Label Types

Figure 1 describes the typical types of labels used on the printers. These labels must meet the requirements set forth in this document.

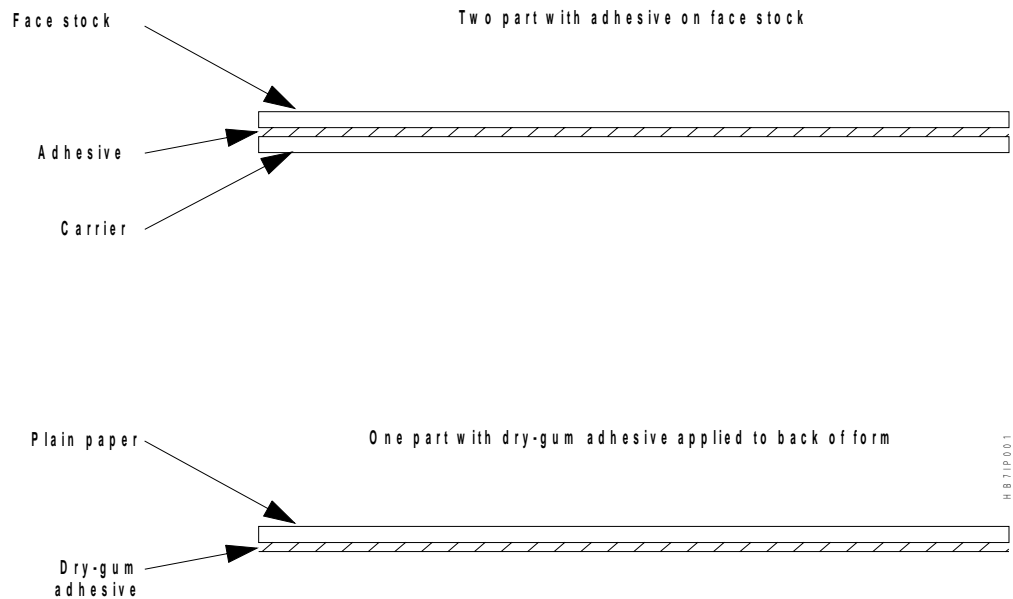


Figure 1. Types of Labels

## Label Design Requirements

Labels must withstand a temperature of 150°C (302°F) while passing through the fuser station. Labels must withstand a continuous temperature of 138°C (280°F) while they sit in the printer-feed mechanism when the printer is not printing.

Labels must be able to form around a 44-mm (1-3/4 in.) radius at a 180° angle without detacking.

The label must have a minimum release value from the carrier of 40 grams/inch (180° peel at 25 feet/minute).

Adhesive must not be left on the carrier after removing the matrix.

### Adhesive

Permanent, removable, or dry-gum adhesive must meet temperature and static requirements. The dry-gum adhesives must not abrade (scrape or rub) off the form and deposit on printer components.

### Face Stock Selection

Face stock can be paper or other materials. When selecting face stock, remember the temperatures previously mentioned.

Because of the low melt point of vinyl materials, do not use them in the printer unless they can meet the temperature requirements.

## Face Stock Paper

Paper used in the printer must be continuous-form bond. The accepted definition of bond is paper formulated from 80% chemical wood pulp. Characteristics of this type of paper are normally within the ranges that work best in the printer. However, experience indicates that papers with 25% cotton content are satisfactory.

## Carrier Material

Carrier material must be compatible with the mechanical and thermal conditions present in the printer.

## Basis Weight and Thickness

The total basis weight for the face stock, adhesive, and carrier must not exceed 25 kg (55 pounds), which equates to approximately 500 sheets of 432 mm x 559 mm (17 in. x 22 in.) paper. The total thickness for the face stock, adhesive, and carrier must not exceed 0.2 mm (.0079 inch).

## Smoothness

To obtain effective toner transfer and fusing, the Sheffield smoothness must be between 35 and 60 units.

## Recommendations

The following recommendations can help you minimize both printer malfunctions and low-quality results when printing on pressure-sensitive labels:

- Hold the basis weight and caliper of the label stock to a minimum to decrease the number of machine checks and to improve fusing quality. The printer do not accept paper with a caliper greater than 0.2 mm (0.0079 in.)(55 pound stock maximum).
- Permanent (nonremovable) labels more often contain adhesives of sufficient heat and pressure stability; therefore, they are likely to perform adequately in the printers.
- Label stock must not emit vapors or odors that cause discomfort to operators or service personnel.
- Coated and synthetic labels can cause poor fuse quality and poor operation in the electrophotographic process of the printers. If treatment is necessary, treat labels on the surface only, and use compounds specifically designed to enhance the operation (fusing, for example).
- If bar codes are used, test them with a scanner to ensure that they meet scanner tolerances for fusing and print quality.

## Operator Tasks

Printing labels sometimes requires operator involvement beyond the usual tasks of loading paper and emptying the stacker. For example, the operator may need to:

- Clean the printer before and after every label job
- Remove any adhesive from the cutter

Refer to *Operator's Guide* for more information about operator tasks.

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## Chapter 3. Developing Special Applications

The printers support a variety of special applications, such as those that print bar code output. This chapter contains information about the paper used for these applications.

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### Bar Code Forms

Special bond papers designed for printing bar codes are similar to standard smooth bond. However, bar code paper has less contamination and less fluorescence than standard smooth bond, which enhances the bar code reading process. These special papers are not designed for use in the electrophotographic process. For best performance, bar code paper should be 24-pound basis weight or greater, to avoid problems with second-side transparency.

The printers support the use of the 4-pel module width. Test bar code applications in the printer for adequate print quality and toner adhesion, and in a bar code reader for scanning quality. Test your bar code applications using the techniques described in Chapter 4, "Testing Paper and Applications" on page 15.

### Colors

The printers process all colors; however, IBM recommends that you create pure black bar codes rather than 3 or 4-color composite bar codes.





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## Chapter 4. Testing Paper and Applications

This chapter contains information about testing paper to be used in the printers. It answers questions about testing and presents test procedures. The information is intended to help you identify—and avoid—potential paper-related problems. Discovering problems early can save you money in paper and maintenance costs.

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### Questions and Answers: Testing Paper and Applications

These questions and answers can help you decide what papers and applications to test, and how to test them.

#### What is an Ideal Paper and Application?

An ideal application for the printers prints standard-font text and simple images on plain, white paper, that meets the guidelines found in Chapter 2, “Selecting Paper” on page 3. This paper is manufactured specifically for use in nonimpact printers, and is free of binder holes, cut-outs, and other cuts. After leaving the printer, output from an ideal application is allowed to cool, and receives minimal handling, rubbing, and creasing.

When processing an ideal paper, the printers can deliver optimal print quality and reliability. With papers that deviate from the ideal, print quality may decrease, and the need for operator interventions may increase.

Be sure to test any papers and applications that do not match this ideal paper and application description. Do your testing *before* processing large production orders or print jobs.

#### What Should I Know Before Testing New Papers?

Consider the following points before running untested papers.

- Ensure that your printer is running within the performance specification range.
- Ensure that papers to be tested are kept in their air-tight original packaging.
- Have on hand some control or standard paper samples to use for comparison purposes. (IBM recommends using either 130 gsm 4 Color Copy paper or Nordland 120 gsm paper as control paper.)
- Print quality on any paper is basically dependent on many paper properties. When testing paper, take into consideration:
  - Web tension
  - Paper pre-conditioning
  - Transfer/Duplex Current
  - Fusing

The paper script files used by the printers contain values for each of these subsets. Try to match the basis weight of your untested paper to that of a tested paper and then use that paper's script file. You may be able to run with the untested paper using that script file. However, this is not guaranteed.

- If the print quality is not acceptable or fusing is poor, contact your service engineer for further support. Not every paper or application is appropriate for this machine. The paper in question may need further testing in an IBM lab.

 **CAUTION:**

**DO NOT buy paper in large quantities before testing the paper with your application in your machine.**

## **When Should I Test My Papers and Applications?**

Test all new papers prior to any commitment to purchase large quantities, and test any paper that is outside the guidelines specified in Chapter 2, “Selecting Paper” on page 3. This testing assures that the expected results are achievable. Some candidates for tests:

- Adhesive labels
- Light or heavy paper
- Rigid paper
- Colored paper
- Recycled paper

Test all new applications on samples of the expected output paper. Candidates for tests:

- Bar codes
- Solid-fill areas
- Large amounts of text in small fonts
- Images

Sometimes an application is a candidate for testing because of what happens to the output after it leaves the printer. Conditions that can affect print jobs after printing is completed include:

- Heat

The printers use heat to put print on the paper. Heat applied to printed output can change the output.

- Moisture

Water and other solvents can cause print to smear on some paper.

- Handling

Frequent handling or rubbing can erase print from a paper. For example, print on a price tag may rub off as shoppers repeatedly grasp the tag to look for size and price information. Similarly, perspiration on an operator’s hand may leave a blurry thumbprint.

---

## Chapter 5. Troubleshooting

This section identifies situations that can cause problems during processing. Consider these possibilities when you attempt to resolve print quality or reliability problems during testing. Following are some common problems seen on coated papers.

- Blistering or Bubbling in Paper Supply
- Blistering in Fuser
- Low-Frequency Clouds
- Wide Low-Density Bands
- Narrow Low-Density Bands
- Wrinkling
- High-Frequency Cloudiness

If these problems persist or if other symptoms are apparent, contact your service representative.

**Note:** A basic level of understanding of paper interaction with the printer is necessary to execute the problem solutions.

---

### Blistering or Bubbling in Paper Supply

**PROBLEM:** Bubbles or blisters are seen at the edges of the web.

**SOLUTION:** Lowering the IPS/U2.N2, which lowers the temperature, will eliminate blisters.

---

### Blistering in Fuser

**PROBLEM:** If the residual moisture content in the paper is high, the high temperature of the paper moving through the fuser boils off the water, forming blisters.

**SOLUTION:** Reduce the fuser temperature (IFX/T3.N1) in increments of 5-10° until the blisters disappear.

---

### Low-Frequency Clouds

**PROBLEM:** The printed sheet may show clouds (0.5 to 1.0 cm in diameter) with a mottled structure on the paper.

**SOLUTION:** Increasing or decreasing the transfer current (ITR/14AA.N1) by 20% should resolve this problem.

---

## Wide Low-Density Bands

**PROBLEM:** Low-density bands may appear at the borders of the web (1 to 2 cm wide).

**SOLUTION:** Decrease the positive (ITR/16AA.N1) duplex current by 20  $\mu\text{A}$  and the negative (ITR/17AA.N1) duplex current by 10  $\mu\text{A}$ .

---

## Narrow Low-Density Bands

**PROBLEM:** Low-density narrow bands appear only in duo-color planes, commonly across the whole web width.

**SOLUTION:** Increase the positive (ITR/16AA.N1) duplex current by 10  $\mu\text{A}$  and negative (ITR/17AA.N1) duplex current by 5  $\mu\text{A}$ .

---

## Wrinkling

**PROBLEM:** Wrinkles (bent and slanted) appear across the web due to a high temperature shock caused by the pre-heating roll in the Paper Supply.

**SOLUTION:** Decrease the paper conditioning setpoint in 20-volt steps, using IPS/U2.N2.

---

## High-Frequency Clouds

**PROBLEM:** High-frequency clouds are caused by high duplex currents.

**SOLUTION:** Reduce the positive (ITR/16AA.N1) negative (ITR/17AA.N1) duplex current in steps of 5  $\mu\text{A}$  until the problem is resolved.

---

## Paper Dust Contamination

Paper dust is loose filler, starch, rosin, and fiber particles. In both impact and nonimpact printing processes, some release of paper dust to the environment and some dust contamination within the printer is unavoidable. Speed and high-volume usage of the printers are factors that contribute to the buildup of paper dust on printer components. The level of paper dust due to paper finishing and converting processes influences the need for operator cleanup and printer service.

Using paper with good surface stability and low amounts of internal size and filler reduces contamination from the paper and helps improve fusing quality (see "Fusing Ability" on page 6).

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## Mottled Print

**PROBLEM:** Mottled print occurs at edges of web in one or more colors.

**SOLUTION:** Increase PRS U2 voltage to provide additional drying of the paper in paper conditioning.

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## Chapter 6. Safety Practices

When selecting ink and paper, consider that fusing temperatures and mechanical actions may cause vapors to be emitted at levels that create an industrial hygiene safety exposure. This chapter describes health and safety considerations for a variety of paper and preprinted forms used with the printers.

Paper exposed for about five (5) seconds to a maximum temperature of 150°C (302°F) emits small amounts of some compounds (such as sulphur compounds, chlorides, resin-base aerosols, and organics), which may cause odors. Some of these compounds can cause eye or throat irritation, or other physical discomforts, to printer operators and service personnel. Aerosols may also cause parts of the printer to deteriorate.

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### Ventilation

Provide appropriate ventilation to conform to health, safety, and environment standards. The ASHRAE recommends a minimum of 34.2 cubic meters per hour (20 cubic feet per minute) per person of outdoor air make-up during human occupancy. With this amount of ventilation, all airborne chemicals detected will be below their respective American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLV), where TLVs are available.

To comply with the most stringent state EPA Guidelines (California), ensure that the printer area meets the following ventilation requirements:

1. If the printer room has a volume greater than 1 000 cubic meters (35 315 cubic feet) for each printer installed, a minimum outdoor air exchange of 1 000 cmh (589 cfm) per printer is required.
2. If the printer room has a volume smaller than 1 000 cubic meters (35 315 cubic feet) for each printer installed, active local exhaust from the machine to the outside of the building must be provided. This exhaust should be attached directly to the two cooling fans at the top of the printer. A fan/blower should be provided in the exhaust duct so that machine cooling air is not impeded. It must provide an air flow rate of 385 to 510 cmh (225 to 300 cfm) for each printer. IBM recommends that 6-inch flexible tubing be attached to the two exhaust fans at the top of the printer.

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### Labels

In addition to the safety considerations for paper and ink as described above, observe the following recommendations when using labels:

- Provide adequate ventilation around the printer to reduce the exposure associated with vapors created when the adhesive and carrier are heated in the fuser.

Adequate venting and filtering are essential to lower the level of airborne contaminants and to help provide a satisfactory printer environment.

To ensure health and safety, the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) recommends in ASHRAE 62-1989

that the air makeup in the computer room contain at least 20 cubic feet per minute of outdoor air for each person.

- Handle labels carefully immediately after printing. They are hotter than paper because the heavier mass of paper, adhesive, and carrier of the label retains more heat than paper alone.

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## Acronyms and Abbreviations

This list explains the acronyms and abbreviations used in this manual, and in the other manuals that are part of the printer documentation library.

### Acronym Description

<b>ANSI</b>	American National Standards Institute.	<b>RIP</b>	Raster Image Processing.
<b>ATM</b>	Adobe Type Manager.	<b>RISC</b>	Reduced Instruction Set Computer.
<b>AUI</b>	Attachment Unit Interface.	<b>SCSI</b>	Small Computer System Interface.
<b>BPS</b>	Bits Per Spot.	<b>SWOP</b>	Specifications for Web Offset Publications
<b>BTU</b>	British Thermal Unit.	<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol.
<b>CE</b>	Customer Engineer (IBM).	<b>TLV</b>	Threshold Limit Value.
<b>CEE</b>	International Commission for Conformity Certification of Electrical Equipment.	<b>UV</b>	Ultraviolet light.
<b>CFM</b>	Cubic Feet per Minute.	<b>VDS</b>	Variable Data System.
<b>CMH</b>	Cubic Meters per Hour.		
<b>CMYK</b>	Cyan, Magenta, Yellow, and Black.		
<b>DASD</b>	Direct Access Storage Device (hard disk drive).		
<b>dB</b>	Decibel.		
<b>DIN</b>	Deutsches Institute fur Normung (German Institute for Standardization).		
<b>DRAM</b>	Dynamic Random Access Memory.		
<b>EPA</b>	Environmental Protection Agency.		
<b>EPS</b>	Encapsulated PostScript.		
<b>GB</b>	Gigabyte (1GB = 1 073 741 824 bytes).		
<b>GUI</b>	Graphical User Interface.		
<b>GSM</b>	Grams per Square Meter.		
<b>IEC</b>	International Electrotechnical Commission.		
<b>IPX</b>	Internet Packet Exchange.		
<b>ISO</b>	International Organization for Standardization.		
<b>KB</b>	Kilobyte (1KB = 1 024 bytes).		
<b>kVA</b>	Kilovolt Ampere.		
<b>LAN</b>	Local Area Network.		
<b>LED</b>	Light Emitting Diode.		
<b>MB</b>	Megabyte (1MB = 1 048 576 bytes).		
<b>NEMA</b>	National Electrical Manufacturers Association (USA).		
<b>PES</b>	Print Engine Supervisor.		
<b>PDL</b>	Page Description Language.		
<b>POD</b>	Print On Demand.		
<b>PRS</b>	Paper Supply.		





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# Glossary

The following terms are defined as they are used in 3170 Full Color Digital Printer/Press and InfoColor 70 documentation. If you do not find the term you need, refer to the index or to the *IBM Dictionary of Computing*, SC20-1699 or the *IBM Dictionary of Printing*, G544-3973.

## A

**A3-size paper.** Paper that is 297 x 420 mm (11.69 x 16.54 in.).

**A4-size paper.** Paper that is 210 x 297 mm (8.27 x 11.69 in.).

**Active Alarms.** A window that opens automatically to display alarms or warnings.

**active window.** A window in which you can perform actions. The title bar of an active window is highlighted.

**administrator logon.** The logon used only during limited sessions for configuration changes or system maintenance.

**Age Developer.** The value, displayed in equivalent A4 sheets, used to determine the age of the developer for each of the eight print units. This value displays in the Toner Concentration Setpoint window.

**alarm.** A message in red text in the Active Alarms window, which indicates a severe problem that must be solved immediately. An example is a paper jam.

**along-web registration.** The accurate alignment of the four-color separations of an image on top of each other in the direction of the paper movement (along the web).

**APIS (automated printer interface system).** The interface protocol used to exchange image data, commands, and status information between the RIP/operator interface platform and the print engine supervisor.

**archive diskettes.** Diskettes that contain data files specific to the upgrade level of the printer. These diskettes are provided by IBM.

**Automatic Control.** A setting in the Paper and Engine Conditioning window used to specify that tower conditioning be controlled automatically. Automatic is the recommended setting.

**Auto Print.** A setting used in the Print Sequence window to cause all jobs in the print queue to print

automatically without intervention by the operator, once the engine has reached Print Quality criteria.

**Auto save settings.** A Preference window checkbox used to have any settings changed in process control windows automatically saved.

**auxiliary (test) tray.** The upper tray on the output stacker. This tray is used for print tests and blank sheets.

## B

**background noise.** A dirty background caused by toner that has adhered to non-image areas of the printed job.

**backup diskettes.** (1) Diskettes shipped with the printer to provide a backup of the software in case the hard drive crashes. (2) Diskettes prepared by the operator to provide a backup of data-file settings that the operator has modified.

**backup roll pressure handle.** Handle used to loosen the pressure against the paper roll so a paper jam can be cleared.

**basis weight.** The weight in pounds of a ream (500 sheets) of paper cut to a given size for that grade; for example, 25 x 38 in. for book papers, 17 x 22 in. for bond papers, and other sizes for other grades. The basis weight of continuous forms for computer output is based on the size for bond papers.

**bearding.** The appearance of blown-off toner at the leading edge of an image.

**bias test patches.** CMYK patches on control strips that are used to measure and control lower densities.

**bitmap.** An image formed by a rectangular grid of pixels. Each pixel is assigned a value to denote its color and the density of color.

**black overprinting.** A page-setup parameter that causes 100% black to overprint the other colors.

**blank sheets.** The white sheets that always precede and follow a printed job.

**bleed.** Extra printed area that extends off the final page trim size. Bleed ensures that no white gap is at the edge of pages. Bleed is also used as a design technique.

**bps (bits per spot).** The number of bits with which each spot's gray level is described.

**brake system.** Keeps the paper web at a certain tension between the paper reel and the first web drive motor.

**Busy pausing engine state.** During this engine state, the print engine is pausing to wait for the Ok pushbutton to be clicked.

**Busy printing engine state.** During this engine state, the imaging process is taking place.

**Busy starting engine state.** During this engine state, the print engine is starting.

**Busy stopping engine state.** During this engine state, either the job has finished printing or the Halt pushbutton has been clicked.

**Busy warming up engine state.** During this engine state, the print engine is waiting for the fuser to warm to its required setpoint temperature.

**Busy waiting engine state.** During this engine state, the job has downloaded to bitmap and is waiting to be printed.

## C

**carrier.** Solid elements that carry and disperse the toner when it is used in a dry powder form.

**Change paper roll.** A step in the Mount Paper Roll window that the operator must select to start the procedure for changing a paper roll.

**cleaning station.** Removes excess toner particles from the drum and directs these particles to a toner waste bottle.

**CMYK (cyan magenta yellow black).** The four basic colors used in offset printing, as opposed to the three basic colors of light: red, green, and blue.

**Note:** Magenta, yellow, and cyan are thought of as the 'subtractive' primaries. Black is added to give better density and to produce a true black.

**Collate.** An edit function used from the Image Disk window to combine several resident jobs into one resident job, somewhat like a small book.

**color balance.** Relative levels of cyan, magenta, and yellow needed to produce a neutral or non-cast grey. Crucial for color scanning.

**color correction.** Adjustment of the balance of CMY channels in an image to produce accurate color rendition of an original image. Many color scanners,

particularly low-end desktop models, produce only average color balance and images from these units must be adjusted using an image editor such as PhotoShop.

**color registration.** The accurate alignment of the four color separations of an image on top of each other at each side of the paper.

**Compression.** A page-setup parameter used to specify that the raster image of a RIPed job be compressed.

**condensation water reservoirs.** The two containers, located in the fixed tower, that are used to collect condensation water.

**Conditioned engine state.** During this engine state, the print tower conditioning is turned on and the paper conditioning and fusing systems are turned off. The engine is idle and no printing is taking place.

**conditioning circuit.** A circuit that controls the temperature and humidity of the air in the print tower to ensure stable print quality and to filter ozone and dust.

**console switch.** The switch used to turn on the printer's two control computers.

**control strip.** (1) A strip of information that can be attached to a print job and be used to measure registration and density. (2) A page-setup parameter used to specify the name of the control strip to be appended to a print job. (3) A Properties window Imaging field used to view a list of all resident control strips and to select a control strip to add to a job or to override the control strip specified in the Page Setup window.

**Cooling.** When highlighted in the Paper and Engine Conditioning window, indicates either the air temperature and/or the relative humidity in the print tower is higher than its setpoint and the air is being cooled.

**cooling unit.** A closed-loop refrigeration unit, physically separated from the print tower, that provides cooled water for the conditioning systems in the printer.

**Copy count.** (1) A page-setup parameter used to specify the number of copies to be printed of each signature of a job. (2) A Properties window Imaging setting used to override the number of copies specified in the Page Setup window.

**corona.** (1) The effect of ionizing air with a high voltage, creating a charge that can be used to perform various functions during printing or copying. (2) In printers, a small diameter wire (or wires, depending on the function) to which a high voltage is applied, causing ionization of the air. The ionization creates an electrical

charge to perform various functions during the printing process.

**corona wire.** A wire with high voltage that emits charged particles.

**Corona current.** A paper-conditioning parameter that displays the current of the first transfer corona. This current is adjusted automatically.

**Counters.** A window used to monitor the number of printed, wasted, and total sheets of paper. Do not use the values in this window to determine the age of the developer. See Age Developer.

**crop.** To remove unwanted areas of an image, usually indicated by crop marks on the original.

**cross-web registration.** The accurate alignment of the four-color separations of an image on top of each other in the cross direction of the paper movement (across the web).

**Cut Sheets.** A Properties window Finishing setting used to specify whether the sheets of a printed job will be cut or not cut.

**cutter.** Cuts the paper perpendicular to the paper movement before the paper leaves the print tower.

## D

**Data depth.** (1) A page-setup parameter used to specify the number of bits with which each spot's gray level is described. 4 bps (bits per spot) means a spot can have 16 levels of gray. Gray levels determine the density of color printed (C,M,Y or K). (2) A Properties window Imaging setting used to override the data depth specified in the Page Setup window.

**day conditioning.** The electronic control of temperature, relative humidity, and air filtering in the print tower during the day.

**DCS.** Desktop color separation file.

**default.ini file.** A file included with the printer software that contains default page-setup-parameter values.

**Delete.** A function in the Image Disk, Queue Manager, and Image Memory windows used to delete a resident job from the lists of jobs in these windows.

**densitometer.** An instrument used for measuring color saturation on a printed page.

**Density Control.** The window used to monitor and sometimes adjust the parameters that affect the density of the printed image.

**density test patches.** CMYK patches on control strips that are used to measure and control the higher densities.

**developer.** A mixture of toner and carrier particles.

**developer unit.** Develops the image by depositing toner particles on the drum.

**digital printing.** Filmless and plateless printing process wherein digital data for each page is transferred directly to a light sensitive drum and then, via various methods, to paper for a final image.

**DIS/RIP switch.** The switch used to switch back and forth between the PES platform and the RIP platform.

**Dmax.** The density printed when the test patch has 100% dot screen.

**dot gain.** Increase in the size of a halftone dot during printing caused by ink spreading. Generally, this value is known to a fair precision and the scanning/film production process is calibrated to compensate for it. The Cromalin proofing system simulates this effect by overexposing slightly to increase dot percentage values an amount equal to the press dot gain percentage.

**downloading.** The first step in the printing process. The selected print job is downloaded to bitmaps.

**dpi (dots per inch).** Also known as pels, and sometimes referred to as spots per inch. A measure of data density per unit distance. Typical values for desktop publishing range from 200 to 300 dpi. The 3170 Full Color Digital Printer/Press and InfoColor 70 print at 600 dpi.

**driftmargin.** The signature is positioned too far to the right or left on the paper.

**drum.** A grounded aluminum core covered with a layer of photoconductor.

**drum refurbishing.** A process used to remove fused-on toner from a drum. Fused-on toner is toner that was not removed by the cleaning station.

**dryc\_0 script file.** A script file that is run to remove paper from the heated roll to prevent paper scorching when the paper is manually pulled through the print tower.

**dryc\_1 script file.** A script file that is run to enable paper contact with the heated roll.

**DTP (desk top publishing).** Generic term for printing-related activities on PC platforms; includes, but is not limited to layout and design, photo manipulation, font creation/editing, color separation, scanning, and animation.

## E

**emergency stop.** Stops the print engine immediately when a serious error occurs. The print engine can be stopped manually by pushing down a red emergency button or clicking the emergency stop button.

**emergency stop button.** The stop-sign button located at the top right of the monitor screen. Click this button to stop the print engine during an emergency.

**Engine State.** A window used to monitor the status of the print engine at any one time. The print engine has eleven possible engine states.

**EPS (encapsulated PostScript).** Digital format for storing scanned images. A file format that the printer accepts for print jobs.

**Executable.** A Preferences window field that shows the path to the file that executes the RIP.

## F

**Face Down.** (1) A page-setup parameter used to reverse the front and back pages in duplex jobs or to print simplex jobs on the back side of the paper. (2) A Properties window Finishing setting used to override the Face Down setting specified in the Page Setup window.

**FastRIP window.** A window that opens automatically to show the progress of the interpretation and rendering phases of the RIPing process.

**File Manager.** A window used to view files and directories, move and copy files, manage disks, and so on.

**Finishing.** A Properties window option used to look at and change finishing settings, such as the output bin.

**fixed horizontal bar.** A bar on the output stacker that can be adjusted to allow the stacker to accommodate different sheet lengths.

**fixed tower.** The area of the tower where the toner is fused to the paper to produce the final image. The fixed tower is located at the end near the output stacker.

**FIX T element measured.** A fusing system parameter that displays the actual measured temperature of the fuser elements.

**FIX T element setpoint.** The value to which the temperature of the fuser elements has to be adjusted.

**FIX T paper measured.** A fusing-system parameter that displays the actual measured temperature of the paper coming out of the fuser.

**FIX T paper setpoint.** The value to which the temperature of the paper coming out of the fuser has to be adjusted. For all IBM tested papers, this value is 140.C.

**Forms.** An Image Disk properties option used to look at the forms (pages) that make up a selected resident job.

**FOT (fused on toner).** Toner left on the drum that has not been transferred to the paper.

**front-to-back registration.** The alignment of the signature position for front and back.

**fuser.** The non-contact element that affixes the eight toner layers to the paper.

**fusing control system.** A system that controls the temperature of the fuser element and the temperature of the paper coming out of the fuser.

## G

**gate.** The metal door located in front of the electronic panel in each print tower.

**GCR (grey component replacement).** Equivalent to UCR (under color removal).

**GB.** Gigabyte or 1 073 741 824 bytes (1 000 MB) of data.

## H

**halftone.** Printing method that simulates continuous-tone shading using dots of varying sizes laid out on a regular grid. Larger dots simulate darker tones and vice versa. Typical grid spacings are: 85 lpi newspaper, 133 lpi low end, 150 lpi midrange, 175 lpi+ high quality. LPI = lines (halftone dots) per inch.

**Halt.** A Print Sequence pushbutton used to stop printing when a problem that is not an emergency occurs.

**hand truck.** Device used to either mount the paper roll in the paper supply or remove the roll from the paper supply.

**HCP (Host Control Panel).** A window used primarily by the service representative to manage processes through the use of commands.

**heated roll.** The roll in the paper supply that dries the paper to a certain moisture content.

**Heating.** When highlighted in the Paper and Engine Conditioning window, indicates the air temperature in the print tower is below its setpoint and is being heated.

**high-coverage job.** A job in which the page has greater than 30% coverage.

**High Priority.** A Properties window Imaging setting used to control the printing sequence of jobs in the print queue.

**Hold Printing.** A Properties window Imaging setting used to put a print job on hold so the next job in the queue can print first.

**Humidifier.** (1) An engine-conditioning parameter that displays the duty cycle of the humidifier. (2) Part of the tower-conditioning system that adds humidity to the air in the print tower. The humidifier is located in the Y tower.

**Humidifying.** When highlighted in the Paper and Engine Conditioning window, indicates the relative humidity is below its setpoint.

## I

**ICS (imaging control system).** A system that controls the eight LED writing heads.

**Image Disk.** The window used to manage job setup, RIPping, and printing. This window displays a list of resident jobs on the printer.

**Image Memory.** The window that lists jobs that have been completely downloaded to image memory, ready to print. Displays the amount of image memory still available.

**Imaging.** A Properties window option used to change image settings, such as copy count and data depth.

**imposition.** The process of arranging pages on a press sheet to ensure proper order during final cutting/folding/binding. Electronic imposition builds press sheets automatically in the RIP and outputs film formatted for immediate use in platemaking. Electronic imposition is very machine-intensive and is used only when maximum speed and throughput are required. Also changes required rerunning an entire press sheet

**INC (instrumentation control system).** A system that controls the operation of all the electromechanical and electronic modules in the print engine.

**ini file.** A file in which page setup settings are stored.

**Initialized engine state.** During this engine state, the microcontrollers are being initialized prior to power-on state.

**Insert Separator.** A pushbutton you can use in the Print Sequence window to cause a separator strip to be inserted between each print job.

**interpretation and rendering.** The two phases of RIPping a job.

## J

**Job type.** A page-setup parameter used to specify whether a job is a master, variable data file (VDF), or test job.

## K

**KB.** Kilobyte or 1 024 bytes of data.

## L

**Layout.** A Properties window option used to specify the sheet and signature layout settings for a job.

**LDA (light emitting diode array).** The imaging device for the electrophotographic print units.

**LED (light emitting diode).** The imaging device element for the electrophotographic print units.

**Load paper settings.** A step in the Mount Paper Roll window that highlights after a new paper roll is mounted and the Done pushbutton is clicked. When the Done pushbutton is clicked again, the Run Script window opens, where the correct setting for the newly mounted paper roll can be specified.

**log file.** A file in which operational errors and messages are automatically stored. These messages can help a service representative debug problems.

**loupe.** A small magnifier used to check printed documents for correct registration.

**lpi (lines per inch).** In computer graphics some screening algorithms use equally spaced lines to print images. This is the line spacing used.

## M

**main-charge scorotron.** A type of corona that contains a grid. Charges the surface of the drum to a negative uniform potential. Each print unit has a main-charge scorotron.

**main power.** The power that runs the printer when the switch, located in the fixed tower, is turned to the ON position.

**main (stacker) tray.** The lower tray on the output stacker. This tray is used for stacking print jobs.

**main switch.** The switch, located in the fixed tower, that is used to turn on the printer.

**Make Duplex.** An edit function used from the Image Disk window to combine two simplex jobs or selected pages of two duplex jobs into a new duplex job.

**Manual Control.** A setting in the Paper and Engine Conditioning window used to specify that tower conditioning be controlled manually by the operator. Automatic control, rather than manual control, is the recommended setting.

**MSDS (Material Safety Data Sheet).** International standards describing how to handle and dispose of chemical substances.

**MB.** Megabyte or 1 048 576 bytes (1 000 KB) of data.

**menu bar.** Contains several menu items used to access the functions needed to operate the printer.

**Mount Paper Roll window.** The window used to progress through the steps to change a roll of paper.

## N

**night conditioning.** The electronic control of the temperature in the print tower during the night or during idle time. Relative humidity is not controlled during night conditioning.

## O

**Open at startup.** A Preferences window selection that opens the APIS connection with the PES automatically when the operator interface is started.

**organic photoconductor.** The light sensitive coating that holds the latent image drawn by the LED array; essentially the 'emulsion' of the printing plate.

**Orientation.** A page-setup parameter used to rotate output. Output can be rotated 0, 90, 180, or 270 degrees. The pages rotate counterclockwise relative to their orientation when the job was created.

**Output bin.** (1) A page-setup parameter used to specify the output stacker destination tray. (2) A Properties window Finishing setting used to override the output bin specified in the Page Setup window. (3) The tray of the output stacker to which jobs are sent.

## P

**page-setup parameters.** Parameters, such as page size, that describe a job for output to the printer. These parameters are specified in the Page Setup window.

**Page size.** A page-setup parameter that specifies the signature size to use when the pages of a job are RIPed.

**Paper and Engine Conditioning.** The window used to monitor and adjust parameters that affect paper conditioning, tower conditioning, and the fusing system.

**paper conditioning system.** Part of the Paper Supply that uses a heated roll and a cooling unit to dry the paper to a certain moisture content.

**paper cooling circuit.** A circuit located in the paper supply that first dries the paper with a heated roll and then blows air on the paper to lower its temperature.

**paper cooling unit.** Blows cooled air on the paper as the paper leaves the fuser.

**paper roll.** See web.

**paper roll axle.** The device inserted through the core of a paper roll to support the paper roll in the printer. A paper roll axle can be adjusted to support six different paper widths.

**paper setting.** A setting the operator changes when a different type of paper is loaded. Paper settings are changed by running script files.

**paper supply.** Holds the paper roll, maintains web tension, heats the paper, and checks paper moisture content. Splicing of paper rolls occurs here.

**paper-supply alignment.** Moving the paper supply perpendicular to the web movement to correct the alignment of the paper supply to the print tower.

**PDF (printer description file).** Defined by Quark for use only with Quark Xpress. This file contains information, such as page size, that is specific for a given output device.

**Performance Monitor.** A window used to monitor CPU usage and memory used during the RIPing process.

**PES (print engine supervisor) platform.** One of two platforms in the printer controller module. This platform controls the operation of the print engine.

**pixel.** (1) Picture element. (2) In architecture, the smallest printable or displayable unit on a physical medium. In computer graphics, the smallest element of

a physical medium that can be independently assigned color and intensity. Picture elements per inch is often used as a measurement of presentation granularity. Synonymous with pel, picture element.

**Position.** A page-setup parameter used to specify the position of the job on the physical sheet of paper.

**positioning blocks.** Blocks located on the back of the output stacked that are used to correctly place the stacker against the bearings located on the cutter unit.

**PostScript.** Adobe's page-description language that has become a standard for graphic design and layout software. PostScript files can contain both vector and raster data. Fonts are described using PostScript coding. Many desktop publishing systems output PostScript.

**Power-off engine state.** During this engine state, the main power to the print engine is turned off.

**Power-on engine state.** During this engine state, the main power of the print engine is turned on and the temperature and humidity in the print tower are adjusted to their setpoints.

**PPD (PostScript printer description file).** Defined by Adobe to streamline the process of generating PostScript. This file contains information, such as page size, that is specific for a given output device.

**pre-charge scorotron.** Preconditions the surface of the drum and any remaining toner particles for cleaning.

**Preferences.** A window used to change some of the printer default settings, such as saving your workspace.

**print engine supervisor (PES).** A unit that controls the operation of the print engine.

**print queue.** The queue that contains Ripped jobs that are ready to print. The printing of jobs from the queue is on a first-in, first-out basis.

**Print Sequence.** A window that opens automatically to let you observe the progress of printing a job and to perform other tasks, such as halting a print job.

**print tower.** The module of the printer that contains the drums, coronas, dosing and developing units. Toner deposition occurs here. Conditioning controls this area. Paper exits this area and enters the fixed tower.

**print unit.** One of four units in each print tower that prints one of the four CMYK process colors.

**print unit drives.** The electric motors that drive the clean station, developer unit, and toner dosing unit.

**process color.** Made up of CMYK inks simulating a specified color. Accepted traditional method for reproducing continuous-tone color images (color separations). Due to the nature of color inks, certain Pantone spot colors will not reproduce well.

**Progress.** An option in the Queue Manager Properties window used to view the progress of a queued job.

**Properties.** A selection used from either the Image Disk, Queue Manager, or Image Memory window to change the layout, imaging, or finishing properties of a job. When selected from Image Disk, you can also display the forms that make up a job. When selected from Queue Manager, you can monitor the progress of a queued job.

**PRS T.** A paper-conditioning parameter that displays the measured standby temperature of the pre-heating roll. The setpoint depends on the type of paper loaded in the printer.

**pushbuttons.** Buttons located in most operator-interface windows that, when clicked, either perform actions or provide access to additional functions.

**PRS U1.** A paper-conditioning parameter that displays the potential measured by the first charge meter. The setpoint must be 500V.

**PRS U2.** A paper-conditioning parameter that displays the potential measured by the second charge meter. A setpoint based on the specific paper humidity that will result in the best print quality has been established for each type of certified paper.

## Q

**Queue Manager.** A window that lets you view and manage all jobs currently in the print queue. As soon as a job prints, it disappears from the list of jobs in the queue.

**Quit PES at exit.** A Preferences window checkbox used to have the PES quit automatically when you quit the operator interface.

## R

**raster.** A pattern of dots comprised of varying data depths. Images with only black and white values are 1 bit (on/off), while greyscale images are 8 bit (256 levels). RGB images are 24 bit (three channels, 8 bits each). CMYK images are 32 bit (four channels.) Raster images are also called bitmapped images.

**raster image processor (RIP).** Converts the job from PostScript into high resolution (600 dpi) bitmaps to be

fed to the LED arrays. Images are screened and converted to halftone data here.

**Refill Toner Containers window.** The window used to progress through the steps for refilling the toner containers.

**refurbish drums.** (1) A process used to remove fused-on toner from a drum. Fused-on toner is toner that was not removed by the cleaning station. (2) The window used to step through the procedure for refurbishing the drums.

**Register Control.** The window used to adjust registration.

**registration.** (1) The accuracy of printing on paper relative to the edges of the paper. (2) the accuracy of printing a single color (cyan, magenta or yellow), relative to black. (3) The accuracy of printing on one side of a page relative to printing on the reverse side of the same page.

**relative humidity measured.** The actual measured relative humidity of the print tower.

**relative humidity setpoint.** The value to which the relative humidity in the print tower should be adjusted.

**Rename.** A function in the Image Disk, Queue Manager, and Image Memory windows used to change the name of a listed resident job.

**resident.** (1) A job that has been RIPed, but not printed. These jobs reside on the spooling disk for printing at a later time. (2) A page-setup parameter used to specify that a job is to be stored on the spooling disk after printing.

**RIPing.** The process of converting PostScript jobs into images that can be printed on the printer.

**RIP platform.** One of two platforms in the controller module of the printer. This platform runs the RIP and the operator interface.

**RIP (raster image processor).** Computer processor that renders PostScript instructions into dot patterns that are transferred to the final print medium. Most RIPs use RISC (reduced instruction set) processors to achieve extremely high throughput.

**Run paper-conditioning state.** The print engine is printing, which means the paper humidity is okay.

**RunID.** A unique number between 0 and 655535 assigned to each job in the print queue.

**Run Script.** A window used to activate script files. The operator uses script files to prevent paper

scorching, specify type of paper, and align the paper supply to the print tower.

## S

**Save workspace.** A Preferences window checkbox used to save the position of open windows in the workspace.

**scripts.** Files that contain predefined control sequences used by the instrumentation system. The operator will use some of these files for specific tasks.

**Separations.** A Properties window setting used to separate a printed image into the four CMYK colors.

**separation strip.** (1) A strip that can be inserted between two print jobs to separate them. (2) A Properties window Finishing setting used to cause separator strips to be inserted between jobs.

**sequential-action functions.** Operator-interface functions that involve a sequence of actions that are performed partly by the operator and partly by the interface. Mount Paper Roll, Refurbish Drums, and Refill Toner Containers are examples.

**service intervention.** (1) A function that allows you to open the print tower doors to do maintenance and solve problems without turning off the main power to the printer. (2) The window used to perform service-intervention steps.

**service key.** The key that must be inserted and turned clockwise before service intervention is used.

**setpoint-adjustment processes.** Processes that include parameters to monitor and setpoints to adjust to control or to optimize print quality. Density Control and Web Tension are examples of setpoint-adjustment processes.

**Sheet size.** A page-setup parameter that defines the size of the physical sheet on which the job will be printed.

**Sheffield unit.** The Sheffield unit is a measure of the smoothness of the surface of the paper. The smaller the Sheffield value, the smoother the paper.

**side jog bar.** A bar on the output stacker that can be adjusted to the width of the paper being used.

**signature.** Group of pages that will print, fold, cut and bind together. Placement of pages on the signature is determined using a folding dummy.

**signature position.** The position of the image with respect to the edge of the paper and the leading cut.



**Size.** A Properties window Imaging field that shows the compressed size of the selected resident job.

**skew.** In printers, the position of paper going through the paper path at a slight angle. Skew is a measure of how well printed lines are aligned to the edges of the paper.

**slip sheet inserter.** A device located in the back of the output stacker that contains the slip sheets used to separate print jobs in the output stacker tray.

**spindle.** A paper mounting axle or auger in the toner dosing unit.

**splicing.** Attaching the leading edge of a new paper roll to the trailing edge of the old paper roll.

**splicing tape.** The adhesive-backed tape used to splice (attach) a new paper roll to the old paper roll.

**Split.** An edit function used from the Image Disk window to either split a duplex job into two simplex jobs, or to split a collated job into uncollated jobs.

**spooling disk.** A disk array on which RIPed jobs can be temporarily stored until the bitmaps are available for printing. This disk is also used to store RIPed jobs for printing at a later time.

**spot color.** Made up of individual colored inks formulated to exactly match a specified color. Used when CMYK process color is unable to produce a reasonable facsimile of the color or when very vivid color is needed. Also used when fluorescent or metallic colors are used.

**Stacker Off Line.** A setting used in the Print Sequence window to put the output stacker offline so the keypad on the stacker can be used for manual control.

**standard test page.** A PostScript file that is printed to check overall print quality on both the X and the Y side of the page. The test-page file is provided with the printer software.

**Standby engine state.** During this engine state, the paper conditioning and fusing systems are turned on and the print engine is ready to print.

**Start paper-conditioning state.** The required setpoints for the first and second charge meters have been reached, and you can proceed with printing.

**Start web drive.** The step highlighted in the Mount Paper Roll window after the correct paper setting has been specified for the new paper roll.

**status bar.** The area at the bottom of the monitor screen that provides informational items.

**Stop paper-conditioning state.** The job has printed, and the temperature of the heated roll is saved automatically to be used as the setpoint temperature for the next print job.

**Surface Potential.** A window used to determine whether each print station is at its optimum potential for printing, which is approximately -630v.

## T

**TC measured.** A density-control parameter that displays the actual measured toner concentration (TC).

**TC d setpoint.** A density-control parameter used to manually adjust the toner concentration (TC) setpoint of toner in the developer mix.

**TC setpoint.** A density-control value to which the actual toner concentration (TC) has to be adjusted.

**TED (transfer erase duplex).** The assembly that holds the transfer, erase and duplex corona wires.

**temperature control system.** A system that regulates the temperature inside the print tower to 30°C when the print engine is turned off.

**temperature measured.** The actual measured temperature of the print tower.

**temperature setpoint.** The target value to which the temperature inside the print tower is being controlled.

**tested papers.** Papers that have been tested and approved by IBM for use in the printer.

**Test frequency.** A Properties window Imaging setting used to specify how often a test sheet should be printed during the printing of one or more jobs in the print queue.

**test (stacker) tray.** The top tray on the output stacker. This tray is used for test sheets and for blank sheets generated during the printing process.

**test sheet.** A single sheet inserted at specified intervals to check overall print quality during the uninterrupted printing of one or several jobs.

**TIFF (tagged image file format).** Digital format for storing scanned images. Also referred to as raster format, as opposed to vector format. TIFF files, when used in DTP work, place only a low-resolution FPO image; the high-resolution data remains on the hard drive.

**Toner Concentration Setpoint window.** The window used to monitor the age of the developer.

**Toner Containers window.** Window used to monitor the level of toner in each toner container and the level of toner waste in the toner waste bottles.

**toner dosing system.** A system that automatically adds toner back to the development unit.

**toner waste.** Toner that is removed from a drum by the cleaning station and deposited in a toner waste bottle.

**toner waste bottle.** Collector for toner that is automatically removed from the drum.

**tool bar.** Contains icons you can click on to quickly access the most frequently used operator interface functions.

**top roller.** Roller located at the top of the fixed tower. Directs the paper toward the fuser.

**tower-conditioning system.** The automatic conditioning of the relative humidity and temperature of the air in the print tower to enhance print quality.

**transfer corona.** Wire that imparts charge to paper to cause toner to move from the OPC drum surface to paper surface.

**transfer test patches.** Two patches each of CMYK on control strips that are used to measure and control transfer efficiency (saturation).

**Transient paper-conditioning state.** The paper is being wound around the heated roll, and the power of the heating lamp is reduced to keep the temperature stable.

**trapping.** The amount an overprinting color overlaps to prevent white paper showing through gaps caused by normal misregistration. On sheet-fed presses this is typically 0.25pt.

**Trial Print.** A Properties window Imaging setting used to fine tune and adjust print quality from a trial print before the entire job is printed.

**tumble.** A page-setup parameter used to rotate the back page 180°. Rotation is cumulative with any rotation specified for orientation.

**TWR RH measured.** The actual measured relative humidity inside the print tower. The minimum can be 25%, and the maximum can be 37%.

**TWR RH setpoint.** The target value to which the relative humidity in the print tower is being controlled. The typical setpoint is 32%.

**TWR T measured.** The actual measured temperature in the print tower. The minimum temperature can be 25°C.

**TWR T setpoint.** The target value to which the temperature in the print tower is being controlled. This value is 27–30°C.

## U

**UCR (under color removal).** Conversion of neutral color areas into black ink. Reduces the use of CMY inks, improves trapping, and reduces setup time. Generally, UCR is performed during image scanning, but some RIPs perform UCR during processing. Also known as GCR.

## W

**Warmup paper-conditioning state.** Pre-heating is on and the engine is in Standby state. When the temperature of the heated roll is at its required setpoint, the paper web can be started.

**warning.** A message in black text in the Active Alarms window, which indicates a situation that could eventually cause a problem. An example is a full toner waste bottle.

**water-cooling circuit.** A circuit that keeps the writing heads at a constant temperature to ensure stable performance.

**web.** Roll of paper used in web or rotary printing.

**web-direction markers.** Markers located on a control strip to show the moving direction of the paper web.

**web-drive speed roll.** A roll at the bottom of the Y tower.

**web-drive torque roll.** A roll in the fixed tower below the fuser cooling unit.

**web tension.** (1) The tension of the paper web between the brake system and the speed motor and between the speed motor and the torque motor. (2) The window used to monitor web tension and to adjust the torque of the torque motor.

**workspace.** The area of the monitor's operator interface screen in which you will work in various windows to perform tasks.

**writing-head cleaning tool.** A felt-tipped edge tool used to clean the lens of the writing heads.

## X

**X tower.** The area of the print tower that contains the four print stations for printing the X (front) side of a page. The X tower is located at the end near the paper supply. The side printed by the X tower is face up exiting the printer.

**xerography.** Dry printing process using corona-charged photoconductive surfaces to hold latent images that are developed with a dry toner, which is then transferred to paper and fused with heat.

## Y

**Y tower.** The area of the print tower that contains the four print stations for printing the Y (back) side of a page. The Y tower is located between the X tower and the fixed tower. The side printed by the Y tower is face down exiting the printer.

## Numerics

**3170.** The machine type of the IBM InfoColor 70 and its predecessor, the IBM 3170 Full Color Digital Printer/Press.



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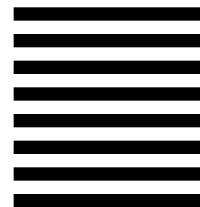
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